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DOCTOR OF PHILOSOPHY

Does constructed development exist as a conceptual measure of self-awareness in the moment?

Stevens, Darren

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Does Constructed Development Exist as a Conceptual Measure of Self-Awareness in the moment?

By

Darren John Stevens

Ph.D.

January 2020



Does Constructed Development Exist as a Conceptual Measure of Self-Awareness in the moment?

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Darren John Stevens

January 2020



A thesis submitted in partial fulfilment of the University's requirements for the Degree of Doctor of Philosophy

Candidate's Declaration Form

Content removed on data protection grounds



Certificate of Ethical Approval

PROJECT 1

Applicant:

Darren Stevens

Project Title:

A mixed-methods study using two self-report online questionnaires to determine a participant's perceived level of self-awareness of certain cognitive intentions

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

20 December 2018

Project Reference Number:

P75986



Certificate of Ethical Approval

PROJECT 1

Applicant:

Darren Stevens

Project Title:

A qualitative semi-structured interview process to discover a participant's level of selfawareness as determined by their participation in P75986.

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

18 April 2019

Project Reference Number:

P88931

Abstract

In general, individuals are not aware of how they construct their thinking and the unconscious intentions behind this construction that leads to a cognitive and behavioural response in the moment. Essentially, they lack the metacognitive capacity to think about their thinking from a developmental perspective. Joiner and Josephs (2007) stated that self-awareness and intention were the mechanisms that made growth between developmental stages possible. This dissertation provides an original contribution to knowledge regarding the use of cognitive heuristics to facilitate cognitive growth, not previously seen in the literature. The primary aim of this study was to investigate the extant literature on stage development psychology, metacognition, thinking and intelligence to determine if any gaps exist from the perspective of intention, awareness, choice and response which together lead to an habituated thinking style. A further aim that emerged was to discover if a new measure of selfawareness was possible using thinking shortcuts defined in the literature review as metacognitive strategies. These were then tested across 5 separate but inter-dependent studies. The Methodology chapter highlighted certain aspects of existing profile tools that omit the underlying intention and awareness of the facets being described. Study 1 investigated the potential to use a specific methodology, including the use of Meta-Programmes via the Identity Compass profile tool to deconstruct post-graduate students' thinking in context. Study 2 used this methodology to investigate the thinking of 177 postgraduate students to discover if there were patterns of Meta-Programmes that were common to all participants, which would then identify particular 'Thinking Styles'. Further to this, to determine if a benchmark tool could be created to normalise the Identity Compass profile output. Also in study 2, Meta-Programmes were reframed as Cognitive Intentions by virtue of the additional inherent factors of Intention and Awareness. Study 3 utilised a large dataset initially as a control group to either reinforce or repudiate the artefactual findings of studies 1

and 2. The findings of study 3 were significant and supported the concepts of Thinking Styles based on different combinations of Cognitive Intentions. It also supported the creation of a benchmark tool called the Thinking Quotient, and the use of the term 'Dynamic Intelligence', a combination of Intention, Awareness, Choice and Response, as the process on which Constructed Development Theory (CDT) is based. Study 4 investigated these theoretical four pillars of CDT via a self-report questionnaire that compared the self-report scores to the Identity Compass scores of the same 13 Cognitive Intentions to determine if awareness was present. The results showed individuals were developmentally limited. Finally, study 5 aimed to validate the four quantitative studies with a qualitative study to ascertain the lived experiences of the ten interviewees from a Constructed Development perspective. The themes that emerged from the interviews demonstrated that the interviewees both consciously and unconsciously utilised Thinking Styles as a function of their self-awareness from a Constructed Development Theory perspective.

In summary, this thesis concludes its key findings with a major new contribution to psychology: *metacognition for adults*. This comprises of Constructed Development Theory; the process of Dynamic Intelligence that determines one's Thinking Style; the use of the Thinking Quotient tool as a new measure of self-awareness; the move away from stage development to a more holistic approach to cognitive growth; the bridging of constructivism and constructionism; the alignment of unconscious heuristic use to Piaget's disequilibrium principle (1978); and finally, the use of CDT as a therapy intervention.

Overall, the findings of this thesis demonstrate that a gap exists in adult developmental psychology that can be filled by Constructed Development Theory by understanding the four pillars of CDT: Intention, Awareness, Choice and Response.

Keywords: cognition, cognitive, complexity, dynamic, intelligence, intention, awareness, stage development, metacognition, choice, response.

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I have also been very fortunate with the numbers of participants who offered their input via various questionnaires or interviews. Without their honest and open conversations about their lived experiences, my thesis would be far less substantial.

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This PhD is dedicated to my wife, Tabatha.

Darren Stevens, January 2020

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List of Abbreviations

- APA American Psychological Association
- BPS British Psychological Association
- CDT Constructed Development Theory
- CI Cognitive Intention
- DI Dynamic Intelligence
- EI Emotional Intelligence
- DTF Dialectical Thought Form
- IC Identity Compass
- SCT Sentence Completion Test
- TQ Thinking Quotient
- TQ2; TQ3; TQ4; TQ5 Respective Stage of the Thinking Quotient scale (Kegan alignment)
- ZPD Zone of Proximal Development
- ZDD Zone of Dynamic Development

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Foreword

Introduction

This research aims to evaluate what unites and separates the literature on adult stage development, intelligence and cognition. It sets out to discover if the transition between developmental stages can be deconstructed using fifty 'Cognitive Intentions' (CI) to determine a person's 'Intention', 'Awareness', 'Choice' and 'Response' in the moment, and in so doing, create a new approach to adult development, called 'Constructed Development Theory'. Furthermore, it aims to question the existence of developmental stages as the process for growth and asks if a holarchical approach is more appropriate to an individual's cognitive development. The main aims of the research are to determine initially, a postgraduate student's intention in the moment; their level of awareness of this intention; their construction of self in an academic context using 50 Cognitive Intentions; their ability and capacity to change this construction in the moment, and the strategies for a choice of response this creates. In order to achieve this, Cognitive Intentions were removed from their original arena, renamed and reframed and aligned with schemata (Piaget, 1971; Rumelhart and Norman, 1983; McAdams and Pals 2007), giving them a psychological foundation not previously seen in the literature. This will directly impact the teaching of Cognitive Intentions going forward, thus expanding their future use and influence. In order to achieve the main aims, the research has five key objectives:

- 1. To provide a review of the literature on adult stage development, awareness and cognition in order to elicit the main theoretical principles underpinning each;
- 2. To provide an assessment of factors identified by these main theories in the literature as having an influence on development, awareness, cognition and behaviour;
- 3. To identify the gaps in the theories that emerge from the literature that allow for the development of a new theoretical framework, leading to a new conceptual framework in the theory: Constructed Development;
- 4. To test the theory of Constructed Development using an experimental design that quantitatively measures a person's level of awareness of construction of self in the moment that contributes to their choice of response;

5. To test the lived experiences of the profile participants using qualitative methods to support the quantitative studies that precede it.

Thinking and intelligence exist as a duality in psychology and are treated as separate but inseparable concepts. They work in a dynamic relationship with each other, influencing each other in a mutual and reciprocal way (de Visch, 2014). Since Socrates, Aristotle and Plato, the human capacity for thinking has been deliberated (Georghiades, 2004), moving through the centuries to culminate in Descartes' (1637) summary: *cogito ergo sum*. How did Descartes know he knew he could think, and what measure did he place on his intention to think, as well as his awareness of his thinking? This was achieved by understanding 'doubt'. By virtue of the fact that we can doubt our existence, we must exist. By 'thought', Descartes meant anything 'marked by awareness or consciousness' (principle I9). It is these cognitive acts of believing, doubting, thinking or sensing that supports the hypothesis that one exists, because one cannot do these things without existing. Descartes' intention was to prove we think and exist. It will be argued throughout this literature review that a more appropriate phrase could be: *cogitandi mea intentio est, ergo sum* ('my thinking has intention, therefore I am').

There are a number of models that specifically examine cognitive and emotional complexity (e.g. Kegan, 1994; Laske, 2008; Cook-Greuter, 2013; Eigel & Kuhnert, 2016), thus a constructivist approach informs the conceptualisation of the new theory of Constructed Development. This, in turn, allows the exploration of a link between Intention, Awareness, Choice and Response as the foundation for one's Dynamic Intelligence.

Further to this, this study aims to investigate the extant literature for philosophies surrounding the measures of intelligences (e.g. Spearman,1927) and complexity in thinking (Kegan, &Lahey, 1994; Laske, 2008) based on metacognition and stage development (Commons, 1984), initially in a post-graduate student population. Whilst social-emotional and cognitive complexity have been widely identified in the research (Travis 2003; Boal &

Hooijberg 2000) there is a major gap in the literature with regard to the concept of selfawareness from a position of Intention and Choice. Laske (2008) and Kegan (1994) both address cognitive and social-emotional complexity, however they only describe the thinking and behaving of actors at the various levels of their respective scales. This thesis aims to expose the gap within their systems by offering a 'thing' to change in order for an individual to progress up their ladders of cognitive and social-emotional development.

It is important that this gap is addressed as self-awareness is overlooked as a factor of vertical development within the literature. By aligning self-awareness from the perspective of cognitive heuristics with cognitive complexity, this thesis makes a unique and potentially disruptive contribution to the fields of stage development and metacognition.

As psychology has moved towards a more hypothetico-deductive model, where the outcome of a falsifiable hypothesis is investigated and observed, and where the outcome is unknown, the introspective elements of anecdotal psychology have been discarded (Spector, Rogelberg, Ryan, Schmitt, & Zedeck, 2014). See Figure F.1.



Figure F.1: Hypothetico-Deductive Model

With so many theorists having an influence on the psychology of adult developmental stages, it would be appropriate to demonstrate the theorists and their theories from a comparative perspective. See Table F.1 for a comparison of stage development theories.

Stage	Hy & Loevinger 1996	Cook-Greuter 1999	Rooke & Torbert 2005	Joiner & Josephs 2007	Kegan (1982, 1994); Kegan & Lahey (2009)	Fischer	Laske (2008)	Stevens, 2020 Constructed Development Theory
ventional	Impulsive E2	Impulsive	Impulsive (2)	Enthusiast	Self-sovereign mind (2nd order of consciousness)		Instrumental 2.0	Unaware 5.0
Precon	Self-protective E3	Self-protective	Opportunist (2/3)	Operator	Socialized mind (3rd order) Traditionalism	Representation al Systems	Socialised Mind	Other-Unaware
ntio	Conformist E4	Conformist	Diplomat (3)	Conformer		Simple Abstractions	3.0	(0.0)
onvei nal	Self-aware E5	Self-aware	Expert (3/4)	Expert	Self-authoring mind (4th order)	Abstract Mapping		
U U	Conscientious E6	Conscientious	Achiever (4)	Achiever	Modernism		Other-Dependent	Other-Aware (7.0)
Transitional Postconventional	Individualist E7	Individualist	Individualist (4/5)	Catalyst		Abstract Systems		
entional	Autonomous E8	Autonomous	Strategist (5)	Co-Creator	Self-transforming mind	Single Principles	Self-Authoring	0-16 August (0.0)
Postcon	Integrated E9	Construct Aware	Alchemist (5/6)	Syneraist	(5th order) Postmodernism		Style 4.0	Self-Aware (8.0)
Transpersonal		Unitive	Ironist (6)	giot			Self-Aware	Construct Aware (9.0)

Table F.1: Stage Developmental Psychologists and theories

An Overview of Constructed Development Theory

The theoretical underpinnings of Constructed Development Theory (CDT) are that human beings utilise shortcuts in their thinking in order to construct their Intention, Awareness, Choice and Response in the moment. The five studies within this thesis set out to determine initially, that participants deconstruct their thinking by way of fifty Cognitive Intentions (such as Internal and External), and it is their level of awareness of their relationship with these heuristics that holds the key to their Dynamic Intelligence (DI).

DI is the process by which one constructs their thinking in the moment, incorporating as many facets from conscious action as possible in order to predict the outcome in the moment. This study aims to determine the level to which individuals are capable of consciously choosing those facets in order to predict the outcome in the moment, to facilitate greater choice in their response.

This predictive quality extends Vygotsky's (1978, p84-91) Zone of Proximal

Development into the adult arena, creating a new Zone of Dynamic Development, and

incorporates a constructive element that creates a new field of psychology explored

throughout the thesis, called: adult metacognition.

Adult metacognition is supported by the following Four Pillars: Intention, Awareness,

Choice and Response, upon which CDT is built as a unique contribution to psychology and

an emergent theory throughout the five studies in this thesis.

Key Contributions

There are a number of key contributions put forward in this thesis:

- Constructed Development Theory the focus on shortcuts to our self-construction
- Adult Metacognition thinking about habituated thinking from a heuristic perspective
- The Four Pillars of Constructed Development how CDT is deconstructed
- Dynamic Intelligence the process by which CDT is constructed by the individual
- Zone of Dynamic Development the adult complexity version of Vygotsky's ZPD
- The Development Onion moving CDT away from a stage-based system
- Cognitive Intentions linked to Piagetian schemata not done before
- Cognitive Thinking Styles and our unconscious habituated use of them
- The Thinking Quotient Measurement tool for self-awareness
- The Development Iceberg conscious and unconscious mapping of CI's
- The Dynamic Intelligence Awareness Model the process for DI awareness
- Constructed Development Grid where one places themselves developmentally
- Emotional Intelligence is a facet of DI when IACR are considered
- CDT is the Conduit between constructivism and constructionism
- CDT is the Conduit between domain-general and domain-specific thinking

Each one of the contributions has the capacity to be disruptive in either the stage

development field of psychology, or stage transition and thus offers a unique contribution to

psychology as a whole.

Study 1 intends to test the methodological approach and study 2 intends to use this

approach to align a post-graduate student's level of cognitive complexity with Cognitive

Intention use as per the work of Kegan (1994) and Laske (2008) as a shortcut to their methods of determining an individual's capacity and capability. Study 3 intends to validate the previous approach by testing the objectives on a large dataset of profiles. Study 4 intends to determine how self-aware an individual is by questioning their awareness of their Cognitive Intention use. Finally, study 5 intends to map the quantitative findings of study 3 with the self-report findings of study 4 by way of a semi-structured interview to determine the lived experience of the participants. This will help uncover the predominantly unconscious drivers of thinking and behaving for the participants, thus offering qualitative support for the theory.

Research Question

Understanding stage development in a psychological arena cannot progress using existing terminology that replicates previous studies and does little to differentiate one approach from another. The purpose of these mixed methods studies is to make a contribution in this area and thereby advance the field of stage development by the investigation of Constructed Development Theory and its capacity to fill the gaps both in the literature and between stages with a process not previously utilised in psychology. Hence, this study's research question is:

Does Constructed Development Theory exist as a conceptual measure of self-awareness in the moment?

This is a fundamental break from the zeitgeist of adult stage development, and if the ideas are supported by the quantitative and qualitative data within this study, then a new developmental arena opens up for future investigation by developmental psychologists: namely the use of self-awareness as a measure of cognitive and social-emotional complexity.

To complete this research, participants were recruited for five studies, beginning with post-graduate students, to test the concept of CDT using methodology outlined by Mason, (2002) who argued for the use of mixed methods as it places the value on theoretical

knowledge. There is also an inherent difficulty in designing tests for cognitive complexity, which is potentially the reason there are so few available that test the concept of psychological growth (Pfaffenberger, 2007). This adds support as to why it is important for this research to take place as it will open the door to future studies on adult cognitive growth not previously seen in stage development psychology.

As this study is concerned initially with the post-graduate student's construction of self, there is an element of phenomenological theory (Finlay, 2007). This is where the researcher aims to provide a profound description of a post-graduate student's construction of self in the world. Analysis focused on identifying patterns in an individual's thinking by virtue of the combination of Cognitive Intentions (called their 'Thinking Style'), and a measure of their 'Dynamic Intelligence' as determined by a new scale for measuring self-awareness: the Thinking Quotient.

It is expected that the new knowledge gained from this research will lead to a reification of the theory of Constructed Development in the literature after testing the concept with quantitative and qualitative data. This will lead to a new way of interpreting an individual's capacity and capability via their awareness of their self-construction without the need for an intellectual framework that requires interpretation by a trained interpreter, thus eliminating the potentially fallible human element of the typical process.

The aim of developing the theory of Constructed Development in order to betterunderstand either the progression of an individual's growth from one stage of development to another, or indeed, to establish if there are no stages at all, will be of particular interest to stage development academics, as well as adult development researchers. The question: '*what is changing that causes the growth*' is addressed with a result that will impact thirty years of stage transition thinking, as cognitive shortcuts have not been utilised in this manner before

now. It was therefore important to expose this gap in the stage development literature in order to open up a space for Constructed Development Theory to occupy.

Using a mixed methods approach to quantify the qualitative aspects of a profile questionnaire into the 'deeper aspects of life, rather than the surface level of behaviour' (Harung, Heaton & Alexander, 1995) is essential if we are to further our understanding of adult developmental psychology. The theoretical perspectives prevalent in cognitive development for children are compared and contrasted and then enhanced in order to elevate them to the adult development arena, including reframing a number of eminent theories that have the potential to impact both child and adult learning.

The study concludes with a qualitative representation of the quantitative findings by virtue of a series of interviews that utilise a hermeneutic phenomenology to expose the lived experiences of ten participants. These findings reinforce the premise that individuals are not aware of the principle that our thinking is constructed in a simplistic and habituated manner, and that this construction has major implications on what is perceived as 'personality' within psychology. The findings introduce the Four Pillars of Constructed Development (IACR) into a number of psychology disciplines and thus impacts existing dominating interpretations of how we think and behave. Questions arise from the findings that warrant further study, such as: *if thinking is constructed in the moment, how does this impact one's personality in the moment if it is the culmination of our constructs*? And with awareness, *can one construct their personality differently, at choice*? If one can choose how to construct their personality, it has the potential to transform trait theory and personality theory from the perspective of Intention and Awareness.

Finally, as the initial impetus for this thesis is to investigate post-graduate students' Thinking Styles, it is important to determine how much research exists on student thinking, and to what extent this thesis could add to the knowledge of how students construct their

thinking in context. Given that there is very little research on intelligence and students in recent years, the concern also arises as to how psychology is depicted within academia and if the theories are misleading in any way (Warne, Astle & Hill, 2018).

The following chapter provides a thorough review of the salient literature that the theory of Constructed Development impacts. It suggests cross-disciplinary links between stage development, heuristics, adult development and intelligence.

Introduction

The aim of the literature review is to examine previous research and theoretical discussion on existing theories of development, with a particular emphasis on how they relate to an individual's awareness of self in the moment. The intention is to discover what unites and separates these various theories and approaches in order to form an opinion on self-construction from the perspective of Intention, Awareness, Choice and Response.

The review is broken down into four key sections that correspond to the four key theories that inform and frame this research: Stage Development; Stage Transition; Intelligence, and Meta-Programmes. See Figure L.2. The literature within each of the sections will be discussed as it applies to the research question in this thesis.

Stage Development	 From child to Adult Thinker Constructivism Soft Stage and Hard Stage 		
Stage Transition	Awareness in the momentFinding the bridgeDevelopmental Limbo		
Intelligence	 General Ideas about Intelligence The story of multiple intelligences Metacognition to Constructivism Where does EI fit in? 		
Meta-Programmes	 Meta-programmes in use Learning Styles or not Learning Styles Rename and Reframe of MP's The creation of Cognitive Intentions 		

Figure L.2: Literature Review Flow

The focus of this study is an examination of these different approaches from an adult development perspective. In order to address the theoretical gaps in the adult development literature, the current chapter will focus on exposing the limitations of the existing theories, including the human elements of Laske's (2008) framework, the adult extensions to Piaget's (1932) work, the removal of stages from development in general, the movement between stages as they occur, rather than by description, and the use of heuristics as unconscious shortcuts for self-construction, which ultimately impacts personality.

The starting point for the literature review is a necessary examination of the fundamental theory of Stage Development that underpins this thesis and upon which the research question depends. Thus, in the first section, Stage Development is discussed as the foundation for adult thinking, stemming from Piaget's (1932) work on how a child constructs a mental model of the world as a process for cognitive development. Piaget maintained that cognitive development stems from independent exploration in which children construct knowledge on their own. It is important to include Vygotsky's (1978) work in this section as he opposed Piaget by emphasising the fundamental role of social interaction in the development of cognition, focusing on Social Development Theory. Commons, Richards & Armon (1984), suggested that stage is a property of subject behaviour or response separable from performance. This will be discussed from a Constructed Development Theory (CDT) perspective.

Having identified and discussed the leading theories on Stage Development, it is then necessary to answer the natural question: how does one transition from a lower stage to the next? To answer this question, the second section of the literature review addresses existing research into Stage Transition. The review identifies that there is a gap in the theories, specifically regarding the determinant factors of the movement between stages, to which CDT can provide an answer. This leads to the questions around an individual's intention and awareness in the moment and if movement between stages can be a choice.

The general mechanisms underlying learning and problem solving depend on developmental processes, and as cognitive complexity increases through stage progression,

an intention and awareness gap emerges for CDT. This invites discussion about intellect, hence the third section of the literature review.

The third section addresses theories on intelligence and how the theories on Stage Development and Stage Transition could potentially impact on intelligence. This section examines the connection between complexity stages and how 'smart' a person is (Kaufman, 2015). In this section, a number of intelligence theories are explored as alternatives to selfawareness with the literature focused on reasoning and problem-solving. This is an important section as it illustrates that one's cognitive complexity comes before one's perceived level of 'smart'. The questions being asked will be: how does Multiple Intelligence (Gardner, 1983) challenge 'g' (Spearman, 1961) and can someone with high Dynamic Intelligence do both at choice regardless of theory?

Students are required to self-regulate and self-reflect, a process described and aided by metacognition as it allows them to understand their process of knowledge construction (Touw, Meijer, and Wubbels, 2015). As the literature review focuses on post-graduate students initially, the move from children's metacognition to adult metacognition is addressed and the gap widened for CDT to insert its hypotheses. The argument between domain-general and domain-specific thinking is addressed, with an alternate approach discussed. The way in which adults utilise the shortcuts mentioned in the first section is continued, which opens the door for the final section.

The fourth section focuses on the foundations of meta-programmes and from whence they came, the obvious gaps in their construction and the lack of literature supporting them as a human endeavour. However, as there are humans to perceive them, they must therefore exist (Feldman-Barrett, 2017) and this position is exploited in the literature review to such an extent as these ideas are reframed, renamed and repurposed to better suit the purposes of the new emergent theory, within which they are more useful. These are then linked to Piaget's

(1952) schemata by virtue of their unconscious heuristic intention and placed into the adult cognition arena.

Finally, the overarching themes are evaluated, leading to the suggestion for the most suitable research methodologies in chapter 2.

1.1 Stage Development

The problem of defining a stage and a stage sequence continues to be an important issue in developmental theory. Psychologists such as Piaget (1972), Flavell and Wohlwill (1969), Kohlberg (1969, 1981, 1984), Flavell (1971, 1972, 1976, 1982), Bickhard (1978, 1979), and Campbell and Richie (1983) have devoted substantial academic effort to it. This defining was important for Kohlberg and Armon (1984), and Commons and Richards (1984a, 1984b). Kohlberg and Armon's objective was to differentiate between hard and soft stages. Soft stage refers to development gained in response to an individual's experiences arising from any number of factors, such as differences in personality, age, class, education and so on. Hard stage refers to developmental sequences that are said to arise out of an underlying intellectual framework. Hendry & Kloep (2007) suggested that development is domain specific and that a person could develop faster in one domain than another. However, life stage theories assume global patterns of development and Arnett (2007) suggested that both are possible, as they are formed at different levels of abstraction.

Groups of adult development researchers known as neo-Piagetian theorists expanded Piaget's work in investigating cognitive development in adulthood (beyond age 25) and provided evidence for up to four stages beyond Piaget's formal operations stage. The stages are commonly known as post formal or post conventional stages (cf., Commons et al., 1984; Cook-Greuter, 1999; Kegan, 1982, 1994). Although Piaget focused his investigations on cognitive development, he recognised the importance of emotion as a central aspect of all activity and acknowledged that emotion and cognition function as interdependent systems

(Basseches and Mascolo, 2009). This line of reasoning was followed by Cook-Greuter (1999), Kegan (1982), Kohlberg and Armon (1984), Loevinger (1976), Torbert (2004), and others, who broadened Piaget's cognitive focus to include social-emotional, affective, and moral aspects under the umbrella of constructive-development theory. Here one can also support the work of Vygotsky as Shotter (2000) commented there is a connection between social interaction, emotion, and applying value to knowledge. In other words, the individual can control their thinking according to value systems. How clarity for the value system may be enhanced by emotion and connection with others on a social level will carry over to the depth and richness of relationships as these relationships progress over time.

To apply Vygotskian theory to the framework for aspects of adult thinking also implies the need to explore how thinking influences behaving in context, such as postgraduate study. However, if thinking is considered a complex (yet simple action) biological function of every human, one will see there are different types of thinking processes, including that of reactionary and emotional intelligence. However, there is also the concept with Piaget and Vygotsky's sets of theories that also support the activeness of knowledge and that each individual will progress over time to reach a certain capacity of intelligence if they allow themselves to have an active role in the process (Byrnes, 2003). Some individuals may be stalled in their thinking complexity because they are not active and also may not realise that they are not active. This also implies there is a connection between the biological action of thinking and applying this action to learning about the environment.

Another group, led by Commons and colleagues (Commons, Trudeau, Stein, Richards, and Krause, 1998; Commons and Richards, 1984, 2003; Commons and Pekker, 2008), developed a general theory of behavioural development focused on the content-free structure of task performances (i.e., irrespective of content such as emotional, cognitive, moral, or motor skills) and produced substantial research on post formal development.

The following section contains an overview of various theories following Piaget. At the risk of oversimplification, they are grouped into two categories: post conventional (or constructive-developmental) theories and post formal cognitive development theories. Cook-Greuter (1999) explained the two groups as follows:

Post conventional theories emphasize contextual and process-oriented forms of knowing, and increasingly turn attention to people's inner life. They explore meaning making not only in terms of its mechanics, but also in terms of its human valence and experience. Some theories distinguish between understanding what is merely rationally defensible and logically consistent from what is perceived as meaningful or wise in mature living. ... To underline this distinction, I prefer to restrict the term "post formal" to theories

of cognition that describe more complex, higher-order forms of logical analysis and reasoning (Commons and Richards, 1984; Fischer, 1980; Kohlberg, 1984), and to favor the term "post conventional" for theories that also deal with issues of meaning, value and experiential salience. (p. 30)

This is not to suggest that all the theories mentioned in this section fall neatly into one category or the other, but such delineation helps position this thesis within the dialectical tradition as an extension of the post formal cognitive line of research.

The Early Years

The work of Piaget (1954, 1976) had two major thrusts: constructivism and stage theory. He based his work on children's development as they construct a view of the world. He used propositional logic as a model of formal operations, building on work by Gottlob (1950) and Peano (1894) who attempted to generalise propositional logic in order to represent, most notably, arithmetic reasoning. Basseches (1984) and Kegan (1982) saw the model as complex constructions of the world, where the child has the capacity to build upon this world. Piaget, at the core of his work conceptualised cognitive development as an extension of the biological process of adaptation (Dodonov & Dodonova, 2011). The child can approach the environment and the organisational capacity to process information upon his or her ability to reconcile the details. Piaget saw the four levels as: schemata or the plan, the imprint of strategy to organise where the knowledge is stored to control adaptation. In this way, the knowledge works to assimilate and accommodate in a way that also serves to further deepen understanding of the environment which leads to equilibrium. Shayer (1997) noted that "*Piaget's own model of adaption, being the result of the dialectic of assimilation and accommodation, does seem to contain the notion that it is only the child's own efforts that are the process of accommodation.*" (p.35). It should be noted that Piaget did not specify if the child developed from a position of awareness, just that their knowledge grows accordingly. His model, when referring to his concepts, does not allow for the differentiation between 'spontaneous' and 'lack of conscious awareness' (Ashford & leCroy, 2009).

Piaget proposed a complex theory of assimilation, accommodation, and autoregulation that relied on the postformal operational level being true. If Piaget's own system operates above formal operations, using higher-level logic, then it is higher level logic that is of use to psychologists trying to determine adult stages of development. In the framework proposed by Piaget (1952), any transformation of the existing cognitive structures had to be regarded as accommodation, which is how he defined how one alters existing schemata as a result of new information.

The ability to adapt and grow within the environment also points to how such a model can apply to exploring thinking and development in adults which includes post-graduate students. Piaget saw intelligence as non-fixed, suggesting we have the ability to adapt and develop concepts where new schemata are formed, and contribute to shifting the adaptation, where for a moment of progress, the individual may acknowledge feeling imbalanced. The question arises of how aware an adult is of this development of new schemata and how in control they are of their intention in the process.

At the adult level, further review of how the concepts work also supports thinking in terms of a dynamic process. Allowing the information as symbols and objects to break down and associate with fixed concepts within the schema also promotes actively modifying on a

constant basis (in the moment) where the individual can increase balance of knowledge as they have flexibility to accept new objects while retaining the foundation they started as a child (Basseches and Mascolo, 2009; Piaget, 1952, 1964, 1972).

Whilst intelligence can be increased, many of the tools for assimilation and adaptation of the environment are formed early in childhood, and therefore will impact the adult mind later (Carey, Zaitchik & Bascandziev, 2015). Piaget's four major stages (sensorimotor, preoperational, concrete-operational, and formal operational), take shape between infancy and adolescence (Piaget & Inhelder, 1969). He stated that these stages are hierarchical and irreversible. However, more recent research has revealed that cognitive development is not necessarily a set of discrete stages, and actually occurs uniformly across all domains of thinking, and is highly dependent upon individual experience as a contributor (Sinnott, 2010). Burton (2003) states, in his book, *State of Equilibrium*, that the original seven cognitiveperceptual styles identified by Piaget play a crucial role in the shaping of our early personality, and the basic operating during the first seven years of life are the essential ingredients of most [of our] problem states. He goes on to say that these states are primary, and they function at the effect of these early cognitive intentions.

Piaget postulated each stage creates a hierarchical sequence with each subsequent stage integrating the previous stage's structure into a higher and more differentiated form or the process cannot continue (Lourenço, 2016). However, he was remiss in his definition of how the child or learner is taking away from the environment information they deem relevant and acting upon it (Halpenny and Pattersen, 2013). Yet in the action, the child has control over shaping the experience as per his or her needs and is able to gain knowledge through the understanding of such constructs. There is thus a level of social interaction and engagement in the process where there is a time component to developing the knowledge. This is an

important distinction of a child's capacity to perform dialectical thinking (Basseches, 1984) yet it is not clearly defined in Piaget's explanation.

In his earlier theories, Piaget saw an issue with the level of progress that can be made after a certain age of maturity. He would revise this perspective later but did not offer reasoning toward determining how cognitive change impacts the adult's ability to think (Cartwright, Galupo, Tyree, and Jennings, 2009; Piaget, 1972) and therefore this was a limitation in his theory. Piaget (1987) said that development never ends, even after the attainment of formal operations. However, he missed the opportunity to investigate the developmental processes of adults, as different to children and adolescents, by excluding more mature thinkers. This mantle was picked up by Kegan (1982) who demonstrated with his Levels of Adult Development theory that humans are capable of continued cognitive growth well beyond 80 years of age. Laske (2009) went one step further and demonstrated the difference between cognitive and social-emotional growth in mature adults, by stating that according to his Cognitive Development Framework, maturation is possible beyond the age of 25, but the highest levels of cognitive complexity are not available to those under 40 years of age as they lack the experience necessary to make the requisite connections (Laske, 2007).

Piaget suggested a duality of transitional steps. To describe transition, this model elaborated on and systemised the dialectical strategies described in the Piagetian probabilistic transition model (Flavell, 1963, 1971). The systemisation of the sub-steps is based on choice theory and signal detection (Richards & Commons, 1990). Although each task can be broken down by a myriad of subtasks (Overton, 1990), the following simple example has three subtasks: A, B, and C. Piaget conceived stage transition as such:

- 1. A, B (or not A)
- 2. A or B
- 3. A with B

A is an action from the initial stage. B is a complementary action or the negation of A (Not-A). For example, in a mathematics class, A might be an addition task and B might be multiplication. So, when presented with the problem $2 \times (3 + 4)$, the steps would be to assert A, assert B, alternate A and B depending on the situation, and finally, coordinate A with B.

However, Piaget missed the potential for the task to be 'thinking'. If one considers thinking the task, what are then the components 'A' and 'B'? One might assume at this stage for them to be a shortcut in a child's thinking. Piaget also ignored the *intention* of the action 'B'. What is the purpose of doing B for the individual? If it is an instruction from a teacher, then the intention is not necessarily to grow beyond the stage, but to do as one is told. The transition is in itself, an intention, albeit an unconscious one, and it could be argued that directed growth is extrinsic, not intrinsic, and as such, not growth, but tuition. This raises the question of the awareness of the child to make the changes necessary, and their conscious direction of intention to grow in context.

It has been argued that what really underpins development is that by virtue of the fact children age, they increase their processing capacity, such as memory or attention (see Keating, 1990). It is not so much changes in formal logical skills as it is ongoing neural development (Byrnes, 2003). However, it is not clear if this physical growth helps to create intention and awareness within the child's thinking, or if it is still relatively out of awareness.

In a study on vertical decalage (a child using the same cognitive function in different stages across development) Kuo, et al. (2012) determined that older children are more capable than younger children due to the greater experience in their years, which seems an obvious outcome. This is especially true if the child has direct experience of the area that is being tested. Principally, the development of the prefrontal cortex was key to the capacity and capability of the children to develop a more dynamic awareness of the subject. It is unsurprising that Piagetian development theory is closely aligned with changes in the

physical brain (Bolton & Hattie, 2017) in particular, the prefrontal cortex and its associated connections. This raises a question of developmental needs of children as a guide rather than a steadfast method of increasing capacity if one's brain is going to grow due to aging regardless of any academic intervention. The natural question arising from this would be to ask whether cognitive intentions are the result of experience rather than knowledge acquisition or downloading, and are they a specific entity in their own right?

Limitations and Critique of Piaget's Theory

It is evident that Piaget's theory enjoys widespread support (Brainerd, 1978; Lourenço & Machado, 1996; Müller, Eycke & Baker, 2015; Lourenço, 2016), however, it also has a number of weaknesses: his inability to separate memory from logic (Bryant & Trabasso, 1971; Mou, Province & Luo, 2014); the assumption that children exist at only one stage at a time (Case, 1992, 2013; Flavell, 1993); and the lack of acknowledgment of the impact of cultural context (Oesterdiekhoff, 2013; Munroe & Gauvain, 2010; Dasen, 1975; Dasen & Heron, 1981; Mishra, 1997; Price-Williams, 1981; Price-Williams, Gordon, & Ramirez, 1969).

Piaget was primarily an epistemologist and was concerned with the emergence of new ways of knowing (1950) and how they became necessary once they were constructed (1978). Over the decades, Piaget's theory has come under criticism due to limiting how the highest cognitive stages of development are defined. The implication that thinking stops at a certain age and a certain stage was refuted throughout the 1950's and 60's. The argument remains, according to Beard (2013), Hy and Loevinger, (2014), Kohlberg (1973), Loevinger (1976) and Perry (1970), Piaget's theory failed to support higher ranges of capacity for adult development, of higher thinking and learning practices because the theory failed to define higher order adult cognitive development. Piaget's lack of attention to the full capacity and capability of adults limited his theory according to Commons, Richards & Armon (1984) and
left the door open for questions based around a child's and adult's intention in the moment, their awareness of this intention and how, if capable, they chose to respond in context.

Today, there is general consensus that mental growth continues in adulthood (Craik & Trehub, 2012; Horn, 1982, Schaie, 1996) and that cognition is not the only facet of mental development (Irwin & Sheese, 1989; Laske, 2009). Piaget's own critique of his work centred around 'novelty', where he wrote: "*For me, the real problem is novelties, how they are possible and how they are formed*" (Piaget, 1971, pp. 192-194). This raised more questions: what is the person looking for? Are they sorting for sameness or difference? It would appear that Piaget was suggesting that a child with a need to sort for difference will notice novelty rather easily, which could be interpreted as an intention in the moment, whether conscious or unconscious.

Basseches (1984) sought to explain how the formal operation stage narrowed thinking to only a specific range of problems and thus could not be equated with epistemological maturity (p45). However, in this way Piaget's model remained subordinate to other models of cognitive processing as there was evidence to support reasoning capacity intensified in adulthood (Kegan, 1994). Simply put, adults think more in highly complex ways than children and this cannot be left out of (hard) stage development. In addition, the complexity of children's thinking and adult's thinking are different from an experiential perspective, and it will be argued that a ten-year-old can think complexly for a ten-year-old, provided we do not compare his thinking to a forty-year-old. Both Karmiloff-Smith (1992) and Bruner (1960) agreed with this idea and believed that a child of any age is capable of understanding complex information and using a child's supposed stage of development as a guide to their academic capacity was misguided. This is potentially a limiting factor as it is dependent upon the teacher's perception of the child's ability to grow and progress to a higher state of cognitive maturity without understanding the level of awareness the child has in the process.

In Brainerd's (1978) words: "... whereas Piaget's [developmental] stages are perfectly accepted as descriptions of behaviour, they have no status as explanatory constructs." (p.173). For Piaget "...we never attain a measure of comprehension in a pure state, but always a measure of comprehension relative to a given problem and a given material." (Piaget & Szeminska, 1980, p. 193). However, the logical progression from these ideas would be to understand the intention that drives the behaviour in order to explain the constructs in context.

Contemporary research validates Piaget's position in that cognitive development progresses during the adolescent years, where adolescents show improved capabilities in inductive and deductive inferences, objective and mathematical thinking and decision making (Byrnes, 2003). However, they disagree with him about the 'how' (Byrnes, 2003; Klaczynski, 2000) as the research does not support the Piagetian assumption of domain-general transitions (Csapó, 1997). The point being, if Piagetian development were taking place, children would improve across all domains, whereas teenagers tend to function better in cognitive tasks where they have an existing knowledge (Byrnes, 2003) or have received contextual training [rather than development] designed to improve performance (Iqbal & Shayer, 2000). These unsurprising findings led many researchers to favour domain-specific models of cognitive development. If you expose a child to a variety of cognitive opportunities, of course that child will perform well on a test of the same than if they had never seen it before (Byrnes, 2003). It is possible that what is being tested is actually memory, rather than the process of how to perform the thinking within the test, and as such, the construction of thinking in the moment, is domain-general, which would transcend the above ideas. If one were to test a child on what they can remember from what they have been taught, that is a different test to whether they are cognitively capable of doing the foundational thinking that allows for an answer to emerge, regardless of whether they answer

10 or 50 questions, which is arguably a better measure of the child's capacity than a static test answer.

Siegler & Crowley, (1991) theorised that there is extreme variability at all times at all levels [of thinking]. They stated that a child will have several strategies available at any age that she can use to figure things out. If we think about this concept as a CDT process, it becomes apparent that whether a child has one strategy or ten strategies, their ability to pull in multiple factors in order to decide which is the most appropriate in the moment is a facet of their capacity to think, not necessarily a metacognitive strategy. Siegler & Jenkins (1989) also noted that a child will fall back on older strategies (e.g. formal back to concrete) should the cognitive load become too demanding. According to the neo-Piagetian theorists Pascual-Leone and Johnson (2017), endogenous quantifiable changes in one's mental capacity, not associative learning mechanisms are the main cause of developmental change.

Those adults who transcend formal operations and use it within a 'higher' system of operation, are evidence for the use of reasoning at a more complex level than formal operations (Commons & Pekker, 2008), and thus beyond the capacity of Piaget's theory.

In summary, from an adult development perspective, there is a need to go beyond Piaget and to consider thinking as the task, especially from the perspective of how development specifically occurs and if people are aware of the process of growth. Kohlberg (1984) said:

"The strict Piagetian stage construction may need to be abandoned in the study of adult development, but the idea of soft stages of development in adulthood should not be. ... Soft stage models present a new way of doing research in the subject area of adult development, a way that has emerged from the Piagetian paradigm." (p.249)

Finally, this raises the question: could a process of soft-stage measurement be developed to map this growth and provide the cognitive intention behind a person's developmental journey?

The Constructionist Approach

In contrast to Piaget's understanding of child development, in which development essentially leads to learning, Vygotsky felt that social learning preceded development. Vygotsky's (1978) stage development considers how the adult will seek processes for problem solving, as well as collaboration with others as peers.

The complexity and arbitrary nature of social interaction, along with trait, personality, self-identity, the ego and attitude toward thinking and learning will also influence one's adult capacity for intellect. Without precise comprehension of the theories within development, without the general and broad view, applying the theories becomes difficult (Van der Veer, 1997). From a domain-specific perspective, in *Mind in Society*, Vygotsky argued that:

The mind is not a complex network of general capabilities such as observation, attention, memory, judgment, and so forth, but a set of specific capabilities, each of which is, to some extent, independent of others and is developed independently. Learning is more than the acquisition of the ability to think; it is the acquisition of many specialised abilities for thinking about a variety of things. Learning does not alter our ability to focus attention but rather develops various abilities to focus attention on a variety of things. (1978: p83)

Vygotsky (1978) subordinated development to learning, thus advocating a weak conception of development. For Vygotsky, (1987) seeking ways to provide evidence of environmental interaction having a direct impact upon learning and intellect also suggested a connection between speech and the ability to form coherent thoughts. The dynamics between speaking and language where there is flow of one thought to the verbal output also points to how thoughts take shape. There is movement from thought to speech, and from speech to thought (Vygotsky, 1987, pp. 249-250).

The notion of multiple contexts and complexity translates not to dualism as Piaget believed, but to the sense of space that requires a degree of social support and collaboration between peers. The concept of multiple contexts and complexity expands upon how one can approach scaffolding in terms of adapting and acting upon the thought process (Copple and Bredekamp, 2009). For many classroom environments, post-graduate study included, this is task-based by the teacher to form the parameters of the activity. Siler (2011) saw scaffolding as an assessment of the learner's current knowledge and experience, which can be related to the course content to determine what they understand and can do already. Siler also used scaffolding in the form of verbal cues and prompts to assist students and the breakdown of tasks into smaller tasks with the opportunity to feed back in process.

In the home environment, it was noted that parents who talk about and explain their use of emotions to their children facilitate a child's development of emotional abilities (Cassidy et al., 1992; Denham et al., 1997). Focusing on the child's academic development, Vygotsky introduced the concept of the 'Zone of Proximal Development' (ZPD) which he defined as: *the ability of the child to learn only when interacting with people in their environment and in cooperation with their peers. Once these processes are internalised, they become part of the child's independent developmental realisation* (Vygotsky, 1978. p90).

The Zone of Proximal Development is the difference between what a learner can do without help, and what they can accomplish with directed guidance. Bruner (1957) coined the term 'scaffolding' in which he explains the learner actively constructs new knowledge based on existing knowledge, as well as their interaction with the environment. Scaffolding is seen as a learning framework from which as a thinker, one seeks ways to apply knowledge to suggest development within an environment that values such relationships. The concept of scaffolding builds on the idea of teacher-led development in the ZPD (Wood, Bruner, & Ross, 1976) to stretch students just beyond their independent ability (Hannafin, Land and Oliver, 1999). Here, it cannot be ignored how the social aspect of learning also supports a person's ability to build upon their capacity toward acquiring more 'knowledge'. It is thus only through guided learning and subsequent introspection that an adult can develop the tools to expand their way of thinking (McLeod, 2012). However, the process of this movement is

not defined clearly as to what is actually taking place in the moment. For example: before a process can become part of a child's independent development, how does their capacity to reflect on the dialectic impact their choice of metacognitive strategy? In other words, what if a child were capable of choosing an entirely different strategy not based on existing knowledge as they hold the capability to question what they are not seeing? If offered this by a more complex other, the child might develop their thinking less procedurally (strategy) and more abstractly.

Piaget said the child is a scientist. Vygotsky said the child is an apprentice. They also offered opposing views on how they saw private speech developing and the environmental reasons for when and how often it occurs (Berk and Garvin, 1984; Davis, Meins & Fernyhough, 2013). Vygotsky (1987) proposed that inner speech is a product of an individual's [interaction with their] social environment.

From a cognitive perspective, there have been many studies on what makes a good learner, with the study from Modrek et al, (2019) looking at the differences between cognitive and behavioural regulation as potential predictors of individual differences in early teenage children. The results demonstrated that cognitive regulation, not behavioural regulation was associated with more successful inquiry learning.

With a modern lens, this principle would appear unsurprising as thought precedes behaviour. However, as to whether this transfers to the adult learner later in life, postformal stages are important as they potentially account for academic performance, including the effects of culture on social, political, and educational development (Commons, et al., 2007; Baily & Pransky, 2005). Because education is a good predictor of developmental stage (Commons & Ball, 1999) it is arguable that finding out the reasons why would benefit adult post-graduate students.

Researchers have considered the connections between vertical development and effective learning outcomes for postgraduate students (Bartone, Snook, Forsythe, Lewis, & Bullis, 2007; Hart & Mentkowski, 1994; Lasser & Snarey, 1989; Manners, Durkin, & Nesdale, 2004; McCauley, Drath, Palus, O'Connor, & Baker, 2006; Tanner, 2006). Lasser and Snarey (1989) found that female students who were more vertically developed were far more adaptable when moving to university than less vertically developed female students. Further to this, in a longitudinal study of military cadets, Bartone et al. (2007) found that 47% of cadets studied over a 4-year period at college grew in their vertical development. What this represents is the difference between developmental levels in a specific context, which could be considered a soft-stage approach.

A Soft Stage Approach

Loevinger (1976) was one of the first researchers to focus on the problems and experiences of women in post-war America. She drew on Sullivan's (1968) description of levels of interpersonal maturity to create her own system of ego development based on eight rather than four sequential stages. Each stage represents a level of complexly perceiving one's relationship to the world. Loevinger used psychometrics to validate her work, which separated her from her predecessors.

Soft stages are often characterised as self-reflective stages, involving an ego that makes an existential meaning of and for itself (Reams, 2014). Loevinger's model described personality in terms of cognitive, affective and behavioural components, and assumed that we evolve toward greater complexity, rationality and integration (Cook-Greuter, 1999). Hard stage developmental psychologists have issues with this statement, such as Laske (2015) who states that his stage 2 people are incapable of this kind of growth as they lack the requisite complexity.

Loevinger considered the ego to be a process as opposed to an organising function. Loevinger created a tool to measure the differences in how people responded to a set of sentence stems, which she called the Washington University Sentence completion Test (WUSCT), which she stated empirically measured the participant's ego development (Hy & Loevinger, 1996; Loevinger & Wessler, 1970).

The WUSCT assesses the written answers to sentences that begin with an incomplete question or statement, after which a participant finishes the sentence. Cook-Greuter (1999) noted that the WUSCT measured performance, whereas Kohlberg's model measured competence. Loevinger also recognised the importance of language in any assessment and stated: *"the centrality of language or verbal behaviour as a medium through which we manifest our conception of reality is the basis of any verbal projective test"* (p. 26). Further to this, both Kegan and Laske investigated the ways in which we make meaning and thus how this meaning manifests in our thinking to determine a level of social-emotional and cognitive complexity respectively.

The concern with language as a method of assessment of cognitive capacity is illustrated by Cook-Greuter (1999) as the dependence on articulation being the only means of measuring the individual, is prone to extreme data not being taken into account, as well as novel data being ignored. A second issue with Loevinger's approach was that within the written response, there was no allowance for examination and explanation of meaning. A criticism was that Loevinger confused content with structure, and as such, failed to answer the question as to why one stage is higher or more mature than another (Reams, 2014).

From a pedagogical perspective, Loevinger's model helps us to understand the way emotion motivates learning and can have an impact on unresolved emotional issues which creates the need for safe environments in academia, where students are supported and scaffolded whilst dealing with emotional issues (McClure, 2005).

Hy & Loevinger (1996: p6) used the term 'transmuted' to describe the change which takes place in a person's meaning-making capability as they move from the conventional tier of ego development to the qualitatively different level of postconventional ego maturity. Transmutation means the action of changing into another form completely, indicating that growth from conventional to postconventional levels of development entails a departure from one form of meaning-making structure in order to arrive at a completely different form: a qualitatively higher form. This is a common theme throughout stage development.

The general consensus amongst stage theorists is that there are inherent difficulties in the longitudinally tracking of meaning-making transmutation over the course of the development of a person (student or leader), so studies instead rely on comparing and contrasting lived experiences of both conventional and postconventional level leaders, and mapping the difference (Harney, 2018). However, what is missing is the measure of the potential underlying intention to change or grow in this model.

Another criticism of Loevinger's Sentence Completion Task comes from Commons et al. (1989) who mapped their Multisystems Task instrument against a number of other systems that determined complexity. Loevinger's WUSCT was the only one not to correlate with the postformal stages after factor analysis. Dwyer, Hogan and Stewart (2014) achieved similar results. Essentially, the argument is that although soft stages do appear to have qualitative separation, they are derived somewhat less directly (Reams, 2014).

Loevinger's ego development model stated that personality structures can evolve (Dweck, 2011) and that this is affected by social dimensions, such as environment, in line with Vygotsky. Environment is key to understanding how a person constructs themselves in the moment, determines their unconscious intention and responds accordingly as individuals are capable of constructing themselves differently depending on the context (Cook-Greuter, 2010). In one study by Adams and Fitch (1982) and Kroger, Martinussen and Marcia (2010) on

change in identity status and ego development over a one-year period, they found that 61% of the students remained stable, whereas 22% progressed and 17% regressed. However, a recurring criticism is that the study, and subsequent studies by Redmore (1983) and Weathersby (2014) all had student participants, thus reducing the scope of the outcome. This is key to understanding the limitations of psychological studies that only use students as their participants, as this is not typical of the population as a whole (Peterson & Merunka, 2014).

Finally, it could be argued that Loevinger's stages omitted the structures of thinking awareness that informs the process of growth. From an intention and awareness perspective, because the relationship between underlying structures and behaviours is complex, this makes it difficult to predict behaviours in terms of construct validity (Broughton, 1978; Carruthers, 2011). It is not expected that a person's 'self-esteem' increases with increased ego development, as the two things are not correlated (Pazy, 1985; Weathersby, 2014). However, it is argued here that 'self-esteem' is a nominalisation, which means that it does not exist in its own right: it has to be constructed, and it has to be constructed from a position of external validation. This was explored further by Cook-Greuter.

Furthering Stage Development

Another Neo-Piagetian developmental psychologist of note is an independent scholar named Cook-Greuter (1999, 2010) who noted that the last two stages of Loevinger's system were not adequately differentiated, and whom could illustrate distinctions within the final stage of Leovinger's model. Kohlberg & Armon (1984) also noted the same. Loevinger's observations led to enhancements in the sentence completion test (1999) and collaboration with Torbert (2004) enabled them to develop the Leadership Development Framework and the Leadership Maturity Profile, which examined stages of ego development within organisations.

Constructive developmental theories differentiate between content and structure.

Structure looks at the way a person frames their awareness of their responses to life's tribulations. Content refers to the '*what*' of an individual's conversation. What are they saying rather than how are they saying it. However, Cook-Greuter did not demonstrate how her participants knew they were aware, or if indeed they had awareness of their awareness. She took her research motivation from Loevinger's stage theory of ego development and expanded up on it. Loevinger (1979) provided a framework for conceptualising the growth in an individual's way of constructing meaning through their lifetime from her empirical research using her sentence completion test. From a constructivist perspective, what changes is the relationship to one's individual life challenges based on our awareness of this relationship. Some have maintained that Loevinger's model suffers from a lack of clinical grounding and that like Kohlberg's theory, it confuses content and structure, as it is a more pseudo-structural than a true structural stage theory (Blasi, et al., 1998; Loevinger, 1991, 1993).

Cook-Greuter's stages of most interest are the post-conventional stages, namely: Achiever stage, Individualistic stage, Autonomous stage and Integrated stage. Cook-Greuter (2013) went into detail in her description of the capabilities of each stage and how they progress and differ from the previous stage. She stated that as development occurs in logical sequences from birth, the majority of adults seldom grow higher than the Achiever stage. This is below the maximum potential for adult development, which makes them unable to cope with the complexity of the adaptive challenges of modernity (Lucas & Donnellan, 2011; Cohn, 1998; Cook-Greuter, 2004). This was consistent with Laske's (2007) theory where the majority of the population (55%) resides at the socialised-mind stage of development, which was his stage 3. However, the process and the '*what*' of the change is omitted.

Cook-Greuter likened the movement to a spiral, hence the connection in her literature to Spiral Dynamics by Wilber (2013). Furthermore, she went on to say that world views

evolve from simple to complex, from static to dynamic and from ego-centric to socio-centric, and finally to world-centric (2013). This aligned her theory with all previous adult development specialists such as Wilber, Kegan and Laske. In a similar fashion to Laske, Cook-Greuter stated that each stage progression incorporates the previous stage and all facets of that stage are available to the person.

Cook-Greuter's (2013) model stated that its highest-level thinkers can differentiate self from culture. They recognise what separates and unites humanity, and this dualistic perspective was a paradigm shift from her lower levels' thinking. She stated that it was a difficult and painful emotional transition to realise one was disconnected from the general population. Thus, at an emotional level, the realisation that nothing is separate, paradoxically separates and isolates these high-level thinkers from the mainstream of humanity. However, Laske (2008) argued that if one is allowing emotion to control one's thinking and feeling outcomes, then they have not yet moved through emotion into cognition to become a high-level thinker. Emotion is limiting, as stated above, and Cook-Greuter mixed up emotion with high level, abstract conceptualisations of what it is to be separate and inseparable from humanity. As she focused on the construction of meaning via the ego development, she was not actually focusing on the construction of self in the moment. Cook-Greuter's Construct-Aware stage thus represented people who are aware that all meaning is constructed and as such, she neglected to demonstrate if there was a transition from intention via awareness through choice and into response.

Cook-Greuter's (1994) idea that ego stage transition was possible if the appropriate life experiences were structurally dis-equilibrating, tied in with Piaget's ideas of the same area. In essence, it can be thought of as 'disruptive thinking' that moves a person from one thinking stage to the next, as without the ability to disrupt the current patterns, a person does not move at all. Although there have been many studies that have promoted adult ego

development within (Esperian, 2010; Reisberg, 2013; Alexander et al., 1990; MacPhail, 1980; White, 1985), only the study by White aligned with Cook-Greuter's advanced ego stages for some participants. However, it was unclear what triggered the stage transitions, as no control group was employed, and the intervention consisted of a nurse-training program conducted over a two-year period (Manners, Durkin, and Nesdale, 2004). Therefore, it would be interesting to learn what was actually taking place as people moved between stages as this was missing from Loevinger's and Cook-Greuter's models.

Dynamic Skills are not Developmental

Fischer (1980) examined how the learning environment impacts the optimum level of skill in cognitive development. A skill can be taught, and thus passed on to a student from a more knowledgeable other. Development, on the other hand, is not taught, but guided. A disruptive facilitator is more appropriate to guide a student's thinking vertically, whereas the language used by Fischer advocated development through skill acquisition.

Because of this limitation in language, Fischer mirrored Piaget and Case when he theorised that there were four stages with a recurring pattern of advancement through each, and that a child's experience across domains would account for their growth.

For Fischer and Granott, (1995) adult cognitive development moves in a multitude of directions. It forms a dynamic web, with each strand also being dynamic (and thus fractal), rather than linear. For Fischer, developmental change is defined: "*in terms of structural transformation in patterns of thinking, feeling and action within particular domains and context*" (Mascolo & Fischer, 2010, p. 168). The nature of this transformation is seen as a set of rules, which provide micro-developmental processes, or within-level descriptors which he stated: "*specify how a skill is transformed into a new, more advanced skill*" (Fischer, 1980, p. 497). Fischer listed these micro-level skills as: inter-coordination; compounding; focusing; substation and differentiation. Inter-coordination is the macro-development transformation to

which the others lead and contribute. However, Fischer does not make note of the child's (unconscious) intention in the moment to either transform or not, which will be directly impacted by their capacity to change. Complexity is not a skill to be taught, but a vertical movement that can only be guided (Laske, 2009). It would be interesting to learn how much of a student's development is within awareness.

Fischer (1980), Fischer, Hand, and Russell (1984), and Sternberg (1984), proposed a number of instruments for cognitive development, that reputedly resulted in postformal thinking. The approach by Fischer (1980) describing the new level of complexity was to use the analogy of unfolding dimensionality, which uses dimensions in space to illustrate the idea of the complexity of postformal cognition. Although size could be considered quantitative, dimensional increases in size generates complexities that should be considered qualitative. However, this appears to be a complex way of explaining a simpler heuristic.

It is interesting how Fischer differentiates how a single set is separated into distinct sub-sets. When a person encounters a new task at a level of complexity with which they are already familiar, they can break the task down into subsets from an earlier (or lower) skill level in order to ensure a better performance and thus any arbitrary skill can be automated if it is practised often enough, within expected conditions (Posner & Snyder, 1975; Shiffrin & Schneider, 1977; LaBerge, 2014) which renders the skill an unconscious process once begun (called automaticity).

Fischer's research on compounding, where two or more skills at the same level of complexity are combined is interesting from an experimental perspective. Even finer detail was the focus on moment-to-moment behaviour in Fischer's model, which in the wider psychology is understood as attention (Reams, 2014).

According to Bolton & Hattie, (2017), time is a more precise predictor of academic achievement than intelligence and IQ. Despite a large variety of definitions of what

constitutes Executive Function (EF) (Jurado & Rosselli, 2007), and the inherent difficulty in their measurement (Miyake et al., 2000), changes in EF contribute to academic achievement rather than the reverse (Best, Miller, & Naglieri, 2011; Bull, Espy, & Wiebe, 2008; George & Greenfield, 2005; Towse, Hitch, & Hutton, 2001; Miller & Hinshaw, 2010). Although executive function increases throughout our school years, it gradually decreases from 16 to 30. (Best et al., 2011; Blair & Diamond, 2008; Blair & Razza, 2007; Davidson, Amso, Anderson, & Diamond, 2006; Huizinga et al., 2006; Somsen, 2007; van der Sluis, de Jong, & van der Leij, 2007). It would be interesting to note if this gradual improvement occurs in combination with the physical development of the brain during childhood, and how this affects thinking into adulthood.

From Child to Adult Development

A recognised problem with the domain-specific approach is how one determines what defines a domain. As mentioned, domain-specificity is a function of human cognition, but it is not clear precisely how. The word 'domain' has many uses in language: such as in biology, mathematics, politics, and more. Domain implies a systematic relationship of member parts.

All complex concepts are relatively undefinable and ambiguous. There will always be synonymous connections with other concepts. This idea played an important role in Karmiloff-Smith's (1992) developmental theory. She stated that behavioural competence is acquired through exploration and experiment, regardless of whether or not they received help. Then, through a process she called '*Representational Redescription*', the child is able to think more flexibly and more sophisticated as he recodes the information.

Piaget neglected to differentiate how the child knows *what* must be learned and *when* (Fodor, 1980; Wood, 2010). For example, it could be asked to which factors should the child pay attention within the environment and which can be ignored? One of Karmiloff-Smith's (1990) key contributions to developmental science was her support for a 'middle ground'

between nativism and Piagetian constructivism. Nativists argue that genes coordinate the development of cognitive modules (such as language). Karmiloff-Smith (1992) argued that our development produces domain-specific modules based on our direct experience, shaping our neural connectivity. This is contrary to Piaget's (1952) assimilation vs. accommodation concept mentioned above.

Karmiloff-Smith's 'middle ground' is accepted by the majority of developmental scientists (e.g. Mareschal et al., 2007) as it is consistent with developmental systems theory which states that: "*the structure of the adult brain is not predetermined but is gradually constructed from complex cascades of gene–environment interactions*" ('probabilistic epigenesis'; Gottlieb, 1991, as seen in D'Souza & Filippi, 2017, p. 519).

It is essential to understand how internal representations change over developmental time if we are to better understand the internal structure of the adult brain (Karmiloff-Smith, 1986, 1992). It is therefore essential that developmental processes are identified and investigated (D'Souza & Karmiloff-Smith, 2011, 2016). Further to this, if we consider the meaning-making aspects of complex thinking as per Kegan and Laske, any internal representations that change over time will have an element of meaning associated to them that also influences what they mean in context, and as such, any developmental process applied to a 25 year old male is going to be inappropriate for the same male at 45 as his meaning-making will have changed dramatically.

However, there are contradictions to this perspective. For example, development profiles are similar across individuals and across cultures, despite the hypothesis that development is driven by general learning abilities, which seems implausible given the wide variation and quantity in stimuli individuals experience (D'Souza & Karmiloff-Smith, 2011). Furthermore, the wide range of general intelligence would be expected to have an impact on a person's development over time which is not accounted for in the theory of gradual

modularisation. Prinz's (2006) critique of modulation argued that perceptual and linguistic systems rarely exhibit the features characteristic of modularity, which means that systems are not 'informationally encapsulated'. Prinz used perception as an example of cross-modal activity, which detracted from the encapsulation argument at the level of input. If these modular systems are domain-specific, it would be expected that not every module is linked with every other module, and thus limitations of cross-modular content would be experienced. Our ability to combine creative concepts could be a simple addition to the language module, or it could be that the function of pretend play in childhood is to construct and develop this capacity (Carruthers, 2002). It could also be asked whether there is an unconscious intention behind the behaviour. Another issue is that after the formation of cross-modular thought, we can use the new thoughts as premises for reasoning or derive new meaning from them and more (Carruthers, 2006). Perhaps this can be explained in terms of the use of a number of existing modular processes, with minor additions and adjustments. What is interesting is what drives those minor additions and adjustments could be the same unconscious intention mentioned above. Further to this, how would the thinking change should the individual become aware of their modular-intentioned thinking? It could also be asked whether the modules are the name given to the variety of intentions to one's development over time. From a post-graduate student perspective, one has a variety of academic goals 'chosen' by the student as important for that stage of horizontal growth. Thus, it is prudent to ask whether modularity could be the result of experience-based learning rather than its cause, i.e., "Modules are made, not born" (Bates, Bretherton, & Snyder, 1988, p. 284).

In summary, there is a distinct lack of Adult Development research in social sciences (Fein & Jordan, 2016) and the various ways existing developmental psychologists are looking at cognitive growth can be expanded by including Adult Development as a perspective.

Karmiloff-Smith (2009) epitomised the approach to child development and why it is more appropriate to focus on adult development: "*numerous studies of development (typical or atypical) are not developmental at all, because studying children by no means guarantees a developmental approach*" (p. 276). Whereas Cornish (2008) stated it is possible to study adults developmentally. The truly developmental, neuro-constructivist perspective embraces a developmental way of thinking, regardless of age.

An Alternate Learning Perspective

Siegler's (1996) overlapping waves theory is based on three assumptions:

(a) at any one time, children think in a variety of ways about most phenomena;(b) these varied ways of thinking compete with each other, not just during brief transition periods but rather over prolonged periods of time; and(c) cognitive development involves gradual changes in the frequency of these ways of thinking, as well as the introduction of more advanced ways of thinking.

Siegler suggested that the staircase metaphor used by other stage theorists (such as Piaget) missed out the variability between stages of development (Slavin, 2012). Schwartz & Fischer (2005) also found that the trajectory for learning was constructed of waves. Siegler was thus interested in the number of strategies a child could use at any age rather than if a stage matched a particular strategy. Figure 1.3 illustrates the concept. In essence, Siegler was concerned with thinking as a skill. But is it a construct? Finally, Siegler was focused on learning, rather than development.



Age & Experience

Figure 1.3: Schematic depiction of Overlapping Waves Theory

Overlapping waves theory, according to Chen & Siegler (2000), distinguished among five dimensions of learning:

- acquiring appealing strategies
- mapping strategies onto new problems
- strengthening strategies for consistent usage within given problem sets where they have begun to be applied
- refining choices among optional strategies or alternative forms of a single strategy
- and executing appealing strategies increasingly efficiently

The acquisition of a new strategy for the child, according to Siegler, had to begin somewhere, but the initiator is vague. Mapping existing strategies onto new problems required the child to differentiate between relevant and irrelevant components of the information compared to where the strategy was originally applied. In Siegler's model, this could be problematic if a strategy were wrongly applied, or not applied at all. However, Siegler did not offer a deconstruction of his wave formation. Both adults and children often fail to utilise newly acquired strategies, even when they are significantly more effective than existing strategies (Rendell, et al., 2011; Acredolo, et al., 1989; Goldin-Meadow, Alibali, & Church, 1986; Siegler, 1996). Siegler offered an explanation of this problem as an issue with retrieval of the new strategy, and a problem with the suppression of the old strategy.

Experience also plays an important role in a child's performance. Daily activities for young children are improved by repetition, such as laying out clothing for the morning (Kreitler & Kreitler, 1987; Conner, 2010). However, the ability to plan further ahead appears to be a learned skill much later, especially when the task is unfamiliar. Rule-following provides a good explanation of a child's performance in most Piagetian tasks, however, on more complex tasks, their performance is inconsistent. If an adult were to follow rules without thinking around the problem, this would be described by Laske (2015) as Stage 2 thinking and not very cognitively complex! Rule-following is not, however, typical of all problem solving (Siegler & Chen, 2002). It has been shown that experience greatly affects

the adult's capacity to answer such simple questions, and their strategy as described by Siegler's waves, are subsumed by their cognitive capacity as adults. Thus, their capacity is not required to answer strategic questions.

If, instead, one is asking if adults use the Overlapping Wave theory in the same way as children, then it could be asked whether one can determine an adult's capacity by a level of awareness of their wave-based strategy.

Reaching the Adult Stages

Kegan (1982, 1994) built on the foundations of Piaget (1954) and developed his ideas for hierarchical stages, when he created his Subject/Object Theory, where he postulated each hierarchical stage subsumes the previous (Piaget & Inhelder, 1969). His research combined three major intellectual constituents: the existential humanistic work of researchers such as Rogers, Maslow, Buber, and May; the neo-psychoanalytical practices of Freud, Erickson, Winnicott and Bowlby, and the constructivist developmental approach described here.

Development occurs in the pressure between challenge and support. Challenge comes from one's meaning-making that is insufficient for one's environment. Support comes in the form of a secure environment for risk-taking, including making new meaning and actions. Lahey, et al (1988), developed the Subject/Object Interview in order to assess these orders of consciousness. This method engages people in dialogue where the structure of their meaningmaking is investigated. This semi-structured interview format was similar to those of Piaget and Kohlberg. Kegan (2003) argued that people move from one order to the next by building a bridge to the next order by constructing meaning in two ways simultaeneously, and once the transition to the next stage is complete, the previous order is incorporated into their new meaning-making method.

However, a criticism of this approach is levelled at Kegan's lack of feedback after the interviews. He stated it was none of the participant's business what the outcome was but

Cook-Greuter (1999) repudiated this and stated it is the duty of the interviewer to feedback the interview findings, or they are doing the participant a disservice as they become interested in the truth about themselves through feedback (Cook-Greuter, 2004). Further to this, it is arguable that there is little point in determining a person's level of thinking subjectivity if they do not benefit from the results. Other objections levelled at Kegan's (1982) work suggest that his stages of development, as well as works such as King and Kichener's (1994) stages of reflective judgement, or Perry's (1970) and Peters' (2015) scheme of intellectual and ethical development, did not sufficiently differentiate a person's profile, to discover the foundational thinking of a person's unique mode (Vurdelja, 2011). Laske (2009) separated out the social-emotional from the cognitive as he suggested this is where Kegan's work was inadequate.

An interesting perspective from Kegan (1994) was his assertion that his stage four (self-authored stage) was a 'siren song' (Eigel & Kuhnert, 2016) for most people and where their development was arrested. A person attaining stage four will effectively become a victim of their own success, and eventually stuck in their own value set. In order to progress to the next stage, the primary motivator for development must be an internal desire to create an enduring legacy (Eigel & Kuhnert, 2016; Bauer et al., 2015; Cloninger, 2013; Bauer, 2011; Davis, 2010). This internal desire or intention must derive from an awareness of either growth or the need to grow one's thinking.

In terms of development, a flaw and limitation in Piaget's theory was that it did not allow for a child to skip a step. However, this may explain why some learners remain stalled. Kegan (1982, 1994) sought to expand upon this theory to examine adult learning after 25 years where there were also four stages to development that moved beyond Piaget's scope of formal operations stage. Kegan (1982) argued that as humans develop, they cannot be considered independent from the social environment and suggested there is not much

difference between being a person and being a meaning-maker (Laske, 2015). While the focus was not about constructivist views, the concept of meaning making also suggested internal dialogue or projecting the thought, building on Piaget's and Vygotsky's work here. Kegan's point was, every individual does meaning-making whether they have awareness of it or not, otherwise, the thought process halts. It could be asked at this point, if everyone undertakes meaning-making, could this meaning-making be interrogated specifically? The common denominator missing in stage development is this area of meaning making, and how it is decided that a person has awareness of how they are constructing it in order to move from one aspect of meaning-making to the next, once a new meaning has been made.

Kegan, (1982) contributed to stage development with his constructive-development theory, where he integrated thought complexity with our meaning-making processing. The principles of social constructionism support how change may alter meaning and posits: *"individuals make meaning of their experience of periods of change and stability in their lives and the cognitive development of their meaning-making process proceeds in a systematic, sequential, predictable, and increasingly complex way from childhood and into adulthood*" (Wall, 2003, p. 71). Kegan (1982) wrote further:

The heart of the constructive-developmental framework—and the source of its own potential for growth—does not lie so much in its account of stages or sequences of meaning organisations, but in its capacity to illuminate a universal on-going process (call it "meaning-making," "adaptation," "equilibration," or "evolution") which may very well be the fundamental context of personality development. (p. 264)

Kegan's (1982) model consisted of five stages of consciousness that represent a growing ability in meaning-making, or an ability to step back to gain an increasingly complex perspective of one's surroundings as well as one's relatedness to them. The process evolves in the following sequence: in the first order, one perceives and responds by emotion; in the second order, one is motivated solely by one's desires. The third order signals self-definition as determined by the group; in the fourth order, one becomes self-authoring and self-directed. The last, fifth, order symbolises interpenetration of self-systems (Cook-Greuter, 1990). The model involved the individual developing an increasing capacity for relatedness to and perspective on the self. Constructive-developmental theorists (Cook-Greuter, 1999; Kegan, 1994; Rooke and Torbert, 1998) suggested that only a minority of the adult population (between 10% and 40%) currently operate at level 4, the minimum level of functioning required by modern society. The implications of this are, according to Kegan (ibid. p326) that 'differentiation precedes integration' by which he meant that a reconstructive postmodernism provides a more flexible means of galvanizing the resources of culture. This allowed the higher level individuals to better-meet the mental demands of a modern (and postmodern) life by the act of constructing modernity rather than transcending it (p.337). The path to selfawareness begins after leaving level 3, characterised by "our world hypothesis and internalising others' perspectives" (Laske, 2006, p. 117), and it represents a milestone in development. "The acquisition of the third-person perspective enables people to see themselves as separate objects. They become conscious of themselves" (Cook-Greuter, 1990, p. 96). Reaching this threshold appears to be a gradual evolutionary process, yet it is the developmental shift that many individuals find the most difficult to make:

The internal experience of developmental change can be distressing. Because it involves the loss of how I am composed, it can also be accompanied by a loss of composure. This is so because in surrendering the balance between self and other through which I have "known" the world, I may experience this as a loss of myself, my fundamental relatedness to the world, and meaning itself. (Kegan, 1982, p. 374)

Ashforth et al., (2008) used the term *identicide* to describe the dis-equilibrating phenomenon, underscoring the need for safe, holding environments which can facilitate development. On this, Kegan (1982 p232) wrote:

Every transition involves to some extent, the killing off of the old self.

However, from a logical perspective, the above 'distress' is an over-reaction. The main issue

being the use of the word 'composed'. Alternatively, it is possible that the individual is

adding to their intention and awareness, regardless of whether this is in light of a balance of self and other, or in their knowing the world. They are increasing their relating to the world and as such, are adding to their experience. That is to say, none of this could be considered a 'loss' if one is adding to their awareness of self.

Just two years after Kegan's (1982) work on his five-stage model, Kohlberg and Armon (1984) made a significant contribution to developmental studies by extending Piaget's stages beyond adolescence and into the realm of moral reasoning. They conceptualised the evolution of moral judgments as a progression of six stages distributed evenly within the preconventional, conventional, and post-conventional tiers (Kohlberg and Armon, 1984). However, Kohlberg and Armon's work was criticised as being male-oriented, culturally biased, and overly focused on individualism. Gilligan (1982) later developed her own line of research on the moral development of women and put more emphasis on interpersonal relationships, compassion, and care. It would seem a logical step that a combination of both approaches would cover all aspects of thinking for both sexes, and offer a better definition of reasoning and meaning-making for both based on shared fundamentals, such as a person's unconscious intention to be or not be moral, and an awareness to be caring or compassionate.

Adult development is characterised by the shift of subject-object relationship, where what we are subject to becomes object, and in so doing reframes and transforms the way we make meaning. Suffice to say, that meaning making never stops, even as there is active transfer from subject to object and back again, much like Vygotsky's use of language to transfer knowledge and comprehension of it as applied to the real world as a tool. Stages are considered useful constructs for identifying and charactering developmental change in the present (Feldmna, 2004; Müller, et al., 2009a), as well as useful heuristics to chart developmental change in the past (Lourenç0, 2016).

Finally, the question remains as to what Kegan had missed out, and if by omitting one aspect of complex thinking, could there be another omission with as-yet-unseen, but far-reaching consequences?

Cognitive Complexity is Key

Originally considered a generic personality characteristic (Bieri, 1955), cognitive complexity was redefined by Schröder, Driver and Streufert (1967) as a domain-specific, information-processing variable, strongly associated with expertise. According to Streufert and Swezey (1986) and Furnham (2012), individuals with greater cognitive complexity perform better at tasks that have a high level of task complexity, as per Jaques (1989) and Commons (1984). They went further and said that it was actually imperative that an organisation aligns a person's cognitive complexity to the task demands of their role, as there was a positive correlation to efficient outcomes of decision making when done so (Ceci, & Liker, 1986; Sternberg, 2017). To balance competing demands, post-graduate students need to possess the capability and capacity to process opposing perspectives without getting cognitive dissonance (Robertson, 2005). Robertson stated that they need to transform the potential conflict into a generative paradox (p.182). Cognitive complexity *'reflects the ability to recognise and accept the interrelated relationship of underlying tensions. It enables actors to host paradoxical cognitions* '(Smith & Lewis, 2011, pp. 381-403).

In his book, *Measuring Hidden Dimensions of Human Systems: Foundations of Requisite Organisation, Volume 2*, Laske (2015) continued and refined Basseches' (1984) cognitive schemata framework and developed his own cognitive developmental framework. He then contextualised it by applying it to Jaques' (1989) theory of requisite organisation, and separated it out into 28 forms of thinking. These became Laske's question-set, which he uses to elicit a person's unconscious thought forms, and then to access the structure of a person's thinking through his Cognitive Development Framework (CDF). According to

Laske (2008), behaviour is a symptom of one's developmental level, and can only be explained and examined via this definition. This was based on the premise that the structure of a person's thinking generates the content (Laske, 2009). Laske's theory does not take into account an individual's capacity to respond in the moment based on their level of self-awareness and the resultant choice this awareness offers. Further to this, it could be argued that he also missed out the intention of the thinking and behaving, as our intention drives our attention, which is limited by the individual's level according to his theory. Implicit in Laske's theory is the person's future capacity and capability, but not their immediate response-ability. Laske discussed a person's level of development without discussing the construction of that development. When one considers the construction and awareness of a person's intention, their level of cognitive complexity according to Laske, will drive their cognitive development. It is arguable that this is a stage before their development, or the actual process of transition. Laske (2014) states:

I thought that the main issue in teaching CDF-interviewing as a dialogue method would lie in making clear the separation between the focus on "how am I doing" (psychologically) and either "what should I do and for whom?" (social-emotionally) or "what can I know about my options in the world?" (cognitively). This triad of questions for me encapsulates the mental space from within which people deliver work, without ever quite knowing how to separate them in order to reach a synthesis of self-insight. (2014, p1)

In this way, Laske articulates alternatives to what Cook-Greuter's theory surmises. It would be useful here to see how Laske, (2011) described the distinctions between stages and their thinking. See Table 1.2. The difference between development and learning is that learning is a change in time, whereas development is a change across time (Cook-Greuter, 1999). Some learning leads to developmental shifts, but in reality, most simply reinforce the person's current stage (Laske, 2006). See <u>Appendix 1</u> for a full description of Laske's stages.

Orientation	Level 2 (10%)	Level 3 (55%)	Level 4 (25%)	Level 5 (10%)
View of Others	Instruments of own need gratification	Needed to contribute to own self image	Collaborator, delegate, peer	Contributors to own integrity and balance
Level of Self- Insight	Low	Moderate	High	Very High
Values	Law of the Jungle	Community	Self-Determined	Humanity
Needs	Overriding all others' needs	Subordinate to community, work group	Flowing from striving for integrity	Viewed in connection with own obligations and limitations
Need to Control	Very High	Moderate	Low	Very Low
Communication	Unilateral	1:1 Exchange	Dialogue	True Comm
Organisational Orientation	Careerist	Good Citizen	Manager	System's Leader

Table 1.2: Changing orientation across adult stages (% of population)

Thus, from Laske's perspective, it could be argued that as we construct ourselves and our intention in the moment, the experience we pull into our construction takes time to unfold and absorb.

As we have seen so far, Laske was describing the behaviours of a Stage 3 person, which supported his earlier assertion. However, he was not stating *how* they think about others and how their thinking leads to these particular outcomes. It would thus be interesting to learn how the Stage 3 person constructs their meaning-making that leads to their stage of development.

Laske was specific in his thinking about higher levels of thinkers where he proposed that post-graduates have not reached a level of control, capacity, or proficiency in their thinking, so for them to embark upon graduate level work is potentially pointless. Laske (2015) and Cook-Greuter (2010) stipulated that students lack the cognitive capacity to meet the complexity demands found in these environments. Basseches (1984) demonstrated that within a university setting, faculty had a broader dialectical schemata range than third year students, who had a broader range than first year students, thus supporting the principles of adult growth in an academic context. Basseches (2005) goes deeper with the principle when describing a metaphorical perspective of students who articulated that lecturers/teachers are far too subjective when grading an exam or paper which suggests a lack of dialectical thought on their part.

Laske (2008) proposed a process for analysing the content of interviews to ascertain the most likely stage of adult development, based on the structural form of the interview content (how the participant said it), rather than the content itself (what they said). Laske (2015) stated: *only what can be measured can be managed* (p348). However, the nature of his measurement of capacity and capability potentially ignored the underlying intention of the interviewee, because even Laske uses a Likert scale (Likert, 1932) for his clients to selfreport their thinking capacity using his 'Needs/Press' questionnaire. This questionnaire generates data based on the subjective needs of the client in relation to the internal and environmental pressure the client feels in their organisation (p.297). Further to the point above, the Needs/Press questionnaire missed the underlying intention of the client, and how this intention would change their environmental perceptions.

Laske, (2008) stated that meaning-making (emotional) and sense-making (cognitive) lead to performance. However, it could be argued that there is no separation of emotional and intellectual development: there is only growth.

Behaviour is Complex

Cognitive complexity provides post-graduate students with the prospect of acquiring a clearer understanding of contextual (academic) variables. Denison, Hooijberg, and Quinn (1995) called this *behavioural complexity* and went on to say, should paradox exist in the academic environment, then it must be echoed in the behaviour [of PG students]. However, this is not necessarily the case if we were to consider the higher-level thinking behind the capacity to make the choice of appropriate behaviour in the moment. Where contrary or opposing behaviours are necessary, a low-complexity thinker, or a less self-aware thinker, would not have the capacity to choose a different behaviour, and it is this misunderstanding

of developmental levels that Denison, Hooijberg and Quinn's (1995) theory was missing. They did, however, state that a high level of cognitive complexity allowed for a more appropriate response to a wide range of situations, without actually demonstrating how one gains a high level of cognitive or behavioural complexity. To provide academic leadership, supervisors must also demonstrate behavioural complexity. This is the capacity to move between apparently contradictory positions with ease (Denison et al., 1995; Hooijberg & Quinn, 1992; Middlehurst, 2007; Hooijberg, Lane & Diversé, 2010). Supervisors thus must nurture and motivate students, deal with their individual issues, whilst simultaneously demanding that they complete assignments to the appropriate post-graduate standard on time. This required the detailed monitoring of student performance. Not only must supervisors be capable of thinking paradoxically, they must also be able to behave accordingly with no discomfort (Eggen and Kauchak, 2013). Behavioural complexity makes available a range of behaviours necessary for effective leadership within an academic context which can directly translate to the behavioural and developmental requirements of the post-graduate student. It could be argued that when discussing behavioural complexity, the authors were talking about the intention, awareness, choice and response of thinking and behaving of the individuals in the moment, and in context.

Criticisms of Stage Development Theory

Broughton, (1984) and Scott-Janda and Karakok (2016) argued that the ideas of Piaget and the growth beyond the postformal stages would be best served abandoned rather than revised, for not explaining why development occurs, and why some develop quicker than others. This is evident in a quote from Larivée, Normandeau, & Parent (2000, p. 828): "...*a particular situation may facilitate one subject's ability to solve a problem, whereas it may hinder another's*." It would thus be interesting to discover the self-awareness (or lack of) for each individual to find the difference that makes the difference.

Commons and Richards (1999) suggested that postformal research does not actually talk about different stage development sequences, but instead about many different manifestations of the same stage sequence. This also aligns with Erickson's and Arnett's ideas on regression to lower stages, but it needs to be mentioned here that a visible flaw in almost all research based within universities is that emerging adulthood can only be achieved by affluent middle class adults who can afford to spend longer at university, participating in the introspection (Peterson & Merunka, 2014). This ethnocentric specificity is a drawback to stage development theory (Hendry & Kloep, 2007). The same can be said of Levinson's stage theory as it involved predominantly American middle-class individuals. According to Robinson (2013), almost all the research undertaken on stage development took place in affluent middle-class Western countries.

Hendry and Kloep (2007) also pointed out that categorising general developmental stages and transitions based on age is a potential issue. As mentioned previously, decalage has been used to refute the concept of developmental stages (Bond, 2010). Laske (2015) stated that his stage 4 cannot be achieved by children due to their lack of life experience, however, it should be possible to have a (Laske-esque) stage 4 thinking 20-year-old by virtue of their high self-awareness and subsequent choice of response. It is also possible that as the environment changes due to technological improvements or cultural influences, existing stages and stage transitions will change accordingly. For example: the Third Age has only been around as a recognised life stage for fewer than 50 years, and the Fourth Age is due to increased life expectancy (Robinson, 2020, pp. 165-166).

From a theoretical perspective, it should be possible that a more individualistic approach to development is necessary, as we see the idea of life-stage development being over-ridden by individual stages and choices (Côté, 2006;). The greater the individuation, the more stage theory must adapt, and with a more flexible approach to adult development. How new cognitive structures emerge, either from assimilation or accommodation (see Bringuier, 1980) is an issue not only for Piaget, but also in other specific theories, such as: theories of action (e.g., Adolph & Berger, 2006), theories of learning (e.g., Jacobs & Michaels, 2007; Lattal & Bernardi, 2007), theories of language acquisition (e.g., Goodman, 1997; MacWhinney, 1999; Ramscar & Yarlett, 2007), and theories of organisation (e.g., Hummel & Holyoak, 2003; Kalish, Lewandowski, & Davies, 2005).

Gilligan (2005b) examined the failure of developmental psychology to take into account the perspectives of women. She noted that Freud's: "*difficulty in fitting the logic of his theory to women's experience leads him in the end to set women apart, marking their relationships, like their sexual life, as 'a dark continent' for psychology*" (p. 693). Kohlberg's samples were exclusively men and came under fire from Gilligan for the same reasons. It would be almost impossible to differentiate between male and female judgment, as an example.

King and Kitchener (1994, 2004) and Dwyer, Hogan and Stewart (2014) built on Piaget and Kohlberg to examine how reflective judgment evolves. From a post-graduate student perspective, this is important as critical thinking is aligned with reflective judgment. Reflective judgment occurs when one encounters a badly-structured problem (Churchman, 1971; Saaty, & Kearns, 2014), or adaptive challenge (Heifetz, 1994) which "*cannot be defined with a high degree of completeness, and that cannot be solved with a high degree of certainty*" (King & Kitchener, 2004, p. 5). Reflective judgment moves from assuming that knowledge is certain to recognising that knowledge creation involves uncertainty. This, however, assumes a certain level of complexity in the actor's thinking. Thirdly, to using evidence and an understanding of context to support one's cognitive outcomes. Their work criticised two fundamental assumptions of stage models. Firstly, individuals operate at one stage at any given time, and using Fischer's skill theory model, (1980) they confirmed developmental variability. Secondly, these stages were cross-culturally valid. They also looked at performance being domain specific, which is in contrast to ego stage models, where development is applied across all domains.

It is these issues plus the need to address the roles of environmental impact and emotion in development that will be addressed next.

Section Summary

In summary, this section has demonstrated that the qualitative nature of stage development suggests that new objects of awareness at the higher stages are not within the limits of awareness for the lower stages (Richards & Commons, 1984). Also, according to the Model of Hierarchical Complexity (Commons, 1984) stage is a property of (or function of) subject behaviour or response (Commons, Trudeau, Stein, Richards, and Krause, 1998). Further to this, there are potentially a number of intentions that are not available to those at the lower stages of development but are available at the higher stages. It is not only the meaning-making that changes, but the intention behind the meaning being created.

As researchers focused on task complexity, they understandably came to the conclusion that stages are an epistemological competence internal to an individual that is separable from performance (Commons, et al, 1984). However, Commons and Richards (1984) claimed that one can only assess the stage of response required by a given task, and thus what is measured is simply one's performance in said task, which comes with its own level of complexity. An important question to ask about Commons' work is: what if the task is not the task, and 'Thinking' is the task? Commons did not consider this, and it warrants further discussion, as he also stated that there is no such thing as competence. If one were to consider thinking on a dynamic scale, with complexity demands increasing as one ascends, then the act of thinking becomes the task and competence might exist by a different name:

dynamic intelligence. Commons et al, did not consider this perspective as far as is discernible in the literature and could be open for discussion later.

Counter to this perspective, Lourenço (2016) argued that it is possible to experience development without the need for stages. He went on to argue that should we not use stages as the benchmark, then charting vertical development will be difficult (p. 128).

It would also seem there is more to the transition between stages, or sub-stages than is demonstrated in this review so far, and what is not being offered is the intention of the thinking and behaving in context. The intention behind a particular way of thinking, rather than a level of cognitive complexity could help to answer this puzzle.

It is apparent from the literature that the transition between stages is less-than coherent in the developmental theories reviewed. It is thus necessary to separate out the stage theory from the stage transition in order to discover the actual transition through the stages of development. Stage transition will be discussed next.

1.2 Stage Transition

"... in psychology there are experimental methods and conceptual confusion" (p. 232e). Wittgenstein, 1953

As discussed in the previous section, the concept of stages is somewhat contentious. It illustrates the question of whether it is actually possible to transition from one to the next, or even regress under duress. Research on the movement between stages focuses on two things: transition or transformation. 'Transformation' describes the qualitative difference between orders of consciousness in terms of meaning-making and how we move between them (Kegan, 1982), or in terms of Loevinger & Blasi, (1976), from one level of ego development to the next. 'Transition' is the incremental movement between stages and is explained in the Model of Hierarchical Complexity (Ross, 2008).

The type of western academic reasoning made by scientists appears to represent Piaget's conclusion for the stage sequence concept, and as such it tends to cast its shadow backwards into infancy as the obvious genesis of the system (Kessen,1984). However, there is no reason to use stages as the *de facto* measure. It would be equally valid to ask about developmental phases, levels, cycles, layers, seasons and so on (Levinson, 1986). A number of psychologists use levels as their preferred measure: Fischer's (1980) theory of thirteen hierarchical skills, Turiel's (1983) social domains approach has seven major levels, and Karmiloff-Smith's (1992) model of representational re-descriptions are three such examples. However, it is questionable as to whether another name for what is essentially a heuristic for the mapping, not necessarily the explaining of developmental change, is any more useful or clear. The development of children is primarily focused on strategies for skill acquisition which is not the main focus of this study. With this in mind, it is more appropriate to focus on the adult development stage transitions as mentioned.

If we consider the many adult developmental psychologists and researchers who extol the use of stages to demonstrate their theories, a pattern arises in each theoretical position in

that one theory apes another, without deviating from an accepted norm. There is an element of isomorphism in Table 1.3, which shows this alignment.

Stage	Hy & Loevinger 1996	Cook-Greuter 1999	Rooke & Torbert 2005	Joiner & Josephs 2007	Kegan (1982, 1994); Kegan & Lahey (2009)	Fischer	Laske (2008)	Stevens, 2020 Constructed Development Theory
jeu				1 1 1	Self-sovereign mind		00	
ojjuəz	Impuisive EZ	Impulsive	impuisive (2)	Entrusiast	(2nd order of consciousness)		Instrumental 2.0	Unaware 5.0
1009 0 .	Self-protective E3	Self-protective	Opportunist	Operator	Socialized mind (3rd order)	Representation		
ď	-	_	(2/3)	_	Traditionalism	al Systems	Socialised Mind	Other-Unaware
ojju	Conformist E4	Conformist	Diplomat (3)	Conformer		Simple Abstractions	0.0	
jel Ið A	7	y		1	Self-authoring mind	Abstract		
u 1 <i>00</i>	Self-aware Eb	Self-aware	Expert (3/4)	Expert	(4th order)	Mapping		
9	Conscientious E6	Conscientious	Achiever (4)	Achiever	Modernism		Other-Dependent	Other-Aware (7.0)
Transitional Postconventional	Individualist E7	Individualist	Individualist (4/5)	Catalyst		Abstract Systems		
JEUOJ	Autonomous F8	Autonomous	Strateoist (5)	Co-Creator	Self-transforming mind	Single Principles		
иәли			(a)	5			Self-Authoring	Self-Aware (8.0)
୲୦୦ୢଽଽ୦ୄୄ୶	Integrated E9	Construct Aware	Alchemist (5/6)	Svneraist	(5th order) Postmodernism		JUJE 4.0	
Transpersonal	5	Unitive	Ironist (6)	,			Self-Aware	Construct Aware (9.0)

Table 1.3: Developmental Stage Theories

From Table 1.3, one can see the convention for naming and categorising stages of adult development. However, this does not immediately give rise to the process of growth,

the actions of development and the constituent parts of that process. What this review is interested in is the transition *between* these stages, an individual's awareness of this growth, and the process of growth in one's thinking that propels cognition vertically.

A secondary aim of this review is to understand the transition between these stages in a way Peacocke (2007) did not cover. A potential issue with Kegan's (1996) and Laske's (2008) interpretations of their level-specific behaviours is that they both assign higher levels on their respective scales than the behaviours should warrant, as the example behaviours given do not demonstrate a high level of self-awareness in the moment. See <u>Appendix 1</u> for a full description of Laske's developmental stages.

Awareness in the moment

Peacocke (2007) claimed in his '*Principle Hypothesis*', that mental events of judging, deciding, reasoning, and so on, are a class of action, and that they offer an efferent copy which also offers immediate and non-sensory information about them. Although this is motorsensory, Peacocke was nevertheless offering an explanation of how one's thinking could be aware in the moment. The premise of his theory was that one can try (and fail) to believe something, and one can try (and fail) to forget something.

However, it is erroneous to claim that believing and forgetting are mental actions in themselves. Rather, they are events (or states) that direct action will bring about. Peacocke was rebutted frequently for being too shallow in his argument (Zimmerman, 2006; Fernandez, 2006) and further, it is argued that he missed out the facet of 'intention' in one's thinking that drives the mental behaviour in the first place. It could also be argued that *trying to forget* is an intention, which is potentially more key than the action itself, and Peacocke did not attempt to address this. The argument put forward by Carruthers (2009) to rebut Peacocke's claims was not complex enough, and thus did not repudiate Peacocke's argument nearly enough when he stated that:
So while I am happy to accept the criterion that an action is an event that constitutively involves a trying, I want to emphasize that the fact that we describe ourselves as trying to decide, or trying to imagine, does not yet settle the active status of the attempted events. (Carruthers, 2009. p 142)

When asked how one can have first-person knowledge of mental events, Peacocke's response was: in the same way we have knowledge of our physical actions. For this reason, Peacocke's Action Awareness theory is not developmental, as it is focused on the motorsensory aspects of awareness. This could be labelled today as 'somatic intelligence' (Carruthers, 2009). Whilst fascinating, bodily knowledge has little to do with awareness of oneself as a cognitive being (Carruthers, 2009, p134). However, how we know what we know about our mental state (our epistemic knowledge) is arguably more fundamental than either knowledge of our traits, as in personality, or knowledge of our self as an ongoing mental state. The way we move from one state of knowing to the next, as described in the last section is the focus of this section.

Developmental stages form the foundation of Piaget's (1983a) theory of cognitive development, Erikson's (1968) theory of psychosocial development, Kohlberg's (1984) theory of moral development, Commons' (2008) model of hierarchical complexity, and so on. Stages of development are also accepted by several neo-Piagetian theorists (e.g. Case, 1985), and have been applied to various domains such as belief/faith (Fowler, 1981), progress in art (Gablik, 1977), aesthetic experience (Parsons, 1987), education (Egan, 1997) and more. Awareness is impaired by the notion that stage transition is slow, according to Armon and Dawson (1997) who showed that people generally transition [a stage] roughly every two years. The question arises here: is there a shortcut one can take that would expedite transitioning?

The fact that many developmental theories depend on stages to define their progress in differing fields lends support to the concept of stages existing, despite the variety of meanings made. Where executive control functions are at the heart of Case's (1985, 1992)

theory, they play no part in Piaget's (1983) or Kohlberg's (1984) theories. It could be argued then, that the position of meaning-making could be a potential problem for children and adults alike when referring to a stage. By extension, the idea of stages is dominant in development research because stages are what is researched. A tautological argument being semantically argued for whilst testing for it becomes a self-fulfilling prophecy as we inevitably find what we seek.

Without this concept of stages though, we would not have the useful heuristics for mapping the developmental path of children and adults on a continuum (Lourenço, 2016). To paraphrase Voltaire (1768), if stages did not exist, it would be necessary to invent them. A variety of researchers have tackled the question of what creates development in a number of ways: social context has been a major contributor, with its signs, tools and practises influencing development (Vygotsky, 1978; Wertsch, 1985; Cole, 1988; Rogoff, Mistry, Goncu & Mosier, 1993; Cole, 2013; Goncii, 2013). The nativist approach attributes development to the growth of our innate abilities (Gesell, et al., 1940; Brown & Jernigan, 2012), seen specifically in language development (Chomsky, 1980; Fodor, 1975). Previous thinking aligned a person's genetic constitution and actual experiences as the driver for development (Murgatroyd & Spengler, 2011; Gottlieb, 1991; Scarr, 1993). However, genetic constitution is an inadequate factor when it is not clearly defined. A more recent attempt by Plomin (2018) sheds some new light on this; however this is out of scope of the current study.

The scientific field of consciousness development can trace its origins back to Piaget (1948, 1954) on the cognitive development of children and adolescents. He showed later how cognitive development manifests in a meaning-making (Piaget, 1972) process that becomes increasingly more complex, which ultimately influences how we construct ourselves in the world. The process of refining one's perspective of self in the world is possible with feedback

loops (Nelson, 1996; Winkielman, & Schooler, 2012). Further, Piaget (1970) observed that the tautological implications of one's mapping of the world reinforces our future mapping of the world, as we assume our maps must be correct, which is philosophically not the case. This tacit false understanding of one's world limits our potential to really be aware of our construction of ourselves in the moment, as we assume we are correct in our construction. Nelson, Kruglanski & Jost (1998) and Huntsinger & Clore (2012) demonstrate in their review of metacognition that the various sources of information made available when one tries to assess their self-knowledge and knowledge of others only really provides the 'raw materials' which then require interpretation in light of other implicit theories. This strongly contradicts the notion that we are in control of our thinking and behaving. It also emphasises that what we think we know is a result of a complex construction process (Lories, Dardenne & Yzerbyt, 1998).

The best way to demonstrate the need for growth, according to Piaget (1971), is when information comes in that contradicts our existing map of the world, and we are forced to remap our meaning-making system. Moving this research beyond adolescence, Wilber (2000) demonstrated a similar stage sequence for adults, where the stages of consciousness are comparable to world views, and meaning-making systems that are simultaneously cognitive, affective and functional (Cook-Greuter, 1999; Wilber, 2000). There are many claims by certain psychologists on what it is to be at a certain stage of development, from a person's ability to recognise and remedy emotional experience, to determining a person's profound life purpose, and how this affects behaviour in context (Cook-Greuter, 1999). These claims are much less profound when one reads the literature and understands the '*how*' of this understanding is not explained in detail by the psychologists in question.

The study of the mechanisms of change have been undertaken since the early 1980's by such psychologists as Keen (2011), Kuhn & Ho (1980) and Kuhn & Phelps (1982) who

used the methods of microgenetics to observe the evolution of finely-tuned behaviours over time. The fact that their processes involved observation suggests a level of experimenter input that is susceptible to the observer effect. Once merged with Vygotsky's dynamic assessment method, this did provide a more robust measure of development over time, rather than the snapshot method employed previously (Kuhn, 2009), however, it still did not break down the specific facets of the developmental process.

There is a long history of the difficulty of demonstrating empirically the existence of developmental stages (Commons, Trudeau, Stein, Richards and Krause, 1998). Traditional stage theory has been criticised for failing to demonstrate that stages exist as more than random descriptions of observations of sequential changes in human behaviour (Boom, 2011; Cavanaugh & Blanchard-Fields, 2018; Kohlberg & Armon, 1984; Gibbs, 1977, 1979; Broughton, 1984). Fischer, Hand, and Russell (1984), along with Case (1985) and Schneider, Niklas and Schmiedeler (2014), have demonstrated the problems of mistaking developmental *sequences of behaviour* with traditional concepts of stage development in the search for empirical evidence. Sequential acquisition of behaviour can obviously be demonstrated empirically, even though it is still effectively only a snapshot. However, Campbell and Richie (1983) and Destrebecqz & Cleeremans (2001) have suggested that an empirical demonstration of a stage would involve a qualitative difference between one stage and the next. This has proven more elusive (Commons, et al. 1998).

Commons, et al (1998)'s notion of 'stage' was based on the hierarchical complexity of tasks and then on the performance on those tasks by the actor. His General Model of Hierarchical Complexity used the hierarchical complexity of tasks as the basis for his definition of stage (Commons & Richards, 1984, p.240), and is described as:

Roughly, hierarchical complexity refers to the number of nonrepeating recursions that the coordinating actions must perform on a set of primary elements. Actions at a higher order of hierarchical complexity: (a) are defined in terms of the actions at the next lower order of hierarchical complexity; (b) organize and transform the lower order actions; (c) produce organizations of lower order actions that are new and not arbitrary and cannot be accomplished by those lower order actions alone.

However, the decision-making process in the moment is missed by Commons et al, who admit that: "If one measures less often, one sees jumps in performance or gaps between subject performance measured at one time. If one measures more often, one may see what appears more like continuous acquisition" (p.239). It could thus be argued that this perspective is not about how often one measures, but the actual process of stage transition that is taking place, which appears to have an element of task familiarity: the more one does a task, the better one gets at it. In other words, there is an argument for no stage transition, or hierarchy of stages, and it is instead a continual holarchy of growth. With that in mind, the hierarchy of the stages is defined by a variety of psychologists, from Piaget to Vygotsky, Torbert to Cook-Greuter, Kegan to Laske, and as such, there is not one unified explanation despite them appearing to measure very similar theoretical outputs. The commonly accepted four stages of development are: pre-conventional (childhood), conventional, postconventional and transcendent (Miller and Cook-Greuter, 1994). However, it could be argued that the act of labelling development a 'stage' movement has influenced the field to such an extent that developmental psychologists have been caught in a philosophical, ontological and tautological trap: we get what we look for. Further, potentially what is missing is a unified theory that underscores the intention in the moment that leads to awareness and choice in a context-specific response. The true subject of developmental research is change. What has been omitted so far is the unconscious intention behind the change. Cross-sectional 'snapshots' of a person's encounter with an experience can be developmentally limited in that they portray a different second approach to a problem based on the fact that it has been attempted previously (Kuhn, 2009 p109). According to Kuhn: the 'dynamic assessment' that goes back to Vygotsky, provides an informative picture of how an individual functions (p109). According to Kuhn & Phelps, (1982), in their microgenetic studies, individuals have

a range of strategies that they employ over time, and the most common developmental change is where new, more effective strategies gain ground and older strategies are used less often. What seems to be important for growth is strategy selection, rather than simply measuring performance in any experiences. This potentially translates to a change in intention but is not defined as such by those mentioned. They go on to say that a more difficult challenge in the process of development is not the acquisition of new strategies but the letting go of old ones. This is contrary to how development was previously thought (Keen, 2011; Kuhn & Phelps, 1982). What is not discussed here is the *intention* behind the transition and how it drives the new strategies. A new strategy would not arise out of old behaviours without a fundamental shift in an individual's awareness of the need to change, and their intention in the moment.

If we consider the cognitive development of humans not as stages, but as a continuous and contiguous developmental 'onion', with each 'layer' interacting with its neighbour in the fashion of a holarchy rather than a hierarchy, then growth becomes much easier to understand and we remove the need for stage transition as an explanation for human development completely. Also, from an intention perspective, it becomes much simpler to explain. This opens the door to the idea of backward transition, whereby an individual moves from a higher level skill (not necessarily a cognitive capacity) to a lower level skill in order to construct the higher-level skill more effectively (Fischer & Granott, 1995; Granott, 2002). This allows the individual to be more flexible in devising solutions to more complex tasks. Livesay (2015) described this phenomenon as 'fallback' which he attributed to leaders as part of their growth to postconventional development. Like Fischer and Granott, he also saw this as a positive step as it often indicated an opportunity for accelerated growth once having fallen backwards.

The hierarchical and integrative organisation of the stages of complexity development is almost always illustrated as a spiral diagram, where it is implied that each successive stage

is higher than the previous, and it incorporates and subsumes the strengths and weaknesses of the previous stage, as already mentioned (Piaget & Inhelder, 1969). When Kegan (1982) stated (cited in Baron & Cayer, 2011, p.348):

"individuals who have reached the second conventional stage of consciousness, the so-called Expert stage, are able to easily communicate their opinion of the technical quality of a colleague's work (an object of awareness), because they are less subject to the need for group approval and the conformist strategies that hold sway in the previous stage..."

He did not, however, say how he knows that the person can 'easily communicate' nor how they gauge the 'technical quality' of the work. It would be advisable to question the scale used. What lets them know what is 'good', and what does 'quality' mean. These are two very different ways of being within Kegan's Expert stage, for which Kegan was either not explicit about or not aware of. This is not obvious in Kegan's writing, who used the word 'transition' and aligned it with tension or dissonance in a person's thinking that lead to a struggle in the process of growth, and he stopped short of describing the actual act of this transition, instead referring to it as a continuum until fully embedded within the new (higher) order (Kegan, 1994). Piaget's own proclivities on the use of stages were:

Why does everyone speak of stages? ... One tries to construct stages because this is an indispensable instrument for the analysis of formative processes. Genetic psychology attempts to envisage the construction of mental functions, and stages are a necessary instrument for the analysis of these formative processes. But I must vigorously insist on the fact that stages do not constitute an aim in their own right. I would compare them to zoological or botanical classification in biology, which is an instrument that must precede analysis (Piaget, 1977, p. 817).

When we consider that the Formal Operational stage represents a higher level of equilibrium than the Concrete Operational stage because formal thinking includes negation and reciprocity, whereas concrete thinking only has one (negation or reciprocity, but not both. See Piaget & Inhelder, 2013; Inhelder & Piaget, 1958; Piaget, 1960), we can also question whether there is a way to further deconstruct these stages. This aligns with the proclivities of Dawson-Tunik, Fischer & Stein, (2004), who stated that stages should be a vehicle for analysis, not a core process at the heart of the theory of development. They went on to say:

"we do not think that developmental stages should be the centrepiece of a developmental theory. At the centre of such a theory, we seek fundamental principles that can explain and predict developmental phenomena, not simply describe them. Stages are descriptions of phenomena. Even when stage definitions are highly abstract, they must point to observables. That is their value. They allow researchers to make structured observations of behaviour, and in doing so, provide the possibility of deeper insights into the functioning of the mind" (Dawson-Tunik, Fischer & Stein, 2004, p261).

Within Common's (2008) model is a repeating pattern of transitional steps that lead to each stage, whether a simplistic movement or a complex transition (Ross 2008). This requires a level of persistence in order to achieve their goal, potentially in the face of complexity and ambiguity. One could ask whether it is their intention that will need to change in order to facilitate growth?

Commons (2011) and Ross (2008) essentially said that abstraction is the result of reflexivity, and the ability to transcend. The symbolism is increasingly more generic and ambiguous, which meant it is open to interpretation and miscommunication from those people at the lower levels of adult development. Two people at Laske's stage 5 have no such miscommunication as they got there on purpose and by choice, so the symbolism is accepted and thus not misinterpreted by either as each knows it is their interpretation only, not the other's. Again, the intention behind the act of doing this was not explicitly deconstructed in Commons' or Ross' explanations.

Commons et al., (1999) also pointed to a concept called decentration, as opposed to concentration, which meant one is willing and able to step out of one's own perspective and adopt a new perspective on a given problem. In other words, the ability to imagine things that do not exist and to 'bring them to life' in the imagination, Commons called 'thinking in *n*-space' (p297). Hindsight offers a perspective on development where Commons and Bresette (2006) framed the achievements of previous innovators as easier than expected due to the

simple fact that the present is embedded in the 'now' and as such, everything has taken place since a particular innovation. These events were not available to the innovator at the time of conception or discovery, and any sense-making surrounding them is constructed wholly from a position of 'now'. This creates a different lens through which to view the innovation or discovery (Commons & Bresette, 2006).

Finding the Bridge

Another way of looking at stage transition is called 'bridging'. Bridging is the process of leaping into the unknown (Granott, Fischer & Parziale, 2002) and is found within 'microdevelopment'. Researchers in this field focus on the 'how' of development (and learning) and on attempting explanations to transitional processes (Granott & Parziale 2002). It is called 'micro' as it focuses on the process of change in the very shortest of timespans: from months to just minutes. Early studies by Saada-Robert & Brun (1996) and Inhelder & Cellérier (1992) confirmed and added knowledge to Piaget's ideas on constructivism and interactionism. With constructivism, they emphasised that existing knowledge is not simply applied to a situation: it is reconstructed in accordance with the situation (Saada-Robert & Brun 1996). With interactionism, they emphasised the role of the situation/environment and ascribed a greater significance to 'accommodation' in the relationship an individual creates with their environment. The environment can be seen as micro and macro, where boundaries on development are set at the macro level, which affects the microdevelopment sequences within a given context according to Granott (2002). Granott (1998) and Smith and Pourchot (2013) also suggest that when social and physical environments are unrestricting, allowing for agency and initiative, they can encourage microdevelopmental progress, which in turn, promotes macrodevelpment progress. Research shows that bridging is a development transition mechanism that people use unconsciously across all development levels. The question one could ask here is: if bridging were undertaken from a position of intention and

awareness, with a view to choosing to bridge, would the bridge change? This is not obvious in the literature.

As mentioned previously, a snapshot of a person's state can be developmentally limiting (Kuhn, 2009) although the comparison of snapshots over time can provide an understanding of an individual's capacity at specific stages or ages (Granott & Parziale 2002). However, there still remains a lack of understanding as to how change actually occurs (Siegler & Crowly, 1991; Chinn & Sherin, 2014). By looking for the microdevelopment processes instead of focusing on static snapshots, researchers have been able to highlight its main attributes by observing the process of change. Microdevelopment was viewed as a paradigm shift in cognitive growth theory (Lee & Karmiloff-Smith 2002; Granott 1998). Bridging allegedly provides one answer to the central question of how more complex structures can be achieved on the basis of less complex ones. It is suggested that the argument is not for more or less complex structures, but the actor's awareness of intention behind the structure in question. Granott (1993, 1993b) and Wozniak and Fischer (2014) observed the mechanism of bridging in a study on adults solving problems. "Bridging appears to be prevalent," (Granott et al. 2002 p151). There are three ways to define the process: firstly, bridging is a partial, transitional step that, in itself, does not constitute a developmental level. Instead, it represents a search for new knowledge that can result in 'a glimpse of new development' (ibid. p134). Secondly, bridging operates with 'not-yet-constructed' knowledge. It sketches an unknown target level and sets an 'anchor' in the next level up and pulls the developmental process toward constructing this level (p134). Finally, during bridging, individuals function on two different levels of knowledge simultaneously. In an unfamiliar task, they work on it directly at a low level (comfort zone). They also work at a higher level where they construct a bridging 'shell', albeit still empty of content knowledge. They use this higher-level shell to guide their knowledge construction by gradually filling in

the shell's unknown component. Laske (2008) would ask the developmental question here: *what are you not seeing that is equally important*?

However, it is arguable that 'bridging' using a 'shell' is simply a synonym for 'personal scaffolding' and as such, offers nothing more to the investigation of how a person transitions from one stage to the next. All proffered explanations of what is taking place do not explicitly state the transition, only a description of the bridging process, which is likened to a physical bridge over a motorway. This is the same concern when reading other stage development psychologists in their area of expertise, such as Commons (1984) and Jaques & Clement, (1991). An example would be the following given by Granott, Fischer, & Parziale (2002, p141), on the transition between stages:

'As Marvin was putting his hand around the robot, Kevin commented: 'looks like we got a reaction there.'

Kevin implied but did not specify cause and effect by using the word 'reaction'. Kevin meant this as a bridging term which alluded to the unknown cause. It is the word 'reaction' in this case that is the target-level shell as it implies more advanced knowledge currently out of reach as Kevin and Marvin have not specified a previous causal relationship. According to Granott (1993a), the empty shell indicated progress and assisted the construction of the missing knowledge. However, the process of construction and the object being constructed within the shell was missing.

The description went further and included 'pillars for support', but if we were to break down the above paragraph and discuss what was actually happening when Kevin commented on the outcome of the robot movement (apart from an assumption of agency), the entire paragraph can be negated based on a total lack of meaning-making by the authors. Kevin's meaning was not explicit in his spoken sentence. Kegan (1982) would question the construction of the meaning by Kevin before allowing it to pass to the listener. Marvin's meaning-making would not be the same as Kevin's, and according to Laske (2009), it might not be as capable as Kevin's thus creating an entirely different interpretation of the language used. Thus, a different meaning was implied or inferred by Marvin. How the authors defined 'reaction' and imposed a meaning-making structure around it, which they then labelled as a 'shell', was also problematic, unless there was a mutually-agreed meaning frame.

This then begs the question: what is the 'bridge' if it could be different for each person? The authors went on to say that: the content (cause and effect) of Kevin's statement was still missing. By sketching a target level, the shell guided toward further development; except that this is not obvious from the literature. It could be argued that that what was occurring in Kevin or Marvin was a change in intention, which would lead to development, but this would have to be qualified with a change in their individual awareness. According to Granott et al., (2002: p142): *"The vacant structure traces a goal for future development and, like an attractor, pulls the process toward it... The target level serves as a magnet, attracting the process of knowledge construction toward a more complex skill."*

The authors explained (ibid. p142):

The marker shells serve as place-holders that people use to direct their own learning and development toward achieving these targets... Bridging operates as an attractor in dynamic systems and pulls development toward more advanced, relatively stable levels. The shells serve as scaffolds that guide the construction of new knowledge by providing a perspective for processing new experiences.

The main criticism of this perspective is that the empty 'shell' serves as both the bridge and the scaffold, and yet the shell is derived from an intention by the actor to 'achieve these targets', which makes the whole theory circular and self-fulfilling. Setting the target, however, defines the ultimate goal that then guides further growth. "*Bridging is a self-scaffolding mechanism that bootstraps one's own knowledge*" (ibid. p145). The targets are achieved by the shell bridging the gap [to the next level] by being its own scaffolding to the target [level] which attracts knowledge construction towards the new target [level]. The implication is that the missing cause is enough to direct the participants' observations and

actions (ibid. p142). The authors go on to say that after the bridging statement, Kevin and Marvin focused on discovering the missing causality. It is arguable that this was a shift in their intention due to a raised awareness which created a new choice in their thinking and behaving. Granott et al., (2002) even suggested that: "The phenomenon is paradoxical, since this goal-oriented process is guided by an unknown goal." (p. 149) When said goals are set, the ways to reach them (bridging) is unknown. However, the intention is known: to reach a new goal. One is compelled to ask whether something has changed in their thinking in order to progress their intention to the goal. This seems to be missing from the explanations given by Granott, et al, who treat the bridging shell as a perspective-guiding entity, rather than the seeking of missing knowledge. According to Harney, (2018) bridging clarifies how people create goals for their learning and development and then directs them to construct new knowledge. However, the 'how' of this construction is missing. It would also be considerably influenced by a person's level of adult development (Kegan, 1994) in the sense that an individual at Stage 2 would have a very different mechanism for constructing their goal state and knowledge acquisition process to an individual at Stage 4. This again appears very circular. There was no suggestion that a person can self-develop when limited by their level of development as discussed by Laske (2008), where he suggested that those at the socialised mind stage of development (his stage 3) will not be capable of seeing the stretch necessary to grow their thinking vertically, unless it is pointed out by a more complex other.

What Granott, Fischer & Parziale (2002 p151) called a growth motivation, could also be considered an intention: "...we have demonstrated, a need can guide learning and development... A need expressed in a vague statement may be a sufficient trigger for developmental change." Kuhn (2002) examined the systematic construction of knowledge and concluded likewise that: "we cannot fully understand the kinds of knowing and knowledge acquisition that people engage in without understanding their beliefs about

knowledge" (p. 123). In other words, their epistemic stance or, how they know what they know.

Other theories on stage movement are considered by McGuire and Rhodes (2009) who described vertical stage development as a three-step process:

(i) a person awakens to new possibilities of sensing and doing things

- (ii) the person then challenges and unlearns assumptions, and tests new assumptions
- (iii) new ideas get stronger and begin to overtake the previous ones

Harney, (2018) makes the assumption that this is how individuals proactively shift to a later stage of development. However, this is an assumption because the explicit process in step two (ii) is ambiguous. As has been written, an individual's capacity to 'unlearn' something is predicated on their awareness of their need to give up the information in order to move on to the next level of thinking. This was not possible in Laske's (2015) CDF as his stage 2 person did not know what they did not know and had no capacity to gain the information.

Palus and Drath (1995) also listed criteria for an individual's capacity and willingness for growth. Some deliberations included: openness to new ideas, complexity of job challenges, stability of current life circumstances, and environmental conditions. Marko (2011) investigated the triggers that allowed developmental change to occur, defining a trigger as a construct that (p. 87):

provides the impetus for ego development to occur or signals the occurrence of ego development.

He asked participants of a questionnaire to recall a critical incident they felt had influenced or changed their perspective or way of being, and inferred from this a 3-phase process that had, very simply, a beginning (trigger), a middle, consisting of incremental changes, but as previously, no specific method of determining how or what constructed these steps, and a final step that allowed the individual to 'let go' (p. 91) of the old ideas and embrace the new understandings of the next level. This is akin to both Kegan's (1994) method, and Laske's (2008) process.

Petrie (2014) mirrored Marko's findings and presented three alternate elements that constitute growth between levels of adult development:

- intense stretch experiences (what),
- new ways of thinking (how), and
- strong development networks (who).

Petrie (2015) later refined them and termed the three primary conditions for development as:

- heat experiences (initiates),
- colliding perspectives (enables) and,
- elevated sensemaking (integrates).

This multilateral model aligned with the findings of Manners & Durkin (2001) and Manners,

Durkin & Nesdale (2004).

Developmental Limbo

Every transition involves, to some extent, the killing of the old self... (Kegan, 1982)

Kegan (1982, 1994) suggested that consciousness development is brought about by experiencing the gap between one's meaning making and the challenge being faced. He went on to say that it was rarely deliberate and could be painful. Kegan (1982) echoed others such as Vygotsky (1978) when he argued that human development cannot be considered independent from their social environment. Further to this, development could be facilitated by the availability of what Winnicott (1965) referred to as 'holding environments'. Vincent, Ward & Denson (2015) highlighted a similar finding (p242) that they also called 'holding environments' due to the naturally 'disequilibrating' nature of the experience. Ashforth et al., (2008) used the term '*identicide*' to describe the same 'disequilibrating' phenomenon.

Deci, Ryan, and Guay (2013) stated that the social environment plays a critical role in an individual's cognitive development by supporting their psychological needs. It is apparent that the authors of the disequalibrium perspective, such as Kegan, have written the stage transition from the perspective of Stage 3, socialised mind, which would indeed feel an emotional pain by the apparent 'loss' of self if told this is what they should feel. However, from a Stage 4 perspective, it would simply be accepted as part and parcel of their growth as their awareness changed. In this sense, the context, or holding environment, becomes a contributing factor, but not necessarily a negative one.

Interestingly, Vincent, Ward & Denson (2015) explored the impact on vertical development in leadership programs in Australia, aligned with Manners' and Durkin's (2000) conceptual framework. A framework was created that provided a form of self-assessment which enhanced participants' self- and other-awareness, such as peer assessments, coaching and case studies that stretched their thinking beyond their own organisational level. Vincent, et al., (2015) found that in order to trigger development, not surprisingly, more challenging psychological development activities were necessary. It follows then, that in the context of academia, if there is to be a fundamental shift in how post-graduate students construct their thinking in such a way as to facilitate vertical growth, they are going to need to be exposed to more adaptive problems as experienced in industry. If the context remains unchanged, no amount of development is going to influence the post-graduate student's thinking without some disruption from a more complex guide acting as the 'trigger', as internal scripts and cognitive links are often resistant to change (Young & Wasserman, 2005).

Understanding a post-graduate student's stage of adult development and ensuring a supervisor is at least at the same stage, will ensure the chances of a successful supervisory relationship (Garvey-Berger 2012; Bennet 2010; Kegan 1994; Laske 2006). Writing on the topic of vertical development, Cook-Greuter (2004, p. 277) stated:

Only specific long-term practices, self-reflection, action inquiry, and dialogue as well as living in the company of others further along on the developmental path has been shown to be effective.

As per Vincent, Ward & Denson (2015)'s perspective above, Garvey-Berger (2012) gave the same advice: a problem should be one manager-removed. In other words, participants on any development programme should be solving the problems faced by their manager's manager

in order to stretch their thinking. From an academic perspective, this would be more difficult to implement. However, a post-graduate student can have their thinking challenged by the exposure to their level of awareness which will result in different behaviours in context.

The Person is not the Behaviour

The concept of stages has been rejected by a number of behavioural psychologists, most notably Skinner (Skinner & Vaughan, 1983; Gross, 2015). Behaviourists acknowledge that a chronological acquisition of various behaviours is necessary, however, have not yet provided a conclusive process or method. Gerwitz (1991) and Fonagy (2018) stated that Piaget's stage process is particularly objectionable as it assumes an automatic growth rather than development being produced by the interaction between actor and environment.

From a post-graduate student's perspective, this could be a significant difference that could have an impact on their final grade. There are those who focus on IQ studies and maturation (Berk, 2010; Sharma, 2012; Binet & Simon, 1916; Gesell & Amatruda, 1947; Terman & Merrill, 1937; Wexler, 1982) who consider development a sequence rather than a set of stages. There are also those who reject stages and who characterise development in terms of periods in one's life. Erickson (1978, 1982) and Levinson (1986) thought these periods specialised. Flavell (1963), Dmitriew (2011), and Alexander, Druker & Langer (1990) thought there are only three or four broader periods in life and are seen as sequential but not hierarchical, and not strictly organised. Development from a period perspective would be characterised more as socialisation, whereas stage development, as mentioned, would be considered transformation.

Finally, as mentioned in the previous section, a number of stage theorists have provided an analysis of the limitations on stages, such as Dmitriew (2011), and Campbell & Bickhard (1986, 1992). These theorists undoubtedly accepted the notion of adult stages and provided a psychological analysis of the stages. The issue, according to Commons (1984) and

Jaques (1991) was that it neglected the task analysis that would support their developmental claims. It is appropriate that Campbell and Bickhard rejected task analysis as an insufficient explanation to the problem of stage transition, but their logical analysis does not offer an explanation for what was the difference that makes the difference in task complexity. A levels account such as Campbell and Bickhard's, and other developmental psychologists did not offer a sufficiently detailed account of inter-developmental steps. It is here that one would enquire about an individual's intention to grow, or awareness of the growth potential as a possible catalyst, as well as any habituated patterns of thinking that unconsciously propel an actor to act.

Section Summary

The main principles discussed in this section are that the transition from one level of thinking to the next higher level is not explicit as a process by the respective theorists. It is hinted at, suggested and described; however, it is not explained in a way that would cement the theory as a stage transition.

As has been discussed, as a result of the work of researchers such as Loevinger, Kegan, Cook-Greuter, Torbert and many other scholars in this domain, there is a wealth of literature regarding what the various stages of adult development look like in terms of degrees of meaning-making complexity. There are also a corresponding number of measurement instruments which measure degrees of cognitive complexity, such as Laske's (2007) Cognitive Development Framework, or Loevinger's (1979) Sentence Completion Test. The general principle throughout the sections on stage development and stage transition is that an individual's growth influences how he or she copes with uncertainty and ambiguity. For example, Kegan's Stage 3 individual (socialised mind) will seek guidance from experts (External) to find the best way to achieve. Kegan's Stage 4 thinker (self-authored mind) follows endogenous principles, whilst determining multiple ways of moving forward to

achieve their goals. Kegan and Lahey (2001) described the process as one of: "outgrowing one system of meaning-making by integrating it (as a subsystem) into a new system of meaning-making" (Drago-Severson, 2004, p21). Kegan (1982, 1984, 1994) (and Laske, 2008) stated that a person's stage growth involves a tension between stagnation and movement within the cognitive, moral and psychological arenas, and can thus be a painful one that triggers a loss of self when moving, for example, from Stage 3 to 4. Were a postgraduate student to go through this transition whilst in academia, they would require scaffolding by a more complex other (MCO) as mentioned above. Developmental growth refers specifically to the transition by the individual to a more complex (cognitively-capable) mindset. This vertical growth is predicated upon an individual's unconscious intentions, which are embedded in the subjective self and thus cannot be reflected upon until they are brought to awareness (made object) and then available for reflection (Yorks & Nicolaides 2012). How this reflection then results in a transition to a higher level of cognitive complexity is an enigma which numerous scholars continue to question (Spence & McDonald 2015; Harmer 2015; Hawkins 2015; McLaughlin 2014). One potential factor for growth is a person's intellectual capacity. The general mechanisms underlying learning and problem solving, as discussed, depend on developmental processes that include an individual being more mentally efficient, capable, foresighted and flexible. An individual, whether child, post-graduate student or adult who demonstrates these could be considered more intelligent, traditionally speaking.

It is thus important to include intelligence in the discussion to understand how it is perceived in the literature. This will be discussed next.

1.3 Intelligence Introduction

Even though Descartes (1637) summed up the essence of being with his: *cogito ergo sum*, he did not presume one acquires knowledge in their thinking. However, it is clear that both

thinking and knowledge acquisition take place internally (Brown, 2016; Rumelhart, Hinton, and Williams, 1985). It would be easy to fall into the trap that thinking is learning, however research shows it is not that simple (Bannister and Fransella, 2013). The fields of cognitive psychology and developmental psychology can be used to form a guide for a way of determining a student's preferences for thinking (Armezzani and Chiari, 20014; Flavell, 1976).

It has been argued that an individual's identity and thinking patterns contribute to their preferred cognitive styles (Borgotta, 1964; Buss, 2009). What is evident from the literature is that one's personality, biology, and specific demographic variables only serve as a knowledge base or foundation, and not the actual thinking intention (Bluck, Alea, and Ali, 2014; Chen and Lee, 2013; Figueredo et al., 2010; Hopwood et al., 2011). These variables act as a catalyst from which an individual builds up their personality. Students do not think or apply thinking to their learning through a process of steps because of what type of personality they have (Evans, 2010). Every person thinks, and every baby is born on a relatively even playing field (Blonigen et al., 2005), without prior knowledge. However, they do construct knowledge, through developmental stages as a result of interactions with the environment (Piaget, 1954; Blonigen et al., 2005). How one takes these interactions and approaches the thinking process, allows links to one's natural ability for thinking, and then puts in place the measure for those preferences for thinking (Buss, 2009; Goldberg et al., 2006).

There is a difference between thinking and the application of what is thought, reflected, or inquired (Bannister and Fransella, 2013). Thinking is the action, and possibly learning is the by-product (Baumann et al., 2014; Bock and Kim, 2002). A person's potential to form an awareness of their intention remains conditional on their level of adult development (Kegan, 2009), which within the literature, interlinks to form theories about how thinking takes place within the social interaction for cognitive constructivism (Burr,

Giliberto, and Butt, 2014). The modern world has created such a strong ideology for individualism, and it is this individualism that has led to a sense of being 'special' (Burr, Giliberto, and Butt, 2014; Buss, 2009). How this influences the cognitive constructivist perspective is intriguing because of individualism defining one's goals and dreams (Borkenau et al., 2001; Cattell, Eber, and Tatsuoka, 1970; John, Robins & Pervin, 2010), which in turn is the accumulation and combination of one's experience in context. Each person's thinking is both limited by and liberated by their sense of uniqueness, with goals and intention being discoverable via the deconstruction of their thinking styles.

It would be beneficial for educators to understand how students think, allowing strategies and curricula to be adjusted to allow learning to fit into the thinker's approach (Touw, Meijer, Wubbels, 2015). This allows for a teacher/student interaction that takes advantage of a person's style of thinking (Costa, et al., 1984; Brown, 2002). Acknowledging the fact that different thinking styles and approaches exist is paramount (Merlevede, 2005). Taking into consideration how the individual thinker will apply cognitive constructivism from the social range of filtering experiences remains of interest (Ashton, 2004; Burr, Giliberto, and Butt, 2014; De Raad and Perugini, 2002). As we read in the previous section, knowledge of one's stage of development allows educators to examine the relationship between their teaching style and the student's preferred learning style (Pashler, 2009). In a continuously stimulating and challenging academic environment, it would be more beneficial to know how post-graduate students think rather than what they think or know (Touw, Meijer, and Wubbels, 2015). In order to have a more profound idea of how, we must look at intelligence in general and how it applies to post-graduate students.

Intelligence Defined

In December 1994, a group of over fifty experts in the scientific study of intelligence and associated fields provided a 25-point summary definition of intelligence in the *Wall Street Journal*. This was point 1:

Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings — "catching on," "making sense" of things, or "figuring out" what to do.

This could be considered a judicious definition of intelligence. It includes a description of

behaviours relating to attention, perception, and learning that are key aspects of intellectual

functioning. It also allows for the common definition of how 'smart' a person is by covering

the obvious notions of reasoning and problem solving (Kaufman, 2015).

According to Gardner (1983), and Kornhaber, Fierros & Veneema (2004), there are

certain criteria for the identification of an intelligence:

- It should be seen in relative isolation in prodigies, autistic savants, stroke victims, or other exceptional populations. In other words, certain individuals should demonstrate particularly high or low levels of a particular capacity in contrast to other capacities.
- It should have a distinct neural representation that is, its neural structure and functioning should be distinguishable from that of other major human faculties.
- It should have a distinct developmental trajectory. That is, different intelligences should develop at different rates and along paths which are distinctive.
- It should have some basis in evolutionary biology. In other words, an intelligence ought to have a previous instantiation in primate or other species and putative survival value.
- It should be susceptible to capture in symbol systems, of the sort used in formal or informal education.
- It should be supported by evidence from psychometric tests of intelligence.
- It should be distinguishable from other intelligences through experimental psychological tasks.
- It should demonstrate a core, information-processing system. That is, there should be identifiable mental processes that handle information related to each intelligence.

But first, we must look at intelligence in general.

Generally Speaking

Within academic psychology, Spearman's theory of general intelligence (g) is the prominent concept of intelligence taught (Brody, 2004; Deary et al., 2007; Jensen, 2008) and the basis for more than 70 IQ tests on the market (e.g., *Stanford-Binet Intelligence Scales Fifth Edition*, Roid, 2003). Some contemporary researchers have maintained that intelligence is influenced by environmental factors (Vernon, 2014; Healy, 2011; Diamond & Hopson, 1998; Lucas, Morley, & Cole, 1998; Neisser et al., 1996; Nisbett, 2009). Others suggest it is innate and one can do little to change it (Herrnstein & Murray, 2010; Seung, 2012; Eysenck, 1992; Herrnstein & Murray, 1994; Jensen, 1987, 1998; Plomin, 2018). Other psychologists such as Thorndike, (1920; Thorndike, Bregman, Cobb, & Woodyard, 1927) conceived of intelligence as the sum of three parts: abstract intelligence': '*an ability to understand men and women, boys and girls; to act wisely in human relations*' (as cited by Salovey and Mayer, 1990) can be thought of as:

- ideas (abstract intelligence),
- concrete objects (mechanical intelligence), and
- people (social intelligence) (Kihlstrom and Cantor, 2000).

This list aligned with Kegan's (1994) Socialised-Mind Stage 3 thinker. This is limited in its approach to (higher level) cognitive thinking as it is hamstrung by the emotional needs of the thinker. However, as Cronbach (1960, p. 319) stated: *"fifty years of intermittent investigation … social intelligence remains undefined and unmeasured."* Thorndike acknowledged the idea that any unitary trait correspondence to social intelligence remains to be demonstrated (Brackett, Rivers & Salovey, 2011; Mayer and Salovey, 1997). However, there could be an argument for a social need or drive as per Kegan's and Laske's developmental perspectives.

There is a long list of psychologists who have considered deconstructing 'intelligence' into a variety of categorises. Thurstone (1938, Thurstone & Thurstone, 1941) argued that intelligence could be better understood as consisting of seven primary abilities. Guilford (1967; Sternberg, 2013; Guilford & Hoepfner, 1971) conceptualised intelligence as consisting of four content categories, five operational categories, and six product categories; he eventually suggested there are 150 different intellectual faculties. Sternberg (1985) offered a triarchic theory of intelligence that identified analytic, creative, and practical intelligences. Finally, Ceci (1990, 1996) described multiple cognitive capacities that allowed for knowledge to be acquired and relationships between concepts and ideas to be considered. This was followed by Wechsler in 1940, who stated:

"The main question is whether non-intellective, that is affective and conative abilities, are admissible as factors of general intelligence. [My contention] has been that such factors are not only admissible but necessary. I have tried to show that in addition to intellective there are also definite non-intellective factors that determine intelligent behaviour. If the foregoing observations are correct, it follows that we cannot expect to measure total intelligence until our tests also include some measures of the non-intellective factors." (Wechsler, 1943, p151).

This led to Gardner's Multiple Intelligence theory, discussed in the next section.

However, neither Willingham (2004) nor other 'geocentric' theorists have as yet provided an acceptable definition for General Intelligence. One could argue that *g* (general intelligence) is simply the common factor that underlies the set of tasks devised by psychologists in their attempt to predict academic success. An element of isomorphism. It is also possible that *g* measures speed or flexibility of response; capacity to follow instructions; or motivation to succeed at an artificial, non-context-specific task. When one calls something an 'intelligence', then the 'thing' becomes reified in logic and an agreed definition of what it is and what it demonstrates is wrapped up in the meaning-making for that word. If we were to consider 'intelligence' as a misnomer, how would this open up the debate on what is an intelligence, and how we then define it not as a skill acquisition, but a dialectic approach to thinking in the moment that defines a thinking capacity or capability? Although Spearman's '*general*' factor of intelligence has been discussed here (Seung, 2012; Jensen, 1998; Spearman, 1927; see essays in Sternberg, 2000; Sternberg & Grigorenko, 2002b), in reality, no one is good at everything or bad at everything. Part of successful intelligence is deciding what to change, and then how to change it (Sternberg, 2003a). To go one step further and question the intention and awareness of the individual making the change would offer an awareness of what it is to have 'successful intelligence' in this context.

An Unconvincing Catch-All

Although Multiple Intelligence theory challenged Spearman's (1927) concept of general intelligence, it was not the only one to suggest intelligence is pluralistic. The theory of multiple intelligences was developed by Gardner in the late 1970's and early 80's, and it hypothesised that individuals acquire eight (or more) relatively autonomous intelligences. Individuals utilise these intelligences individually or collectively to solve problems (Gardner, 1983, 1993, 1999, 2006). They are:

Musical-rhythmic: These individuals are sensitive to sounds, rhythms, tones, and music. They have sensitivity to rhythm, pitch, meter, tone, melody or timbre, and are quite discerning listeners.

Visual-spatial: This area deals with spatial judgment and the ability to visualize with the mind's eye. Spatial ability is one of the three factors beneath *g* in the hierarchical model of intelligence.

Verbal-linguistic: People with high verbal-linguistic intelligence display a facility with words and languages. They are usually good at reading, writing, telling stories and memorising words. Verbal ability is one of the most *g*-loaded abilities.

Logical-mathematical: This area has to do with logic, abstractions, reasoning, numbers and critical thinking. This also has to do with having the capacity to understand the underlying principles of some kind of causal system. Logical reasoning is closely linked to fluid intelligence and to general intelligence (g).

Bodily-kinaesthetic: The bodily-kinaesthetic intelligence augers control of one's motor skills and the capacity to handle actions and objects skilfully. Gardner goes on to say that this also includes a sense of timing, along with the ability to train physical responses.

Interpersonal: In theory, individuals who have high interpersonal intelligence are characterised by their sensitivity to others' moods, feelings, temperaments, motivations, and their ability to cooperate in order to work as part of a group. Those with high interpersonal intelligence communicate effectively and empathise well with others and may be either leaders or followers [very vague]. They often enjoy discussion and debate. Gardner has equated this with emotional intelligence of Goleman. This seems like a lot of responsibility for one 'intelligence'.

Intrapersonal: This 'intelligence' is about one's capacity to be introspective and selfreflective. It implies a deep understanding of the self, recognising one's strengths and weaknesses, how we are unique, and being able to predict one's own reactions or emotions.

However, there was an assumption in the intelligence theory that people in general are capable of knowing themselves to such an extent as to have an effect on their over-all world view, and we have seen in the stage development section from the likes of Kegan (1994) and Laske (2015) that this is not the case. The 'deep understanding' mentioned in this particular intelligence is thus limited by a person's capacity to know themselves: Stages 2 to 3 on Kegan's scale. Someone at Stage 5 could have this intelligence in abundance, but whether this could be measured in this context is questioned by Laske (2007) in his CDF system.

Naturalistic: Although not originally part of Gardner's seven, naturalistic intelligence was proposed in 1995. Gardner stated:

"If I were to rewrite Frames of Mind today, I would probably add an eighth intelligence - the intelligence of the naturalist. It seems to me that the individual who is readily able to recognize flora and fauna, to make other consequential distinctions in the natural world, and to use this ability productively (in hunting, in farming, in biological science) is exercising an important intelligence and one that is not adequately encompassed in the current list." – (p. 200)

This 'intelligence' is about recognising one's place in the natural surroundings. Examples include classifying natural forms such as flora and fauna. This ability would have been of value in our past as hunters, gatherers, and farmers. However, this seems to be a very large generalisation when it comes to what is an intelligence (the word 'ability' is mentioned) in that the nature of semantic memory, procedural memory and declarative knowledge (Hamrick, 2015; Cohen & Squire, 1980) seem to be better descriptors for what is actually happening when someone recalls the name (and more) of specific flora.

The difference between an intelligence and a skill (or ability) is a common source of confusion. Skills are the cognitive executions that result from the operation of one or more intelligences (Gardner & Moran, 2006). Sternberg's Successful Intelligence distinguished between adapting, shaping and selecting one's environment, which went beyond the convention for intelligence's broad definition of 'adapting to the environment'. In order to be successful, one must formulate a meaningful and coherent set of goals, and then have the skills and dispositions to achieve those goals. However, one could ask here how one would create the meaning behind the goal, and the difference from an adult development perspective across the stages of awareness. When Gardner discussed the creation of meaningful goals, he did not consider a person's capacity to create and think about the long-term ramifications of their decisions. Instead, he focused on three sub-items regarding the identification of meaningful goals, coordinating them in a meaningful and coherent way, and the movement towards those goals by the individual. However, their capacity as a thinker, and how they construct their thinking will greatly influence what Sternberg called 'Successful Intelligence'. Also, what appears to be missing from the description was the intention behind the goalcreation, not just the goal itself.

Gardner's ninth inclusion was 'existential intelligence', which was about the 'big questions' such as our place in the cosmos, the significance of life and death, the experience of personal love and of artistic experience (p53-65). He considered religious and philosophical thinking as part of our intellectual world, which were insufficiently represented in the 1983 schema. An argument against this is the concept of religion as a superstition. Anything believed without evidence is a superstition, unlike philosophy, which is a debate. The thinking required to believe something without evidence is not the same thinking in complexity terms as one's ability to discern Hegel's dialectic, for example. There is an element of philosophical debate within theology, however, it would need to be separated out as a specific way of thinking (about itself), which would then place it within the philosophical arena. The intelligences discussed here have an element of immediate awareness that is missing from Gardner's theories. For example, by understanding 'spatial' intelligence, it is possible to enquire into how much of an awareness (and thus a choice of response) an individual has in their 'spatial intelligence'. For a deconstruction of Gardner's intelligences by Meta-Programmes, see Appendix 11.

Multiple Intelligences in Education

Kornhaber, Fierros, and Veenema (2004) compiled data on educators' perceptions of the impact of MI-based methods within education, using interviews and questionnaires. Others have extended this research (e.g., Barrington, 2004), and included how it can be applied to the curriculum (e.g., Dias-Ward & Dias, 2004; Nolen, 2003; Ozdemir, Guneysu, & Tekkaya, 2006); how MI functions within and across different schools (e.g., Baş & Beyhab, 2017; Campbell & Campbell, 1999; Greenhawk, 1997; Hickey, 2004; Hoerr, 1992, 1994, 2004; Wagmeister & Shifrin, 2000). MI approaches have been credited with greater performance and a better retention of knowledge when compared to a more traditional approach (Ozdemir et al., 2006). It has also impacted how children understand content in more complex ways (Emig, 1997). Similarly, teachers have benefited from an MI framework when making instructional decisions (Ozdemir et al., 2006). Teele, who devised one of the primary MI self-administered instruments, suggested that:

"...intrinsic motivation, positive self-image, and a sense of responsibility develop when students become stake-holders in the educational process and accept responsibility for their own actions" (1996, p. 72).

It was anticipated that academia tended to favour children with good memories and some analytical abilities, so from an MI perspective, researchers explored the question of whether standard education in schools discriminated against children with creative and practical strengths (Calero, Belen & Robles, 2011; Sternberg, 2018; Sternberg & Clinkenbeard, 1995; Sternberg, Ferrari, Clinkenbeard, & Grigorenko, 1996; Sternberg, Grigorenko, Ferrari, & Clinkenbeard, 1999).

Criticisms of MI

An important question for understanding intelligence is: how does one use the criteria to determine what an intelligence is? Gardner (1983) made it clear in "*Frames of Mind*" that there is no 'algorithm for the selection of an intelligence, such that any trained researcher could determine whether a candidate's intelligence met the appropriate criteria' (p.63). He went on to say that: 'the selection or rejection of a candidate's intelligence is reminiscent more of an artistic judgment than of a scientific assessment.'

Gardner's and Sternberg's theories are popular with textbook authors, even though their foundations have limited empirical support. Researchers studying cognitive abilities often produce 'g' in their data (e.g., Pyryt, 2000). It has been suggested that textbook authors should present both sides of the argument when representing these theories, as there are many arguments for the weaknesses of both (e.g., Deary, Penke, & Johnson, 2010; Gottfredson, 2003a, 2003b; Ackerman, 2014; Lubinski & Benbow, 1995; Waterhouse, 2006), as are rebuttals (e.g., Gardner, 1995; Sternberg, 2003; Sternberg & Hedlund, 2002). For example, a balanced approach to Gardner's theory would demonstrate how his denial of 'g' is counter-to the evidence over the last century, and that his logical-mathematical intelligence (for example) aligns well with certain factors in modern intelligence testing. Also, he had neglected to systematically research his theories by gathering data (Hunt, 2001; Ackerman, 2014; Lubinski & Benbow, 1995). From Sternberg's perspective, his emphasis on creativity is a valued trait (e.g., Guilford, 1950; Subotnik, Olszewski-Kubilius, & Worrell, 2011). However, his practical intelligence is seen as less important than *g*, which weakens the theory (Gottfredson, 2003a).

White (2006) was one of the few scholars to question the efforts of Gardner. He suggested that Gardner's selection and application of the criteria was a subjective one, and thus flawed. A different specialist would have had different criteria and consequently, would have arrived at a different set of intelligences. White (2006) went on to say that the practical and creative endeavours are no less valuable than being good at more abstract subjects, which suggests that MI theory is less important to children or post-graduate students, than it is assumed. Warne, Astle & Hill (2018) found that three-quarters of psychology text books give disproportionate coverage to theories such as Gardner's Multiple intelligences, with 80% containing logical fallacies in their discussion of the topic (Warne, et al., 2018).

Finally, an issue that is prominent in the field of psychology is that even eminent psychologists present a misleading view of the science of intelligence in academic text books, voraciously devoured by the average psychology student (Jarrett, 2018). This serves to mislead the student on what is and what is not good psychology, especially if a liberal message appears exaggerated by the media about the study in question (Ritchie, 2017). Therefore, a more discerning post-graduate student is necessary to counter the potential for misinformation in all academic endeavours, not just psychology.

Constructivists Think It's About Them

Cognitive psychology as a discipline would have us believe that individuals are born with some cognitive and epistemological equipment. However, there are disputes between the different constructivist theorists as to what these are (Phillips, 1995; Dweck, 2000; Loewen, 2011). Blonigen et al., (2005) were differentiating knowledge from epistemological equipment when they said we construct and acquire our knowledge after birth as a result of our interactions with our environment. In an academic context, cognitive psychology states that learning is an active process (Gagne & Goldsmith, 2011). Human knowledge, whether personal or associated with a field or discipline of study, is constructed internally, within and by each human (Phillips, 1995). Following on from this, in order to understand how human knowledge forms within the cognitive psychology discipline, we need to look at the relationships between thinking patterns and strategies. For example, Elliott & McGregor (2011) examined the thinking processes that students engaged in while writing research papers and found that students did not instinctively operate in a metacognitive manner. Other researchers found that a lack of metacognitive ability negatively impacted student success (Cornelissen, Clarke & Cienki, 2012; Hill & Levenhagen, 1995; Land & Hannafin, 1997). This lack of metacognitive skill supports the need for students to "plan, implement, and evaluate" strategies for learning (Askell-Williams, Lawson & Skrzypiec, 2012; Palincsar, 1986). This is in line with the previous point that students can match their learning style to their lecturer's teaching style if their level of awareness were raised regarding their own thinking style. However, Schryer (2012), and Cavanaugh, Grady & Perlmutter, (1983) have demonstrated in their research that students use a strategy when required but fail to use it when the requirement is removed. This could suggest there is an alternative unconscious cognitive intention at play instead. If there were a way to bring to objective awareness the pattern used by each individual student, this could be transferable across teaching subjects.

Thinking About Thinking

Metacognition is a configuration that is suggested as 'fuzzy' by many scholars and has a wide range of meanings (Akturk & Sahin, 2011). Cognitive psychology lies at the foundations of metacognition studies (Hart, 1965; Peters, 2007), as does cognitive development psychology (Piaget, 1950; Steinbach 2008), and social development psychology (Tsai 2001; Vygotsky, 1962). Hart (1965) was more concerned with how memory was perceived as a predictor of behaviour (Peters, 2007). Conversely, Piaget (1950) was talking about personal information epistemology when he first mentioned "knowing the knowing and thinking the thinking" (Steinbach, 2008). Vygotsky (1962) focused on the early years and maintained that consciousness and conscious control were basic contributors (Tsai, 2001). More recently, 'metacognition' has been used as an umbrella term incorporating the concepts that are related to an individual's thinking processes (Leader, 2008), and perhaps the most common definition today is that metacognition is an individual having information about their cognitive structure and being able to organize this structure (Dunlosky and Hertzog, 2000; Georghiades, 2004). Kuhn (2000) characterised metacognition as the very gradual movement to acquiring metacognitive strategies in order to replace inefficient ones, which suggests those strategies improve with age (Kuhn & Dean, 2004; Schneider, 2008). The question arises here about how a child knows one strategy is more efficient than another and what, specifically, are they replacing in the construction of their thinking, rather than the construction of the strategy? There might be a more dynamic intelligence at play.

The self-regulation facet within metacognition has been linked to intelligence (Perry, Stupnisky, Hall, Chipperfield & Weiner, 2010; Borkowski et al., 1986; Brown, 1987; Sternberg, 1984, 1986). In his triarchic theory of intelligence, Sternberg referred to these executive processes as 'metacomponents' (Sternberg, 1984, 1986), as they controlled other cognitive components as well as received feedback from them.

According to Sternberg, metacomponents are responsible for "*figuring out how to do a particular task or set of tasks, and then making sure that the task or set of tasks are done correctly*" (Sternberg, 1986b, p. 24). This involves planning, assessing and monitoring problem-solving activities. Central to Sternberg's interpretation of intelligence is one's capacity to appropriately allocate cognitive resources to tasks, such as deciding how and when a given task should be accomplished. These are important to post-graduate students, and students at all stages of education (Sternberg, 2000). However, what is not clear is how a student knows how to evaluate their task in relation to the context and themselves.

Pursuing knowledge, creating knowledge, and promoting the flow of knowledge, from knowledge to knowledge-set also opens the post-graduate student's eyes about selfperception and how they view their own knowledge base (Hall, 2008; Touw, Meijer, and Wubbels, 2015). For the post-graduate student, metacognition remains important for the persistence to stay on course with their studies (Touw, Meijer, and Wubbels, 2015). Over the course of study, students are expected to develop a cogent argument for a research topic. There is immense pressure in research to not only select the right topic but to write a study that is both unique and brings value to the academic community (Lynch, 2014). One would assume that study of metacognition not only allows a student to gain knowledge about learning, but also about their thinking and their ability to adapt to the environment (Merlevede, 2005). Kostons and van der Werf, (2015) asserted that metacognition is a subject to be taught, and a process to be applied in order to allow pattern recognition in relation to thinking and sense of self.

Metacognitive knowledge, according to Kostons and van der Werf, (2015) and Thurstone, (1938) is when the learner acknowledges awareness of learning or perceives his or her style of learning. What a student understands to be learning, and how learning relates to their performance influences how they learn (Kostons and van der Werf, 2015). To form

coherent thinking strategies requires self-reflection and analysing the strengths and weaknesses of a student's learning style, encourages and reinforces independent study (Loehlin, Lewis & Goldberg, 2014).

The 'meta' implies a higher-order thinking about one's thinking and has two dimensions: metacognitive knowledge and metacognitive regulation. Metacognitive knowledge includes the learner's knowledge of their own cognitive abilities, (e.g., I have trouble remembering people's names), the learner's knowledge of particular tasks (e.g., the ideas in this article are complex), and the learner's knowledge of different strategies including when to use these strategies (e.g., if I break telephone numbers into chunks I will remember them) (Brown, 1987; Flavell, 1979).

Metacognitive regulation describes how individuals monitor and control their cognitive processes. For example, realising that the strategy you are using to solve a maths problem is not working and trying a different approach (Nelson and Narens, 1990). However, knowing not to use the same strategy to write an essay will be discussed next.

A theory of metacognitive regulation that is commonly cited in the research literature is Nelson and Narens' (1994) Model of Metacognition, and it makes two specific assumptions: the first is that the meta and object levels are related in a hierarchical, though asymmetric, manner via metacognitive control and monitoring. A second assumption is that parallel processing occurs between levels.

Our thinking is said to occur at the object level. An example would be a post-graduate student trying to understand the meaning of some text. This goal would be a cognitive strategy at the object level (Nelson and Narens, 1990). The meta level, on the other hand, is where 'thinking about thinking' takes place (Nelson and Narens, 1990). From a reading perspective, a student would gauge how well they have understood the text and re-read it if not very well. This is an example of 'monitoring'. If happy with their comprehension, they

will continue. In essence, based on their monitoring feedback, the student would choose one

of those behaviours, which is considered to be a control processes.

Perkins (1992) defined four categories of metacognitive learners: tacit; aware;

strategic; reflective:

'<u>Tacit'</u> learners are unaware of their metacognitive knowledge. They do not think about any particular strategies for learning and merely accept if they know something or not.

'<u>Aware'</u> learners know about some of the kinds of thinking that they do – generating ideas, ending evidence, etc. – but thinking is not necessarily deliberate or planned.

'<u>Strategic'</u> learners organise their thinking by using problem solving, grouping and classifying, evidence seeking, decision making, etc. They know and apply the strategies that help them learn.

"<u>Reflective</u>" learners are not only strategic about their thinking but they also reflect upon their learning whilst it is happening, considering the success or not of any strategies they're using and then revising them as appropriate. For an example of this categorisation in action, see the work of Harvey (2000) which specifically demonstrates how to teach thinking strategies for educators so students become engaged.

Metacognition promotes the monitoring of our cognitive processes, which is important from a post-graduate student perspective in an academic context (Flavell, 1976). Most theoretical accounts of metacognition distinguished between two main components that include knowledge of cognition and regulation of cognition (Kinnunen & Vauras, 2010; Baker, 1989; Schraw & Moshman, 1995). Knowledge of cognition states what we know about our cognition, and typically includes three components (Whitebread et al., 2009; Ahmadi, Ismail & Abdullah, 2013; Jacobs & Paris, 1987). The first, declarative knowledge, includes knowledge about ourselves as learners and what factors influence our performance. For example, adult learners are aware of the limitations of their memory and can plan an appropriate action based on this understanding. However, a person's capacity to know their intention in the moment, and the awareness of this intention will affect their response.

Procedural knowledge is eponymously titled as it refers to strategies and other procedures, and we know how or when to use them due to our Conditional knowledge. However, the act of using a strategy is a strategy and not using a strategy is also a strategy, so the act of choosing a strategy could be considered a meta-strategy with a different set of intentions and an awareness of the outcome being one level higher than the (outcome of the) strategy itself. This point is somewhat validated by the regulation of cognition with its planning, monitoring, and evaluation aspects (Jacobs & Paris, 1987; Kluwe, 1987). Previous research suggested, rather unsurprisingly that experts are far superior to novices largely due to more effective planning, and in particular, global planning that occurs prior to a task beginning (Bereiter & Scardamalia, 1993). An expert has an experiential thinking style that allows them to automate the initial steps of the process, making planning a more unconscious act, based on prior experience. When the same person monitors their ability to learn (knowing whether they have understood or will understand something), their capacity to perform this monitoring will be dependent upon their level of awareness, which could suggest why some adults are skilled at learning, but not good at monitoring (Odic, Roth & Flombaum, 2012; Koriat, 1994; Pressley & Ghatala, 1990).

Finally, evaluation refers to the appraising of the regulatory processes. How one reevaluates a personal goal, and the ramifications of the short- and long-term decisions around this goal will also be dependent upon an individual's self-awareness. It has been discussed already that people in general are not good at recognising their own incompetence (Kruger & Dunning, 2000), and conversely, competence is a prerequisite for judging one's relative performance. This naturally leads to the 'double curse' that those less competent in a specific domain will also lack the capacity to recognise what is a competent performance in said domain (Kruger & Dunning, 1999). The knowledge of cognition and regulation of cognition appear to be related in both children and adults, which makes this a useful comparison for
post-graduate students in an academic context (Schraw & Dennison, 1994). What emerges from the literature is that metacognition is not necessarily related to cognitive abilities. Neither Ajhideh, & Saeeidi-Manesh, (2015), Pressley and Ghatala (1988) nor Yan (1994) found significant relationships between monitoring proficiency and measures of verbal ability. Wigfield and Cambria, (2010) and Schraw, et al. (1995) did not report a significant relationship between knowledge and regulation of cognition scores. This pattern of findings suggested that traditional measures of ability are related to performance on cognitive tasks such as reading comprehension but are unrelated to regulating performance. However, there are links between deliberation and superior cognitive performance. Deliberation is related to and can even cause differences in domain general cognitive abilities, such as intelligence and attentional control (Stanovich, 2012). Deliberation is also thought to be an essential component of rational thinking (e.g., reflectiveness and active open-minded thinking; Baron, 2008).

However, metacognitive abilities are not necessarily naturally endowed in graduate students (Wilson & Conyers, 2016). Successful learners employ a variety of metacognitive skills to improve their learning (Thompson, Turner & Pennycook, 2011; Garner & Alexander, 1989; Pressley, Borkowski, & Schneider, 1987). In contrast, metacognition does not appear to be related strongly to measures of intellectual ability (Schraw, Horn et al., 1995). However, a lack of metacognition is not indicative of a lower cognitive performance, although in the middle-aged subgroup, there is a consistent tendency to lower scores (Tavares, 2018). Flavell (1979) suggested there was 'too little' cognitive monitoring by adults. He also suggested that adults would benefit from being taught how to monitor their thinking in order to "*make wise and thoughtful life decisions*" (1979, p. 910).

What emerges from a metacognitive perspective is a person's ability to know, in the moment how their thinking is influenced by the relationship between their intention and

awareness, and as such, where knowledge can be conceptualised as either concrete (i.e. facts and procedures) or abstract (i.e. concepts and principles), skill development is often domainspecific (Fischer, 1980). Although it can be argued that abstract thinking is better than concrete thinking, abstract thinking becomes a limiting intention, thus contradicting the last point in context. Where a child has been taught a metacognitive strategy for learning, he has been taught a process. From a post-graduate student's perspective, if the lecturer knew how the student's thinking were constructed, they could create a strategy specific to the student's thinking style, rather than a generic strategy, which brings into question whether the strategy would be domain-specific or domain-general depending on the level of awareness the student has of their thinking in context. The role of the lecturer for post-graduate students is thus an important one (Wilson & Conyers, 2016). Schraw (2009) highlighted the difficulty of measuring metacognition and suggested that a connection to, and a measurement of metacognitive processes simultaneously does not exist. Tobias and Everson (2002) highlighted this point when they explained that observation and self-report tools are insufficient for measuring metacognition. In short, there is currently no single tool that can measure the many facets of metacognition (Akturk & Sahin, 2011). In support of this perspective, a study by Ndethi, (2017) found that engineering students were not able to adequately describe their strengths, weaknesses and strategies regarding their metacognitive awareness, which indicates that there is a need for greater focus on metacognition as a process of learning.

From an adult perspective, it would be interesting to understand how thinking is habituated over time (Piaget's schemata), if certain patterns of thinking develop as a consequence of these habituated patterns, and thus how aware an individual is of these patterns with a view to changing them should awareness increase. Research on metacognition for adults focuses on mnemonic cues and memory, utilising heuristics that allegedly operate

below consciousness, in order to yield a subjective feeling (Koriat, 2008). This raises similarities with the children's memory effort heuristic in raising judgments of learning, which leads to the question: at what age do children recognise this heuristic and the inverse result that the more time they spend learning an item, the less likely they are to recall it later? In other words, easily learned items are better remembered than items the child found difficult to learn (Koriat, 2008). In the study by Ndethi, (2017), she found that when a post-graduate student attempted to describe their strategy for learning, it seldom reflected their perceived weakness in the subject. If one cannot adequately describe their weakness, how can one expect to describe the relevant metacognitive strategic remedy? For this, the emphasis on learning must be overlooked, and instead, an emphasis on an individual's potential habituated thinking style should be the observation. This could potentially revolutionise metacognitive development (rather than teaching) in universities.

Specifically about General Domains

There is an ongoing debate regarding to what extent metacognition is a general or a domain-specific phenomenon (Veenman and Spaans, 2005; Veenman and Verheij, 2003; Kostons, Van Gog & Paas, 2012; Schraw and Nietfeld, 1998; Schraw, 1997; Schraw et al., 1995). It would seem that there are obvious specific domains and obvious general domains, and that some will not cross over, such as writing an essay does not depend on knowing Pythagoras' theorem. Otero (1998) discussed ways in which metacognition works within science, while Pennequin, et al. (2010), and Carr & Biddlecomb (1998) discussed the role of metacognition in mathematics. The domain-general hypothesis (Piekny & Maehler, 2013; Schraw, Dunkle, Bendixen, & Roedel, 1995) assumed that metacognitive knowledge is qualitatively different from other kinds of knowledge within a domain and spans multiple domains in a way that domain-specific knowledge does not. To continue the question of awareness and intention, a person's self-awareness in the moment is *meta-to* the tacit

knowledge within any domain. One can be aware or unaware of one's intention in any domain, and as such, the awareness of this awareness (meta-awareness) does not affect and is not impacted by the domain. Finally, Schraw (1998) described metacognition as a multidimensional set of general skills, rather than being domain specific.

Critically Thinking about Metacognition

Flavell (1979) and Martinez (2006) suggested that critical thinking should be subsumed under metacognition. Flavell argued that the definition of metacognition should include critical thinking: "*critical appraisal of message source, quality of appeal, and probable consequences needed to cope with these inputs sensibly*" (p. 910). Martinez defined critical thinking as "*evaluating ideas for their quality, especially judging whether or not they make sense*." (p. 697) He saw this as one of three types of metacognition: metamemory and problem solving being the other two. Kuhn (1999) also likened critical thinking to metacognition.

However, Schraw et al. (1995) saw both metacognition and critical thinking as being subsumed under self-regulated learning, which they define as "*our ability to understand and control our learning environments*" (p. 111). Self-regulated learning requires metacognition, motivation, and cognition, which includes critical thinking (2006). Thus, critical thinking is supported by metacognition to the extent that monitoring the quality of one's thought makes it more likely that one will participate in high-quality (critical) thinking (Sharma and Hannafin, 2004). However, from the literature it should be apparent that Lake's Stage 2 individual would not be capable of performing this thought process, not only taking into account the Dunning-Kruger effect (Kruger-Dunning, 1999), but also their lack of complex thinking would limit their capacity to monitor self-thought and the ramifications of this limitation on the interpretation of their behavioural output.

Definitions of critical thinking vary, but common elements include:

- analysing arguments (Ennis, 1985; Facione, 1990; Halpern, 1998; Paul, 1992);
- making inferences using inductive or deductive reasoning (Ennis, 1985; Willingham, 2007; Paul, 1992; Facione, 1990);
- judging or evaluating (Case, 2005; Ennis, 1985, Facione, 1990; Lipman, 1987; Tindal & Nolet, 1995);
- making decisions or solving problems (Ennis, 1985; Halpern, 1998; Willingham, 2007).
- producing a logical conclusion to an argument or solution to a problem (Dwyer, 2017; Dwyer et al., 2016; Dwyer, Hogan & Stewart, 2014).

Critical thinking also utilises dispositions, including open-mindedness, inquisitiveness, flexibility, perseverance, reason, well-informedness, and the capacity for multiple perspectives (McPeck, 2016; Bailin, et al., 1999; Ennis, 1985; Facione, 1990; Halpern, 1998; Paul, 1992). Critical thinking is often hypothesised as *domain-general*, in that it can be applied to any subject in any field. However, there is some evidence to suggest the possibility of domain-specificity (Dwyer, Boswell & Elliott, 2015). Individuals who are proficient in a specific domain construct relevant knowledge and thus develop their thinking, albeit within said domain (Chi, Glaser, & Farr, 1988; Russell, Gobet & Whitehouse, 2016; Kotovsky, Hayes & Simon, 1985); and thus, are unsurprisingly better able to integrate complex information than are those who are not (Pollock, Chandler & Sweller, 2002; Sweller, 2010).

These same experts are using logic rather than intuition (Kahneman & Frederick, 2002) and they are capable of avoiding making simple errors, such as the gambler's fallacy (which novices are prone to make). The same experts will also perform better on problemsolving, informal reasoning and critical thinking tests specific to their field (Cheung, Rudowicz, Kwan, & Yue, 2002; Tricot & Sweller, 2014; Chiesi, Spilich, & Voss, 1979; Graham & Donaldson, 1999; Tang, 2019; Voss, Blais, Means, Greene, & Ahwesh, 1986). It could be argued that the individual's capacity is greater due to a certain amount of automaticity and a greater awareness of the component parts of their thinking in context, allowing them to evaluate their thinking in the moment or, on the fly. Expanding on this theme, when teaching critical thinking in the classroom as a way of learning a particular topic, such as English literature, the teacher will offer guidance on how to analyse and evaluate plots, characters and settings so the students can infer writing styles and themes. If the same class of students had a history class together where the teacher chose to teach them facts and dates, the general consensus is, from a metacognition perspective, that the students will become more proficient in the English class than the History class because of the way they were taught, yet not able to transfer these skills to their history class (Ennis, 1989). Critical Thinking skills are *"learning objectives, without specific subject matter content"* (Abrami et al., 2008). If academia wishes to impart critical thinking skills on students, it must make clear that critical thinking objectives are separate from the course content (Abrami et al., 2008) and allow students to develop their awareness of their thinking in context.

The domain general nature of critical thinking is generally not realised until students have been trained in CT purposely, and training in CT skills obviously yields better CT performance (e.g. JilardiDamavandi, et al., 2011; Gadzella, Dean, Ginther & Bryant, 1996; Hitchcock, 2004; Reed and Kromrey, 2001; Rimiene, 2002; Solon, 2007).

The Cognitive Constructivist Perspective

A leading cognitive constructivist, Loewen (2011) stated that 'thought' rather than action forms the basis of the situation. Loewen referenced the power we give to the meaning of the words we use in our interaction with the real world, and how our cognitive constructs have greater influence than the interaction itself. Korzybski (1933) was advocating a Constructivist perspective when he warned that the "*is*" of identity presents a dangerous linguistic and semantic construction that maps to false conclusions. He called it "*the Is trap*" (1951). Identity as "sameness in all respects" does not exist, and to use a statement such as "that student is lazy" falsely maps reality. Korzybski uses the word '*unsanity*' to describe the errors of identification in this context. In his book, *Science and Sanity (1933)*, Korzybski tells how one constructs one's reality based not on what is real, but on our map of our *perceived* reality, and this model is executed largely unconsciously. From an academic perspective, students are given their new reality by the post-graduate process. They map their existing experience on to it and create a new perception of their reality because of it, which could be 'wrong' if based on a construction from an under-graduate experience, especially one in a different country.

Although cognitive constructionism asserts we can predict how relationships form with the outside world, Dweck (2000) argued that it is one's approach to thinking that allows for a level of freedom and unpredictability, which is useful in the post-graduate process. In testing predictions, the personal construct may align with social or cognitive constructs as one forms the lens for being in the world (Ajzen, 2005; Loewen, 2011). One particular social construct is academia, which has an important social interaction. If one were able to apply specific and intentional methods to the construction of their thinking, it could result in better outcomes for the individual and their colleagues in context (Blonigen et al., 2005). This hints at how contribution and collaboration can take place within the academic community, and recognises such applications also exist within other contexts. Touw, Mejier, and Wubbels, (2015) recognised the need for a balance between logical and creative thinkers. In this thesis, it is argued that generally, people are not aware of their thinking in the moment, and the literature reinforces this perspective to some degree (Hayes, 2015; Kallio, Virta, & Kallio, 2018). The problem lies in the academic context with the educational modelling supported by the concept of social development (Dunn, Griggs, Olson, Beasley and Gorman, 2010). Bodrova and Leong (2001) commented that there is a systemic failure to explore thinking and awareness as students seek to download information instead. Cleary, Callan, and Zimmerman (2012) commented that with awareness comes a higher level of thinking where the individual

recognises their awareness and seeks to repeat the action in support of synthesising the thinking process. Dennett (2017) sees this as a powerful leap from previous theory where building upon thinking as a construct is the next step.

The essence of Personal Construct Theory states that applying a lens and filter to the individual's experience also relates to cognitive ability (Kelly, 1955). Kelly referred to individuals as 'native scientists' with their own perceptions of the world. Kelly said that this personal construct, created by the individual, sets the limits for personal construct. Those individuals form personal constructs based upon the filter, and yet how the filter is set can be deemed loose or tight (Kelly, 1955). How open the person remains to experiences will also relate to how loosely or tightly they restrict their perceptions of their world. According to Kelly (1955), constructs also meant a literal and symbolic interpretation of how their context was described. One student would associate their construct of a lecturer with 'arrogant' because this was how they described his or her new under-graduate experience of having a university lecturer, whilst others will have different but equally valid constructs for 'lecturer'. The concept of loose personal construct in terms of thinking, limits areas of experience where one may not understand his or her relationship to culture, so they miss the inner context of the meaning derived from culture which means they do not reach that level of thought or analysis about culture (von Glasersfeld, 1991). Once the parameters by which the construct is created are brought into awareness, for example: white, male, wealthy, but not necessarily consciously, the constraints on the information processing are changed. Kegan and Lahey (2001) commented that language also sets into place confines or ways people place value to constructs. Those with a tight view will think with precision and seek situations where constructs are black and white. Those within the tight confines also think within strict rules and concepts where there is little value attributed to uncertainty or creative thoughts. They believe X + Y will always equal Z, and differences of perception or opinion of others will not

modify this belief (Kegan, 1994; Laske, 2009; Berger, 2002). It is generally found at the lower stages of Kegan's or Laske's systems as it demonstrates that the student has a limited meaning-making due to their fixed perspective. Kegan's 'strict rules' links to Kelly's (1955) personal construct theory of personality where 'habitual categories' play a profound role in structuring everyday experience suggesting that the process of meaning-making does not follow from personality, it *is* personality: "*Cognitive processing tendencies may predict daily emotion and behaviour even in the absence of correlation or interaction with traits.*" (Robinson 2007: p. 353).

Using the REP Test study devised by Kelly (1955), Crockett investigated the complexity of a person's construct system. The results showed, in simple terms, that the older the individual became, the more abstractly and complexly they were capable of thinking (Crockett, 1982). This suggested to Kelly that a person's degree of complexity could determine their capacity to apply personal constructs to others. In other words: people with high cognitive complexity are more able to see variety amongst people's thinking and are better-able to predict their behaviour (Crockett, 1982). On the other hand, those with low cognitive complexity are more likely to place people in one of two categories, incapable of seeing the variety.

From an academic perspective, studies of under-graduate students in the United States found that those with high cognitive complexity were lower in anxiety and instability and also were inclined to demonstrate more than the conventional five factors of personality (OCEAN). Conversely, those with lower cognitive complexity displayed fewer than the five factors, implying they are less complex emotionally (Bowler, Bowler, & Phillips, 2009; Lester, 2009). In Kelly's theory, cognitive complexity is the more desirable and beneficial cognitive style as the more complex one's thinking, the more able one is to predict behaviours in others. However, this raises the question of whether 'less' or 'more'

complexity is in fact, two "styles" of thinking. Taking Kelly's perspective onboard, being able to anticipate or predict what others do gives us a guide for our own behaviour.

Continuing in academia, a study of first-year under-graduates in Canada found that those with higher cognitive complexity accommodated the pressures of college life better than those who scored lower (Pancer, Hunsberger, Pratt, & Alisat, 2000). There was even evidence to suggest that a student with more than one cultural influence growing up scored higher in cognitive complexity than those with only one (Benet-Martinez, Lee, & Leu, 2006).

Attributional complexity is where an individual attributes another's behaviour to more complicated and sophisticated causes and is defined as: *the extent to which people prefer complex rather than simple explanations for social behaviour* (Schultz & Schultz, 2017, p. 311). People who score highly in attributional complexity have demonstrated greater empathy and understanding toward other people (Foels & Reid, 2010; Reid & Foels, 2010). However, paradoxically, the assumption of complexity is a less-complex perspective as it is a naïve and simplistic attribution that leaves too much unrecognised.

As Kelly attempted to map personality, he neglected to, or simply did not know he could map or measure awareness or responsiveness. How would he have catered for awareness and choice in his REP system? For those exhibiting attributional complexity, the question of choice is also important. Their attribution could be a fundamental misinterpretation of the thinking and behaving of the other person if they are lower on the social-emotional and cognitive complexity scales of Kegan and Laske, which immediately diminishes the findings of Foels & Reid (2010). These would be interesting avenues for investigation, to determine if what Foels and Reid understood complexity to be was the same as what Kegan and Laske understood it to be, as it appeared that high scores in their interpretation would be average scores for Laske. They also did not investigate an

individual's intention or awareness of their complexity, and thus did not measure a person's capacity to choose their response in the moment.

Post-Graduate Me in Relation to You

From the personal construct, identity is formed (Bannister and Fransella, 2013). The human condition is predicated upon powerful social interaction (Ajzen, 2005). One would assume this happens because people need and have emotional connections (Huang et al., 2014). However, Huang was pointing to a specific level of development in adult thinking, where a person would see themselves in relation to others and externalise their locus of evaluation. Thinking is happening right now for all people and yet how the thinking process takes shape is directly aligned to the personal construct of one's psychology (De Fruyt et al., 2006). Academia is a social construct and a social interaction, which suggests that for the post-graduate student, university is not a thinking context, but a 'being' context (Burr, Giliberto, and Butt, 2014; Loewen, 2011).

As mentioned, Laske (2009) hypothesised that as we move through the stages and increase our cognitive complexity, we 'lose' our previous (constructed) self and could potentially suffer from the perceived loss. However, this also allows us to pursue our humanity as we construct our new self at a higher level (Loewen, 2011). From a postgraduate perspective, thinking is not learning, but rather a present state of 'being' (Sosnowska, Kuppens, De Fruyt & Hofmans, 2019; Mischel and Shoda, 1995). Thinking in this context, does not contribute to the student's personality. It would be interesting to understand the extent to which each post-graduate student constructs themselves in context and how the context affects their construction.

Finally, it is not just cognition and personality that is constructed. The emotional side of thinking, according to recent research is also constructed.

Emotions Aren't Real

"Emotions are constructions of the world, not reactions to it." – Feldman-Barrett, 2017

There is evidence that individuals can be taught to recognise the apparent emotions in photographs of people's facial expressions (Elfenbein, 2006), however, this is directly refuted by a theory that was established in 2010 by Feldman-Barrett *et al*, who stated in her book: *"How Emotions are Made"* that all things are constructed, including emotions. Not emotional *intelligence*, but actual emotions.

Feldman-Barrett gives the example of meeting a snake in the wild and running away immediately. At no point did she orchestrate the categorisation of the experience to culminate in fear and thus running away. It "just happened" for her (p. 118). Feldman-Barrett stated that the stimulus-response brain is a myth, and that brain activity is prediction and correction, which means we construct emotional experiences outside of awareness, to minimise prediction error, as this fits better with the operation of the brain's architecture. She ended her point by saying:

"Simply put: I did not see a snake and categorize it. I did not feel the urge to run and categorize it. I did not feel my heart pounding and categorize it. I categorized sensations in order to see the snake, to feel my heart pounding, and to run. I correctly predicted these sensations, and in doing so, explained them with an instance of the concept "Fear." This is how emotions are made." (Feldman-Barrett, 2017, p109)

The brain constructs meaning by accurately predicting and adjusting to incoming information, and to make meaning in this context is to go beyond the information given (Feldman-Barrett, 2006b, 2017). Incoming sensations are sorted so that they are contextually actionable, and thus meaningful, based on prior experience. Feldman-Barrett was saying that the emotion you expect to experience will be experienced as it is constructed using the same neuroanatomical principles for information flow within the brain. This suggests that, to some extent, we are victims of our experience. This can be applied to research on empathy where the difference between empathy and sympathy is feeling *as* the other versus feeling *for* the

other, respectively (Hein & Singer, 2008, p.157). In other words, when perceiving sadness in another, empathy will cause sadness in the observer (same emotion; feeling as), while sympathy will involve feelings of concern (different emotion; feeling for) (Singer and Lamm, 2009). The key word here is *perceiving*. How one perceives sadness is a construction based on meaning-making, and different for each observer, especially given the findings of cognitive complexity and Laske's CDF scale (2008). Thus, Feldman-Barrett would likely call it *constructing*.

The ideas Feldman-Barrett had for emotion regulation tie in with the principles of the cognitive constructivist perspective and social constructionism as outlined in this section, and post-graduate studentship in that there was a cultural agreement on the meaning-making of 'emotion' which is perpetuated from the lecture theatre (Feldman-Barrett, 2017). Feldman-Barrett also agreed that the classical view of emotion does not take into account an individual's intellect in the sense of one's capacity to articulate their state. Essentially, an individual at the higher levels of Laske's scale (2008) will have a more nuanced view of their state and thus a better vocabulary to articulate it in the moment. Feldman-Barrett continued:

"someone with a limited education might use "anger" to describe five states, whereas a well-read and educated person might have five synonyms at their disposal and are thus able to refine their definitions" - (Feldman-Barrett, 2017, p207).

However, the extra synonyms would only be useful if the person with whom one is talking also has five synonyms for 'anger'. If an individual categorises the sensation as "anger", they are effectively making meaning that says: "anger is what caused these physical changes in my body", when in reality, the concept is created by the meaning, and the brain constructs instances of anger. This goes some way towards explaining the lower level automated reactions of individuals as espoused by Kegan & Lahey (1994) and Laske (2008). The thinking *has them* (Kegan's Subject/Object): they do not have the self-awareness to create a different response, and Feldman-Barrett is saying this is borne of experience over time.

Feldman-Barrett (2015) used the word "fingerprint" to describe the collection of bodily movements that represent such nominalisations as 'sadness' or 'anger'. She called them a unique identifier for that particular state, a neural signature, each one different to the next. This description encompassed the body and mind identifiers for said state and helped to establish the mind/body as one system in symbiotic harmony.

Feldman-Barrett's explanation of how an emotion occurs is worth including here in full. The reason will be discussed afterwards:

An internal model runs on past experiences, implemented as concepts. A concept is a collection of embodied, whole brain representations that predict what is about to happen in the sensory environment, what the best action is to deal with impending events, and their consequences for allostasis (the latter is made available to consciousness as affect). Unpredicted information (i.e. prediction error) is encoded and consolidated whenever it is predicted to result in a physiological change in state of perceiver (i.e. whenever it impacts allostasis). Once prediction error is minimized, a prediction becomes a perception or an experience. In doing so, the prediction explains the cause of sensory events and directs action; i.e. it categorizes the sensory event. In this way, the brain uses past experience to construct a categorization [a situated conceptualization; (Barsalou, 1999; Barsalou et al., 2003; Barrett, 2006b; Barrett et al., 2015)] that best fits the situation to guide action. The brain continually constructs concepts and creates categories to identify what the sensory inputs are, infers a causal explanation for what caused them, and drives action plans for what to do about them. When the internal model creates an emotion concept, the eventual categorization results in an instance of emotion (p12).

Where Feldman-Barrett's prediction becomes an experience, there is an argument for the perspective that the experience is determined by the individual's capacity to create said prediction, and thus the greater one's ability to predict the ramifications of one's decisions, the higher one's self-awareness. If this can only be accomplished retrospectively, then the individual has low awareness. An interesting question arises from Feldman-Barrett's paragraph above: when an individual predicts an eventuality, is s/he doing so based on emotion or cognition, or both? And does this change once one moves beyond Kegan's or Laske's Stage 4?

If we consider Feldman-Barrett's (2017) perspective that brain activity is prediction and correction, then it follows that the greater one's awareness of one's thinking intention in the moment, the more capable an individual is to predict and correct in their immediate response, thus possessing a higher level of self-awareness. Ultimately, Feldman-Barrett's theory of constructed emotion allows scientists to consider how a human nervous system constructs a human mind using new conceptual tools. It would then be interesting to see how far this theory can extend into the construction of self in context.

Finally, the Constructed Emotions theory described by Feldman-Barrett (2006) offers reason for an intervention in that a post-graduate student whose contextual awareness is predominately 'External' in their locus of evaluation could be given cognitive exercises that increase and improve their 'Internal' awareness in order to create new synaptic pathways that would result in the physical brain being differently-ordered, thus resulting in future choice in their responding and behaving. It also offers support to a meta-description of data sorting and filtering for thinking and behaving, called meta-programmes, which will be discussed next.

Section Summary

This section has illustrated the myriad approaches to what intelligence is and means to various researchers. It has touched on the meaning-making and how the semantic nature of words impact the research, as though there is some form of psychological essentialism. The meaning constructed by one researcher becomes cemented in the lexicon of the next generation, and as such, can convince the perceiver that there is some profound reality to the meaning and word within the context of psychology (Barsalou, Wilson, & Hasenkamp, 2010; Medin & Ortony, 1989). The main consequence of this essentialising is that researchers ignore the influence of context.

The pervasiveness of essentialism has shaped the thinking of Western psychology over the last century (Feldman-Barrett, Mesquita, & Smith, 2010). Models of the mind have become fractured as researchers and psychologists have developed an assumption that emotion, memory, the self, attitudes, temperaments, personality traits and more, are different

entities with distinct principles and causes (Alexander, Murphy & Greene, 2012; Bruner, 1990). By focusing on a mental state or behaviour in isolation, it is easy to miss its embeddedness in a larger system that contributes to its nature. This idea is reinforced by Gendron & Barrett, (2009) who say that states, traits and behaviours are not entities, but events constructed out of a more basic set of processes. This review is not aiming to discover what causes thinking or feeling, but to discover the variety of ways humans are aware of our thinking in response to the environment in the moment.

1.4 Meta-Programmes

A meta-program is the psycho-neurological algorithm that informs how we sort, classify, evaluate and prioritise both internally and externally generated sensory data. It allows us to create a datadiminished map of the world beyond our senses, by which we create a personal perceptual model of that world and by which we seek to navigate it. – Geoff Dowell (2018)

Bateson first explored the idea of "going meta" in *Steps to an Ecology of Mind* (1972) where he related the "meta move" to almost every human endeavour to uncover the structure of meta communication.

Meta-programmes can be found in the field of Neuro Linguistic Programming (NLP), which is a model of being in the world that was developed from cognitive psychology and linguistics (James and Woodsmall, 1988). NLP was developed in the early 1970s by a computer scientist and a linguist. Bandler and Grinder (1975) respectively, defined NLP as: *'The study of what works in thinking, language and behaving'* (Knight, 2002, p. 1). NLP has come under a lot of scrutiny in the past two decades and has been dismissed as pseudo-science by many, due to the lack of peer-reviewed evidence of the efficacy of the techniques used, and a lack of a generally-accepted definition, even though it has the potential for a comprehensive cognitive behavioural approach (Liotta, 2012). In a systematic review, Sturt (2012) found that: *'the very fact that there is no agreed definition of NLP indicates how little evidence we have of its benefits.'* Sturt concluded: *'This systematic review demonstrates that there is little evidence that NLP interventions improve health-related outcomes. The study*

conclusion reflects the limited quantity and quality of NLP research' (Sturt et al, 2012b, p762). As a result of her review, Sturt could only use 10 out of 1459 NLP citations. The low quality of NLP publication was also an observation of Witkowski in his review of NLP, (Witkowski, 2010). A Delphi Poll is favoured when the views of experts are required, when the subject matter is complex, and a hierarchical structure of opinion is necessary. NLP was included in a Delphi Poll (Norcross, Koocher, & Garofalo, 2006) assessing the opinions of psychologists on what they considered to be discredited psychological methods, with NLP scoring 3.87 where 4=*probably discredited*. Consequently, ignoring the *field* of NLP, this review will focus on what is essentially a facet within it, and is thus separate enough to warrant individual attention.

Although many people claim to have developed meta-programmes first, it cannot be firmly established in the literature (Merlevede, 2005), and as such it is believed that meta-programmes came about as Cameron-Bandler in the early 1980's discovered that sometimes, the NLP techniques she was demonstrating did not work, and the reasons why they did not work (based on how the audience received and sorted the data) formed the original list of meta-programmes (Hall, & Bodenhamer, 2006). Hall and Bodenhamer identified at least 50 meta-programmes within five broad categories in their book, *Figuring Out People* (1997). Maus, (2011, p. 23) in his book '*Forget About Motivation*', renamed meta-programmes to 'thinking preferences' and defined them thus:

- 1. Each preference must, at least potentially, be found in all people.
- 2. Each must have a pattern that consistently repeats itself.
- 3. Each must cover all possibilities.
- 4. Each must be relevant to the chosen context.

According to the literature, there are some common traits amongst the definition of what meta-programmes are and what they do (See Appendix 2 for a full list):

• Almost all researchers refer to a Thinking Preference as a meta-programme, however the difference is clear when you consider Internal and External as Thinking Preferences, and their combination as a Meta-Programme called "Reference".

- There are 50 individual Thinking Preferences
- There are 20 Meta-Programme groups
- One researcher refers to them as "thinking patterns", where Towards is a thinking pattern. However, this is an incorrect interpretation of the intention.
- Each researcher refers to them as binary choices. For example, *Towards* is opposed to *Away From*.

People use specific language and behaviours when communicating, and when one knows what to look for, meta-programmes can be identified (Cook-Greuter, 1999). If the metaprogrammes of two individuals are not matched whilst in conversation, there will be a certain amount of misunderstanding or disagreement (Lawley, 1997; Turan & Stemberger, 2000). When communication is impaired, it also impairs social interactions, especially within a social context such as academia (Beatty & Pascual-Ferrá, 2015; McCroskey, 1977). One idea is where a person is predominately 'Visual', they will use 'Visual' language, such as: 'I see what you are saying', but a person who is predominately 'Auditory' would use language such as: 'That rings a bell'. The mismatch in this one meta-programme can cause a mismatch in language, which can be a barrier to communication (Hall, 2000). However, it is not simply a mismatch in communication, as suggested by Hall, but a mismatch in meaning-making. In this regard, this is not an NLP issue, but a developmental issue, in accordance with Laske (2008) and how he differentiates between levels of adult development based on sense- and meaning-making. Within the NLP framework, they are the basic building blocks of our thinking, and the filters we unconsciously use to determine to what we pay attention (James and Woodsmall, 1988: p. 92), and as mentioned in the previous section, from a cognitive perspective, any conceptual category that requires a human perceiver is valid (Feldman-Barrett, 2017).

From within the NLP arena, meta-programmes determine the form or structure of our thinking, the '*how we think*' not the what, and they exist at a level that is above, or 'meta' to our thinking (Hall & Belnap, 1999). Beddoes-Jones, (1999), refered to meta-programmes as 'thinking styles', however this does not correctly define them. Her intention was clear in that

she proposed each meta-programme was a thinking style, however, individually they are not styles *per se*. They are habituated patterns of sorting and prioritising sensory data in relation to response to stimuli, and as such, offer no 'style' until they are combined in various ways. The ways in which the 50 Meta-Programmes combine produce very different thinking and behaving outcomes for each person, and as such, a specific combination could be considered a thinking style, as governed by the person's unconscious intention in the moment. Meta-programmes have been linked to various elements of psychology over time and are not without psychological foundation. See Table 1.4 for examples of important MP's for post-graduate students.

Thinking Preference	Brief explanation	Contributing ideas from psychology	
Towards – Away from	The learning arising from positive or negative reinforcement following an event.	Watson's (1924) and Skinner's (1972) behaviourist learning theory.	
Internal – External	The extent to which <u>an individual checks</u> with external referents when evaluating information, or relies on internal checking mechanisms.	Bandura's (1989) work in self-efficacy. Sternberg's (1997) 'internal' and 'external' thinking styles.	
Sameness – Difference	The search for familiarity or difference in new information.	Piaget's (1962) work on 'assimilation' and 'accommodation'.	
		Neisser's (1976) work into 'matching' and 'mismatching' behaviours.	
Abstract – Concrete	Degree to which an individual prefers to work with known facts and data, or abstract and theoretical when receiving information.	Jung's (1971) research into psychological 'types'.	
Active -	The need to experience in order to comprehend and classify new information versus a preference to understand new information via an internal mental process.	Jung's (1971) research into psychological 'types'.	
Reflective		Kolb's (1984) learning styles.	
Relationship – Task	The extent to which individuals focus on the needs of the task or the needs of people when taking decisions.	Jung's (1971) research into psychological 'types'. Blake and Mouton's (1985) Managerial Grid.	
Trusting – Sceptic	Degree to which an individual is likely to trust or question the motives of others.	Erikson's (1980) 'trust-mistrust' developmental conflict.	
		Cattell's (1965) personality research.	
Global – Detail	Preference for processing information 'top down' ('big picture', general information) or 'bottom up' (specific, detailed information).	Clarke's (1993) 'serialist' and 'holist' learning styles.	
		Sternberg's (1997) global and local thinking styles.	
Options – Procedures	Extent to which <u>an individual favours</u> and follows existing procedures, or prefers to have the choice to explore options.	Sternberg's (1997) 'liberal' and 'conservative' thinking styles. Cattell's (1965) personality research into 'rule-consciousness'.	

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Although not expressed in the literature as such before now, other noteworthy equivalents exist between the notion of 'schemata' and the idea behind Meta-Programmes.

Rumelhart and Norman (1983) described a 'schema' as a way of guiding our actions. They suggest that we hold schemata generally, from using a PC to tying our shoe laces, and interacting with our children. Piaget (1962) argued that to understanding cognitive development, we must understand schemata as they can change over time as we experience new events. These new situations alter our mental representations of and beliefs about our representation of the world (Korzybski, 1951).

If we consider the alignment of meta-programmes from a neuroscience perspective, investigations of cognitive processes have linked approach motivation ['Towards'] and avoidance motivation ['Away From'] with left and right brain activation using limited behavioural measures (e.g., Friedman and Förster 2005a). See <u>Appendix 2</u> for a full list of meta-programmes.

From a post-graduate perspective, a student who is predominantly Options-oriented will have trouble writing their thesis in a structured way, and they will struggle to stay focused on one thing at a time, instead preferring to oscillate between topic or subject within their thesis. This has implications on their ability to write but also time-keeping and 'Procedures' (being the optimal meta-programme for Ph.D. students).

A supervisor of this student would need to reign in the student's thinking, get them to focus on a particular task by a particular time (what-by-when approach), and demonstrate their movement along this path. For this to happen successfully, the supervisor would need to be predominantly 'Procedural' in their thinking, or at least recognise the pattern within their student early enough to affect change. Since meta-programmes are unconscious and habituated (Hall, 2005), they will be context specific. However, once they are brought into awareness, they can be re-habituated to become a choice:

'We often move through the full range of each of the categories of the metaprogrammes as we go through our day' - James & Woodsmall (1988: p97). Hall (2000) saw meta-programmes as state-dependent and a multi-dimensional holarchy that can be changed and developed over time. By this notion, Hall dismissed the notion that personality is fixed. This is because he saw meta-programmes changing depending on the emotional state of a person in context, especially if a person was experiencing emotional duress at the time (Brown & Sitzmann, 2011; Georges, 1996). If our emotional response is unconscious, then we can say we are *subject to* it (Kegan, 1992). Development involves moving subjective experience to objective analysis, which was the thrust of Kegan's (1994) work as mentioned.

The above paragraph suggests that personality is not fixed. This leads to the understanding that personality, as seen through the lens of meta-programmes rather than other methods, will change over time due to a change in one's meta-programme preferences. If we are products of our environment (as per social constructionism), there will be a difference in our thinking and behaving, from one year to the next (Merlevede, 2003). Brunswik, (1955) emphasised that psychology should pay as much attention to the environment as it does the individual, as this will impact the individual's construction of self based on their emotional response to it. Or, in Feldman-Barrett's terminology, based on their construction of their emotional response to it.

The unique combination of meta-programmes allows each person to create their own model of the world (Hall, 2000). The way this has been described is that: the map is not the territory (Korzybski, 1933), which means that each person will create a unique map of their intellectual and physical environment according to the building blocks of their thinking, which in turn will be dependent upon how complexly they can interpret their 'territory'. Aligned to this is Feldman-Barrett's (2011) physical brain assertion that it is metabolically efficient to implement an internal model of the world with constructed concepts.

Personality psychologists are increasingly looking at individuals' 'characteristic adaptations' in terms of, for example, 'values and beliefs', 'cognitive schemata and styles', and 'coping strategies'—all of which vary within individuals according to context (McAdams and Pals 2007). It could be argued that meta-programmes contribute to these schemata. What is interesting about the unpacking of people's values, beliefs or cognitive schemata is that it is not often undertaken from the perspective of cognitive complexity.

Meta-Programmes and Psychoneuroimmunology Archetypes

In a study that aimed to determine if a particular combination of Meta-Programmes could be associated with three distinct psychoneuroimmunology archetypes, Daniels (2010) found that a clear description emerged of each archetype's profile where different meta-programmes combined to support her hypothesis that running specific combinations of meta-programmes was positively correlated with the development of identifiable pathologies.

A negative (helpless-hopeless) mind-state slows recovery, whereas a positive mindstate speeds up the rate of recovery and reduces secondary complications such as depression and chronic pain. (Robles et al. 2005). This was first realised by Frankl (1959), a psychiatrist and neurologist, who, upon being interned in a concentration camp during World War II, noticed that in his fellow inmates, the development of disease was preceded by a mind-state of 'despair'. He postulated that one's immunity might be suppressed by a helpless mindset. This was later proven by Ader & Cohen, (1975) in their experiments on rats using cyclophosphamide and saccharine.

Daniels (2010) determined that mind and body are one system and it is possible to predict the connection using meta-programmes. She asked: *is it the emotion that triggers the neurochemical and immune changes? Or could it be the thinking pattern* [meta-programme] *which gives rise to the emotion that is the trigger?* Changes in intention, awareness and thus

choice of thinking styles (the combination of MP's) would also influence changes in behavioural patterns, potentially promoting more optimum lifestyle choices.

However, as valid as the research by Daniels is, her approach to what metaprogrammes mean and do, made the same mistake as other researchers in this field in that, for example, she placed 'Sameness' in opposition to 'Difference' (p15) and referred to them as 'opposite poles' as per Hall (2002).

Daniels was demonstrating in her study that the 'fingerprints' mentioned by Feldman-Barrett (2010) potentially had a meta-programme representation that mapped the behavioural as well as cognitive deconstruction of those fingerprints.

Finally, in her study, Daniels (2010) used the Identity Compass Profile tool to determine her subjects' meta-programme combinations, as the concrete closed questions provided a detailed report, which met the requirements of standardised data being the output of the questionnaire, thus negating the need to develop a new tool. The use of the Identity Compass to raise a post-graduate student's awareness of their meta-programmes to improve their metacognition would be a valid learning outcome in its own right (Gunstone, 2012; Gunstone, 1994).

Going Meta for Emotional Control

From a motivational perspective, it is well established that cognitive control functions impact performance and can be enhanced or impeded by emotion and motivation (see Pessoa, 2009). Importantly, emotion and motivation are not aligned directly (see Harmon-Jones and Gable, 2018 for a review). The ability to voluntarily control attention has been linked to emotional valence (Derryberry and Reed, 2002) which can also enhance memory independent of stimulation (Adelman and Estes, 2013).

With awareness of our self-construct allegedly comes the understanding of how we relate to the environment and our relationship with others. With self-reflection comes an

enhanced awareness which can expand our thinking capacity and allow for a deeper understanding of our meta-programmes (Linder-Pelz, 2011). However, how do we know our level of awareness and what criteria do we use to gauge it in order to develop it from a metaprogramme perspective? The ability to reframe the context of the situation and move from an emotional to logical response sets apart the differing levels of cognitive capacity (Evans and Stanovich, 2013), which is important because in order to be a high level thinker, one must move through emotion into cognition (Laske, 2008), so as not to allow an emotional decision to limit one's thinking, and thus the literature goes full circle.

Learning Styles or Education Styles?

The constructs 'learning styles', 'cognitive styles', 'learning strategies', 'thinking styles' and 'learning skills' have been used within the literature with very little consistency in meaning (Zhang, Sternberg, & Rayner, 2012). From an educational perspective, 'cognitive style' and 'learning style' are used interchangeably in the literature, causing relative confusion (Furnham, 1995). Riding and Cheema (1991) found 30 different cognitive and learning styles. Hall and Moseley (2005) and Coffield, et al. (2004a, 2004b) found more than 800 learning styles references, and seventy one learning styles models.

'Cognitive style' was first used as a descriptive term by Allport in 1937, which he defined as an individual's innate, habitual or preferred mode of information processing (Cassidy, 2004, p. 420). Further, Armstrong, Peterson, and Rayner (2012) defined cognitive styles as: "*Learning styles are an individuals' preferred ways of responding (cognitively and behaviourally) to learning tasks which change depending on the environment or context. They can affect a person's motivation and attitude to learning, and shape their* [sic] *performance*" (pp. 451, 454). This definition suggests that cognitive styles stem from underlying personality structure. However, it will be argued here that personality is derived from one's construction of one's thinking style, which also impacts how post-graduate

students learn. They are used to describe an individual's habituated thinking, perceiving and remembering (Riding and Cheema, 1991).

The term 'learning style' was first embraced when researchers became interested in how style could be applied to academia and organisations (e.g., Dunn, Dunn & Price, 1979; Honey & Mumford, 1986). The theory has gained popularity over the years (Pashler et al., 2009), and has led to a variety of models (Coffield, Moseley, Hall & Ecclestone, 2004). There is very little differentiation in the models, however, they do differ in their definitions. For example, the Fleming model (Fleming, 2006; Fleming & Mills, 1992) suggested that the four types of learning styles are, visual, aural, read/write, and kinaesthetic, whereas the Dunn and Dunn model (Dunn, 1990; Dunn & Dunn, 1978) suggested the four learning styles are environmental, emotional, sociological, and physical. Salter, Evans, and Forney (2006) found that learning styles seem to be moderately stable over a two-year period whilst investigating the Learning Styles Inventory (LSI) and the MBTI (Myers–Briggs Type Indicator).

Studies do exist on learning styles in the context of university student supervision, however, they are dated and isolated from the larger pedagogical research on the efficacy and utility of learning styles (Tangen, 2017). Despite a lack of utility, learning styles are promoted in supervision best practices where the supervisor individualises supervision based on the specific needs of the student (Borders et al., 2014, p. 42). Teaching practises also come under observation when Woods, et al. (2016) encouraged the creation of research opportunities based on university students' learning styles. Researchers have utilised specific tools to determine supervisor/student relationships based on learning styles, such as the MBTI (Nielson, 2014; Romanelli, Bird, & Ryan, 2009). However, the MBTI is more focused on personality types than learning styles and thus has limited pedagogical significance (Sharp, Bowker & Byrne, 2008, p. 296).

Despite the research listed here, there is no empirical evidence to suggest that learning styles are factual (Lilienfeld et al., 2010; Pashler et al., 2009; Willingham, 2009), nor supported by empirical evidence (Kirschner, & van Merrienboer, 2013). Pashler et al. (2009) conducted a meta-analysis which found "... *at present, there is no adequate evidence base to justify incorporating learning-styles assessments into general educational practice*" (p.105). Similarly, Reiner and Willingham (2010) stated: "*students may have preferences about how to learn, but no evidence suggests that catering to those preferences will lead to better learning*" (p.35). Also, a number of studies found evidence that contradicted the idea of learning styles (Massa & Mayer, 2006; Constantinidou & Baker, 2002).

Learning styles became the umbrella term used to encapsulate cognitive styles and other behavioural factors such as instructional and environmental factors (Zhang & Sternberg, 2005). However, the phrase *learning styles* in the literature pertaining to this study refers to the concept of individuals 'preferring' to process information in three different ways: Visual, Auditory and Kinaesthetic, which are Thinking Preferences (Maus, 2011), or 'Meta-Programmes' (Hall, 2000). This implies they are better-able to process information when it conforms to their sensory preference (Pashler et al., 2009). Pashler et al. (2009) traced the origin of learning styles back to the Myers-Briggs Type Indicator. Allcock and Hulme (2010) argued that the learning styles approach had been influenced by Gardner's multiple intelligence theory (Gardner, 1991, 1993) by suggesting that teaching instruction should align to a student's preferred learning style. However, although Fridley and Fridley (2010) also linked the proliferation of learning styles to Gardner's intelligences, they emphasised intrinsic weaknesses within. The way learners process information has led to them being described as 'serialists' and 'holists' (Riding & Rayner, 2013; Pask & Scott, 1972). The use of the word 'preferred' in this context is inaccurate if said learning style is unconscious for a post-graduate student.

Kolb's (1984, 1985) inventory categorised learners along two axes: a preferred mode of perception (concrete or abstract) and a preferred mode of processing (active experimentation or reflective observation) (Gogus and Gunes, 2011; Pashler et al., 2009; Zacharis, 2011). These axes then produced a grid of four quadrants where learners found themselves: concrete-reflective (divergers who favoured feeling and watching), abstractreflective (assimilators who favoured thinking and watching), abstractactive (convergers who favoured thinking and doing), and concrete-active (accommodators who favoured feeling and doing). However, Kolb's ideas should be tempered by the considerable body of research that shows students who are concrete are either immature or delayed in their learning, whereas more abstract learners tend to be advanced learners (Taasoobshirazi & Carr, 2009). This will be matched to complexity in chapter 8.

There were further concerns with the validity of Kolb's inventories (Kappe et al., 2009; Martin, 2010). Fridley and Fridley (2010) argued they have very little predictive value and if teaching were to be matched to a student's learning style, then an increase in learning should be apparent. However, this was not supported in one study where Scott, (2010) demonstrated Kolb's learning styles inventories to be unreliable in a factor analysis, thus questioning the validity of the constructs. Honey and Mumford's (1986) Learning Style Questionnaire (LSQ) was developed to address the validity of Kolb's assessment (Kappe et al., 2009). The LSQ identified four types of learners: activists, theorists, pragmatists, and reflectors. However, factor analyses have also shown the LSQ to have reliability issues (Scott, 2010). Scott (2010) also suggested that those people best-placed to evaluate Kolb's ideas regarded them with great scepticism, and two prominent cognitive psychologists, Reiner and Willingham (2010) went so far as to say learning styles are a myth. In a more recent study, An & Carr (2017) found that lack of a solid explanatory framework, poor

reliability and validity of constructs, and a failure to link learning styles to achievement were more prevalent than any positive results.

For undergraduate students, the psychology textbooks are more reserved in their opinions. Ormond (2012) matched a student's preferred learning style to the way they were instructed with no discernible impact on their academic achievement. Since learning is not merely receiving information but making sense of it:

...to become expert learners, students must...learn about their own cognitive characteristics, their available learning strategies, the demands of various learning tasks and the inherent structure of the material... As instructors our task should be to devise training routines that will help the student to develop the understanding of the learning situation (Brown, Campion & Day, 1981, p17).

According to Pask, serialist learners are step-by-step, linear learners. For example, they tend to have a focused, rather than a wide-ranging view of a subject. Conversely, holists are non-linear, 'global' learners who can perceive a body of information as a whole. They are capable of making connections between the concept and application, building connections between topics. For very young children, Maddox and Feng (2013) and Carbo, (1996) state that phonics instruction benefits students with analytic and auditory learning styles, whilst students with a more global nature benefit from whole language instruction.

Finally, for HE students, Viloria, et al., (2019) found that the optimal learning situation required the combination of all teaching strategies, including learning styles in order to attain academic excellence. This tied in with the Delphi study findings by Armstrong, Peterson & Raynor (2012), where participants agreed that:

"Learning styles are individuals' preferred ways of responding (cognitively and behaviourally) to learning tasks which change depending on the environment or context. They can affect a person's motivation and attitude to learning and shape their [sic] performance" (pp. 451, 454).

This links learning styles back to the idea of meta-programmes, which will be expanded upon in this section and chapter 8.

Meta-Learning for Better Learning

In the context of a university education, Brown (2002) established the metaprogramme patterns of Accountancy lecturers using his own system for measurement: the MPQ. In 2003, he went on to compare the leading meta-programmes of Accountancy lecturers to those of Accountancy students (Brown, 2003). This helped establish the importance of meta-programmes to the teacher/student relationship and how students perceived the efficacy of their lecturers based on their meta-programme influence.

Brown (2004) discovered that where students differed from their lecturers' metaprogramme preferences, they viewed the quality of the teaching less favourably, even though the lecturer could have been very knowledgeable. It could thus be argued that it is possible to improve students' educational experience by matching meta-programme preferences, (Lawley, 1997) which contradicts the negative findings on thinking styles above.

Brown and Graff, (2004) identified positive and negative correlations between metaprogramme patterns of undergraduates and their performance in summative assessments. Meta programmes were described by O'Connor and McDermott (1995, p. 79): '*a description of a set of behaviours that are evoked in a certain context*' which labelled them context specific. An assessment tool such as that used by Daniels (2010) tailored to post-graduate students would have the potential to identify those patterns particularly influencing their academic experience and provide clear evidence on which to base future research.

Brown, (2005) discovered that for undergraduate students, the patterns Independent/Co-operative and Through-time/In-time were more significant to higher education than the equivalent patterns in the MPQ: Past/Present/Future and People/Places/Activities/Information/Things respectively. In addition, Seeing/Hearing/Feeling were refined by the addition of Auditory-Digital. Scardamalia, Bransford, Kozma and Quellmalz (2012), and Entwistle and Tait (1990) found that students were more likely to describe teaching as 'effective' if it complimented their learning style. Hauer, Straub and Wolf (2005) included nursing students in their study and found that the nursing and speech therapy students were more inclined towards concrete experimentation, whereas the occupational therapists and physiotherapists favoured abstract conceptualisation (Titiloye & Scott, 2001).

Dweck (2000) demonstrated that a student's behaviour within education was affected by their beliefs about [their] intelligence. This influenced Brown (2002) who included questions in his MPI relating to beliefs about intelligence, and consequently coined the term 'metacognitive patterns' to describe his findings.

One of the main reasons for utilising learning styles is to give educators and students insights into "learning how to learn" (Rayner, 2007, p. 27). Thus, using learning styles in an intentional manner might encourage greater self-reflection (Hall & Moseley, 2005) and self-awareness (Hall & Moseley, 2005; Peterson et al., 2009). Similarly, researchers have claimed that learning styles could be used as a tool to increase meta-cognition by providing a "lexicon of learning" (Abu-Ameerh, 2014; Coffield et al., 2004a [p. 120], 2004b [p. 51]). These ideas will be addressed in more detail in chapter 8.

Meta-Programming Ourselves

As mentioned in previous sections, people do not always learn from experience. Having expertise does not necessarily aid in rooting out false information and this expertise can also be a limiting factor that prevents us from questioning counter-evidence for fear of cognitive dissonance (Eurich, 2018). It can also make individuals over-confident. One study found that managers with years of experience were still unable to give an effective assessment of their leadership capabilities compared to less-experienced managers (Ostroff, Atwater & Feinberg, 2007). Rigas, Carling & Brehmer, (2002) went one step further and

discovered that people do not improve their judgement with experience. Another study of more than 3,600 participants at high levels within industry found that they over-valued their skills when compared to the perception of their co-workers around them. However, this lack of self-awareness was countered by those leaders who sought critical feedback from ordinates and subordinates, who were then perceived as more effective by both.

Introspection is assumed to be a developmental tool that promotes a meta-position to one's thinking and feeling and thus leads to improved self-awareness, as mentioned in the section on metacognition. It is considered a facet of metacognition essential to the process of conscious change (Rothman, Baldwin, Hertel & Fuglestad, 2011; Carver & Scheier, 1998). However, other research would demonstrate this is not the case. In a study by Grant, Franklin & Langford (2002), looking at the Self-Reflection and Insight Scale, they found that an individual's skills in self-evaluation and their propensity for conscious, rather than automatic self-reflection did not necessarily mean that one was capable of developing clarity of insight.

Another perspective on meta-programmes was noted by Pochron, (2014) who suggested that meta-programmes align to Kegan's (1994) stages by way of habituated physiological states. Once habituated, these states become installed as meta-programmes, albeit at an unconscious level. Utilising specific meta-programmes outlined in the research, Pochron mapped them individually to Kegan's stages, hypothesising that meta-programmes as perceptual filters shift as individuals develop to higher stages. However, although Pochron named those MP's as 'developmental MP's', he did not address the Intention and Awareness of the meta-state (implied at Kegan's higher stages) from a position of choice by the actor, and thus omitted the full potential of combining meta-programmes to form Thinking Styles.

What is evident from the literature on self-awareness, from this section and previous, is that an individual's level of self-awareness is far lower than their own perceptions of it, and the need for external feedback is paramount if one is to grow (Eurich, 2018). Where this

corresponds with stages of adult development is in the individual's starting point for selfreflection. As mentioned, an individual at Kegan's (1994) Stage 4 (self-authored thinking) will have a more profound understanding of their relationship with their own thinking in context than an individual at Stage 2. For Laske (2008), this would be a more dialectical understanding of the drivers of one's thinking and behaving in context, as he asked: *what is one not seeing that is just as important* (ibid. p. 22)? However, these positions are not innate, and must be shown to the individual through external guidance by a more complex other. A measure of self-awareness from a Meta-Programme perspective could be advantageous not only for post-graduate students, but also the general public, as a springboard for growth.

Section Summary

From the literature on Meta-Programmes it is apparent that they have a multitude of applications (Hall, 2005) and that there have been numerous studies by academics such as Brown and Daniels, that utilised them as individual and collective methods for determining an individual's meta-programme use in context. However, there would appear to be the potential to utilise them for more than is currently covered in the literature, and an understanding of how they interact with each other, as well as the individual's awareness of this interaction is not measured in any study as yet. From a position of self-awareness, there is evidence in this section that would point to a positive effect on awareness if exposure to the unconscious meta-programmes were more prevalent.

Literature Review Summary

Across the literature examined, there are a number of findings that emerge as we look at the way individuals think, think about their thinking and are self-aware of their thinking in context. Hackley (2003) emphasised that if a selected area of study is novel, or new, there will be little research that deals with the topic. Fein & Jordan, (2016) suggested that there is a lack of Adult Development (AD) research in social science, and any work going forward

should provide inspiring examples of different approaches using the AD perspective to accomplish interesting and novel research. This literature review has determined the same, and this thesis aims to fulfil this suggestion. Development in this review has focused on the sequential growth in complexity of meaning-making and uncovered a distinction in the studies that have omitted an individual's intention, awareness, choice and response in the moment. The theories discussed show a transformation process in the organising structures of an individual's meaning-making, which shows qualitatively different changes (Hoare, 2006).

The initial finding is that the stages of development by the various psychologists are adequately described from a behavioural output, and using a longitudinal study method; however, the specificity of what and how the development occurs is inadequate, especially from a position of an individual's conscious intention to grow and awareness in the moment of any growth.

Such explanations as bridging and holding offer little specificity in the area of what is actually the process of growth, and again, offer no real intention behind such growth for the thinker. And although both Kegan (1994) and Laske (2008) offer scales for gauging development, the process of growth is limited to an interview process for Laske, and no feedback at all for Kegan. Linder-Pelz (2010) repudiated this perspective and stipulated feedback is paramount if the individual is to benefit from the information, but again, the specificity of growth steps is omitted.

In general, individuals are not aware of their thinking in the moment, (Touw, Mejier, and Wubbels, 2015) and the literature reinforced this perspective to some degree (Hayes, 2015; Kallio, Virta, and Kallio, 2018). Eurich (2018) also reinforced this finding in her research, which then reinforced the findings of Nelson, Kruglanski and Jost's (1998) metaanalysis of metacognitive literature, as mentioned. Peacocke (2007) also demonstrated this apparent inability to be self-aware.

There is thus room for a new concept that continues Kegan's 'Universal On-Going Process of Development' which builds on its foundations, whilst uncovering a new way of determining one's developmental level, based on one's intention in the moment as a result of self-awareness. As this would initially be grounded in academia, for post-graduate students, Bodrova and Leong (2001) commented that there is a systemic failure to explore thinking and awareness as students seek to download information instead. Cleary, Callan & Zimmerman, (2012) commented that with awareness comes a higher level of thinking where the individual recognised their awareness and sought to repeat the action in support of synthesising the thinking process. This opens the door to questions about how levels of adult development affect post-graduate students in context.

Where there is a connection between the capability and capacity of the post-graduate student's thinking and the demands of post-graduate academia, especially in doctoral research, there is little research to link them from an output perspective or growth perspective for the researcher. When one asks the question: *should the process of doctoral research grow the student by virtue of the process*, the response is always positive. However, when asked *how*, in quantifiable terms, the response is less convincing.

If this could be linked to Laske's Thought Form principle where we access the structure of a post-graduate student's thinking by using meta-programmes, then following in Daniels' (2010) footsteps by utilising an existing method to deconstruct a post-graduate student's thinking via the Identity Compass profile tool, there is a possibility of developing a new concept that determines a person's *intention* to grow, their *awareness* of this intention and how this affects their capacity and capability as a thinking post-graduate student using meta-programmes to positively influence their self-awareness. Finally, Karmiloff-Smith, Kuhn and Vygotsky all use the term 'dynamic' to explain their theoretical position. This is

something worth considering from the perspective of how the meta-programmes can be combined in order to produce a dynamic interaction between thinking and behaving.

Therefore, the primary purpose of this thesis is to begin working on a concept that demonstrates how it would fill the gaps illustrated in the Literature Review summary by asking the question: *Is there a conceptual measure of self-awareness in the moment that can be determined by the use of meta-programmes that has not been utilised previously*?

The best way to achieve this will be discussed in the Methodology chapter, next.

Chapter 2

Methodology Introduction

Hart (1998) suggested that part of the purpose of a literature review is to validate the research topic, design and methodology. It was concluded in chapter 1 that a person's intention in the moment and their awareness of their intention were not adequately evidenced in the literature, despite the many theories concerning development, whether child or adult. The purpose of this thesis is to explore an individual's intention and awareness in the moment in order to create new knowledge that challenges stage development psychology, stage transition and metacognition. This thesis explores the thinking of participants in five studies, as illustrated in Figure 2.4:



Figure 2.4: Study Flow

It is important to map the intention behind the five studies within this thesis to illustrate the journey through the thinking and the data to understand how the outcomes from each study
determine the hypotheses and objectives for the next, in contiguous fulfilment of the thesis' overall aim.

Study 1 will test the intended methodology on 32 participants in order to determine if it is an appropriate method for the quantitative data to draw out the subjective experience of individuals (Kafle, 2011). Should this be the case, study 2 will expand the pilot with 177 postgraduate students with a specific aim of determining if an academic Thinking Style emerges from the combination of Cognitive Intentions. This will support the ideas of (un)conscious Cognitive Intention use, Thinking Styles and the Four Pillars of CDT.

Study 3 will act as the control group to replicate the findings of study 2 should its objectives be met. From a constructivist perspective, were Thinking Styles to emerge from the data in the larger dataset, there will also be support for the Thinking Quotient measurement tool and levels of self-awareness as indicators of one's Dynamic Intelligence.

Study 4 will investigate these levels of self-awareness further by introducing a number of participants to an awareness questionnaire based on thirteen Cognitive Intention definitions. By offering definitions and gauging the participants' awareness of their use of CI's as shortcuts, it will be demonstrated to what extent an individual is conscious of their use of CI's in the moment, and if they have relative choice in their construction.

Finally, study 5 will take the findings from studies 3 and 4 and use semi-structured interviews to discover if the use of Thinking Styles, CI's and the Four Pillars of CDT transfer to the lived experiences of the interviewees. This study will tie the previous 4 quantitative studies together to demonstrate an extra dimension to Constructed Development Theory by generating support from a qualitative point of view, thus making the thesis and theory more robust.

Before addressing the chosen methodology, other research perspectives are discussed, providing evidence to support the research paradigm implemented in this thesis.

Awareness of awareness is not a new phenomenon. According to Wilberg (2006), it is 'Advaita Vedanta' in Hinduism that focuses on the 'principle of awareness' as the primary route to all forms of reality. It is the sole possible theory of everything. It stems from Advaita schools of Hindu philosophy which states the importance of Awareness (Chit) over Being (Sat). However, without becoming a Hindu scholar, it could be asked: awareness of what and for what? For example: meditation is awareness but has no operational context.

Halford, Wilson, and Phillips (1998, 2010) proposed that the complexity of relations processed simultaneously is a measure of one's processing capacity. Halford et al. (1998) proposed that the more we process in the moment, the greater the complexity load, and that processing capacity has a soft limit (Wilson & Halford, 1998). This means that there are gradations of performance capacity, which should demonstrate a reduction in speed and accuracy as a person's capacity is reached. It would be useful to recognise within the test parameters that when one is overloaded, their thinking does not stop.

Adult educators in Higher Education have used a system of competency-based management education (CBME) since the 1980s to measure such competencies as knowledge, skills, and abilities that are essential for the organisational environment (Paglis, 2013). This has contributed to a student's horizontal development, which is to say, not their vertical development, as it is only about acquiring new skills or knowledge within preexisting stages of cognitive complexity (Brown, 2012; Petrie, 2011). In an increasingly complex world, this will be insufficient to develop future leaders (Petrie, 2011).

The inherent difficulties in investigating the relationship between complexity and non-developmental personality dimensions (such as 'Neuroticism', Costa & McCrae, 2008) were recognised by Westenberg and Block as early as 1993. While technical challenges are those that can be solved with existing expertise (Kegan, 2009), addressing adaptive challenges requires greater cognition as they are problem situations that lie outside the

person's current way of operating (Heifetz, et al., 2009). What has yet to be described is how a person becomes aware of, chooses the most appropriate response (for them) and responds to a situation in the moment. Lateral development represents 'what we know', in terms of skills and knowledge. Vertical development represents 'how we know', as we deepen our awareness and cognitive capacity (Brown, 2012). There have been decades of research in constructive development that has demonstrated the importance of this distinction within an academic setting (Cook-Greuter, 2004; Rooke & Torbert, 2005; Spence, Hess, McDonald & Sheehan, 2009). Rooke and Torbert (2005) state that those who develop vertically are more aware of how they interpret their surroundings and how they react when challenged because they are aware of an increase in their cognitive complexity (Petrie, 2011). However, it is not certain how one develops their awareness of their developmental level and the requisite shift in awareness that promotes growth. It was therefore the aim of the five experiments presented in this thesis to discover this in-the-moment-awareness prior to any developmental shift, as an introduction of a new method of measuring growth using Meta-Programmes, thus opening the door to a new way of determining an individual's capacity and capability not seen in the literature.

As this thesis contains four quantitative and one qualitative study, Mason (2010) argues that using a mixed methods approach is useful because it places value on theoretical logic, and as this research enquired about a person's social construction as well as lived (constructed) reality, along with a quantitatively experienced measure, a mixed methods approach was practical. Mixing methods serves to explain and interpret, offering a theoretical perspective but more importantly, critically addressing the research questions on different levels. In so doing, the approach answers the research question strategically, allowing theoretically driven comparisons to be made. Mason continues:

a 'qualitatively driven' approach to mixing methods offers enormous potential for generating new ways of understanding the complexities and contexts of social

experience, and for enhancing our capacities for social explanation and generalization (Mason, 2006, p. 10).

Another value of using the mixed methods approach is it can overcome the weaknesses inherent in using only one method, by using others to confirm, cross-validate and corroborate findings. Thus, mixed methods can provide some routes to validation and a more robust picture (Fielding and Fielding, 1986).

Research Philosophy

Post-positivism and constructivism are two of the major theoretical perspectives in social science research (Neale, Allen & Coombes 2005), of which this study is comprised. Measuring the objective reality that occurs and developing numeric measures of observations is paramount for positivists. From a quantitative perspective, this research design is a postpositivist approach as human behaviour is not an absolute, and thus one cannot be positive about our claims of knowledge (Phillips and Burbules, 2000). Post-positivists approach human behaviour from a deterministic perspective in that an outcome has a cause. This research is post-positivist because this is the most useful approach to engage an online questionnaire to '*allow the data to emerge*' (Bryant, 2003; Charmaz, 2003). However, Positivism is critiqued because studying human interaction is considered to be radically different from studying chemicals in a laboratory. Additionally, many questions are raised about the nature of reality, for example, can we objectively know if there is a shared reality (Cohen & Manion, 1994)? The ability of the researcher to remove themselves from the process is questioned by Flick (2014), especially qualitative research where the researcher's influence is more interactional and constructional (Breuer, Mruck & Roth, 2002).

Hermeneutic phenomenology is focused on the subjective experience of individuals and groups, and interpretation is all we have (Kafle, 2011). Any attempt to describe something is also an interpretative process. The focus of hermeneutic phenomenology is towards illuminating unconscious details within experience that may be habituated or taken for granted by the actor, with the aim of creating meaning and understanding (Wilson & Hutchinson, 1991). This was the primary aim of the study: a deeper understanding of the meaning of the deconstructed experience of the participants, but instead of achieving this through argument via critical thinking and open-minded scepticism (Smith, 2010), it was achieved by deconstructing the individual's meaning behind their Meta-Programme use.

The terms constructivism and social constructionism tend to be interchangeable and subsumed under the generic term 'constructivism' (Charmaz, 2006). Constructivism proposes that individuals use cognitive processes to mentally construct their experiences of the world whereas social constructionism has a socialised focus (Young & Colin, 2004). It is less concerned with the cognitive processes that create knowledge.

This study was therefore Constructivist in that the participants create their own meaning in the way they map the world in which they operate, which is contingent upon human interactions and transmitted in a social context (Crotty, 1998). The social context was academia in studies 1 and 2, and large organisations in study 3. Individuals develop subjective meanings of their experiences. The Identity Compass profile tool allowed for an interpretation of the awareness of the participants' views (Daniels, 2010), and this unique construction of their world view is more typically linked to qualitative research (Mertens 2009). Thus, the process of qualitative research is essentially inductive: the researcher generates meaning from the data collected.

The constructionist approach is aligned with qualitative research and stems from Berger & Luckmann's (1967) *The Social Construction of Reality*. Social constructionists believe that we seek understanding of the world around us, and we develop subjective meaning of our experiences. Social constructionism makes no ontological claims as it confines itself to the social construction of knowledge, thus making only epistemological claims (Berger & Luckman, 1991). By extension, this study demonstrated that the Meta-

Programmes were individually anchored and socially constructed without any claims to their ontological status. Ontologically speaking, the reality that is deconstructed by the Meta-Programmes can be external to the individual, or produced by their consciousness (Cohen et al., 2000), and thus a representation of type.

Positivistic Paradigms

As discovered in the literature review, much of the literature on stage development in adult thinking comprises a positivistic paradigm, which endeavours to condense the study of complex thinking to a hierarchical ladder that can be measured in verifiable and quantifiable stages. This can be seen in Table 2.5.

The philosophical underpinnings of positivism are best represented by quantitative research (Smith, 2008). The hypotheses being examined here were the relationships between two Meta-Programmes, an individual's awareness of this relationship and a measurement scale derived from it. This returned numerical values, which were more robust as they were governed by mathematical laws (Smith, 2008). However, it has been argued that the subjective experiences of individuals are omitted by quantitative research and as this study aimed to deconstruct self-awareness, how an individual experiences and constructs their world is equally important (Harung, Heaton & Alexander, 1995; Habermas, 1984). Although it has been argued that interpersonal and intrapersonal experiences cannot be adequately explained through quantitative study (Hawkins 2015; Bosma & Kunnen 2001), one aim of this research was a benchmark scale of awareness that aimed to quantify subjective experience and awareness.

Ospina (2004) gave a number of reasons to undertake qualitative research in what could be deemed a quantitative area, as evidenced in the literature review, where he argued that to explore a phenomenon that has not been studied before in this manner, and to add

detail and nuances that documents existing knowledge (such as stage development psychology) where qualitative research can fill the gaps left by quantitative study.

Stage	Hy & Loevinger 1996	Cook-Greuter 1999	Rooke & Torbert 2005	Joiner & Josephs 2007	Kegan (1982, 1994); Kegan & Lahey (2009)	Fischer	Laske (2008)	Stevens, 2020 Constructed Development Theory
jeu.			(0 /	+; + ⊒	Self-sovereign mind		001-1	
оџиәл		Impuisive	impuisive (2)	Entrusiast	(2nd order of consciousness)		Instrumental 2.0	Unaware 5.0
U028.	Self-protective E3	Self-protective	Opportunist	Operator	Socialized mind (3rd order)	Representation		:
ld			(2/3)	-	Traditionalism	al systems	Socialised Mind	Other-Unaware
ojju	Conformist E4	Conformist	Diplomat (3)	Conformer		Simple Abstractions	0.0	(0.0)
EL 8/	и И	y 0		+ <u>-</u>	Self-authoring mind	Abstract		
	Self-aware ED	Dell-aware	ЕХРЕГІ (<i>3</i> /4)	схрег	(4th order)	Mapping		
0	Conscientious E6	Conscientious	Achiever (4)	Achiever	Modernism		Other-Dependent	Other-Aware (7.0)
Transitional Postconventional	Individualist E7	Individualist	Individualist (4/5)	Catalyst		Abstract Systems		
JBUOļļ	Autonomous E8	Autonomous	Strateoist (5)	Co-Creator	Self-transforming mind	Single Principles		
иәли							Self-Authoring	Self-Aware (8.0)
losieoq	Integrated E9	Construct Aware	Alchemist (5/6)	Svnergist	(5th order) Postmodernism		oryre 1 .0	
Transpersonal		Unitive	Ironist (6)	,			Self-Aware	Construct Aware (9.0)

Table 2.5: Stage Development Grid

Ospina's (2004, as cited by Parry et al., 2014: p136) final point is most relevant to this study:

To understand any phenomenon in its complexity or one that has been dismissed by mainstream research due to the difficulties to study it, or that has been discarded as irrelevant, or that has been studied as if only one point of view about it was real.

To this point, the literature review has highlighted the fact that there has been very little study in the area of stage development or metacognition from the perspective of in-the-moment awareness and measurement of this awareness to induce a choice of response. The aim of this thesis is thus to deconstruct the thinking of participants in a quantitative manner and investigate those numbers with a qualitative study to tie the findings together.

Research Design

Research design is defined by Berkeley, (2004) as:

Deciding how the strategy and methods will be implemented in the context of a specific inquiry, indicating more precisely where, when and how data will be obtained and the method to be used to analyse and interpret those data.

More specifically, Stangor (1998) refers to research design as the specific method researchers use to collect, analyse, and interpret data, which is largely dependent on the objectives of said research (Burns & Bush 2006). The first study was exploratory in nature and thus different to an experimental study. Cooper and Schindler (2001) suggest that exploratory studies tend to be looser in structure and aim to discover new ideas. The purpose of the exploratory study was to test the methodological approach for viability. The review of the literature in chapter 1 suggested the need for an exploratory study initially, followed by more structured experimental studies later. Since study 1 was exploratory in nature, and studies 2, 3 and 4 were quantitative, the process of allowing the theory to emerge from the output data further supported a final qualitative method of inquiry (study 5). Given that qualitative methods use individual experience within a context, as well as subjective interpretation, generalisability is not sought or possible (Heppner, Kivlighan, & Wampold, 1999).

Following in the footsteps of Daniels (2010) and Kegan (1994), it was fitting in the initial stages to discover how the thinking of post-graduate students at a UK university mapped against an appropriate tool. The tool used by Daniels was the Identity Compass profile tool (IC), which deconstructed her participants' thinking into 50 (fifty) Meta-

Programmes (MP). These MP's allowed her to understand her participant's thinking and behaving in context.

It could be argued that although the IC returns quantitative data, the process of determining an individual's perception via the questionnaire is exploring a participant's construction, and thus also lends itself to a qualitative approach.

"Qualitative research is especially helpful when it provides us with someone's perceptions of a situation that permits us to understand his or her behavior" (Krathwohl, 1998, p. 230).

Qualitative data highlights an individual's experiences and thus connects their perceptions to the social world (van Manen, 1977). The Identity Compass profile tool is a measure of these perceptions in the social context of academia in the first two studies.

For this reason, the Identity Compass was chosen for the exploratory study above all other psychometric tests. This gave a quantitative return on the measure of each Meta-Programme, based on the self-report question-set in the profile tool, against which each participant was measured. Quantitative questionnaires are objectively measurable against other variables, which makes them useful in the current study (Saunders et al, 2007), as are most psychometric tools. By way of comparison to the Identity Compass as the choice tool for this study, there follows a review of psychometric tests available on the market.

Psychometric Tests

When Galton (1869) posited individual differences existed based on genetics, he disrupted the philosophical thinking of his day. He proposed humans had ingrained traits that were almost impossible to change. Psychologists were keen to leap onto this new idea, and proposed a variety of tests and methods to measure these traits.

The first modern personality test was used in 1919 and was the Woodworth Personal Data Sheet. It was designed to help the United States Army screen out recruits who might be susceptible to shell shock. There have been so many tests over the years that to list them all

here would be a pointless endeavour. Most are replications of other tests and measure very little difference in their output. See <u>Appendix 3</u> for an informative list. For example, Johnson's (2014) 4-Item IPIP scale measures constructs similar to those in the 30 NEO-PI-R Facet scale (Maples et al., 2014). This is called psychometric isomorphism, which is important as it is a logical prerequisite for homology. Therefore, when one posits theoretically similar constructs, they are invoking isomorphism (Tay, Woo & Vermunt, 2014). This is especially true of the trait-based systems. Constructed Development Theory, on the other hand, has an element of analogy as it does not share trait-based foundations with existing systems. Instead, it has intention-based shortcuts in cognition, which were investigated in this study. As Constructed Development Theory is hypothesised, equivalent measurements are prerequisites to its evaluation, regardless of the complexity of the test between or within groups (Vandenberg & Lance, 2000).

Although there is consensus on the structural organisation of personality, there is less agreement regarding the mechanisms responsible, and thus the interpretation of these dimensions of personality is arguably disparate (Ryan, Ployhart, & Friedel, 1998). Some researchers consider personality dimensions more a description of a variety of personality characteristics (Ashton & Lee, 2001; Lee, 2012). On the other hand, such researchers as McCrae & Costa (2008) have come to consider the dimensions of personality as causes of the personality characteristics they incorporate. The problem with these circular arguments can lead to epistemological inconsistencies. For example, the dimension "Extraversion" is assessed in personality questionnaires with statements such as: "I enjoy going to parties". This is then theoretically conceived as the cause of going to parties, and subsequently used to predict such behaviours as going to parties (see Saucier & Srivastava, 2015, for review). This has obvious limitations on the research into, and the results of personality profiling as it conflates the explicandum (Perugini, Costantini, Hughes, & De Houwer, 2016).

Thus, a psychometric test consists of written or practical tests which measure various aspects of human thinking and behaving, usually within an organisational culture (Dent & Curd, 2004). The short list that follows is an introduction to the idea of personality and psychometric tests from the perspective of why they were not chosen for this study.

Eysenck's Personality Theory: Eysenck (1952, 1967, 1982) developed a very influential model of personality. He used personality questionnaires and performed factor analyses on the results to identify three dimensions of personality: extraversion, neuroticism, and psychoticism. He then reduced the behaviours down to a few factors, grouped together as dimensions. Eysenck, (1947) discovered that behaviour could be represented by two dimensions: Introversion / Extroversion (E) and Neuroticism / Stability (N). In 1966 he added a third dimension: Psychoticism. In *Sense and Nonsense in Psychology*, Eysenck posed the question of whether personality could ever be measured. He noted:

"the answer depends on what we mean by personality, what we mean by measurement, and, indeed, one might even maintain that it depends on the meaning of the term 'can" (Eysenck, 1958, p. 175).

Eysenck's 'superfactors' of Extraversion and Neuroticism are found to be almost identical to the same dimensions in the Big Five, and Eysenck's Psychoticism 'superfactor' corresponds to a combination of low Agreeableness and low Conscientiousness (Clark & Watson, 1999; Costa & McCrae, 1995; Goldberg & Rosolack, 1994). It does, however, have several concerns regarding efficacy: its handling of the complexity of processing; its attribution of performance effects to variation in cortical arousal, and its neglect of the adaptive significance of traits (Matthews, 2016). Finally, several of the theory's core postulations are countered by the modernity within cognitive science, thus it is no longer the paradigm for personality that Eysenck (1981) asserted (Matthews, 2016).

MBTI: The Myers-Briggs Type Indicator is listed here because it is the fore-most profile system in use today. It was originally developed by Briggs-Myers and Briggs in the

1940's after reading Jung's book on *psychological type*, and was later used in educational testing for research purposes in 1957, from whence it grew to become the test of choice for the Consulting Psychologists Press (1975). The primary feature of the theory is that each person's personality fits neatly into one of 16 types. This is based on four features of personality: Extroversion vs Introversion; Sensing vs Intuition; Thinking vs Feeling; Judgment vs Perception. This adherence to type suggests that a person can only have one preference, although it is possible to develop the complimentary style with practise (Pittenger, 2005). An example question would be: *When you meet new people, do you: A. talk as much as you listen? B. listen more than you talk?*

Despite being on its second iteration with a differentiation between Step I and Step II assessments, (MBTI Online, 2019), the validity of the MBTI is rigorously questioned by academics (Stromberg & Caswell, 2015), and a factor analysis of 1,291 college students in America found six factors, which translated to 83% of the differences between the students could not be accounted for by the MBTI (Sipps, Alexander, and Friedt (1985).

16PF: Cattell (1943) used Allport and Odbert's original list of traits to identify a smaller number, by categorising clusters, and then applying an umbrella term for each cluster. This reduced the list to 171. Cattell asked one hundred people to rate people they knew based on these 171 traits. He then used a factor analysis to derive 12 factors. He eventually added four more. From these 16 factors, Cattell and colleagues developed a psychometric tool to assess them specifically, known as the 16-factor personality questionnaire (Cattell, Eber and Tatsouka 1970). Cattell employed a factor analysis to investigate personality structure at a higher level, which allowed him to produce the second order of global factors, namely the 'Big five' and were rediscovered by Goldberg (1990). This is argued to be a purely descriptive model of personality (and thus lacking utility) which was

rejected by Cattell (1995). It has been argued that the traits are at such a high level as to not predict or explain behaviour as Cattell's primary level traits (Russell and Karol, 1994).

Big Five: The Big Five Inventory (BFI) is a 44-item questionnaire developed by Benet-Martinez and John in 1998 to measure the Big Five dimensions of personality. Each dimension has up to ten factors with a small number being reverse-scored. The items are rated on a 5-point Likert scale where 1=strongly disagree and 5=strongly agree. The BFI has an internal consistency in numerous researches ranging from .77 to .81.

A number of issues have arisen over time in the argument for where facets appear on each instrument. For example, Costa and McCrae put the 'warmth' facet within Extraversion, whereas John & Srivastava, (1999) say that warmth is more closely related to Agreeableness. Particular disagreement is found in the understanding of the Openness factor. Goldberg emphasises intellectual and creative cognition, calling it Intellect or Imagination; McCrae (1996) criticises this view as too narrow a definition.

Five Factor Model: Costa & McCrae, (1992) assesses the Big Five dimensions of emotional stability, introversion, openness, conscientiousness and agreeableness through 55 adjectives (e.g., *nervous, reserved, cultivated, compassionate, tidy*) rated along a 6-point scale ranging from –3 (*does not describe me at all*) to +3 (*describes me perfectly*). The Five Factor model also has its detractors, beginning with Mischel's (1968) argument from his book, *Personality and Assessment*, that people's behaviour is so varied and inconsistent that the five factors are too superficial and stereotypical, and thus have little or no relationship with actual behaviour (Mischel and Peake, 1982), to Block's (1995) argument that the dimensions lack precision and thus do not provide insight into personality. The Big five are to psychology what 'plant' and 'animals' are to biology (John & Srivastava, 1999), plus the problematic issues of acquiescence and response distortion (Barrick & Mount, 1996; Holden, 2008). **TEIQue**: The Trait Emotional Intelligence Questionnaire v.1.50 (Petrides & Furnham, 2003) consists of 153 items rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree) and encompasses 15 subscales organized under four factors: Well-Being, Self-Control, Emotionality, and Sociability. The psychometric development of the instrument is described in Petrides (2001). Trait EI essentially concerns people's perceptions of their emotions (in context) and rejects the notion that emotions can be artificially objectified in order to be made agreeable as if they are true, along the lines of IQ. Instead, is it along the lines of emotional self-efficacy (Petrides, 2016).

Bartram 8: many studies have examined the individual requirements of job performance, whilst emphasising personality and intelligence (e.g., Barrick & Mount, 1991; Hunter & Hunter, 1984; Hurtz & Donovan, 2000; Salgado, 1997, 1998). However, according to Bartram and SHL Group (2005), an issue is that various aspects of job performance are rarely distinguished. In other words, personality traits and intelligence will only affect a small number of facets of work-based performance. Bartram et al, (2005) suggested a generic taxonomy of competencies be created to differentiate those activities that constitute a wellperformed role in an organisation. This would allow a more detailed exploration of characteristics related to those competencies.

In support of this idea, research has shown that specific personality traits correlate with some, but not all, facets of job performance (e.g., Hogan & Holland, 2003; Robertson, Baron, Gibbons, MacIver, & Nyfield, 2000; Robertson & Kinder, 1993). For roles such as leadership, associations between personality traits and behavioural outputs vary across contexts (Judge, & Ilies, 2002; Judge, et al., 2002). It is unsurprising that if not all traits correlate with job performance, then the test is lacking in what it is purporting to measure.

Hogan Personality Inventory: The HPI is the industry standard for measuring personality as it relates to job performance (Hogan & J. Hogan, 2007). It is based, as all the

others are, on the Five-Factor Model (FFM) of personality with 30 years of criterion-validity and continued refinement. It is a 20-minute test with ambiguous questions that minimise a respondent's ability to respond to the assessment in a socially-desirable manner. The Oregon Research Institute conducted objective reviews for the HPI (Goldberg, 2008).

Gordon's Survey of Interpersonal Values (PreVisor) looks at the over-arching construct perspective, rather than the facets that devise the construct. It uses 90 statements to determine an individual's suitability for a role based on the six sub-scales of Support, Conformity, Recognition, Independence, and Benevolence and Leadership. This takes a global perspective and ignores the facets that contribute to each of the scales mentioned. The inherent problem with this approach is that should an applicant score badly on one of the subscales (Conformity) without the tool explaining which facet was lacking, and should that facet be important to the role for which they are being interviewed, the assessor cannot determine this weakness in the moment.

To offer a breadth of understanding, here is a further list of tests that comprise various aspects of thinking and emoting. *Social desirability* is measured by the Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1960) referring to a tendency to present oneself in an overly positive manner; The eponymous *Trait Anxiety Inventory* (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) is a questionnaire consisting of 20 items rated along 4-point scales. The *Beck Depression Inventory* (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) evaluates depression using 13 items consisting of four statements each to describe how the participant felt last week. Affective positive and negative states can be measured by the *Positive and Negative Affect Schedule* (PANAS; Watson, Clark, & Tellegen, 1988). It consists of 20 adjectives rated along 5-point scales of which 10 measure positive affectivity (e.g., inspired), and 10 measure negative affectivity (e.g., guilty).

The short form of the *Social Support Questionnaire* (SSQ; Sarason, Levine, Basham, & Sarason, 1983) evaluates perceived social support. The SSQ provides two scores: perceived quantity of social support and perceived quality of social support. The *Emotion Refinement Inventory* (ERI) is based on Frijda's (1988) theory of emotions and which rates any emotional episode on an importance scale ranging from 1 (*not at all*) to 7 (*the strongest you can imagine*). Finally, *action tendencies* can be evaluated using Frijda, Kuipers, and ter Schure's (1989) ERI questionnaire. Respondents are required to rate the intensity to which they wished to accomplish 11 actions (e.g., to swear, to disappear, to cry) on a 7-point scale ranging from 1 (*not at all*) to 7 (*the most intense tendency you could experience*). From a psychometric isomorphism perspective, Kozlowski and Klein (2000) suggest:

"Isomorphism means that the amount of elemental content is essentially the same for all individuals in the collective" (p. 62).

Although tests for this form of homology have been established by Chen et al. (2005), this could potentially be viewed as a negative, and contributes in this case to the rationale for the use of a completely different type of profile tool. Reinforcing this view, Morgeson and Hofmann (1999) endorsed a realistic perspective to understanding constructs corresponding across levels as they are embedded in conceptually comparable principles, simply taken as true. Comparing groups based on dimensions that were originally used to describe individuals is only valid if those dimensions are present at the group level. In other words, when groups are hypothesised to differ, or remain similar, on cognitive dimensions such as the use of Meta-Programmes, the dimensional structure of their thinking at the collective level is anticipated to reflect the individual level (Hofmann & Jones, 2005; McCrae & Terracciano, 2008; Steel & Ones, 2002). Comparing the strength of the relationships of MP's across levels will be more valid when there is greater psychometric isomorphism. This is important when contextual analysis is undertaken and measurements across levels are compared (Enders & Tofighi, 2007; Hofmann & Gavin, 1998; Zyphur et al., 2008).

From a Methodological perspective, a potential issue with the existing profile tools, even taking into account psychometric isomorphism, is the way in which the questions are presented. The language and structure of the question can be differently-interpreted by differing participants, which suggests that where a question is ambiguous due to different contextual constraints, the answer given will be equally meaningless. Three examples are:

- 1. I'm usually able to control other people
- 2. Generally, I don't take notice of other people's emotions
- 3. When I receive wonderful news, I find it difficult to calm down quickly

The potential high-level responses for each question are:

- 1. Why would I want to control other people? Am I aware that I like to control other people? What kind of person does this make me?
- 2. Except when I do. When the person means something to me, I tend to take notice. This does not mean that I choose to respond emotionally. But awareness is key.
- 3. This assumes I am out of control and unable to take charge of my emotional reactions to situations.

Intention, Awareness, Choice, Response

To critique psychometric testing is to expose the limitations of Trait theory. Trait theory is primarily focused on the group level of analysis whereas personality is obviously an individual-level phenomenon (Robinson, 2013). As such, any attempt to garner individual information from group data serves to flatten human behaviour into a "static predetermined set of traits" (Emre, 2018). Whilst traits have been a useful describer of individual differences, there still needs to be a definition of trait origin, operations and how they produce differences in behaviours (Jayawickreme, Zachry, & Fleeson, 2019).

The primary issue with Trait-theory research is that it is mainly conducted using selfreport questionnaires. This means that it can only ever include aspects of personality that are within awareness and the participant is willing to share. This leads to the next issue in that the questions offer no real choice of response. In order to make sense of the question, the client must first accept the premise the question is forcing on them, and then choose between a range of "Agree" to "Disagree" on a Likert scale. If the scale is particularly ineffective, there will be an odd number with a middle choice, 1 to 5, with 3 being the middle choice.

To reiterate the point, if a participant were to ask himself the question in response 1, his only 'choice' on the Likert scale is to disagree wholeheartedly with a badly-worded statement. For this, he must tick the radial button under "Disagree". This, however, does not give the psychologist asking the questions the full cognitive capacity of the participant as it fails to determine their meaning-making in the moment, and thus their intention behind any such behaviour.

This occurs in every question set within Trait-based profile tools and can be seen in <u>Appendix 3</u>, where a list of profiles and questions is given. An overwhelming body of research shows that the majority of current measures of personality assess these same five dimensions (OCEAN) with varying degrees of adequacy and efficacy (Hogan and Bond, 2009; p581).

Another issue with psychometric tests as a group, it could be argued is that the meaning-making behind such trait words as "Openness" or "Extraversion" (including their component facets, such as Warmth or Gregariousness) changes as one ages. Although traditionally, traits were thought of as stable over time by occupational psychologists, and that it is convenient to conceptualise personality as a stable property of the individual in order to predict behaviour and attitude, (Woods, 2013) more recent research has demonstrated these changes in various recent studies (Roberts, Walton, & Viechtbauer, 2006; Woods, 2019). However, for those complexity and stage development psychologists, traits have always been seen as temporary. This links to Laske's (2008) cognitive complexity theory. Although organisational behaviour is predictable using the various facets of the Big Five there is evidence that trait-based personality profiles are poor predictors of future behaviour (Woods & Anderson, 2016), and they do not address the issue of vertical development.

Because they are based on statistics rather than theory, they provide no explanation of personality development. In support of Laske, Bowler et al. (2009) suggested that an individual's cognitive complexity should have an impact on the factor structure of their personality (via OCEAN, for example). The study phases of this thesis sought to test this perspective by demonstrating different dimensions of Meta-Programmes at different levels of awareness, which also supported findings by Austin et al., (2002), and Toomela, (2003), who investigated the relationship between cognitive capacity and the measurable factor structures of personality.

Network Analysis and Topology

Network analysis offers a different perspective on personality that allows questions to emerge that would not have been intended without adopting said perspective (Costantini & Perugini, 2016). This approach allows the topology to be questioned where existing profiles confuse explicandum. From a network perspective on personality, a single major dimension should be deducible from the combination of the various facets at the personality level.

Further to this, identifying a facet's unique characteristics is important for determining their different roles in personality (Costantini, et al., 2015; Costantini, Richetin et al., 2015). Network analysis also allows for the investigation of patterns of various constructs by identifying their relationships in context (Costantini & Perugini, 2016). The inherent problems that translate to all questionnaires of this type are discussed next. Looking at one factor of the FFM: Conscientiousness, it is described as:

"...socially prescribed impulse control that facilitates task- and goal-directed behavior, such as thinking before acting, delaying gratification, following norms and rules, and planning, organizing and prioritizing tasks" (John & Srivastava, 1999, p. 121).

Conscientiousness is hypothesised as: *"having both proactive and inhibitive aspects"* (Costa, McCrae, & Dye, 1991, p. 889), and these two aspects of the trait emerge in most taxonomies. Conscientious individuals, compared with less-conscientious individuals tend to live longer

(Kern & Friedman, 2008) and healthier lives (Bogg & Roberts, 2004; Friedman & Kern, 2014; Roberts, Walton, & Bogg, 2005), perform better in academia (Poropat, 2009), to succeed more at work (Barrick & Mount, 1991), and typically express more positive outcomes in their lives (Ozer & Benet-Martínez, 2006).

The principle outlined here is the duality of the factor, and the polar aspects of its facets. These are parallel to the meaning-making behind Meta-Programmes discussed and lends support to the use of Meta-Programmes as a viable alternative method of measure for personality. What this study aimed to demonstrate was that Intention, Awareness, Choice, and Response were missing from the existing personality profile questionnaires. It is evident that the questions offered do not determine an individual's meaning-making, which also means their intention behind the use of "Conscientiousness" cannot be uncovered. Therefore, there is no insightful reason as to why it is used to the degree that it is used by the individual, and as such, is relatively meaningless. Intention, Awareness, Choice, and Response are integral to an individual's self-awareness in the moment, which it was hypothesised here, act as a precursor to their personality, and are thus of greater importance than is evidenced in the existing profile tools. With personality not being fixed over time (Hall, 2005), nor traits being necessarily stable over time (Woods, et al., 2013) a more comprehensive profile tool is necessary to determine facets of thinking and behaving that combine to create a new topological network that can determine useful information about how much of the individual's thinking and behaving are as a result of choice in the moment. Whether it is the MBTI, 16PF, OCEAN or TEIQue, none of them offers a meaning-making choice in their responses. No measure exists currently for the assessment of the facets of OCEAN. Further, there is disagreement within the literature as to what these facets actually represent. When rigorous testing standards are used, the effects of EI traits disappear completely (Antonakis &

Dietz, 2011). This warranted further investigation, as it would appear to be a substantial element missing from personality profile tools. This study aims to fill this gap.

Research Output

Should the research demonstrate the above contributions then it will also produce a marketable product in the form of a profile validation tool that measures an individual's awareness in the moment, the result of which is an individual's capacity to respond in the moment. This output will be a quantitative measure of an individual's capacity and capability as a benchmark for cognitive development. This will have applications in industry, academia and other markets where the growth of complex thinking is important and useful.

Research Contribution

This thesis will provide two contributions: first, to the field of stage development psychology, and second, to the field of metacognition from an adult perspective. The first is based on the hypothesis that a conceptual measure of self-awareness in the moment exists separate from and different to the existing concepts of awareness within a metacognitive framework. If it can be shown that self-awareness is a measure of complexity, then an individual's capacity to consider their own self-awareness can be aligned to their level of development and thus link the fields of metacognition and stage development.

The second contribution will be the creation of a quantitative scale that provides a scalable measure of self-awareness, which will demonstrate a range and flexibility of an individual's capability and capacity to respond in the moment. Both have the potential to create a paradigm shift in psychology from the perspective of constructivism and constructionism, and to impact those fields that touch on both philosophies.

Data Collection

Primary data refers to original data which is obtained first-hand by a researcher or researchers, specifically for the purposes of answering the research question (Burns & Bush

2006; Hackley 2003). In this thesis, the primary data is determined by five separate but linked studies whereby participants undertake an online questionnaire to discover how they utilise the fifty Meta-Programmes discussed in the literature as a deconstruction of their thinking in the moment, ending with a qualitative interview study that ties the four quantitative studies together.

Ethics, Rigour, and Trustworthiness

Within psychology, qualitative research is abundant, yet its ability to demonstrate rigour and dependability is constantly being questioned (Mays & Pope, 2000; Malterud 2001). It can be argued that findings from within interview studies are open to researcher bias as they are based on perceptions and personal meaning-making (Mays & Pope 2000; Barbour, 2001). Hence, to ensure the findings were credible the researcher must be able to demonstrate how rigour and trustworthiness were upheld (Barbour, 2001).

Blumberg, et al (2005) describes ethics as the appropriateness of the researcher's behaviour in relation to the rights of the participants of the research project. Lenth, (2001) recognises that it is unethical to collect information without the participants' expressed willingness and informed consent. Kvale, (2007) also highlighted informed consent and confidentiality and added the potential consequences of a questionnaire or interview. Therefore, all participants of the current study were given a Participant Information Sheet and asked to sign a consent form as per Coventry University's ethics process, prior to any study and assured that any disclosed information would be strictly confidential. See <u>Appendix 4</u>. Participants were informed that the questionnaires or interviews could be terminated at any point if necessary, without any consequence to them or their education. The British Psychological Society also has ethical guidelines on social responsibility, valid consent and informing participants of the factors within the study, such as the aims of the study, confidentiality, methods of collection, compliance with the Data Protection Act (2018) and

the right to withdraw from the study at any time with no adverse consequences, in accordance with its Code of Ethics and Conduct (2009). Having passed through Coventry University's rigorous Ethics process before data collection, it was safe to assume that the BPS standards had also been met.

It is incumbent upon the researcher to be aware of the potential impact their study has on society as a whole, as well as the participants. It was important the researcher upholds ethics and therefore acts accordingly. Participation was on a voluntary basis for all five studies and the participants were able to withdraw from the study at any time. While conducting this study, informed consent was gained from all participants (see <u>Appendix 4</u> for the consent forms). Participants were also advised that should they feel uncomfortable, they were under no obligation to answer any questions. Participants were given an example of the type of information required of them, the reasons behind the studies and how the information they provided would be utilised.

There is a tendency to give too little weight to the sample size. People often judge the probability of samples by how representative they appear to be of the population (Kahneman & Tversky, 2000), as they incorrectly believe that a sample of a given size is more valuable if the population is smaller, as though the proportion of the population sampled was relevant. In reality, everything must be in context to how the participants relate to the larger population from which they are representative. Sample source is, after all, more important than sample size (Survey Gizmo, 2017).

A reliable and repeatable content analysis was the most useful way of interpreting interview scripts with a view to authentically reflecting what the interviewees were attempting to communicate. Prior to the data collection, the ethical issues concerned with interviewing were considered. Kvale, (2007) highlighted three potential considerations: informed consent, the consequences of the interview and its confidentiality. These aligned

with the university's ethical process and as such, each participant (interviewee) signed a consent form for the interview, as well as a consent form for the interview to be recorded on an iPhone (see <u>Appendix 4</u>). Interviewees were informed by the consent form that the interview could be terminated at any time should they wish to withdraw, without consequence.

Qualitative research has been questioned regarding its capacity to maintain authenticity and trustworthiness (Mays & Pope, 2000). As outlined in this chapter, Positivists argue that findings are open to researcher bias as the interviews contain both interviewee and the researcher (Barbour, 2001).

To ensure credibility was upheld, all interviewee's transcripts were transcribed by a professional specialist company. Then, a small number were sent to the interviewees to ensure they were representative of the interviewee's words. This is known as 'member checking' (Tobin & Begley, 2004). This was considered the most appropriate method to ensure accuracy of transcription and not a biased opinion by the researcher (Klenke, 2008; Creswell, 2007).

Chapter 3

Exploratory Study Post-Graduate Thinking and the Identity Compass

Introduction

The aim of this pilot study was to initially explore the feasibility of running a larger study and to test the methodological approach, before investigating almost 200 post-graduate student profiles. In the Literature Review it was ascertained that people in general are not aware of how they think in the moment, nor of how their thinking is deconstructed. This exploratory study aimed to test this awareness and thinking construction with a small contingent of post-graduate students at Coventry University using the Identity Compass profile tool. The intention was to deconstruct their thinking using fifty individual Meta-Programmes (MP's) as per the literature review in the research by Daniels (2010) and Brown (2003). In order to identify common patterns of MP use using the Identity Compass tool, there were several sub-objectives, each of which will be considered in turn later:

- 1. To determine if there are Meta-Programmes common to all post-graduate students.
- 2. To determine if a specific combination of MP's creates an academic thinking style.
- 3. To determine if there are driver Meta-Programmes as suggested in the literature.

The objectives and the aims helped to formulate the main hypotheses:

- Certain Meta-Programmes have more of an effect on the profile than others and thus could be classed as "driver programmes".
- Different combinations of Meta-Programmes will be discovered.

The Research Aim

In higher education, one must attain higher-order thinking as it is integral to the postgraduate process (Halpern, 1998). However, the reliability and validity of the measure of the higher-order thinking was not well-established (Williams, 1999). Despite the many labels on higher-order thinking, there was very little operational validity of the complexity of the academic tasks, and the types of responses provided by students when questioned about their thinking (Crone-Todd, 2007). Thus, to be a successful post-graduate student, one must develop the critical and logical thinking skills required, an awareness of one's own learning process and studying strategies was essential (Gassner, 2009). Higher Education aims to produce students who '*have learned how to learn and are capable of continuously adapting themselves*...' (Kelly, et al., 1999). Formal logical thinking based on sequential procedural decision-making was sufficient for under-graduate level courses, but such thinking should be insufficient for a more dialectical approach to a post-graduate degree. For example: Paglis, (2013) argues for the use of a competency-based pedagogy for undergraduate students which Spence and McDonald (2015) argue was not sufficient for post-graduates in order to develop future leaders in an increasingly demanding and complex world (Petrie, 2011).

Given the more complex nature of Higher Education then, a simplistic behavioural approach to a student's interaction with the post-graduate journey was insufficient (Haselgrove, 1994). Because universities are now measured on efficacy and deliverables, how post-graduate students think in relation to the teaching offered was becoming increasingly important. For example: the development offered by traditional university courses is, by definition, lateral or horizontal development, which Heifetz, et al., (2009) define as the answer to technical challenges that have known solutions, implementable by existing knowhow. On the other hand, vertical development was defined as '*possessing greater mental capacity to encounter completely different ways of understanding the world*' (Kegan & Lahey, 2009) and Rooke and Torbert (2005) define this vertical growth as: "*becoming more aware of how an individual interprets their surroundings and reacts when their power or safety is challenged*", which was achievable by increasing in their own complexity (Petrie, 2011, p.12). It has also been suggested that students could achieve academic success were they to engage in those learning activities mentioned here (Duncan and Barrett, 2007; Vermunt and Vermetten, 2004).

The research aim was thus to demonstrate in the current study that it was possible to deconstruct a post-graduate student's thinking in order to determine if Meta-Programmes are influential in a student's construction of self in an academic context.

Method Research Philosophy

The difference between an exploratory study and an experimental study is determined by the structure and outcome of the study. Cooper and Schindler (2000), suggest that exploratory studies tend to be loosely structured and aim to discover new ideas or research tasks. The aim of exploratory research was to develop a hypothesis or research question for further research. An experimental study would continue from where the exploratory study ends. From the literature review, there was a need for both an exploratory study followed by an experimental study.

Constructivism is when individuals create their own meaning in the way they map the world in which they operate, which is contingent upon human interactions and transmitted in a social context such as academia (Crotty, 1998). Positivism is a useful approach when engaging an online questionnaire, such as the Identity Compass tool as it "allowed the data to emerge" (Bryant, 2003; Charmaz, 2013). Measuring the objective reality that occurred and developing numeric measures of observations was paramount for positivists.

The current study was a unique blend of both Constructivism and Positivism in that the Identity Compass profile tool allowed for an interpretation of the awareness of the participants' construction of their thinking, and although the profile output was quantitative, this unique construction is more typically linked to qualitative research (Mertens, 2009). Also, one cannot be entirely positive about one's claims when studying the behaviour of humans (Phillips & Burbules, 2000). Meaning from the data was generated and any potential for confirmation or researcher bias was countered by interpreting only the quantitative data

according to the profile training. In order to be time and cost-efficient, a survey methodology was selected to generate the necessary quantitative data (Walonick, 2010).

Research Design

Online questionnaires provide a relatively inexpensive and efficient way of obtaining large amounts of data (such as opinions and attitudes) from a large pool of participants as the researcher would not need to be present when the questionnaires were fulfilled. This is useful for large populations when interviews would be impractical (Frey and Oishi, 1995).

As per the Methodology (chapter 2), there were a number of profile tools available that reportedly measured Meta-Programmes, including the Motivation Profile Questionnaire (MPQ) (Arthur and Engel, 2000) as used by Miller and Deere (2000) Brown (2002; 2003) and Brown and Graff (2004). The latter were undertaken with undergraduate students to determine meta-programme differences between students and lecturers. Brown (2005) went to improve the MPQ with his MPI (Inventory) questionnaire. A third tool was the Inventory for Work Attitude and Motivation (iWAM) (Merlevede, 2001) which is an online assessment tool that measures motivational and attitudinal patterns. It was developed in the United States and consists of 40 questions, each of which has five potential responses that determine a meta-programme-based response. The decision to use the Identity Compass profile tool was made because the tool interpreted Meta-Programmes in the way that was conducive to defining polar relationships between the pairs, such as Internal/External, and importantly, had evidence in efficacy from previous research (Daniels, 2010). The researcher also had some experience with the Identity Compass profile tool as it was the preferred method of profiling post-graduate students at Coventry University London.

Participants

The study utilised an opportunity sample of 32 Post-Graduate students. Twenty- one were attending an MBA course at Coventry University London campus, and eleven were at

Coventry university's main campus, as PhD candidates. Seven were in stage 1, and three were in stage 2 of their PhD, from a group consisting of 3 males and eight females. There were twenty-one MBA students from Coventry University London: 7 male and 14 female. Participants' age ranged from 21 to 32 years. Their countries of origin were, but not limited to: England, India, Pakistan, Korea, China, Japan and Nigeria.

The justification for selecting the participants was directly related to the research question on post-graduate student thinking and how it was deconstructed using the Identity Compass profile tool. The MA students at the London campus were asked to participate as they formed part of the then-current High Flyers programme at the time. The PhD students from Coventry's main campus were asked to participate as it was intended that a differentiator between the construction of students at the two levels of post-graduate study would take place. However, this was not the case.

Measures The Identity Compass Profile Tool

The Identity Compass (IC) was developed in Germany by Arne Maus. Maus, (2011, p.167) states the validity of the Identity Compass profiling system was measured by Prof. Scheffer of Hamburg University against the existing personality tests such as NEO-FFI (Big Five), MBTI, Operational Motivation Test and the CFT. In this study, the Identity Compass profile questionnaire used has twenty-two years in industry, with over 25,000 profiles corroborating its efficacy (discovered in conversation with the profile owner in November 2017).

Studies show that the Identity Compass correlates with implicit personality structures (Scheffer, 2003, as cited in Maus, 2019). It has been repeatedly validated against the main personality profile systems, such as NEO-FFI and MBTI, as well as CFT (General intelligence) where it shows substantial correlations. The correlations at .40 are not so high as to nominate the Identity Compass as a personality test. (Maus, 2011. p167).

The Identity Compass deconstructs the thinking of the participant into groups of Meta-Programmes as per their collective intention (see Appendix 2). For example, 'Seeing', 'Hearing' and 'Feeling' are all considered senses, so the Identity Compass puts them together in a group called "Sensory Channel". Another grouping was called "Comparison" and contains the Meta-Programmes of 'Sameness' and 'Difference'. Shulman (2002, p.37) states that: "*One of the central ways we make sense of experience is by making differences*". As a post-graduate student, an important ability was to be able to notice 'difference' in one's research material (Brown, 2002), by asking oneself: how have other researchers written what has been said, and how was it *similar* or *different* to what has been written before? This 'comparison' helps to differentiate the direction of intention (of the student) when researching as this highlights the *direction of attention* from a research perspective. With this in mind, it would be anticipated we see a student's IC output having 'Difference' higher in their percentage score than 'Sameness' due to the need for an objective look at the content of previous researchers' studies and what they said about them. This predictability was also true of other Meta-Programmes.

Reliability of the Identity Compass

Although reliability and validity claims for learning style instruments are not well substantiated (Coffield, et al., 2004; Hawk & Shah, 2007), the scores for the validity of the Identity Compass are presented here. Cronbach's alpha should be higher than 0.7 and ideally between 0.90 and 0.95 (Kline, 1999). Even if a measure is highly reliable, this does not show that the measure is assessing the theoretical constructs stated. The internal consistency of the Identity Compass, using Cronbach's alpha coefficients (Cronbach, 1971) for the 11 items in the first dimension of the factor analysis was 0.894. Internal reliability of the individual Meta-Programmes scored above .90 thus demonstrating excellent internal reliability of the Identity Compass (Kline, 1999).

Procedures

Ethical approval was granted from the Coventry University ethics committee. Participants were treated in accordance with BPS ethical guidelines. Written consent was gained from all participants (see <u>Appendix 4</u>). PhD students were contacted by email via the Faculty Heads at Coventry University. These emails contained details of the research, including all ethical considerations and reasons for the study. Posts were left on social media for volunteers to undertake the profile as part of the research. These were specifically targeted at the Coventry University PhD forum on Facebook. It was made apparent that although the profile would be taken by the student, the resultant data was for research purposes only and no feedback was offered.

All MBA students were contacted separately from PhD students, via direct email, as each had undertaken an Identity Compass profile as part of their High Flyers programme with CU London. The Identity Compass profile forms the basis of the High Flyers programme from a self-awareness perspective for each student. The programme encourages students to go above and beyond their normal academic achievements. Participants were presented with the same question set and asked to use academia as the context when filling in the questionnaire. The questions were contextual and mainly open-ended with a number of closed questions or situational scenarios requiring perspective answers.

Responses were made on a 6-point Likert scale ranging from 1 = Not True for Me, to 6 = Very True for Me. Example items include:

- 1. On projects I mostly tend to:
 - a. push things forward.
 - b. first analyse and check alternatives.

2. In meetings, it is more important to place emphasis on:

- a. who is talking.
- b. the purpose of the meeting.
- c. how the purpose can be achieved.

- d. the process of communication. e. how one talks.
- f. where the meeting takes place
- 3. In a meeting it is more important to pay attention to:
 - a. my perspective.b. the perspective of the others.
 - c. the view of someone outside of the situation.
- 4. I know best that I have done a good job on this project:
 - a. by my own judgment.
 - b. by getting feedback from others.

For example: question 4 was designed to elicit a participant's locus of evaluation which would determine their 'Internal' / 'External' score. Question 3 focused on the participant's capacity to do second position in that answer 'b' was about the other person's position. Should this be significantly higher than the participant's score for 'Own' then they were potentially stuck in second position and subsume their own ideas for the ideas of others (Maus, 2011, p50). There were a number of questions that focused on these, from both directions of intention, and thus a score was devised based on the participant's Likert scale response.

Results

Initially, fifty Meta-Programmes were included in the exploratory factor analysis for determining the factor structure, using IBM SPSS Statistics 25 software. Most of the variables used in this study were normally distributed, according to the Shapiro-Wilk normality test (36 out of 50 Meta-Programmes, Table A1 in Appendix 5), and all histogram distributions were close to normal. The sample size of n = 32 was too small (Tabachnick, & Fidell, 2007), and hence inadequate for factor analysis. Accordingly, principal component analysis was used as a method of factor analysis. According to the correlation matrix, there were many intercorrelations amongst the items higher than r = .30.

The principal component analysis method revealed 13 dimensions (or components) with eigenvalues greater than $\lambda = 1.00$, explaining 85.89% of the variance. According to the scree plot, keeping the first four factors seemed the most appropriate solution, according to the Cattell's criteria (1966).

The four factors explained 56.97% of the variance. Direct oblimin rotation was used in order to get more accurate results, as there was a moderate correlation between the first and the second component (Table 3.6). Many items had communalities higher than .40, except for Places, Activity, Things, Affiliation, and Difference. These items, due to low communality, did not correlate with the other items. However, none of the items had factor loadings lower than .32, so no item was excluded from the final factor structure (Tabachnick, & Fidell, 2007).

1	2	3	4
1.00			
.23	1.00		
.36	.25	1.00	
.17	06	.08	1.00
	1 1.00 .23 .36 .17	1 2 1.00 .23 1.00 .36 .25 .17 06	1 2 3 1.00 .23 1.00 .23 1.00 .36 .25 1.00 .17 06 .08 .08

Table 3.6: Intercorrelations amongst the obtained components

Table 3.7 presents the component structure created based on Pattern Matrix (see Table A2 in <u>Appendix 5</u>), along with the internal consistency coefficients for each of the newly-made subscales. Each subscale had a high reliability, except for the 5-item Dimension 4. Some items had factor loadings of similar sizes on more than one component, for example, Options, Towards, Information, Places, Caring for Self and Trustful.

Based on the results of the principal component analysis, there exists a subset of dimensions (Objective 3) as a summary of the fifty investigated Meta-Programmes amongst post-graduate students. These dimensions are: Dimension 1, Dimension 3, Dimension 2, and

Dimension 4. Each one of which was created by calculating the mean value of five and 23

different Meta-Programmes after obtaining the results of the PCA.

	Cognitive d	limensions	
Dimension 1, $\alpha = .95$	Dimension 2, $\alpha = .89$	Dimension 3, $\alpha = .86$	Dimension 4, $\alpha = .56$
Influence	Pre-Active	Quality Control	Caring for Others
Seeing	Individualist	Hearing	Relationship
Looking	Past	External	Sameness
Internal	Sceptic	Long-term	Caring for Self
Abstract	Short-term	Details	Trustful
Vision	Concrete	Reading	
Global	Own	Realization	
Team Player	Task	Consensus	
Observer	Activity	Things	
Re-Active	Towards	Procedures	
People	Information	Places	
Partner			
Doing			
Listening			
Achievement			
Future			
Difference			
Affiliation			
Feeling			
Present			
Away From			
Polar			
Options			

Table 3.7: Four dimensions of Meta-Programmes, and reliability of their subscales

Discussion

The current study starts from the premise that Meta-Programmes exist as high-level abstracted patterns of data sorting, thinking and responding (Maus, 2019). These MP's can be reliably identified and measured by various existing methods as mentioned in the Methodology chapter (Daniels, 2010). The main aim was to test the methodological process on a small number of participants to determine how a post-graduate student's thinking at Coventry University could be deconstructed by Meta-Programmes using the Identity Compass profile tool. The main objectives were to:

- 1. To determine if there are Meta-Programmes common to all post-graduate students.
- 2. To determine if a specific combination of MP's creates an academic thinking style.
- 3. To determine if there are driver Meta-Programmes as suggested in the literature.

The main hypotheses were:

- Certain Meta-Programmes have more of an effect on the profile than others and thus could be classed as "driver programmes".
- Different combinations of Meta-Programmes will be discovered.

From the findings it can be summarised thus: (1) there are MP's common to all postgraduate students; (2) a specific combination of MP's does occur in the data; (3) a dominant sub-set cannot be determined due to participant numbers.

Objective 1 asked: *if there are Meta-Programmes common to all post-graduate students.* Each Meta-Programme demonstrates an unconscious intention towards a particular way of thinking in context. The results have given a potential hierarchy of Meta-Programmes in Dimension 1. However, it was not entirely clear at this stage what this meant. In this discussion, there have been judgements made on the meaning of the hierarchy and the individual Meta-Programmes. For example, the most-used preference by Median score was 'Towards' (see Table 3.8). The question that required further and longitudinal research was: was 'Towards' the most important Meta-Programme because every student demonstrated they use it, or was it the least significant for the same reason?

By virtue of this question, it was argued that the outliers needed further investigation, and the study required more participants for robustness. Because of the inability to have dialogue with the participants, it cannot be stated accurately what the correlations meant, therefore a logical assumption was to repeat the current study with a greater number of participants. Further to this, a qualitative study that discovered the lived experience of the participants would shed light on their proclivities and the construction of their thinking.

Towards	90
Information	85
Global	85
Activity	85
Task	85
Achievement	80
Vision	85
Re-Active	78
Present	80
Realisation	80
Concrete	78
Caring for	75
Consensus	78
Seeing	80
Future	80
Options	75
Details	75
Short term	75
Quality	80
Long term	75

Table 3.8: Meta-Programmes ranked by Median score

It was asked from a social-constructionist perspective, what the contributory factors to this hierarchy of Meta-Programmes were, and would it have been beneficial to research the background of the students to discover what led to the use of these MP's specifically? If the hierarchy were socially derived, contributing factors such as the students all coming from the same country/region, or their age range was not diverse enough (thus emphasising a generational bias), or they were all simply post-graduate students, and embedded in their academic context, which created specific shared intentions as per social construction theory (Burr, 1995). If these are the case, future study could mitigate these points by including profiles by under-graduates and also supervisors/lecturers to discover how they perceive their environment and how they feel they cope with the post-graduate process, akin to the findings of Brown (2004).
From the cognitive view, Dweck, (2012) would ask what they believe about their own learning ability, as this will directly affect their performance. Also, what are the relationships between Meta-Programmes such as 'Information' and learning preferences? This could better be answered in a qualitative face-to-face interview to determine a student's previous awareness and post-questionnaire awareness in a future study.

Objective 2 asked if an academic thinking style derived from a specific combination of Meta-Programmes could be inferred. With n=32, this was not possible. However, the results of the direct oblimin rotation suggested that with many items having communalities higher than .40, there was a moderate correlation between the first and second components (Tabachnick & Fidell, 2007).

The principle seen in Table 3.8 was an important aspect of objective 2 as it allowed the reader to understand that there were component parts to a post-graduate student's thinking style. Objective 3 asked if a subset of dominant Meta-Programmes can be found in the data (see Table 3.9). Dimension 1 had a reliability score (internal consistency coefficient) of .95 (a = .95) and offered a subset of influential Meta-Programmes.

However, this finding will better be tested on a greater number of participants in a future study to verify or refute the findings here.

Dimension 1
Influence
Seeing
Looking
Internal
Abstract
Vision
Global
Team Player
Observer
Re-Active
People
Partner
Doing
Listening

<i>Table 3.9:</i>	Meta-Progra	ammes in	Dimension	1
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Achievement Future Difference Affiliation Feeling Present Away From Polar Options

Chapter Summary

This exploratory study provided small-scale empirical support for considering the different ways of knowing one's thinking construction as a lens through which to understand the contextual experiences of 32 post-graduate students at Coventry University.

It was also demonstrated that this was an appropriate approach to discover if student thinking could be deconstructed using Meta-Programmes, and if said deconstruction produced viable patterns in their combination. From the metacognition literature, it suggests that the accuracy of metacognitive judgments on an individual's capacity to perform selfevaluation on their performance varies considerably, (Rounis, Maniscalco, Rothwell, Passingham, & Lau, 2010), thus the use of Meta-Programmes offers an alternate way to deconstruct how we know what we know about our thinking.

The study has extended the research of Brown (2004) that stated there are important Meta-Programmes in the context of post-graduate study, but there was insufficient information to definitively determine if those MP's were directing the thinking of the student in their post-graduate course, or if they were an outcome of the student being on their postgraduate course.

The data did demonstrate that the Meta-Programmes clustered differently depending on the thinking of the post-graduate student. The findings showed a clear separation between direct and indirect variables (MP's), or those variables that are tied to behaviours rather than thinking alone (De Bolle et al., 2015). As the Identity Compass is a profile system, it was inevitable that students change over time, so it should be understood that each profile was a snapshot in time of thinking for each participant. This also lends support for a longitudinal study on changing levels of selfawareness. As there was no control group for comparative data, it was argued that the contextual meaning behind the Meta-Programmes for the individual 32 post-graduate students was no different to the meaning created by any participant of the Identity Compass profile. Only further research would help to determine a contextual bias (Academia) for the MP's and their clustering.

The findings of this exploratory study suggested there was a specific need to create a new tool for determining how Meta-Programmes were filtered as dependent or independent variables. With further research, the new tool would evolve out of the Meta-Programme differences and establish levels of self-awareness, giving participants a better explanation for their habituated thinking and behaving in context (Kahneman, 2011).

For those post-graduate students who wanted to discover 'how' they think or increase awareness of validation for 'why' they think the way they did, it was evident at this stage that the Identity Compass used too many questions for too many Meta-Programmes.

Finally, further to this, for those students who wished to make changes in their thinking construction, and thus their world view, there were potential interventions for each Meta-Programme that would progress their thinking towards a more balanced approach, however, this was out of scope for the current study.

Further Study

The testing of the Methodological approach in the pilot study uncovered a number of interesting findings when looking at the deconstruction of post-graduate student's thinking. From here, it was established that the researcher could move on to the second study with a greater number of participants using this same method. Study 2 would thus map the aims and objectives onto a larger post-graduate student dataset in order to discover to what extent the objectives and results were replicable. The objectives were also updated. For example: does a greater number of participants produce a different dimension in the factor analysis? Does this validate objective 2? Would it convince the researcher that different combinations of Meta-Programmes are different thinking styles?

However, as the current study was based on 32 profiles, there was a question of extrapolation to the wider population of post-graduate students. A second study that takes the results of the current study and attempts to replicate them on a larger number of post-graduate students would further investigate the hypotheses and go some way to validating or refuting the findings of the current study. For this, study 2 was devised, using the larger post-graduate population from the large data set within the Identity Compass database.

As discussed, the IC output differentiates between intention and attention in context, and the post-graduate student's awareness of this intention/attention is currently not measured by any profile tool. With this in mind, it was evident that a student's level of self-awareness of their intention in the moment was limited, which also warranted further study.

Chapter 4

Study 2 Post-Graduate Thinking and the Identity Compass Continued

Introduction

Having established in the exploratory study that it was possible to deconstruct a postgraduate student's thinking using Meta-Programmes, and that the Methodology used was appropriate to achieve the principle aim of feasibility, the current study intended to further the stated objectives with additional objectives from which new hypotheses emerged.

With this in mind, it was reasonable to ask the same research question of a larger

participant pool to determine if the results were replicable. The question remained: how does

the thinking of post-graduate students map against the Identity Compass profile tool?

The objectives from Study 1 were:

- 1. To determine if there are Meta-Programmes common to all post-graduate students.
- 2. To determine if a specific combination of MP's creates an academic Thinking Style.
- 3. To determine if there are driver Meta-Programmes as suggested in the literature.

The hypotheses from study 1 were also valid in the current study:

- Certain Meta-Programmes have more of an effect on the profile than others and thus could be classed as "driver intentions".
- Different combinations of Meta-Programmes will be discovered.

The exploratory study demonstrated that the methodological approach was valid. Hence the current study replicated this with the addition of objective 4 and 5 below. The researcher had access to an 8,200-profile database from the Identity Compass profile tool, from which it was possible to extract the profiles of 177 post-graduate students, MBA as well as PhD, obtained over the previous 5 years in order to investigate this.

Therefore, the revised objectives for study 2 were:

- 1. To determine if there are Meta-Programmes common to 177 post-graduate students
- 2. To what greater or lesser extent do 177 post-graduate students have different thinking styles?
- 3. To determine if a similar or different subset of dominant Meta-Programmes arises.

- 4. To discover if any other unique patterns in thinking emerge.
- 5. To create a benchmarking score to normalise the IC output for ease of comparison to other profiles.

A new hypothesis arose out of the fifth objective:

- The benchmark tool will determine different levels of self-awareness based on the different combinations of Meta-Programmes.
- Kegan's Levels of Adult Development can be aligned to the benchmark output scale.

Method

The objective of deconstructing the thinking of post-graduate students into fifty individual Meta-Programmes using the IC ensured inter-relator reliability as each participant performed the same questionnaire with the same questions. For example, a meta-programme group called 'Comparison' contained the Meta-Programmes of 'Sameness' and 'Difference'. As a post-graduate student, an important ability was to be able to notice 'difference' in one's research material (Brown, 2002), and the IC demonstrated to what extent the participants confirmed this Meta-Programme. A student who did not value change, but rather prefers stability and similarity would seek 'Sameness' (Weinberg, 2009).

As mentioned in the pilot study, the IC helps to differentiate between intention and attention in context due to the difference in the combinations of the fifty Meta-Programmes. In this regard, it would be anticipated that we saw 'Difference' higher in its percentage score than 'Sameness' for a post-graduate student.

Research Design

The research in the current study was a replication of the exploratory study in that the Identity Compass profile tool was used to determine the construction of 177 post-graduate students' thinking into fifty Meta-Programmes.

Participants

The study employed an opportunity sample of 177 Post-Graduate students from Coventry University across two campuses, including 32 PhD students, 11 male and 21 female. There were 145 MBA students from Coventry University London. Participants' age ranged from 21 to 44 years. As per the pilot study, their countries of origin were, but not limited to: England, India, Pakistan, Korea, China, Japan and Nigeria.

The MBA student data were selected due to the Identity Compass profile tool holding historical data from 5 years' of High Flyers programmes and it was hypothesised that the initial findings from the pilot study would be replicable on a dataset of similar participants (within-group). The reason for this was that the focus continued to be on how post-graduate students' thinking mapped against the Identity Compass profile tool.

The PhD students were selected based solely on their capacity to volunteer to be part of the study, their availability to partake in the questionnaire and their philanthropic tendencies as psychology students to assist colleagues. A further reason for the choice of participant data was the potential to differentiate between MBA students and PhD students, as per study 1, to determine if there were differing constructions of an academic Thinking Style at the different academic levels.

Measures

As this was an extension of the pilot study, all measures and methods were replicated from study 1, with the main difference being the number of post-graduate student profiles in the data (n=177). This meant that the Identity Compass profile tool used to benchmark student thinking was exactly the same method as in the pilot study.

The Thinking Quotient

Objective 5 asked if a benchmark score can be created to normalise the Identity Compass output. It was important at this stage to note what the literature said about such constructs: variables are created by developing the construct into a measurable form (Vigo & Doan, 2015). Any variable must have at least two possible values. Examples of variables include height, age, scores on any scale, and so on. These variables are measured by operational definitions which should identify how the variable is calculated as a numeric value and specify the range of possible values. It should also establish the variable's level of measurement (nominal, ordinal, or interval). An example of an operational definition for Awareness would be "the sum of the responses to the Identity Compass profile tool, which can range from 2 to 5." This is the foundation of the Thinking Quotient scale.

This was achieved by mapping the relevant Meta-Programmes to the behavioural output of Kegan's Levels of Adult Development (see chapter 1) from a social-emotional perspective, and Laske's Cognitive Development Framework from a cognitive perspective. See Table 4.10.

Social-Emotional	Cognitive
Achievement	Abstract
Affiliation	Activity
Away From	Concrete
Caring for Others	Details
Caring for Self	Difference
Consensus	Future
Doing	Hearing
External	Individualist
Feeling	Information
Global	Internal
Influence	Long Term
Listening	Looking
Options	Observer
Own	Polarity
Partner	Pre-Active
Past	Procedures
People	Quality Control
Places	Reading
Present	Realisation
Re-Active	Sceptic
Relationship	Seeing
Sameness	Task
Short Term	Things

Table 4.10: Meta-Programme Mapping to LoAD and CDF

Team-player	Towards
Trustful	Vision

The principle behind this alignment was those Meta-Programmes that were predominantly gaining their locus of evaluation or control from an external source, such as External, Partner and Caring for Others, were indicative of Kegan's 'Socialised Mind' stage of development, and were thus given the score of '3' to match his stage 3 principle. The level of '3-ness' was then gauged by the difference between 'Internal' and 'External' such that an individual with these at balance (50/50) was hypothesised to have the choice of either in their response. On the other hand, an individual with 40% difference was only capable of using the higher-valued Meta-Programme in any given situation (see Figure 4.3 as an example).

Towards	90.00%
Away From	65.00%

Figure 4.5: Towards / Away From Visual

From a cognitive perspective, Laske, (2008) stated that a person's ability to do 'Abstract' was a function of higher-level thinking. Thus, an individual at Stage 2 (Laske, 2008) would not be capable of this abstraction, but those at stages 4 and 5 would be, to a greater extent. If we know what a student was *not* capable of in terms of their thinking capacity, then we have a starting point for their self-awareness score using the principles of balance (choice) above. See <u>Appendix 2</u> for a full list of Meta-Programmes.

As identified in the Methodology chapter (2), the Intention, Awareness, Choice and Response factors of how a post-graduate student thinks has been omitted from the profile tools currently available, hence why the Identity Compass profile tool was chosen as it allows a deconstruction of an individual's thinking into quantitative data for measurement. The literature on Meta-Programme groups predominantly placed the Meta-Programme pairs in a binary role, in that 'Towards' was always the opposite of 'Away From' on every scale. By virtue of this polarisation, it also stated that a person had a certain propensity for 'Towards' thinking *in opposition to* 'Away From' thinking. This tied in with Piaget's ideas on stage transition as seen in the literature review (chapter 2) where he conceived stage transition to be:

- 1. A, B (or not A)
- 2. A or B
- 3. A with B

This could be extrapolated to Meta-Programme use rather than subtasks (Commons, et al., 1984) if 'thinking' were the task, where A = 'Internal' and B = 'External':

- 1. Internal, External (or not External)
- 2. Internal or External
- 3. Internal with External

As stated above, this linked Piaget to Commons' interpretation of task complexity, where it is arguable that he missed the opportunity to look at 'thinking' as the task. This will be discussed in chapter 8.

The research question in this study asked if the *difference* between the two MP scores were indicative of the individual's self-awareness, akin to Kegan's (1994) Subject/Object theory. In other words, in Identity Compass terms, if 'Away From' was 65% and 'Towards' was 90%, (see Figure 4.3) then there was a difference of 25%, which denoted a specific level of unconscious intention, and lack of awareness in the individual's thinking, which impacted their capacity to respond accordingly. With this score, it suggested the person is goal-oriented to such an extent that they would not see the immediate pitfalls of their decision-making, and thus could not think in a risk-aware manner (Away From).

It was hypothesised that the closer the Meta-Programme pair was in their score, the more capable the individual would be of choosing between the two. For example: should they be 50% and 50% then the individual would be capable of choosing which Meta-Programme was more appropriate in context at that time, and more capable of making a qualitatively

better decision. The hypothesis argued that this was a limitation in the individual's ability to respond in the moment as they were <u>only</u> capable of using 'Towards' thinking, and unaware of how to do 'Away From', thus restricting their capacity for their Intention, Choice and Response.

Alignment to Kegan

A student's capacity to choose their thinking/behaving aligned with Kegan's notion of Subject/Object behaviour in that if they hold the two MP's as Object, they could choose to do either in a given context (Kegan, 1994). This was opposed to the student being 'Subject to' one of the Meta-Programmes due to its unconscious nature. If the student were not aware of their Meta-Programme use, and it manifested as an habituated reaction to a situation (without choice), then the student would be '*Subject to*' that MP (Kegan & Lahey, 1984).

As per the literature review, in Kegan's framework, development does not occur instantaneously. Instead, he argued, that people move from fully constructing their understanding in a way that is consistent with Stage 2 (for example, Internal only), to building a bridge to Stage 3 (External Awareness) by constructing meaning in two ways simultaneously (Internal/External Relationship), and then moving beyond the lower stage by incorporating it into the larger frame (Choice of Int/Ext) of the higher stage.

Kegan's (1994) work illustrated the difference between stage 3 and stage 4 by describing a couple who were struggling with the issue of interpersonal intimacy in their marriage (an emotive topic). He noted that if each spouse had a level of development different to the other (one at stage 3 and the other at stage 4, for example), each would have a different idea (construction) of what it meant to be intimate. The differences being, the spouse at stage 4 would not be *subject to* their construction of self and would recognise the interdependency of the couple without the emotional binds that come with stage 3 thinking. On the other hand,

the stage 3 spouse would not be capable of a dissociative position and would subsume their own values for the values of their partner.

Taking a number of quotes from Kegan's (1994) book, "*In Over our heads*", and combining them here, he describes the thinking patterns of a stage 3 person, the relevant Meta-Programmes have been placed next to the description to demonstrate the possible deconstruction.

People at Stage 3 no longer see others as simply a means to an end; they have developed the ability to subordinate their desires to the desires of others [Caring for Others, External, Partner]. Their impulses and desires, which were Subject to them in the Second Order, have become Object [Away From, Own]. They internalize the feelings and emotions of others [Internal to External] and are guided by those people or institutions (like a church or synagogue or a political party) that are most important to them [Trusting, External, Affiliation, Consensus]. They are able to think abstractly [Abstract], be self-reflective about their actions and the actions of others [Team Player] and are devoted to something that's greater than their own needs. The major limitation of Stage 3 is that, when there is a conflict between important partners, whether a spouse or a business, or even a church or political party, they feel "torn in two" [Consensus, Caring for Others, Partner] and cannot find a way to make a decision [Options]. There is no sense of what they want outside of others' expectations or societal roles [External].

Kegan (1982) notes, "... The popular literature will talk about [someone] as lacking selfesteem, or as a pushover because [they] want other people to like [them]" (p. 96). He goes on to point out that the very notion of 'self-esteem' was inappropriate at this stage because selfesteem implies an internal locus of evaluation for feeling good about oneself. However, those at the third stage do not have an independently-constructed self to feel good about; their esteem is entirely dependent on the perspective of others because they are, essentially, constructed by others' opinions. Thus, a student at stage 3 would be a model student, following the rules out of loyalty to their peers and university. He would try hard not to break the rules as he wouldn't want to let his colleagues down. In academia, this student could do anything, as long as he had someone to help make the difficult decisions.

To align this idea with the Thinking Quotient above, this lack of choice in their capacity to respond would manifest as a low score on the TQ scale (see Table 4.11). If we were to

extrapolate to all fifty Meta-Programmes comprising twenty groups, we then have the foundations of the benchmark scale based on Kegan's work for the Thinking Quotient. This would denote what the person was and was not capable of.

Levels of Self-Awareness

Following on from the above rationale for the Thinking Quotient process, for the purposes of the current study, 5% increments between the scores of the paired metaprogrammes were used in order to better-differentiate the level of Intention, Awareness and Choice. This ensured the Thinking Quotient output was more accurate. See Table 4.11.

This principle was implemented on each of the 20 groups (13 MP pairs, 5x MP triplets, 1x MP fours and 1x MP fives) taking into account what the percentage difference means in relation to the person's Intention, Awareness, Choice and Response about their conscious and unconscious thinking style. See Table 4.11, and in full in <u>Appendix 6</u>.

Table 4.11: TQ Score as per Percentage Difference

Group	Meta-Programme	0	0.05	0.10	0.15	0.20	0.25
Reference	Internal>External	5	4.5	3.5	3.5	4	2
	External>Internal	5	4.5	4	3	3	3
Direction	rection Away From		4.5	4	3.5	3	2
	Towards	5	4.5	4	3.5	3	2

Table 4.11 shows the breakdown of the TQ score for four Meta-Programmes: 'Towards' / 'Away From' & 'Internal' / 'External'. As mentioned, the principle is one of balance. Should each MP be the same score (balance), regardless of where it falls on the percentage scale, the ability of the participant to choose either MP in context was 50/50 and thus was given the highest score (5) for the TQ. The scores then tapered out from this choice position until they reached 25 percentage points difference, at which point there was sufficient difference between them to warrant a subject/object differentiation (Kegan, 1994) and thus a lower awareness score. With the score for 'External' being greater than 25% over 'Internal', the outcome for the person was such that they could not do 'Internal', which meant they were limited in their response in the moment. This reduced their score from a self-awareness perspective. In other words, choice of response diminished with every 5% incremental difference. This principle extended to all fifty Meta-Programme groups and could be tested in a qualitative interview by asking the participants how aware they are of their choice of MP in the moment, and if this choice leads to a choice of response.

Appendix 6 demonstrates the output score for all Meta-Programmes, but particular attention should be paid to the meta-programme groups: 'Time Orientation', which contained the individual MP's of 'Past', 'Present' & 'Future'; and 'Perspective' which contained 'Own', 'Partner', 'Observer' (see Table 4.12) as these are likely to be modified in the future as a result of continued research due to the difficulty of determining a *difference* score between three facets within a group. The principle used thus far was to put the highest-scored MP at the top and the behavioural options emanating from the scores of that lead MP.

Group	Meta-Programmes	Score % Difference					
		0	0.05	0.1	0.15	0.2	0.25
	Own=Partner=Observer	5	5	5	5	5	5
	Own>Partner>Observer	0	4.5	4	3.5	2.5	2
	Own>Partner=Observer	4	4	3	3	2.5	2
	Own=Partner>Observer	3.5	3	3	3	2.5	2
	Own=Observer=Partner	5	5	5	5	5	5
	Own>Observer>Partner	0	4	3.5	3	2.5	2
	Own>Observer=Partner	0	4	3.5	3	2.5	2
	Own=Observer>Partner	4	3.5	3	2.5	2.5	2
	Partner=Observer=Own	5	5	5	5	5	5
	Partner>Observer>Own	0	3.5	3	3	3	2.5
ive	Partner>Observer=Own	3.5	3.5	3.5	3	3	3
ecti	Partner=Observer>Own	0	4.5	4	3.5	3	3
ds	Partner=Own=Observer	5	5	5	5	5	5
Per	Partner>Own>Observer	0	4	3	3	3	3
	Partner>Own=Observer	0	4.5	4	3.5	3	3
	Partner=Own>Observer	0	3.5	3.5	3	2.5	2
	Observer=Own=Partner	5	5	5	5	5	5
	Observer>Own>Partner	0	4.5	4.5	4	3.5	5
	Observer>Own=Partner	5	5	4.5	4.5	5	5
	Observer=Own>Partner	4	4	4.5	4.5	4.5	5
	Observer=Partner=Own	5	5	5	5	5	5
	Observer>Partner>Own	0	4.5	4	4	4.5	5
	Observer>Partner=Own	5	5	4.5	4.5	5	5
	Observer=Partner>Own	0	4.5	4	3.5	3	3

Table 4.12: TQ Scoring of Three MP Group

Finally, Meta-Programmes such as 'Abstract' and 'Future' were, according to Laske, (2008) only available to those people who reach a mature stage of their thinking (see chapter 1), which implied that a more balanced score for 'Abstract/Concrete' was not a level 2 or even level 3 score. It must therefore be level 4 or higher. Hence, where both scores for 'Abstract' and 'Concrete', were balanced, the TQ score was 5. Then, for each 5% incremental difference, the TQ score went down by 5 points, which meant that at 10% difference, the TQ score would become '4'. This was another factor in how the TQ score was determined. Table 4.12 shows the TQ score for each increment of the IC scale.

Procedures

Ethical approval was granted from Coventry University ethics committee to use the larger dataset from which the student data were distinguished. Each MBA student had undertaken an Identity Compass profile as part of their High Flyers programme with CU London. The Identity Compass profile forms the basis of the High Flyers programme from a self-awareness perspective for each student. The programme encourages students to go above and beyond their normal academic achievements. Each participant was presented with the same question set relating to their thoughts in the context of post-graduate study.

Results

All fifty Meta-Programmes were included in the initial exploratory factor analysis in order to determine the factor structure, using IBM SPSS Statistics 25 software. Factor analysis regularly yields a five-factor structure that parallels the typical dimensions of the FFM for self, peer, supervisor, and teacher ratings (Goldberg, 1992; Miller, Pilkonis, & Morse, 2004; Ployhart, Lim, & Chan, 2001).

As the data used in this study were not normally distributed, according to Kolmogorov Smirnov test (p < .05 for all the variables included), the principal axis factoring method of factor analysis was used (Fabrigar, Wegener, MacCallum, & Strahan, 1999).

Before performing the analysis, the basic assumptions for exploratory factor analysis were checked to see if they were met. The sample size was adequate in general (n=177), however, the ratio between items and subjects, 50:177 was not, as recommended by (Tabachnick, & Fidell, 2007). According to the correlation matrix, there were many correlations between the items higher than r = .3. Kaiser-Meyer-Olkin Measure of Sampling Adequacy was equal to .90, which was higher than the recommended value of .60 (Kaiser, 1974). Bartlett's Test of Sphericity (Bartlett, 1954) was statistically significant (p < .001). This all suggested that the data were overall appropriate for factor analysis, with the only limitation being the item/subject ratio.

The principal axis factoring method revealed eleven factors with eigenvalues greater than $\lambda = 1.00$. According to the scree plot, only the first five factors offered any potential solution, according to Cattell's criteria (1966).

The five factors explained 54.64% of the variance. Direct oblimin rotation was used, in order to get more accurate results, as the factors were correlated themselves, as presented in Table 4.13. All items had communalities higher than .40, showing that they were correlating to the other items, except for the MP of 'Trustful' (communality = .25).

Dimension	1	2	3	4	5
1	1.00				
2	.20	1.00			
3	48	26	1.00		
4	.29	.08	22	1.00	
5	.44	.21	34	.26	1.00

Table 4.13: Correlations of the extracted factors

It loaded on the first factor with the factor loading of .32, which was acceptable according to Tabachnick and Fidell, (2007), so it was not excluded. Items 'Present' and 'Looking' did not load on any of the obtained five factors with the loading of .32 or higher, so they were excluded from the final factor solution.

Table 4.14 presents the factor structure, i.e. the new five dimensions created based on the Pattern Matrix, keeping those with factor loadings higher than .32, and attaching each item to the factor on which it had the highest factor loading.

		Meta-Programmes	5	
Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5
Achievement	Team Player	Quality Control	Own	Abstract
Information	Relationship	Details	Places	Global
Activity	Caring for Others	Procedures	Internal	Vision
Long-term	People	Sameness	Non-external	Towards
Future	Collectivist	Away From	Influence	Options
Caring for Self	Affiliation	Things		Polar
Pre-Active	Partner	Past		Seeing
Realisation	Trustful	Reactive		Listening
Task	Consensus	Doing		
Difference		Sceptic		
Concrete		Short-term		
Observer		Hearing		
		Feeling		
		Reading		

Table 4.14: Five dimensions of Meta-Programmes

Based on the results of the factor analysis, which was effectively saying: *these things tend to happen together*, it was deduced that there exists a subset of latent dimensions (objective 3) underlying the fifty investigated Meta-Programmes amongst post-graduate students. Each dimension combined between 5 and 14 different Meta-Programmes. From the list in Table 4.14, it was inferred that the Meta-Programmes within the first dimension are the 'drivers' in the context of post-graduate thinking in an academic context.

The sample size of 174 was adequate for the linear regression model with five predictors (Tabachnick, & Fidell, 2007, p. 123). The assumption of multicollinearity and singularity was not violated. There were many high intercorrelations of cognitive dimensions, and two low significant correlations of cognitive dimensions with the Thinking Quotient (Cohen, 1988; Table 4.15). Tolerance and Variance Inflation factor (VIF) measures suggested that there were no problems with multicollinearity between any pair of the independent variables.

Variable	1.	2.	3.	4.	5.	6.
1. TQ	1.00					
2. Dimension 1	14*	1.00				
3. Dimension 2	10	.62***	1.00			
4. Dimension 3	09	.77***	.66***	1.00		
5. Dimension 4	06	.66***	.66***	$.70^{***}$	1.00	
6. Dimension 5	15*	.76***	.68***	.74***	.69***	1.00

Table 4.15: Correlations between the variables in the model

*. Significance of *p* < .05, 2-tailed. ****. Significance of *p* < .001, 2-tailed.

Normal P-P Plot of Regression Standardised Residual suggested that the data were very close to normally distributed. Scatterplot visualisation suggested that there were not many atypical points, and no violation of some of the assumptions of linearity, normality, and independence of residuals, and homogeneity of variances. Maximum Cook's distances lower than 1 also indicated that there were no atypical points, and hence no cases to exclude from the analyses.

Finally, the dependent variable TQ was close to normally distributed, based on skewness and kurtosis absolute values lower than 1.96, as well as based on the analysis of the histogram. However, the overall regression model was nonsignificant, F(5, 168) = 1.07, p =.38. Accordingly, none of the five cognitive dimensions predicted the outcome variable TQ, as presented in Table 4.16.

To determine if objective 4 was achievable, the effects of the five cognitive dimensions on the TQ score were tested using multiple linear regression, with five cognitive dimensions as independent variables, and the TQ score as dependent variable. As with the first regression model, three cases were identified as outliers, since they had Mahalanobis distances higher than the recommended threshold of 20.52 (Tabachnick, & Fidell, 1996).

	Unstand Coeffi	lardised cients	Standardised Coefficients	<i>t</i> -value	Sig.
	В	Std. Error	β		
(Constant)	3.52	.16		21.48	.00
Dimension 1	003	.003	12	90	.37
Dimension 2	001	.003	04	37	.71
Dimension 3	.002	.003	.08	.55	.58
Dimension 4	.002	.003	.10	.82	.41
Dimension 5	003	.003	15	-1.10	.27

Table 4.16: Regression coefficients of cognitive dimensions with TQ as the outcome

The final multiple regression was conducted without these three cases, on the sample of 174 participants. Before that, the assumptions of conducting multiple regression analysis were evaluated.

The average TQ score for the 177 post-graduate students was 3.19 and can be seen in Figure 4.6. Although there were a number at level 3.0, there were a significant number above this score, which suggested that if this were correlated with Kegan's levels of adult development, the average post-graduate student had a measure of thinking construction marginally higher than the average population.



Figure 4.6: Average TQ Score for PG Students

It is possible that this was a reflection of the academic hiring policy since the late 1990's where it was decreed that everyone could obtain a degree. It would have been interesting to compare these results to under-graduates from the 1980's when this policy was not in place.

Discussion

As the pilot study had demonstrated the methods used were appropriate, the main aim of this study was to extend the findings of the pilot study, to determine how the thinking of 177 post-graduate students mapped against the Identity Compass profile tool. The aim was to discover any commonalities in the clustering of Meta-Programmes that would form 'Thinking Styles', as per objective 2, and to uncover how this thinking influenced their construction of self as a post-graduate student. This research started from the premise that Meta-Programmes exist as high-level abstracted patterns of thinking and responding (Hall, 2005) and can be reliably identified and measured by the Identity Compass profile tool.

Pilot Study (<i>n</i> =32)		Study 2 (<i>n</i> =177)	
Towards	90	Activity	90
Information	85	Information	90
Global	85	Towards	90
Activity	85	Achievement	85
Task	85	Vision	85
Achievement	80	Task	85
Vision	85	Global	85
Re-Active	78	Seeing	80
Present	80	People	80
Realisation	80	Caring for Self	80
Concrete	78	Re-Active	80
Caring for Self	75	Consensus	80
Consensus	78	Realisation	80
Seeing	80	Concrete	80
Future	80	Present	80
Options	75	Future	80
Details	75	Short-term	80
Short term	75	Feeling	75
Quality Control	80	Partner	75
Long term	75	Influence	75

Table 4.17: Meta-Programmes ranked by Median score

As per the pilot study, a hierarchy of Meta-Programmes emerged from the data. However, this was a different hierarchy compared to the pilot study findings. A comparison of hierarchical MP's can be seen in Table 4.17. What was interesting was that the same seven Meta-Programmes appear in both studies, with the obvious exception of ranked order. 'Information' is about learning and appears second in both studies. The MP of wanting to get on with their work (Activity) became the highest unconscious habituated MP with a greater number of student profiles. Goal orientation (Towards) also remained important, as did the unconscious MP of receiving the degree (Achievement). These similarities were understandable as the pilot study was a subset of study 2. However, this ranking is different to the question raised in objective 1, which will be discussed next.

The results of the 177 profiles demonstrated that *there were Meta-Programmes common to all post-graduate students*, as per Objective 1, and these Meta-Programmes had a specific meaning in the context of academia. Table 4.18 shows the first dimension listing the highest factor Meta-Programmes. As mentioned, the factor analysis was effectively saying that if you answer a certain way with 'Internal', you are likely to answer in a similar way with 'External'. It was possible that dimension 1 lists those MP's most accessible to the students, and dimension 5 the least accessible. As students are not encouraged to think in an 'Abstract' or 'Global' way due to the nature of the academic system, it made sense that those two Meta-Programmes were unavailable. Taken in context, the combination of those twelve Meta-Programmes in dimension 1 demonstrated a potential *thinking style* as per objective 2, and highlighted the intention and direction of thinking *behind* the profiles for the students. It was possible that the combination was an academic Thinking Style: however, it was more likely to be a Thinking Style common to post-graduate students, suggesting it was also available to non-students alike. See Table 4.18. These component MP's of dimension 1 are discussed next. The first Meta-Programme was '<u>Achievement'</u> which was about attaining the reward, and in context, this was about the student getting their post-graduate degree. They were actively motivated (consciously or unconsciously) to get the certificate. McClelland (1985) determined there are three basic motives, with Achievement being a stable preference over time. The factor analysis for post-graduate data would support his perspective in this context.

Meta-Programmes				
Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5
Achievement	Team Player	Quality Control	Own	Abstract
Information	Relationship	Details	Places	Global
Activity	Caring for Others	Procedures	Internal	Vision
Long-term	People	Sameness	Non-external	Towards
Future	Collectivist	Away From	Influence	Options
Caring for Self	Affiliation	Things		Polar
Pre-Active	Partner	Past		Seeing
Realisation	Trustful	Reactive		Listening
Task	Consensus	Doing		
Difference		Sceptic		
Concrete		Short-term		
Observer		Hearing		
		Feeling		
		Reading		

Table 4.18: Five dimensions of Meta-Programmes

The fact that '<u>Information</u>' was second demonstrated that 'learning' was a key (conscious) Meta-Programme to all post-graduate students profiled. Also, a low score in this MP would indicate a tendency towards arrogance.

The third MP was '<u>Activity</u>' which showed an intention to get things done. This could be considered an appropriate MP for post-graduate students in terms of workload and outcome.

<u>'Long Term'</u> demonstrated that the student was capable of planning beyond the confines of their studies (usually 12 or 36 months).

'<u>Future'</u> also showed that the future was at the forefront of the student's thinking, and was indicative of higher level thinking according to Laske (2015) and Jaques (1989) in his ideas on 'span of discretion'.

<u>'Caring for Self'</u> was a common MP for foreign students studying in the UK. It emphasised their prerequisite to take care of their own needs first.

<u>'Pre-Active'</u> demonstrated that a student was conscientious and willing to work for their degree.

'<u>Realisation</u>' was the MP that determined if the students followed through on their ideas, and as it was the very next MP on the list, this suggested that post-graduate students, at least in this context, did indeed follow their ideas through to fruition. This implied from the moment they were assigned a group activity, up to the moment they hand in the finished work.

'<u>Task'</u> suggested the student was more concerned about getting the job done than the people involved in the actual task.

'<u>Difference'</u> was tenth, and this was an important Meta-Programme for post-graduate students as it essentially showed how a researcher maintained their search filter for what was new and different to what had been written previously. It was indicative of the student's intention to grow through their research and aligned with the findings of Brown, (2004).

The eleventh MP was '<u>Concrete</u>' which was about knowing the facts, such as who does what and how, and when it will be delivered. This could have been an environmentallydriven MP as research is key in post-graduate study.

The final Meta-Programme in dimension 1 was '<u>Observer</u>' which was a student's ability to dispassionately step back from their studies and consider the neutral perspective. It does not associate with feelings, and thus highlights the point raised in the literature review that stated in order to be a high level thinker, one must move through emotion in to cognition.

Vermunt (1998) suggested that 'constructive friction' was a useful tool for disrupting a student's thinking by way of a mis-match of teaching/learning styles, which would be made easier to achieve with an appropriate tool such as the Identity Compass. This perspective aligned with Piaget's (1985) concept of disequilibrium and was supported by the third dimension in Table 4.18. The findings of the factor analysis showed that those Meta-Programmes in dimension 1 were opposed by their MP pair in dimension 3. Thus, in order to cause friction as per Vermunt, (1998) one only needed to offer the post-graduate student a 'Sameness' MP where they habitually used 'Difference' and their disequilibrium would be in effect. This also supported the findings from Dunn, Griggs, Olson, Beasley & Gorman (2010) who found that the variation in Meta-Programmes required students to focus on those MP's that were less habituated in order to grow their thinking in context. It is possible that what Dunn, *et al* (2010) meant was that a student would gain an awareness of their intention and a choice of response would result. This idea could be tested further on a greater number of IC profiles.

Objective 5 asked if it were possible to create a benchmarking tool to normalise the Identity Compass output. As mentioned in the Measures section, this was achieved by mapping the relevant Meta-Programmes to the behavioural output of Kegan's Levels of Adult Development (see <u>Appendix 6</u>) from a social-emotional perspective, and Laske's Cognitive Development Framework from a cognitive perspective. This mapping allowed an inference to a student's underlying Intention, Awareness, Choice and Response as a function of their MP combinations. This provided a score against which the four attributes were measured.

Objective 3 asked if a similar or different subset of dominant Meta-Programmes emerged from the larger student data. When compared with Table 3.7 from the exploratory study, the combination of CI's was clearly different. The obvious difference being the number of student profiles in the data (pilot n=32; current n=177). Although each study found a subset of Meta-Programmes, the current study had five dimensions and the pilot study had 4. What was interesting was the principle found in the combination of MP's in each

dimension remained the same. In the pilot study, dimension 1 contained the majority of Meta-Programmes, suggesting that all profiles were influenced by more MP's than in study 2. However, those MP's in dimension 3 in each study were the polar pairs to those contained in dimension 1. This suggested that in each study, the principles of disequilibrium as put forward by Piaget (1964) were supported by the fact that should a student use (unconsciously) an MP in dimension 1, then a focus on the opposing MP would be necessary in order to balance their thinking. The two factor analyses supported this principle and thus supported the findings of Dunn et al. (2010).

The current study only included profiles of post-graduate students at one university in the UK, and thus any conclusion on their thinking or their Thinking Style would be premature without the existence of a control group for comparison. With a number of psychological concepts emerging from the current study, a larger dataset investigation of the same principles is recommended to determine if the same concepts/hypotheses can be found, taking into account the need for a control group.

Should the same objectives and hypotheses be applied to a larger, more diverse dataset, the results should differ. This is something to be considered as the basis for a third quantitative study.

Objective 4 asked if any other unique patterns of Meta-Programmes emerged from the data. From 174 profiles, the results have demonstrated that there were too few records to discern unique combinations of Meta-Programmes sufficient to be considered Thinking Styles. However, what was interesting in this second study was the combination offered by the factor analysis in relation to Piagetian schemata (1965), and Kegan's (1994) Levels of Adult Development. The data for the TQ score was non-significant in the current study, however, there was suggestion that the TQ score was different *because* the combination of Meta-Programmes within each was different. To test this further would require a much larger

dataset. For example: it is plausible that a post-graduate student is more likely to be higher on the TQ scale than someone who does not attain the same level of education for a reason other than CI combinations, such as General Intelligence. This would also be investigated in a larger dataset.

The combination of the Meta-Programmes allowed a student to construct different meaning-making in their thinking process as their awareness of their intention increased. Inferred from Kegan (1994), this suggested that their experience of being a student would vary depending on where they found themselves on the TQ scale, because the degree of choice of behaviour differs at each TQ level. Thus, the hypothesis was that lower TQ-level thinkers had less awareness of their Meta-Programme use in context (academia). Further study on a greater number of participants would offer a more profound understanding of this hypothesis and allow the TQ score to develop into a more robust system of measuring awareness in the moment.

Redefinition of Meta-Programmes

The standard definition of metacognition is one of learning strategies and a learning process requiring awareness of each to be successful in the classroom (Flavell, 1979). Meta-Programmes are thus not metacognition as they offer no such educational process or strategy. However, they do offer a way of thinking about one's thinking from an intention and awareness perspective once fed back to the participant, as discussed. From a post-graduate and thus self-directed learning perspective, students must be able to assess their own knowledge relative to the research, which involves metacognitive knowledge (Hmelo et al, 1997). What metacognition does not offer, and was thus a differentiator for this study, was a definition of the intention behind a student's thinking that determined where they placed their attention. For example: if a student unconsciously used 'Sameness' as a heuristic, this impacted how they approached assignments in comparison to a student who used

'Difference'. This direction of intention (comparison) is not accounted for by developmental psychologists in the manner it is described here as a thinking shortcut.

The results of the current study demonstrated the importance of a student's thinking when comparing the output of two individual meta-programmes, such as 'Internal' and 'External'. According to the literature, it was apparent that the Identity Compass, and other similar tools (Daniels, 2010) measured what they purported to measure: Meta-Programmes. However, from the current study, it was evident that the Identity Compass, when understood differently, was capable of measuring more than the standard definition Meta-Programmes. Arguably, it was also measuring a participant's Intention and Awareness. Consequently, it could be argued that the label of "Meta-Programme" is a misnomer, and a more functional label for the fifty Meta-Programmes uncovered by the Identity Compass is: '*Cognitive Intentions*'.

It was understood that they could also be considered and named *cognitive biases*. However, it was preferred here to use 'Intention' in order to differentiate from other meaning-making systems. There is an argument for meaning-making that needs to be considered when describing any phenomenon, and that is 'essentialism'. This had an impact on the reasons behind the reframing and renaming of Meta-Programmes. One needs to be careful when naming categories of thinking, elements of intellect or facets of behaviour, to ensure the perceiver is not convinced of some deeper reality that simply is not true (Barsalou, Wilson, & Hasenkamp, 2010). A concept contains the essential information necessary to be able to distinguish its instances from its non-instances. They are information reducers and augmenters. The process of conceptualising, or forming concepts, involves reducing complex information to simpler, more essential, and manageable forms for the purpose of facilitating other cognitive processes, such as classification, identification, storage, and retrieval. Thus, to explain and predict human conceptual behaviour, the key is to decipher the nature of the

essential information that concepts encode and to discover how it is encoded. Stated in different but equivalent terms, we wish to understand how multiple MP's are represented as one (Vigo, 2015)

Humans tend to go beyond the simple naming of an essence of something and perform an obtuse meaning-making on that 'thing' in order to find evidence for it. James (1890, 1961) observed this when he said: "Whenever we have made a word ... to denote a certain group of phenomena, we are prone to suppose a substantive entity existing beyond the phenomena, of which the word shall be the name" (p195). He knew that naming something created an essentialism which Bloom, (2004) argues is how individuals think about events and objects in their world view. This allows the individual to give more deference to the word, rather than the object, which creates an 'essence placeholder', which in turn promotes essentialism. This meaning can convince the individual that there is a deeper reality to the 'object' in the material world (Barsalou, Wilson, & Hasenkamp, 2010; Medin & Ortony, 1989). Consequently, the context is ignored (Mesquita, Barrett & Smith, 2010).

This problem occurs in psychology so dramatically that entire fields are considered immovable and unchallengeable due to the nature of the belief behind the essentialism. This is particularly true in Trait theory, where it is sacrosanct that 'traits do not change' (Woods and Anderson, 2016). Behaviours, mental states, and humans are, it is believed, all determined by 'deep, unchanging internal forces' (Mesquita, et al., 2010).

The issue is a circular paradox in that names create meaning, yet we must name our observable phenomena. However, we must do it intelligently to avoid essentialism as a matter of course. The pervasiveness of essentialism has shaped Western psychology, where models of the mind have become fragmented due to the assumption by psychologists that emotion, memory, the self, attitudes, personality traits and more, are different entities with distinct organising properties and causes (Bruner, 1990). By concentrating on a singular mental state

or behaviour, it is easy to miss its embeddedness in the larger system. From a Constructed Development perspective, this would be to focus on a single Cognitive Intention and miss the awareness process by which all fifty are measured: Dynamic Intelligence.

According to Gendron & Barrett, (2009) psychological states, behaviours and traits are not entities but events constructed out of a more basic set of processes, which are shaped by context. Feldman-Barrett, et al., (2010) goes further and states that mental events as well as behaviours are states that emerge from our immediate interactions with our environment. She calls this moment-by-moment interaction the *context principle*. By extension, one Cognitive Intention can serve as the context for another, hence the objective of discovering 'driver programmes' in the factor analysis throughout these studies. It is suggested in the current study that Gendron and Barrett's "more basic set of processes" are those Cognitive Intentions outlined in the current study, and it is one's level of awareness of their relationships that guide our response in the moment. Feldman-Barrett could be suggesting that these processes are out of awareness, and thus unchangeable. With the hypotheses outlined in this thesis, a level of awareness would allow for a change in one's response in the moment, offering a reprieve from the *context principle*.

Feldman-Barrett, Mesquita & Smith, (2010) state that those observed functions of psychology, such as thoughts, feelings and actions, are not necessarily driven by single causes, but are the emergent results of multiple transactive processes. It is argued here that those transactive process are the fifty Cognitive Intentions: they precede the state that leads to the response in the moment, hence the necessary reframing from 'Meta-Programmes'.

In support of this renaming, it should be considered whether each individual Cognitive Intention is a heuristic; a shortcut for thinking and behaving in support of Piaget's (1971) schemata. An example would be the use of stereotypes. A stereotype is a cognitive function that serves as a predictor for an individual's future behaviour (Snyder, Tanke and

Berscheid, 1977) based on prior thoughts and experience about a particular thing or group, albeit, an overly-extended schema. From a dual process perspective (Evans, 1975), System 1 appears to be the self-regulator of reactive thought, forming quick conclusions and allowing for one to act upon impulses within the context of reality on a simpler level. Whereas System 2 is in control of deeper, less compulsive ways of filtering information, this could describe an unconscious heuristic. Many people do not monitor the output of their System 1 reasoning, and they could lack the competence to switch to more effective methods if they did (Stanovich & West, 2000). It could also be that System 1 thinking is a shortcut of the System 2 heuristics. Kahneman, (2011) states that passing judgement too quickly reinforces what the self believes as true: 'jumping to conclusions' bias, assumptions, and biases about what is being assessed. This points to, albeit negatively in this example, 'Internal' being a potential bias in one's thinking, and a shortcut to an internal locus of evaluation.

An alternate perspective on Cognitive Intentions is their potential for conforming to the definition of a *perceptual set*. A perceptual set refers to a predisposition to perceive things in a certain way (Bruner, 1990). In other words, we often tend to notice only certain aspects of an object or situation whilst ignoring other details. This *noticing* directly aligns to the Cognitive Intentions of 'Sameness' and 'Difference', whereby it is explained by Maus (2011) and Hall (2005) that an individual initially filters for difference in general. What Hall and Maus do not explain is whether an individual is capable of performing this 'noticing' with a conscious intention, which further supports the need for a redefinition with a deeper understanding of what a Cognitive Intention pair achieves from an awareness perspective.

From the current study, it was shown that the combination of Cognitive Intentions, when understood in the context of heuristics and schemata, offer a deeper understanding of an individual's deconstruction of their Thinking Style. However, this is not metacognition as the post-graduate students were not thinking about their thinking in the traditional

metacognitive context, affecting learning and tasks at hand, and the strategies employed (Baker and Brown, 1980; Palincsar and Brown, 1981). As well as it being almost impossible to determine if or when a student is engaging in metacognitive behaviours (Markman, 1977), the current study also suggests that participants are not aware enough of their cognition to be able to control and monitor them in the traditional sense, but more from a complexity perspective (Markman, 1977).

Perceptual experience is about our beliefs about our environment, in that it helps to justify them, and represent our world around us in what we see and hear (Schellenberg, 2014). There are three questions that have motivated the study of perceptual experience that help us to deconstruct this: the *Epistemology*-question asks how our perceptual experience justifies our beliefs and yields knowledge of our environment given that perceptual experience can be misleading? The *Mind*-question asks whether perceptual experience brings about conscious mental states in which our environment appears a certain way to us. This is what Korzybski (1951) meant when he said: '*the map is not the territory*'. Finally, the *Information* question asks how does a sensory system convert a myriad of informational input into mental representations that we then attribute to the world?

With these three questions in mind, and the arguments in the literature review, it is apparent that the answer could be the use of a cognitive heuristic based on our past experience of our environment. The third question hints towards a Constructivist perspective, which is the thread throughout this thesis, and which points to the potential use of Cognitive Intentions as one method of thinking construction, employed as heuristics.

It could then be further hypothesised from the Identity Compass output via the Thinking Quotient scale that the score attained by each participant (e.g. 3.1), is a scaled measure of their *self-awareness*, as it also pertains to the level of awareness of the participant's use of the fifty Cognitive Intentions. This awareness is brought into the individual's consciousness typically in the feedback process. It has already been suggested that an individual's level of self-awareness from a Cognitive Intentions combination perspective could be tested qualitatively in a fifth study.

Finally, as the data suggests there is scope for a change in one's habituated thinking patterns, with the use of Cognitive Intentions as the guide for this deconstruction, there is a suggestion that should the Thinking Quotient uncover a scale of self-awareness, then with the aid of the Cognitive Intentions, a guided reconstruction is possible that would affect an individual's thinking style, which is a more constructed development approach.

Taking into account the findings in the studies so far, it would be interesting to discover if the same or similar combination of Cognitive Intentions creates the same counterpattern (Dimension 1 versus Dimension 3) within a factor analysis that supports the principles present in the current data. Were they to, the implications on the objectives and hypotheses were such that students did not have a discernible Thinking Style different to the general population, and other styles do exist.

Table 4.14 demonstrates that the five dimensions within Table 4.16 do not predict the outcome variable TQ score, and although this addressed objective 5, it did suggest the results of the pilot study were artefactual. As per objective 3, a different combination of Cognitive Intentions was correlated with different scores on the Thinking Quotient scale, however one cannot assume causation. Again, it would require an investigation on a much larger dataset to determine a more robust relationship between CI combinations and TQ scores.

What was inferred from the results of the factor analysis, however, was an intention in the thinking of the post-graduate students to maximise their experience within academia based on the prominence of Cognitive Intentions such as 'Information', 'Activity', 'Achievement', 'Towards' and so on. Given the description of each (in <u>Appendix 2</u>), the intention behind their use was mirrored in both the pilot study and the current study. What is

missing, and was pointed out in the literature review, is the awareness of the students that they are actually utilising a shortcut in their thinking in the first place, the lack of choice one has from this unaware state of mind, and finally the individual's inability or capacity to respond in the moment according to the choices this awareness would offer. As it stands, there was a suggestion that post-graduate students lack the capacity to respond in the moment based on their habituated Cognitive Intention combinations. This warrants further investigation on a larger dataset.

For those students who utilised the combination of CI's in the manner in which they are defined in the factor analysis, the data suggested that this is the standard Thinking Style for post-graduate students. What was not determined, and thus requires further study, was those students whose intention was to either stand out, or blend in, and what their specific TQ score was in relation to their CI combination. In other words, for the bespoke 'High Flyers' programme within Coventry University London, was there a difference in how those High Flying students construct their thinking when compared to the average student on campus?

Learning Styles

As per the literature review, theories of learning and learning styles have been well researched in the past (An & Carr, 2017). It was discussed in the literature review that understanding '*meta-programmes*' (now Cognitive Intentions) contributes to the creation of an optimal teaching and learning environment (Wium, Pitout, Human & du Toit, 2017) and conversely, ignoring those students whose Cognitive Intentions (CI) are dissimilar to those habituated CI's of the lecturer will be less conducive to an optimal learning environment (Hawk & Shah, 2007). Where the original studies focused on an individual Cognitive Intention, the current study offers a deeper understanding of that principle by the use of combinations of CI's for students on an MBA course at Coventry University London. It could be argued that not only do lecturers and students have differing Cognitive Intention

combinations, so too does each taught subject, such as engineering, accounts, art, design and computer programming. Brown (2003) determined those CI's that combine to produce the thinking behind accountancy modules by profiling accountancy students. By extrapolation, a computer sciences student would need to display a different combination of Cognitive Intentions to succeed at that course than if they undertook a nursing degree. With this hypothesis in mind, there is evidence that once a lecturer becomes aware of their own CI combination (Thinking Style), they could be more affective at facilitating learning (Wium, Pitout, Human & du Toit, 2017). There is thus potential to deconstruct the constituent Cognitive Intentions required in a specific module at university and align a student profile to it before their education commences, matching the post-graduate student to the course content, as Jaques achieved with organisational complexity (1989).

This would lend support to research by Chen & Zhang (2007) who discovered that the cognitive complexity of underachievers was lower than that of higher achievers. It would also tentatively support the findings of Yasmeen, et al., (2020) who demonstrated that learning styles impacted employee creativity in differing industries in the following ways: "*feeling dimension is dominant in the telecommunication sector; thinking dimension is dominant in insurance sector; sensing dimension is dominant in banking sector. ... Visual learning style is dominant in banking sector; auditory learning style is dominant in telecommunication sector and kinaesthetic learning style is dominant in banking sector. " (p.52). Finally, the findings of Komarraju, et al., (2011) in a study that correlated personality traits and learning styles, demonstrated that Conscientiousness is critical for learning and performance, and was positively and significantly associated with all four learning styles. This suggested that Conscientiousness facilitated a number of effective learning strategies and was potentially useful for attaining higher levels of academic achievement. They also found that students who were careless, and*

who did not adopt a systematic approach to study were more likely to suffer in their performance. This tied in with the ideas found in the current study that showed post-graduate students who demonstrated a Procedural and Detail perspective fared better.

From a CDT perspective, it would be possible to predict which students would do well at university using the Thinking Quotient tool. This is a major contribution to complexity theory and justifies the use of student data for the first two studies within this research.

The results for study 2 have given five dimensions of Cognitive Intentions, with the most-available CI's by post-graduate students being Dimension 1. The question that requires further and longitudinal research is: if 'Achievement' is about gaining the reward at the end of the degree, does this CI motivation diminish over time the closer the student gets to graduation? There are a vast number of combination questions such as this that could be asked and answered with a variety of longitudinal studies on CI combinations in context.

Limitations of the Study

The 177 post-graduate students were recruited from one UK university, albeit across two campuses. For the purposes of identifying the students' Cognitive Intentions, the study relied on the Identity Compass profile tool, which is predominantly an organisational tool, rather than being aimed at academia. A further possible limitation of the data was that a proportion of the participants were not native English speakers, however, they did conform to the minimum standard of English for post-graduate study in the UK. This limitation could be mitigated in future studies by offering foreign students a profile in their native language. Further to this, a comparison could be made between two Identity Compass profiles by one student in both English and their native tongue to discover not only meaning-making differences, but their self-construction differences as a national, and a foreign student. Studies using students-only were potentially less generalisable to the wider population, with opinion varying. Kardes (1996) and Lucas (2003) argued that using students was acceptable, especially in a psychology environment. However, others such as Sears (1986) and Wintre, North, and Sugar (2001), articulated apprehension about the use of university students in behavioural research. Sears went further and suggested that university students bias the output of studies as they tended not to be representative of the wider population due to having stronger cognitive skills, more flexible attitudes, more accommodating behaviour, and more transient peer group relationships than older adults. As this study was specifically designed to test for the Thinking Styles of post-graduate students, the limitations mentioned represent a potential for bias, not an actual bias. It was for this reason that a control group of nonstudents would be investigated next.

Chapter Summary

The main result coming from study 2 was the creation of a tool that normalised the output of the Identity Compass tool that allowed for the alignment of the combinations of Cognitive Intentions with Kegan's (1994) Levels of Adult Development in order to demonstrate that there are different levels of self-awareness at the different levels of the TQ scale. However, the caveat here was that the data were non-significant and there was no control group, which suggests the need for a third study on the larger dataset mentioned in the introduction to either validate or refute the principles investigated in the current study.

A second important outcome was the renaming and repurposing of what were known as Meta-Programmes to Cognitive Intentions. This has the potential to impact a number of disciplines, not only the field of Neuro-Linguistic Programming, as mentioned in the literature review, but also metacognition and stage development. The consequences of this will be discussed in chapter 8.

The findings of study 2 regarding Cognitive Intention combinations were different to the pilot study, which implied that the pilot study findings were artefactual and potentially
misleading. Although a positive outcome of study 2 was a specific combination of what could be termed 'Academic Cognitive Intentions', the first dimension in Table 4.18 cannot be considered an academic Thinking Style, rather a style of thinking found in post-graduate students. This leaves the combination open to non-academics to utilise in a different context.

What was interesting in the results of the pilot study and study 2 was that the use of Cognitive Intentions transcends learning styles (and thus academia) and offers an insight into an individual's (domain-general) thinking strategy. With this in mind, an emphasis on general thinking and awareness would be beneficial in future studies. Another important finding was the first dimension in Table 4.18 demonstrated that the post-graduate students did not know they used those Cognitive Intentions (in context) and did not know the impact those CI's had individually and collectively on their thinking and behaving. This implied a further study on CI awareness is necessary in order to discover the extent to which post-graduate students and the general public are unaware of their construction of self based on CI use.

Grasha, (1984) contended that in order to learn, students need to be pushed, and to avoid the potential for 'bore-out' (Csikszentmihalyi, 1990). Therefore, it is possible that a negative side to not knowing the student's CI combinations (or Thinking Style) could lead to apathetic, argumentative behaviour, often mis-identified by the lecturer as laziness (Coffield et al., 2004). However, using the lens of Dynamic Intelligence, it is simply be a mismatch of lecturer/student Thinking Styles. This was an important finding as it supported previous work by Brown and Graff (2003) and Daniels (2010) as well as Pashler (2009) where the alignment of lecturer and student Thinking Styles afforded a more productive academic outcome.

From the findings demonstrated here, the relationship between Cognitive Intentions such as 'Internal' and 'External' was responsible for and accurately predicted an habituated Intention and Awareness that led to a choice of response in the moment. As demonstrated in the current study by the Thinking Quotient, once this intention and awareness was defined, it was then measured by interrogating the numerical relationship between them.

Although it was disappointing that the results of this study were not significant, due to the nature of the findings in the factor analysis, it was hypothesised that on a much larger sample of profiles, it could be possible to validate the Thinking Quotient, in order to offer a robust measure of a person's level of awareness and positively address the research question that Dynamic Intelligence exists as a conceptual measure of self-awareness in the moment. Also, future research on each Cognitive Intention with regards to validating an intervention would be a worthwhile study, in line with Vermunt's (1998) ideas.

Considering the supervisor plays the role of both coach and mentor to the research student (Wisker, et al., 2008), and the efficacy of each approach is different, Luecke (2004) suggests mentoring allows the transfer of tacit knowledge, whereas coaching helps the process and methodology of research (Blow, 2005), a further study on the efficacy of the supervisor/student relationship would be an interesting outcome of the current study whereby the results of good or bad supervision were investigated due to the dependency on the supervisor for the process (Yew et al., 2011).

Brown and Graff (2003) demonstrated a link between students' Cognitive Intentions and their performance in summative assessments. However, this current study is important as they did not go so far as to measure the Cognitive Intentions from the perspective of Intention, Awareness, Choice and Response, which leaves room for a future study on postgraduate students' awareness of their potential Thinking Style. This would expand the research by Brown and Graff. Further to this, a study on whether the different levels of the TQ score produce different degree outcomes (2:2, 2:1, First) would be interesting to the academic system. For example: in line with Chen and Zhang's (2007) findings, is there a similar correlation between those who scored 2.5 on the TQ scale and their final degree

classification of 2:2, and those who scored 3.8 on the TQ scale and their final degree classification of a 1st? The findings of Komorraju, et al., (2011) are also interesting in that they demonstrate that Thinking Styles, as defined as the combination of Cognitive Intentions allow personality data to be deconstructed by CDT to obtain a deeper understanding of academic performance. Where they state carelessness and systematic study as indicators of poor academic performance (p.476), a CDT profile would show Procedure and Detail as dominant Cognitive Intentions, and thus offer an intervention approach for vertical development. This would provide further evidence that CDT was capable of standing alone as a theory of cognitive development, and thus contributing to personality psychology and academic learning.

There is evidence that cultural self-awareness has an impact on a student's well-being as well as self-identity (Lu and Wan, 2018). A future study could investigate, initially any combination of Cognitive Intentions that hints at cultural division in Thinking Styles. This would reinforce such studies as Markus & Kitayama (1991) and Phinney (1990) whose work focused on how culture contributes to and helps shape the development of self.

With further research on a larger dataset, as mentioned in the introduction, a deeper definition of the Thinking Quotient could emerge out of the various combinations of the Cognitive Intentions, offering all levels of thinker a more robust explanation for their habituated thinking and behaving in context, further validating the Theory of Constructed Development and adding to the genre of stage development and personality.

Finally, it is important to demonstrate the levels of awareness each individual has in their conscious or unconscious choice of Cognitive Intentions. These extrapolations will be investigated next in study 3.

Chapter 5

Study 3 Large Dataset Interrogation

Introduction

The exploratory study validated the approach of deconstructing the thinking of post-graduate students using what were previously called Meta-Programmes and are now referred to as Cognitive Intentions, via the Identity Compass profile system. Study 2 (chapter 4) also supported the concepts of Thinking Styles, the Thinking Quotient (TQ) benchmark tool and the potential for the TQ to be a measure of intention and awareness of CI-use. However, even though a number of dimensions within the data were demonstrated, the two previous studies' findings were non-significant regarding the TQ scale. It was therefore necessary to test the hypotheses with a larger number of profiles to ascertain if the results were replicable.

The current study had the potential to be either a validation or refutation of the aims and objectives of the previous studies by virtue of acting as a large control group. Thus, the data in the current study set out to test the third incarnation of the quantitative research question:

Does Dynamic Intelligence exist as a conceptual measure of self-awareness in the moment?

Having determined that objective 5 from study 2: *can a benchmark tool be created to normalise the data output of the Identity Compass profile tool?* was possible, and having used its principles to discover the findings were non-significant on n=177 profiles from a Thinking Styles perspective, the current study aimed to apply the findings to a larger dataset (n=8,200) to determine if the results were replicable and significant. Therefore, it was necessary to expand the objectives to accommodate the third study:

- 1. To determine if there are Cognitive Intentions common to 8,200 profiles
- 2. To determine if the larger dataset confirms or contradicts the existence of Thinking Styles by virtue of the various combinations of Cognitive Intentions

- 3. To determine if a similar or different subset of dominant Cognitive Intentions arises
- 4. To determine if the Thinking Quotient scale is valid for 8,200 profiles as it was for 177

The hypotheses that emerged from study 2's findings were:

- 1. Individuals are not aware of their use of Cognitive Intentions in context
- 2. Each level of the Thinking Quotient has a unique combination of Cognitive Intentions which equates to different thinking styles
- 3. Individuals are not aware of their thinking style using CI combinations
- 4. Thinking Styles, and thus behaviour, can be influenced by polar CI intervention

The Factor analysis in study 2 uncovered five dimensions that differentiated a potential

'academic thinking style' as per objective 2 above. The aim was now to differentiate between

the academic data and the larger data set to discover if the principles transfer with the larger

dataset acting as the control group.

Method Research Design

The research in the current study was the same as in the pilot study and study 2 in that

the Identity Compass profile tool was used to determine the construction of circa 8,200 individuals' thinking using fifty Cognitive Intentions. With the data pool being so large compared to the previous two studies, Fabrigar, Wegener, MacCallum and Strahan (1999) articulated that if data are relatively normally distributed, maximum likelihood is the appropriate method because:

"it allows for the computation of a wide range of indexes of the goodness of fit of the model [and] permits statistical significance testing of Dimension loadings and correlations among factors and the computation of confidence intervals." (p. 277).

There are very few rules for sample sizes within a factor analysis. Studies have shown that adequate sample size is determined in part by the nature of the data (Fabrigar et al., 1999; MacCallum, Widaman, Zhang, & Hong, 1999). Usually, the stronger the data, the smaller the sample can be for a precise analysis. 'Strong data' in a factor analysis means homogeneously high communalities without cross loadings, plus numerous variables loading strongly on each factor.

Participants

The current study made use of secondary data in the form of a database of circa 8,200 Identity Compass profiles donated to this study by the profile owner (see Appendix 7). Each profile was anonymous, with only the country of origin being a differentiator. For example: if the profile consultant were from the UK, their profiles began with the letters "UK". If they were from Germany, their profiles began with the letters "DE". It was not possible to determine sex or age from the profile data as this was not part of the data spreadsheet received from the profile owner. Their countries of origin were, but not limited to: England, Germany, Italy, Sweden, India, Pakistan, Korea, China, Japan, South Africa and Nigeria. The common denominator amongst the profile participants was their status within their respective organisations as the profile tool was predominantly aimed at medium-to-large sized businesses as a method of profiling their middle managers and higher-level managers.

The secondary data in the current study was leveraged in order to examine a new perspective on the original question from study 2. A justification for utilising secondary data to answer the existing research question began with it being highly preferable (Doolan, Winters & Nouredini, 2017), and that the data were already clean and stored in a format familiar to the researcher. They were also already pursuant to the output of the Thinking Quotient tool. A further justification for using the large participant dataset was that the larger the (participant) sample size, the more precise the mean, which in turn allowed for the pinpointing of outliers. From a participant perspective, the outliers were important for the substantiation of the theory emerging from the data.

Next, the volume of data within the dataset would have been impossible to collate by the researcher individually. Finally, time was a factor for both the researcher and potential participants. Having secondary data in the form of profiles already completed saved potentially thousands of (wo)man/hours.

Measures

As this study was an extension of the previous two studies, all measures and methods were replicated from study 2. The only differentiator between studies 2 and 3 was the number of participants: n=177 and n=8,200 respectively. This meant that the Identity Compass output data were used for all 8,200 participants, and the Thinking Quotient score was used to benchmark their thinking in the same manner as in study 2.

Procedures

Ethical approval was granted from Coventry University ethics committee to use the historical data within the Identity Compass profile database in Germany. The profile owner granted permission to use the dataset, provided it remained anonymous, and a gatekeeper letter was signed allowing the use of the anonymised data (see Gatekeeper letter in App. 7).

Results

In order to ensure continuity, the same statistical tests were conducted on the large dataset as were on the student dataset in study 2. Fifty Cognitive Intentions were included in the initial exploratory factor analysis in order to determine the latent dimension structure, using IBM SPSS Statistics 25 software. As the data used in this study were not normally distributed, according to Kolmogorov-Smirnov test (p < .05 for all the variables included) as well as histograms, the principal axis factoring method of factor analysis was used (Fabrigar, Wegener, MacCallum, & Strahan, 1999).

Before performing the analysis, it was checked if the basic assumptions of exploratory Factor analysis were met. The sample size of N = 8243 was adequate (Tabachnick, & Fidell, 2007). Tabachnick and Fidell (2001) cite .32 as a good rule of thumb for the minimum loading of an item, which equates to approximately 10% overlapping variance with the other items in that factor. According to the correlation matrix there were many correlations between the items higher than r = .03 (although most of them were lower). Kaiser-Meyer-

Olkin Measure of Sampling Adequacy was equal to .94, which was higher than the recommended value of .60 (Kaiser, 1974). Bartlett's Test of Sphericity (Bartlett, 1954) was statistically significant (p < .001). This all suggested that the data were overall appropriate for factor analysis.

The principal axis factoring method revealed ten factors with eigenvalues greater than $\lambda = 1.00$, explaining 59.37% of the variance. According to the scree plot, keeping the first five factors seemed to be the best solution, according to the Cattell's criteria (1966).

The five factors explained 47.29% of the variance. Direct oblimin rotation was used, in order to get more accurate results, since some of the factors were correlated themselves, as presented in Table 5.19. Many items had communalities higher than .40, except for Seeing, Hearing, Feeling, Things, Observer, External, Caring for Self, Caring for Others, Pre-Active, Post Active, Sameness, Team Player, Past, Long Term, Short Term, Doing, and Trustful, which, due to low communality, did not correlate with the other items. However, only variables Hearing, Looking, Pre-Active, Doing, Achievement, and Caring for Others had Dimension loadings lower than .32, so they were excluded from the final five-Dimension structure (Tabachnick, & Fidell, 2007).

Dimension	1	2	3	4	5
1	1.00				
2	.07	1.00			
3	40	08	1.00		
4	.30	.04	29	1.00	
5	.38	.13	31	.21	1.00

Table 5.19: Correlations of the extracted factors

Table 5.19 presents the Dimension structure, i.e. the new five dimensions created based on Pattern Matrix (see <u>Appendix 8</u>), keeping those with dimension loadings higher than .32, and attaching each item to the dimension on which it had the highest dimension loading. Item 'Reactive' had the same dimension loading size on the first and the third dimension (although positive on the first, and negative on the third), so, as it correlated just slightly more with the third Dimension (r = .50 with the first, and r = -.51 with the third), it was finally attributed to the third factor.

Cognitive Intentions				
Dimension 1:	Dimension 2:	Dimension 3:	Dimension 4:	Dimension 5:
Future	Sceptic	Procedures	Own	Relationship
Abstract	Trustful	Concrete	Individualist	Affiliation
Vision	Things	Realisation	Internal	People
Long-Term	Away From	Quality Control	Influence	External
Difference		Task	Caring for Self	Listening
Options		Short-term		Team Player
Polarity		Details Places		Places
Observer		Consensus		Partner
Global		Information		
Towards		Present		
Seeing		ReActive		
Activity		Sameness		
Reading		Past		
		Feeling		

Table 5.20: Five factors of cognitive intentions

Based on the results of the factor analysis it can be concluded that there exists a subset of latent dimensions (objective 3) underlying the fifty investigated Cognitive Intentions amongst the general population.

In order to test objective 4, the effects of the five dimensions on the TQ score were tested using multiple linear regression, with five cognitive dimensions as independent variables, and the TQ as dependent variable. As with the first regression model, 84 cases were identified as outliers, since they had Mahalanobis distances higher than the recommended threshold of 20.52 (Tabachnick, & Fidell, 1996). The final multiple regression was conducted without them, on the sample of 8159 participants. Before that, the assumptions of conducting multiple regression analysis were evaluated.

The sample size of 8159 was adequate for the linear regression model with five predictors (Tabachnick, & Fidell, 2007, p. 123). The assumption of multicollinearity and

singularity was not violated. There were many moderate and high intercorrelations of cognitive dimensions, and four low significant correlations of cognitive dimensions with the TQ score (Cohen, 1988; Table 5.21). Tolerance and Variance inflation Dimension (VIF) measures suggested that there were no problems with multicollinearity between any pair of the independent variables.

Variable	1.	2.	3.	4.	5.	6.
1. TQ	1.00					
2. Dimension 1	.27***	1.00				
3. Dimension 2	.26***	.60***	1.00			
4. Dimension 3	02*	.64***	.62***	1.00		
5. Dimension 4	.01	.49***	.42***	.48***	1.00	
6. Dimension 5	.20***	.59***	.61***	.51***	.32***	1.00

Table 5.21: Correlations between the variables in the model

*. Significance of p < .05, 2-tailed. ****. Significance of p < .001, 2-tailed.

Normal P-P Plot of Regression Standardized Residual suggested that the data were very close to normally distributed. Scatterplot visualization suggested that there were not many atypical points, and no violation of some of the assumptions of linearity and homogeneity of variances. Maximum Cook's distances lower than 1 also indicated that there were no atypical points, and hence no cases to exclude from the analyses.

The results of the multiple regression analysis were that the overall regression model was highly significant, explaining 20.2% of the variance of the TQ, F(5, 8153) = 412.26, p < 1200.001. All five cognitive dimensions predicted the TQ at 1% (Dimension 1, Dimension 2, Dimension 3 and Dimension 4) or 3% level of statistical significance (Dimension 5), as presented in Table 5.22.

	Unstandardized Coefficients		Standardized Coefficients	<i>t</i> -value	Sig.
	B^1	Std. Error	β		
(Constant)	3.00	.02		134.46	<.001
Dimension 1	.010	.00	.40	26.74	<.001
Dimension 2	.007	.00	.31	21.39	<.001
Dimension 3	012	.00	43	-30.26	<.001
Dimension 4	003	.00	12	-10.12	<.001
Dimension 5	.001	.00	.04	3.01	.003

Table 5.22: Regression coefficients of cognitive dimensions with TQ as the outcome

¹Three decimals maintained due to small numbers.

The final multiple regression equation looked like this:

TQ = (3+).40 * Dimension 1 + .31 * Dimension 2 - .43 * Dimension 3 - .12 * Dimension 4 + .04 * Dimension 5

It was apparent that Dimension 1 had the strongest positive effect on the TQ, with Dimension 2 having a slightly smaller effect, and Dimension 5 having a very small effect. Dimension 3 had a negative effect equivalent to dimension 1, whilst Dimension 4 had a lower negative effect in predicting the TQ. In terms of un-standardised coefficients, when Dimension 1 increased for one percentage point, the TQ score increased for .010 at 2.40-4.90 of the TQ scale. When Dimension 2 increased for one point, the TQ increased for .007. When Dimension 3 increased for one point, the TQ decreased for .012, and when Dimension 4 increased for one level, the TQ became, on average, .003 points lower at 2.40 - 4.90 scale. Finally, if Dimension 5 increased by 1, the TQ increased for only .001, but still significantly.

Objective 2 asked: *Does the larger dataset confirm the existence of Thinking Styles by virtue of the various combinations of Cognitive Intentions?* In order to answer this, the TQ Score was divided into levels to give a spread of the scale: 2.5, 2.7, 3.0, 3.2, 3.3, 3.5+. From the data output, this was the most appropriate way to differentiate the levels in order to determine any clustering. The data demonstrated that at each of these levels, there were five different dimensions, which supported the hypothesis of automorphic Thinking Styles based on the combination of Cognitive Intentions (see Figure 5.7). Informally, an automorphism is a map that preserves sets and relations among elements.



Figure 5.7: Visual isomorphism of thinking styles as per DI

Discussion

Contrary to the previous two studies' findings, the results of the current study were

significant, which supported the hypotheses that:

- Thinking Styles exist: see Figure 5.7
- The levels of the TQ exist: see Figure 5.7
- People have a measurable level of self-awareness
- People are unaware of their self-awareness

In Table 5.22, it can be seen that Dimension 3 had a negative effect equally as large as

Dimension 1's positive effect in predicting the TQ. In terms of the literature, and as was

mentioned in study 2, this was suggestive of what Piaget called Disequilibrium in that the

positive effects of those Cognitive Intentions within Dimension 1 were held in place by their

polar CI in Dimension 3. As also mentioned in study 2, in order to grow the individual's

thinking, it would be necessary to stretch them to do 'Procedures' where they normally and comfortably do 'Options' (Dunn, Griggs, Olson, Beasley & Gorman, 2010). This supported hypothesis 4 that Thinking Styles (and thus behaviour) are influenced by polar CI intervention. This helps to form the basis of what could be called Dynamic Intelligence. This will be discussed in chapter 8.

Objective 1 asked if there were Cognitive Intentions common to 8,200 profiles. With hindsight, a more appropriate question would have been: which were the most influential CI's on the participant's thinking? Dimension 1 in Table 5.20 demonstrated that the 13 Cognitive Intentions listed had the most effect on the Thinking Quotient score, whereas the five CI's listed in Dimension 5 had the least effect. As mentioned in the previous study, a factor analysis says: if you do this, then you probably do the other to a similar degree. In context, this suggests that Dimension 1 contained those CI's most accessible to the participants, and those in Dimension 5 the least accessible in context. What was interesting about the factors was that Dimension 3 contained those Cognitive Intentions that oppose those in Dimension 1 (see Figure 5.6), and the regression model demonstrated that increases in Dimension 1 scores increased the TQ score, whereas increases in Dimension 3 CI's decreased the TQ score (see Table 5.20). This again supported hypothesis 4, and further reinforced the findings from study 2 that in order to influence a participant's thinking long term, they must incorporate elements of the opposite heuristic in order to create future choice (Dunn, et al., 2010). As was mentioned in the literature review, it was this choice (of constructing one's thinking) that was missing in current profile tools. In other words, in order to grow one's thinking, where an individual habitually and unconsciously used 'Options' as a heuristic, they would need to consciously consider a 'Procedural' approach going forward.



Figure 5.8: Creating choice in our thinking construction

As determined in study 2, this influence and detraction from the TQ score aligned with Piaget's (1971) Cognitive Developmental Theory, specifically his accommodation and assimilation. The output also aligned with Piaget's (1952, 1985) disequilibrium concept, and Ashforth, et al.'s (2008) theory of '*Identicide*', in that one must place one's thinking into a state of disequilibrium before one can grow. Piaget maintained that the brain tries to achieve a sense of equilibrium, to exist in harmony with its environment and reduce disequilibrium. The current study supports future research on the potential for interventions using this specific polar-CI (disequilibrium) strategy. Palus & Drath (1995) questioned the validity of short-term interventions that cause disequilibrium in an individual's meaning-making system, in favour of more long-term development methods. Therefore, a fundamental change in one's conscious use of 'Towards' and 'Away From', for example, could be considered a long termstrategy for growth as it disrupts an individual's meaning-making and thus world view, which can only be resolved when a more adaptive, more sophisticated mode of thought is adopted (Piaget, 1985).

Objective 2 asked: *does the larger dataset confirm or contradict the existence of Thinking Styles by virtue of the differing combinations of Cognitive Intentions*? Study 2's data were non-significant in this regard, however there was a specific combination of Cognitive Intentions that appeared influential in a post-graduate student's thinking (see chapter 4, Table 4.12). The current study demonstrated that a larger population had a different combination of Cognitive Intentions in Dimension 1 due to the context of the questions and the general managerial roles of the participants, which supported the hypothesis from study 2 that an academic Thinking Style does exist, as does an organisational Thinking Style.

It was also argued that the TQ scale was not indicative of a hierarchical stage of development. There were myriad stage theories to link development to levels, including Maslow, (1968); Loevinger, (1976); Cook-Greuter, (1999); Rooke & Torbet, (2005); Joiner & Josephs, (2007); Laske, (2008) Kegan and Lahey, (2009); Commons, (2011); Eigel & Kuhnert, (2016) and Anderson & Adams, (2015). Instead, these represented differing Thinking Styles that were labelled numerically for ease of differentiation within this thesis.

In order to address this point, the TQ scale was divided into output measures to give a spread of the scale: 2.5, 2.7, 3.0, 3.2, 3.3, 3.5+ (see Figure 5.8). From the data output, this was the most appropriate way to differentiate the measure in order to determine any clustering. The data (and Figure 5.8) demonstrated that at each of these measures, there were five different dimensions, which supported the hypothesis of Thinking Styles based on the combination of CI's.

With the above in mind, by virtue of the measures described in the TQ scale, each was intended to be a way of constructing one facet of one's thinking in the moment (see Figure 5.9). The Constructed Development Onion is an illustration of growth within the framework of CDT via Cognitive Intention awareness. This will be discussed in greater detail in chapter 8.

The principle behind the onion avoided the inherent assumption of betterment, as seen in Laske's or Kegan's scales where a reader could assume Stage 4 was 'better' than Stage 2

by virtue of it being numerically higher, when in reality, from a Constructed Development perspective, it was simply a *different combination* of Cognitive Intentions and thus a different way of constructing oneself in the moment.



Figure 5.9: The Constructed Developmental Onion

This was akin to Siegler's (1996) overlapping waves theory mentioned in the literature review, where he stated that children have several strategies available to them at any age in order to figure things out. A more capable child would have greater facets of thinking available to inform their construction of a strategy in the moment. Siegler wanted to address cognitive variability better than existing models so developed his own model, as he contended that the metaphorical staircase of Piaget did not sufficiently differentiate between stages of development (Slavin, 2012). It was suggested here that the theory of Constructed Development offered a facet of cognitive growth that can be manipulated and measured, which the adult stage development theories lacked. In other words, each growth ring of the onion was an (un)conscious Intention, and where it was repeated, had become a conscious Intention. This contributes to theory by demonstrating that stage development was not

necessarily a staircase, as described by Piaget and others, nor a wave, as described by Siegler, but instead was constructed of Cognitive Intention awareness growth rings.

From an adult perspective, a more self-aware thinker would have a number of response strategies available to them based on their level of Dynamic Intelligence. This capacity to respond in the moment was called their *Dynamic Responsiveness*. What was intrinsic in their Thinking Style was their level of 'Intention, Awareness, Choice and Response' (as discussed in study 2) was different at TQ2 than TQ4, which manifested in their outward thinking and behaving. The following list explains the construction difference:

- greater balance between CI pairs for TQ4 than TQ2
- greater intention (purpose) behind their construction
- a greater awareness of their construction of self
- more choices offered in terms of how (and if) they choose to respond in the moment.
- Their greater capacity to respond is termed their 'Dynamic Responsiveness'.

The research question from studies 1 and 2 asked: *does Dynamic Intelligence exist as a conceptual measure of self-awareness in the moment*? It can be concluded, based on the results of the current study that the evidence supported the hypothesis.

As mentioned, a factor analysis states that "*if you do this Cognitive Intention* (dimension 1) then you're also likely to do this CI (dimension 3) to a similar degree". At TQ2.5 the average for dimension 1 was 64.6% and the average for dimension 3 was 75.4%. This was an 11% difference, which pointed towards the CI's in dimension 3 being unconsciously higher than their paired CI in dimension 1 at TQ2.5. This supported the hypothesis that the low TQ score was indicative of an imbalance in Cognitive Intention scores (by an average of 11%), and thus a lack of Intention, Awareness, Choice and Response. To reinforce this premise, the difference at TQ4 was only -1.54, thus demonstrating greater balance between the same CI pairs than TQ2.5, and hence a greater choice of response in the moment. The same principle applied to dimension 4. Dimension 4 (in Table 5.20) consisted of five Cognitive Intentions: Own, Individualist, Internal, Influence and Caring for Self. Each of these could be considered the building blocks of a TQ2 [and TQ4] profile. When someone only utilised 'Internal', they would be incapable of doing 'External', thus they were TQ2. However, the graph demonstrated that with awareness and greater balance, 'Own' and 'Internal' take on a completely different meaning when there was balance with 'Partner' and 'External' (Dimension 5). With this balance, they were more akin to TQ4 thinking. By virtue of the fact that TQ4 was a higher score compared with TQ2, it was indicative of the greater balance in the participant's CI scores, and thus their greater choice (and capacity) can be inferred from the results, as mentioned above. In other words, the foundational aspect of Constructed Development as a theory would be: the greater the balance between the Cognitive Intention pairs, the greater the awareness of the participant to choose a response in the moment.

The heuristic 'Options' at TQ2 was very different in its intention and awareness (and thus Dynamic Responsiveness) to 'Options' at TQ4. At TQ2, one can only respond in one direction, whichever the CI bias was. At TQ4, one could choose between 'Options' or 'Procedures' and thus choose a more dynamic response in the moment.

Objective 3 asked: *if a subset of dominant Cognitive Intentions arises in the current study different to the previous two studies*. Based on the results of the factor analysis, and as was described in the factor analysis, it was reasonable to state that there exists a subset of latent dimensions underlying the fifty investigated Cognitive Intentions amongst the general population of the current data. Further to this, if one were to investigate each Identity Compass profile for each participant, it would be evident that a different combination of CI's exists, unique to each individual. The idea that these unique combinations were representative of a level of awareness on a scale that united all profiles was the essence of the

thesis and was supported by the fact that five dimensions existed at varying levels on the TQ scale (see Figure 5.10).



Figure 5.10: Visual isomorphism of Thinking Styles as per DI

Objective 4 asked: if the Thinking Quotient benchmark scale is valid for 8,200

profiles as it was for 177? Study 2 demonstrated the same principles of normalisation using the TQ score, however the data were again non-significant. In the current study, the multiple linear regression demonstrated that the 8,159 participants were adequate and that the results of the overall regression model were highly significant, explaining 20.2% of the variance of the TQ.

Below are the factor analysis tables (5.23 & 5.24) from study 2 and study 3 for comparison. All five cognitive factors predicted the TQ at 1% (Factors 1 to 4) or 3% level of statistical significance (Dimension 5), as presented in Table 5.23.

It was shown that Dimension 1 had the strongest positive effect on the TQ, with Dimension 2 having slightly smaller effect, and Dimension 5 having very small effect. Dimension 3 had a negative effect equating to Dimension 1's positive effect, while Dimension 4 had a lower negative effect in predicting the TQ. The importance here was that when Dimension 1

increased by a certain percentage score, then the TQ score increased by a predictable amount. This fundamentally supported the premise and utility of a scale for self-awareness within CDT.

Cognitive Intentions				
Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension
Achievement	Team Player	Quality	Own	Abstract
Information	Relationship	Details	Places	Global
Activity	Caring for	Procedures	Internal	Vision
Long-term	People	Sameness	Non-External	Towards
Future	Collectivist	Away From	Influence	Options
Caring for	Affiliation	Things		Polar
Pre-Active	Partner	Past		Seeing
Realisation	Trustful	Reactive		Listening
Task	Consensus	Doing		
Difference		Sceptic		
Concrete		Short-term		
Observer		Hearing		
		Feeling		
		Reading		

Table 5.23: Five dimensions of Cognitive Intentions – Study 2

Cognitive Intentions					
Dimension	Dimension 2:	Dimension 3:	Dimension 4:	Dimension 5:	
Future	Sceptic	Procedures	Own	Relationship	
Abstract	Trustful	Concrete	Individualist	Affiliation	
Vision	Things	Realisation	Internal	People	
Long-Term	Away From	Quality Control	Influence	External	
Difference		Task	Caring for Self	Listening	
Options		Short-term		Team Player	
Polarity		Details		Places	
Observer		Consensus		Partner	
Global		Information			
Towards		Present			
Seeing		ReActive			
Activity		Sameness			
Reading		Past			
		Feeling			

Table 5.24: Five factors of Cognitive Intentions

By comparison to the post-graduate student data in study 2, it can be seen in Figure 5.11 that overall, the level of self-construction of the students (mean = 3.2) was close to the greater population (mean = 3.19). This suggested that in order to become a post-graduate student, one does not need to be 'smarter' in IQ terms, but instead, one needs to have an adaptive Thinking Style that best-suits academia.



Implicit and Explicit Awareness

Our thoughts, actions and perceptions become our habits of mind, eventually becoming the subjects and objects of our experience, and also our experience of self (Vago, 2014). Previous research suggested that how people perceived others, and even themselves was often inaccurate, possibly contributing to negative outcomes for their well-being (Vago, 2014). A consequence of these studies was an emerging field of contemplative science that looked at the underlying processes of such constructs as mindfulness from a neurophenomenological perspective in order to investigate a self-awareness that was meta-to self-awareness.

It thus took awareness as an actual object of attention, allowing an individual to disassociate from self and account for changes in self-awareness based on lived experience.

This contributed to our understanding of self but also the relationship between awareness and our habituated thinking. Habituated thinking manifests as habituated behaving, often called automaticity. Automaticity reflects the reinforcement between past and future behaviour and the circular structure of repeated patterns (Vago, 2014).

In order to transform this and change one's habits and biases in both cognitive and emotional systems, a form of *interoception* was required that focuses on what were referred to in the literature review as VAK: visual, auditory and kinaesthetic (Young, 2013). This aligned with the principles in the current study that hypothesised that awareness of one's VAK was the primary filter before Intention and Choice began, which also conformed to evidence of early attentional processing of sensory information existing before there was conscious awareness (Pessoa, 2005; Sperling, 1960). The current study goes some way to supporting Vago's (2014) perspective in that habituated Cognitive Intention use reifies over time until such a time that an adult unconsciously processes incoming data with an Intention outside their awareness, which then influences their thinking and behaving. This is done in context, which also suggests that in different contextual scenarios, an individual would construct their thinking differently. In essence: they use a different Thinking Style in each context.

A final consideration for the effects of awareness on an individual's score for selfawareness was their propensity for alexithymia, which was their ability to process emotions explicitly. A study by Laws and Rivera (2012) demonstrated that individuals have discrepancies with their self-image which often cause an internal inconsistency, only alleviated by externalised positive affirmations of their character (Petty and Briñol, 2009). From Kegan's perspective, this would be a stage 3 response (emotional) to a stage 2 reaction (alexithymia). From a Cognitive Intentions perspective, the disequilibrium caused by a lack of awareness between emotional CI pairs could be remedied by exposure to their opposite in

order to create choice where none existed originally. Alexithymia is possibly an extreme example, however, the potential for investigation of efficacy for Constructed Development would be interesting. The net effect of constructing disequilibrium by CI pairs could disengage an actor from their alexithymia mindset. Table 4.10 illustrates the emotional Cognitive Intentions.

Limitations

The 8,200 profiles were from differing countries where cultural differences influence ways of thinking (Kegan, 1982, p.7). From the information gained from the profile owner, the profiles were predominantly of middle-to-upper management in a variety of large organisations across the world. This suggested that the starting point for their [Constructed] development would be around the median and higher stages.

Summary

The findings of the current study are important to the theory of Constructed Development and Dynamic Intelligence in that they supported the hypothesis that based on the difference between a participant's score for paired (or otherwise) Cognitive Intentions, there was a measurable difference in their Intention, Awareness, Choice and Response. There was also a demonstrable difference in how they process incoming information and sort it for social or cognitive intentions. This has a significant impact on stage development psychology specifically as it implies that an individual's level of self-awareness is an indication of their residence at a specific stage of adult development. This can be seen in the alignment between the TQ score and Kegan's scale. In other words, their level of Dynamic Intelligence is akin to their epistemic stance (Laske, 2008).

What was also apparent in the data was the participant's capacity to manage their choice of response in the moment based on their use of certain Cognitive Intentions. In other words, where they did not know they were using a Cognitive Intention such as 'Internal' as a heuristic, they had no choice to <u>not</u> use it, and the data supported this. In essence, this meant that TQ2 aligned with Kegan's LoAD Stage 2 behavioural output. And an individual with the relevant combination of External and Partner, and so on, would align to Kegan's Stage 3, Socialised Mind. The implications of this from an intervention perspective will be discussed further in the final Discussion chapter. However, this lack of awareness was interesting because it was predicted in the data, thus further reinforcing the CDT perspective of Cognitive Intention relationships as a determinant of adult development. Again, this has a significant impact on stage development psychology as it offered further support for CDT and how it would change the perception of adult development going forward. In order to reinforce the findings in this study, a qualitative study will be devised that investigates a participant's lack of awareness in order to gauge how true the quantitative support was.

Now that it had been established that stages are but one avenue for determining adult cognitive growth, the next study to logically follow was to investigate an individual's awareness of their Thinking Style, and to test the hypothesis of opposing CI's being the necessary disequilibrium catalyst for growth. Study 4 aimed to discover if there was a correlation with a person's awareness of self and their individual Cognitive Intention scores, and if this correlation could help to define a person's thinking capacity and capability. It also aimed to determine if a person's level of awareness of the relationship between Internal and External (for example) defined their behavioural output. This would further disrupt the stage development perspective on cognitive and social-emotional growth.

Chapter 6

Study 4 Self-Report Online Questionnaire versus The Identity Compass Profile Output

Introduction

Since the exploratory study (chapter 3), the research question that emerged from the literature review morphed into a more succinct question regarding the measure of self-awareness, as it was discovered that the participants of studies 1 and 2 were less self-aware than the original question hypothesised, and the use of Cognitive Intentions was less understood by the participants than initially hypothesised. Instead of asking *how the thinking of post-graduate students mapped against the Identity Compass*, it was necessary to determine an individual's *awareness of the relationship* between these Cognitive Intentions, in order to measure the self-awareness in the moment. The research question thus became:

Does Dynamic Intelligence exist as a conceptual measure of self-awareness in the moment?

In order to answer this new question, it was necessary to determine to what extent the participants were aware of their intention in the moment using a bespoke questionnaire as a measure of their Cognitive Intention use. This also involved reframing the objectives for the current study. Study 3's objectives were:

- 1. To determine if there are Cognitive Intentions common to 8,200 profiles
- 2. To determine if the larger dataset confirms or contradicts the existence of Thinking Styles by virtue of the various combinations of Cognitive Intentions
- 3. To determine if a similar or different subset of dominant Cognitive Intentions arises
- 4. To determine if the Thinking Quotient scale is valid for 8,200 profiles as it was for 177

The hypotheses that emerged from the previous studies were:

- 1. Individuals are not aware of their use of Cognitive Intentions in context
- 2. Each level of the Thinking Quotient has a unique combination of Cognitive Intentions which equates to different thinking styles
- 3. Individuals are not aware of their thinking style using CI combinations
- 4. Thinking Styles, and thus behaviour, can be influenced by polar CI intervention

The amended objectives for the current study, taking into account the findings from the

previous studies were:

- 1. To determine to what extent participants are *aware of their use* of Cognitive Intentions in their thinking style
- 2. To determine to what extent participants *understand the use* of Cognitive Intentions in their own thinking style
- 3. To determine to what extent each participant is aware of the variation between the CI pairs (such as Internal/External) and what this means for their thinking style
- 4. To determine how each participant thinks about the 13 Cognitive Intentions as described in the first questionnaire

This list of objectives brought forth a new set of hypotheses for the current study:

- Individuals are not aware of their use of Cognitive Intentions in context
- Individuals are not aware of their thinking style using CI combinations
- Individuals are not aware of their self-awareness (meta-awareness)

Study 4 was devised in order to further substantiate the underpinnings of the theory of

Constructed Development by asking each participant to rate themselves on thirteen Cognitive

Intentions as defined by the researcher. They then undertook an Identity Compass profile in

order to give a subjective score on each Cognitive Intention in order to compare against their

self-report score to discover the differences, and what it meant for their thinking.

The first step was to discover what the extant literature on self-awareness reported on

an individual's level of awareness in the moment.

Awareness is Out of Awareness

Individuals today are and must be constantly considering and addressing their selfperception and change it in relation to new influences and experiences with which we are constantly confronted (Illeris, 2017: p184-185).

Socrates believed that by *active listening* and questioning he could elevate his audience's self-awareness (cited in Laske, 2009). That is to say, by asking exploratory questions about a person's intentions, he would hold a mirror to their thinking and bring to awareness their cognitive intentions, offering a more dynamic responsiveness in the moment. This continues the discussion from the previous chapter (Study 3) where it was argued that self-awareness is

a factor in one's hypocrisy, according to Laske (2015), borne of their lack of awareness of how they construct their thinking in the moment.

From the literature, there was a distinct connection between levels of self-awareness and an individual's cognitive capacity or complexity. This was evident in the meaningmaking changes between the stages of Loevinger's conventional and post-conventional thinking where reflexivity was key (Taborga, 2012; Jordan, 2011). In order to have the capacity for heightened self-awareness, one must engage in self-reflective thought (Eigel & Kuhnert, 2016). However, this was a circular paradox in that the less-capable thinker will have a more simplistic relationship with their self-awareness, and thus discover more simplistic facets of their self-awareness than a more complex thinker.

Joiner & Josephs (2007) extend this by saying the development of self-awareness was an increasing capacity to maintain internal [thinking] processes. According to their *Catalyst* stage, the ability to step back in the moment and notice both thinking and feeling was when self-awareness first becomes possible. This was represented in studies 1 to 3 by the Cognitive Intention 'Observer'. Jordan (2011, p78) suggested that a developed self-awareness allowed an individual to work on strategies to transform their habituated patterns of thinking and behaving. He used the phrase 'perspective awareness' when referring to personal meaningmaking. He advocated the noticing of other people's patterns and habituated meaning-making systems:

...A strong perspective awareness means that the individual reflects on the properties of perspectives, realizes that these properties can be different and that they can develop over time, and, most importantly, that the properties of perspectives cause people to make sense of events in particular ways.

The tendency for self-awareness becomes 'perspective awareness' when one starts to perceive one's own patterns of reasoning in a systemic way. The system used can be Cognitive Intentions or other equivalents. Guiette & Vandenbempt (2017, p.60) wrote that:

Reflexive sense-making of change loosens the grip of rationalizing, controlling and predicting change by placing a premium on acknowledging and allowing the emergent processes of change to come into existence.

Joiner and Josephs (2007) went so far as to say that self-awareness and intention were what made growth between developmental stages possible. Although the literature has not currently been linked to meditative practises, there is an over-lap with the types of selfreflection required for higher self-awareness and meditation methods, such as mindfulness. Joiner (2011) stated that the more equipped leader is much more likely to practise some form of meditation than their less-successful peers. Luthans and Avolio (2003) consider selfawareness to be responsible for authenticity, as it leads to self-regulation. However, this does not take in to account an individual's starting level of complexity, as discussed in the literature review.

Forbes (2016) stated that mindfulness meditation is an active practice that can follow the developmental path by making one's subjective experience objectively aware. For the purposes of the current study, the subjectivity in question is divided into fifty Cognitive Intentions, and was also linked to Kegan's (1994) Subject/Object theory.

From an organisational perspective, Duval and Lalwani (1999) stated that self-aware managers are not only aware of their thoughts, feelings and limitations, but are also open to the feedback of peers and incorporate it in their thinking. Thus, understanding of and acceptance of how others view them is key to self-awareness. This aligns to Laske's (2008) Stage 4 individual, self-authoring, who also recognises the impact of others, without necessarily taking responsibility for their being.

The above few examples of self-awareness are all generic in their interpretation, whereas the effects of self-awareness within the current study are to be specifically deconstructed using thirteen Cognitive Intentions, as this allows the continuation of the substantiation of the theory with the previous three studies.

Self-awareness allegedly refers to an individual having a deep understanding of their strengths and weaknesses, learned preferences, and insight into one's impact on others in interpersonal contexts (McCauley, et al., 2010). Combined with this is Kegan's view that in order to be 'Object to' a strength or weakness (as opposed to Subject to it) one must develop a sense of awareness of that thought or behaviour in context, after which, one will potentially have the choice to either do it or not. However, Harney, (2018) points out that just because something becomes an object of awareness does not mean it is automatically integrated. Cultural self-awareness is often studied from the perspective of linking one's understanding of self with experience, and requires conscious reflection of one's cultural influences (Lu and Wan, 2018). However, should an experience be of greater importance to an individual, they are more likely to give it more importance and thus a greater awareness of it is developed. This often results in a higher emotional impact (Ward, Bochner, & Furnham, 2001) which is then counter-to the principles hypothesised in the current study that in order to develop one's thinking, one must move through emotion into cognition. Further, by virtue of the fact that an individual would place greater emotional importance to a particular task or experience is indicative of their lack of awareness.

Historically, research on self-awareness suggests that it is limited (Paulhus, Lysy, & Yik, 1998) and also biased towards flattering and improving oneself (Alicke, 1985; Dunning, Meyerowitz, & Holzberg, 1989; Taylor & Brown, 1988). Whilst the consequences of such biases continue to be argued (Colvin & Block, 1994), there is relative consensus that selfawareness is lacking in most domains. That is to say, it could be that those psychologists were measuring the wrong thing. In an organisational setting, the outcome is no different. People are not aware of how assertive they are, and completely mis-read the signs from others about their self-perception of their own assertive behaviour (Ames & Wazlawek,

2014). Ames et al (2014) determined that those people who are either under- or over-assertive are unaware of their non-standard position on what it is to be assertive in context.

Awareness in the moment

Wall, Burns, and Llewellyn (2017) find one cannot ignore social construction as an active source of information for an individual's ability to think and process knowledge in the moment. For example, both Goldberg, Rich, et al., (2016) and Zarrabi (2016) find that student thinking is more complex than the social construction suggests because regardless of demographic background or cultural ties, it will have similar responses across all domains. Previous literature suggests that thinking is learning, but when considered in the moment of the thought, learning is the by-product of the thinking, whether from a metacognitive perspective or learning perspective (Sawhney and Bansal, 2015).

The argument for awareness in the moment is hindered by the lack of literature on gaps in our thinking due to the notion of non-linear thought processing and creativity being ignored in this context (Hayes, 2015; Kallio, Virta, and Kallio, 2018). This is due to the impact that educational modelling, supported by social development models have had on the research (Dunn, et al., 2010).

The application of knowledge, according to the major learning theories, seen in the literature review (chapter 1) is seen as more important than the study of awareness in the moment in the context of academia (Bodrova & Leong (2001). From a metacognitive perspective, Cleary, et al., (2012) comment that with awareness comes a higher level of thinking where the individual recognises their awareness and seeks to repeat the action in question in order to synthesise the thought process. Dennett (2017) sees this as a powerful leap from prior theory where building upon thinking as a separate construct is the next logical step. However, it is an aim of the current study to test this from the perspective of Cognitive

Intentions and feedback, as it is hypothesised that Dennett's (2017) perspective is only true after an individual is fed back their Thinking Style.

To enable an awareness of thinking in the moment, Bernstein, et al.,(2015) determined that one must leave the social constructs and social context behind, from where it was once centred upon development, the thinking process then moves to the present context of 'action'. Both past and future thinking in terms of development are removed from the process of awareness and are replaced with instantaneous thinking that leads to awareness (Kuhn, Ramsey, and Arvidsson, 2015). However, to arrive at the awareness of this happening in the moment means understanding the presence of different variables in the process (Cognitive Intentions) where individuals are not necessarily conditioned to acknowledge this awareness. The social construction models presented by Piaget and Vygotsky convolute awareness from an adult perspective. Lourenço (2016) comments thinking does not need to be stage based or predicated upon stages being in place to develop beyond the initial thought. This was demonstrated in the Discussion section of study 3 where the 'Developmental Onion' was introduced.

The adult thinker has the power to change the process of thinking in the moment because of the level of his or her awareness (Kuhn, et al., 2015). However, it is the *measure* of this awareness that remains incomplete, and what this study aims to address. Further to this, as mentioned in the previous study, dependent upon one's level of awareness (TQ score), a different measure is possible, which was not addressed by Kuhn, et al. (2015).

Kegan (2003) sees how one can, in his or her awareness of how they think, also create new channels of thought processes where they control the variables and free flow of thoughts as these build in a non-linear fashion. From a Cognitive Intention perspective, it is this notion of choice that can be determined as per studies 1, 2 and 3 above, and is the main objective of the current study, as the previous two studies suggested Kegan missed the mark due to the

individual's lack of metacognitive awareness. These ideas will be investigated in the final study (5) that uses qualitative methods to explore these quantitative results.

Method

From study 3, it was hypothesised that the measure of the difference between the paired Cognitive Intentions could be interpreted as the gap in a participant's self-awareness and choice. From the literature reviewed in the current study, a question emerged that built upon the previous studies:

To what extent are people aware of their construction of their cognitive intention in the moment?

Taking into account the findings of studies 2 and 3 as support for the measure of awareness of our constructed intention in the moment, the purpose of the current study was to determine to what extent each participant had an awareness of their individual Cognitive Intentions (such as 'Internal' and 'External') as these formed the basis for how student thinking was deconstructed in the first two studies, and it was important to determine if the theoretical hypothesis continued.

Research Design

The current study adopted a quantitative methodological approach as the data gathered were via two questionnaires. The second profile used was the Identity Compass, and as such, the research design and methodology for the current study were identical to the first three studies in this thesis. As this was also a within-participants design, it was imperative that the participants undertook both questionnaires of study 4.

In the current study, it was important to use the research methods most suited to the types of questions being asked within the constructed questionnaire (Tashakkori and Teddlie, 2003). As mentioned in the Methodology chapter (2), the current study was post-positivist. This suggested that although 'things' could exist independently from our knowledge of them, they can only be measured imperfectly (Fleetwood, 2005; Ponterotto, 2005) and

inconclusively (Madill, Jordan and Shirley, 2000; Kwan and Tsang, 2001; Kemp, 2005). This often leads researchers to suggest that post-positivist research can descend into relativism, however, the current study ensured those standards called by Patton (2002, p.544) 'traditional science research criteria'. These are: internal validity, external validity, reliability and objectivity (Guba and Lincoln, 1994).

In the first questionnaire of the current study, the participant was given a definition of 13 Cognitive Intentions, e.g. 'Towards', and then asked to what extent they thought their thinking utilised these CI's in context using a sliding scale indicator. An example of the CI definition and scale can be seen in Figure 6.12. For the full set of questions, see Appendix 9. This gave a self-report score, from which a comparison was made, and a level of awareness of utility was inferred.



Figure 6.12: Example Question 1 of Study 4

What may not be evident to the reader, however, and what was important to understand from a Methodological and Results perspective was that as the participant considered the question behind the definition, they would undertake a *self-derivational search* (Vaknin, 2008, p623) which would include their ability to do 'Sameness' and 'Difference' to determine how 'Towards' their thinking and behaving was. In other words, if they utilised the 'Sameness' Cognitive Intention, this would impact their score for 'Towards'. If they utilised 'Difference', this would impact their score differently. This was derived from the results of study 3 where Table 5.24 demonstrated five dimensions, the first of which positively impacted the TQ score, and thus the participants' awareness, but dimension 3 negatively impacted the TQ score.

This suggested that by virtue of asking the questions in the way they were written, the participant was being introduced to the individual facets of their thinking construction, which was in itself, a part of their development process. The results would, therefore, be a statistical measure of a participant's construction of self, thus further substantiating the theoretical underpinnings of Constructed Development.

Participants

Questionnaire 1 of the current study was the self-report questionnaire and it attracted 76 volunteers in total, taken from Coventry University and a specialist online group (LinkedIn.com). Of the 76 participants, 33 were male and 43 were female. Participants' ages ranged from 24 to 67. The majority of the 76 were white British. Of the 76, fifty-five participants went on to complete the second phase questionnaire (Identity Compass), discussed in the next section. The reason for 21 participants declining to continue the research was unknown.

A justification for selecting the participants from the online LinkedIn group in the current study was that the use of meta-programmes was foundational in both the Identity Compass tool, and the measure of awareness as part of the objectives. Although not essential, a certain level of meta-programme knowledge was preferable as it was demonstrated in the literature review that meta-programmes had gone through a metamorphosis based on a new and more developed understanding of their impact on an individual's thinking construction. By virtue of this fact, it was preferable for the participants of the current study to have an understanding of what Cognitive Intentions were in order for the first questionnaire to have the necessary impact on their thinking awareness, hence the specialist LinkedIn group.

This existing awareness of the participants would translate to a more nuanced awareness of how they utilised the 13 Cognitive Intentions as described in the questionnaire.

Measures

The individual Cognitive Intentions used in the current study are listed in Table 6.25. Each was chosen due to its disruptive nature in an individual's thinking. In other words, the ability to influence an individual to perform their opposite CI was quite profound and was investigated as part of this larger study. A participant's capacity to utilise and perform any one on the list is potentially developmental according to the factor analysis of study 3 (Table 5.24). For example, motivation is about 'Towards' and 'Away From', which is known to influence one's intention. It was important to question the participants on these two CI's to determine if they were aware of their direction of intention and attitude to risk. Intention was also within 'Future'. According to the factor analysis in study 3, it was the most accessible Cognitive Intention as it appeared first in factor 1.

CI's	Dimension
Internal	1
Abstract	1
Away From	2
Difference	1
Future	1
Detail	3
Own	4
Towards	1
External	5
Sameness	3
Concrete	3
Observer	1
Global	1

Table 6.25: List of Cognitive Intention Questions

The second part of the current study utilised the Identity Compass profile tool as per studies

1, 2 and 3 and as such, was identical to the measures within.

Results

Inter-Class Correlation is used when two different raters are used. In the current study, these were (1), each participant and (2) the Identity Compass profile tool. The raters were, in effect, rating their own opinion of their use of the Cognitive Intentions, which was the objective of the current study. The ICC should be higher than .70 for good interrater reliability (i.e. they mostly agreed in their evaluations). However, the current data displayed this for 'Details' and the TQ score only. As the TQ was the scaled output of all dimensions, it was concluded that over all they did agree. However, they did not agree on specific dimensions (except for Details. See Table 4.13).

According to Table 6.26, the Pearson correlation coefficients, the measure of strength of relationship between two variables, between pairs of cognitive intentions measured subjectively (participants) and objectively (Identity Compass) were positive (p < .05), except for Observer, which was nonsignificant. Therefore, participants overall tended to agree with the objective measurement. The highest proportion of shared variance (R^2) among the subjective and objective measurement was the Cognitive Intention: 'Abstract'. The overall TQ scores correlated positively, sharing 54.76% of the variance.

On the other hand, paired samples *t*-test on all thirteen intentions, as well as the overall TQ score, revealed significant differences on subjective and objective measurements for all intentions (p < .05), except for Own, Observer and Internal. The difference between the average TQ scores was also significant. Overall, the scores were higher on subjective than on objective measurement.
Cognitive	Subjective		Objective		Pearson correlation			ICC			
intention	Mean	SD	SE Mean	Mean	SD	SE Mean	r	р	R^{2} (%)	r	р
Own	63.89	16.156	2.199	64.31	23.347	3.177	.29	.032	8.41	.43	.022
Observer	67.13	17.035	2.318	60.46	24.121	3.282	.16	.253	2.56	.25	.139
Away From	72.50	18.397	2.503	56.69	21.406	2.913	.43	.001	18.49	.49	.001
Towards	84.54	12.181	1.658	66.70	18.142	2.469	.45	.001	20.25	.40	.001
Internal	66.11	14.494	1.972	61.57	22.084	3.005	.53	< .001	28.09	.64	< .001
External	67.41	14.593	1.986	50.81	23.082	3.141	.53	< .001	28.09	.52	< .001
Sameness	71.20	17.182	2.338	52.39	23.083	3.141	.54	< .001	29.16	.53	< .001
Difference	70.19	14.920	2.030	59.65	21.073	2.868	.40	.003	16.00	.49	.003
Global	81.30	17.729	2.413	57.11	26.019	3.541	.46	< .001	21.16	.43	.001
Details	67.04	20.707	2.818	59.54	22.089	3.006	.59	< .001	34.81	.71	< .001
Abstract	66.48	20.550	2.796	48.67	27.632	3.760	.67	< .001	44.89	.67	< .001
Concrete	74.81	18.196	2.476	64.94	23.595	3.211	.34	.012	11.56	.46	.007
Future	71.57	18.804	2.559	59.80	21.733	2.957	.35	.009	12.25	.46	.005
TQ	3.25	.294	.040	3.12	.260	.035	.74	< .001	54.76	.80	< .001

Table 6.26: Descriptive characteristics of CI's on subjective/objective measurements

SD, standard deviation; SE, standard error; ICC, interclass correlation coefficient

The largest differences were on CI's 'Global', 'Sameness' and 'Towards'. The difference between the two TQ scores was minor, compared to the differences on cognitive intentions, however, the TQ had a smaller scale range. Out of 55 participants, as per Table 6.27, the mean of the self-report scores for the participants' TQ was 3.12, and the mean for their IC report was 3.25, demonstrating that on average, the participants under-estimated their level of self-awareness based on Cognitive Intention use.

The range of this difference was from 0.8 to -0.37, with only four participants [4/54] achieving a match (to two decimal places) between their self-report and IC TQ scores. Twenty-two further participants achieved a self-report TQ score within 0.1 of their actual score, either positive or negative.

The difference between a positive score and a negative score was an important differentiator as twelve participants scored negatively, (see Figure 6.13) which implied they over-estimated their self-awareness based on Cognitive Intention use. In other words, their scores for their self-report TQ were higher than their actual IC TQ score.

Duch	TO	C.ICD.	DIG
Profile	10	Self-Report	Difference
ROMAHE506	2.73	2.63	0.10
LAGECOS05	3.17	3.17	0.00
BIEVPR504	3.03	2.77	0.26
EUYUNU503	3.40	3.27	0.13
CHBEMA500	3.07	3.13	-0.06
ALMAMC503	2.70	2.60	0.10
IABEMY600	3.60	3.20	0.40
PAANAA159	3.20	3.10	0.10
ATHGIA172	3.30	3.30	0.00
PHEJHU174	4.10	3.30	0.80
SVMABR503	3.40	2.90	0.50
DAKAHU159	3.40	3.50	-0.10
SAHIGI510	3.00	2.77	0.23
DECOSA168	3.56	3.38	0.18
DASYCR501	2.97	2.73	0.24
JANSYN123	3.00	2.84	0.16
BRBAAN545	3.34	2.88	0.46
DAPAWI197	3.17	3.23	-0.06
PASUGR509	3.00	2.97	0.03
CAFIMI172	3.00	3.37	-0.37
JOCYMI172	3.67	3.33	0.34
WICASH508	3.13	3.07	0.06
CHJE503	3.33	3.33	0.00
ENVELA160	3.07	2.97	0.10
ERHAKO160	2.91	2.88	0.03
XIHOSU170	3.60	3.43	0.17
DOKASP165B	3.27	3.30	-0.03
BONEBI508	2.97	2.93	0.04
NOSUTH602	3.17	2.97	0.20
ANLISI510	3.06	3.03	0.03
ROBERA602	3.37	3.57	-0.20
FRSHHA168	3.73	3.43	0.30
JOCYMI508	3.13	3.06	0.07
PAULCR	3.59	3.25	0.34
PELYPE175	3.81	3.50	0.31
STTRHI601	3.43	3.07	0.36
PAHIJA508	3.57	3.43	0.14
KECACO167	2.60	2.53	0.07
VICSER165	3.00	2.73	0.27
CHAYEE164	3.19	3.25	-0.06
MASADA507	3.53	3.13	0.40
ANBAMA152	3.50	3.78	-0.28
IAELMC506	3.03	3.13	-0.10
DOCAJO510	3.10	3.07	0.03
ARBRJO503	3.25	3.31	-0.06
ABCDEF222	3.20	3.07	0.13
DACALO165	3.23	3.27	-0.04
ROMAHE168	3.59	3.41	0.18
GFULLE190	3.13	3.13	0.00
JDWARB752	3.57	3.17	0.40
TIJACR508	2.83	2.90	-0.07
BILMAR600	3.06	3.00	0.06
RIPONA502	3.22	3.09	0.13
ROMASL155	3.37	3.17	0.20
Mean	3.25	3.12	0.12

Table 6.27: TQ vs Self-Report scores

Cognitive]	Paired Dif	ferences (Sub	jective – Objecti	ve)	t	df	р
intention	Mean	SD	SE Mean	95% CI of the				
			_	Lower	Upper			
Own	43	24.195	3.292	-7.03	6.18	13	53	.898
Observer	6.67	27.238	3.707	77	14.10	1.80	53	.078
Away From	15.81	21.398	2.912	9.97	21.66	5.43	53	.000
Towards	17.83	16.740	2.278	13.26	22.40	7.83	53	.000
Internal	4.54	18.984	2.583	-0.64	9.72	1.76	53	.085
External	16.59	19.693	2.680	11.22	21.97	6.19	53	.000
Sameness	18.81	20.041	2.727	13.34	24.28	6.90	53	.000
Difference	10.54	20.451	2.783	4.95	16.12	3.79	53	.000
Global	24.19	23.833	3.243	17.68	30.69	7.46	53	.000
Details	7.50	19.500	2.654	2.18	12.82	2.83	53	.007
Abstract	17.81	20.643	2.809	12.18	23.45	6.34	53	.000
Concrete	9.87	24.401	3.321	3.21	16.53	2.97	53	.004
Future	11.78	23.201	3.157	5.45	18.11	3.73	53	.000
TQ	.12	.204	.028	.07	.18	4.43	53	.000
N = 54.								

Table 6.28: Results of paired samples t-tests for subjectively/objectively measured CI's

SD, standard

The importance of this finding was that other profile tools do not differentiate between perceived levels of psychometrics and actual levels of psychometrics, and do not offer a choice of response that would facilitate such a differentiation. These factors will be addressed in the discussion.



Figure 6.13: TQ score versus Self-Report Score

Discussion

An initial investigation of the results demonstrated that given a description of a cognitive heuristic such as 'Abstract', it would appear that the participants (n = 54) were not aware of how they utilised this, or the other 12 Cognitive Intentions as described, and were thus not aware of any prevailing Thinking Style. An interesting common thread in the data was that 39 participants predicted their use of their Cognitive Intentions to be much lower than their actual scores. Twelve assumed their self-awareness was higher than it was. Four participants matched their self-report score with their TQ score within two decimal places.

The results of the current study suggested that individuals were not aware of how their thinking was deconstructed when using the Cognitive Intentions as described. This remained true even when given a definition of a number of CI's and asked to rate their own use of each. Their awareness was not necessarily so far away as to be deemed a cognitive issue, with a Pearson correlation of .001 between their TQ and self-report TQ score. This was in line with findings from Hahn, Judd, Hirsh and Blair (2013) who used four experiments to determine that participants were surprisingly accurate when predicting their results on an Implicit Association Test. However, the degree to which awareness was lacking matched the findings of a study on metacognition by Fitzgerald, Arvaneh & Dockree, (2017) where an individual's self-report score versus online score for a daily functioning test did not correlate (Plomin, 2018).

Pronin (2008) also offered a suggestion for how an individual could objectively assess more accurately another's metacognitive performance, due to what he called 'extrospection', which was looking outwards to observable behaviour. Thus, if we looked beyond the metacognitive labels and chose a Constructed Development perspective, once one were aware of their own Thinking Style using Cognitive Intentions as shortcuts, it would be possible to observe the same Thinking Style in others based on language use, as per Cook-

Greuter's (2013) research in the literature review, who said that how we represent our world was evident in our language. Thus, the predictive utility of understanding Cognitive Intentions and their combinations allows for a behavioural prediction not previously seen in other profile tools or personality tests. This point warrants further study.

Ranked Awareness

The Cognitive Intention with the greatest number of accurate predictions, implying it was the CI with the greatest participant awareness was 'Internal'. It was hypothesised that it was the difference that made the difference, and Table 6.29 illustrates those Cognitive Intentions that were least (Global) and most (Internal) accurate in the participants' predictions. This simplistic ranking was validated by the ICC scores in the results section (see Table 5.24) which showed that participants were aware of almost all CI usage except Observer and Global.

Factor	Diff.
Internal	114
Abstract	133
Away From	161
Difference	166
Future	205
Detail	208
Own	210
Towards	229
External	235
Sameness	241
Concrete	246
Observer	247
Global	311

Table 6.29: Ranked Cognitive Intention Awareness

With reference to Table 5.24, the Factor Analysis from study 3 suggested that the Cognitive Intentions tend to happen together. In other words, if one were to answer a certain way for 'Internal', then they are likely to answer in a similar and predictable way to 'External'. Therefore, the current study was simply asking: was the participant aware they were using the CI's? This meant that dimension 1 of the factor analysis in study 3 (Table 4.18) suggested that all participants utilise those Cognitive Intentions, and the current study demonstrated they do not necessarily know they use them.

The overall TQ scores correlated positively, sharing 54.76% of the variance. This demonstrated a certain level of awareness. The remaining variability could be explained by other factors not measured in the current study, such as alternate bias, lack of awareness of 'personality', problems with measurement, random answering, and so on.

It was not apparent if four participants achieving precise TQ scores for their IC and self-report suggested those three were more self-aware than any other participant. However, the thrust of the hypothesis suggested that a participant who scored the same on both outputs was highly flexible and adaptive in their awareness of self, regardless of their capacity to respond differently in the moment. This could be developed further in a qualitative study.

The fact that 'Internal' was the CI most easy recognised as a heuristic suggested that there was a predominance for thinking about oneself in the participant group. This demonstrated that individuals knew their own mind, as per the study by Hahn, Judd, Hirsh and Blair (2013). This was not necessarily the same as being self-aware or able to choose their response in the moment, however it did suggest a certain awareness for thinking about their thinking in context. This is discussed next.

Metacognition Perspective

It was discussed in the literature review (chapter 1) that metacognition has a number of definitions, including the capacity for an individual to understand and control their learning environment (Schraw, et al. 1995). It was also mentioned that metacognition promotes self-monitoring of one's cognitive processes (Flavell, 1976). From the findings of the current study, it was evident that an individual's level of self-awareness was a contributory factor to one's capacity to understand their self-monitoring in context, and thus a

student was no more capable of controlling their environment than a non-student. This was due, in part to the way in which a post-graduate student constructs their Thinking Style, as seen in study 2. Critical thinking was pushed as an important facet of student thinking (Flavell, 1979), however, an individual's ability to analyse arguments would be directly impacted by their level of self-awareness (Ennis, 1985; Facione, 1990; Halpern, 1998; Paul, 1992). For example, if one were only capable of using the CI 'Polar' as a heuristic, then their initial reaction to a request would be to refuse to do it. This obviously limits their capacity to respond differently in the moment.

By the same token, another facet of metacognition that would be impacted would be an individual's capacity to produce a logical conclusion to an argument (Dwyer, 2017; Dwyer et al., 2017; Dwyer, Hogan & Stewart, 2014). As hypothesised in studies 1 and 2, one's level of self-awareness will influence how deeply one is able to create and recognise the relationships between Cognitive Intention pairs, and then recognise the impact these unconscious intentions have on one's Thinking Style. In other words, how logical one can be would be determined more by how 'Options/Procedures' one was, rather than how high one's IQ is. An interesting study would be to discern if individuals with verified high IQ's also have high levels of self-awareness. From the results of the current study, where 'Observer' was measured, the outcome seen in Table 6.29 was that 'Observer' was low on the list of awareness and thus participants were less aware they were using this in their Thinking Style. 'Observer' was about taking a dispassionate step back and assessing the elements of a situation as close to the moment as possible. If the current findings demonstrated this was out of awareness, then the metacognitive factor that discussed this could be as manifest as the literature suggests for adults.

Again, within an adult thinker context, conditional knowledge is concerned with why and when to use a strategy. With Cognitive Intentions used as unconscious shortcuts, the

conscious element of conditional knowledge was removed, and as a consequence, the act of using an unconscious strategy becomes the strategy that was each Cognitive Intention. That is to say, CI's could be considered unconscious conditional knowledge. Flavell (1979) said that there was 'too little' cognitive monitoring for adults. He also suggested a role for cognitive monitoring in teaching adults how to "*make wise and thoughtful life decisions*" as well as "*comprehend and learn better in formal education*" (1979, p. 910). This principle will be investigated in the next study, which will be a qualitative investigation of the findings of the current study.

The data in the current study showed that general intelligence (g) was not necessarily a factor in how self-aware an individual was. This correlated with the findings of Schraw, Horn, et al., (1995) who reported that metacognition does not appear to be related strongly to measures of intellectual ability. Further to this, according to Bolton & Hattie, (2017), time was a more accurate predictor of variability of academic achievement than intelligence and IQ.

Consequently, the output of the Thinking Quotient was not correlated with IQ and should not be considered a measure of intellect, *per se*. However, the output of study 3 (chapter 5) demonstrated that there are different Thinking Styles based on different combinations of Cognitive Intention awareness which could be misconceived as stages or levels of thinking. This was introduced in study 3 and will be discussed further in the Stage Development section below.

Some studies have utilised subjective self-reports via interview to determine if participants were aware in the moment of certain stimuli (Juruena et al., 2010; Killgore & Yurgelun-Todd, 2004; Whalen et al., 2004). However, these relied on the participant's memory and were thus questionable for their reliability when establishing awareness. Instead, it is arguable that awareness should be measured indirectly, rather than directly, as per the

current study. For example, instead of asking a question about awareness of 'Internal' directly, one could ask a question that infers 'Internal' and elicits a response that exposes the participant's lack of awareness of 'Internal' to tease out their actual unconscious usage. This could be further investigated later with the creation of a new profile tool.

The question of metacomponents can be raised at this point. According to Zabelina, (2011, p607), metacomponents are responsible for: *"figuring out how to do a particular task or set of tasks, and then making sure that the task or set of tasks is done correctly*".

From Table 6.29, it can be seen that 'Concrete' was third from the bottom of the ranked list, which suggested that in the context of the current study, the participants were less aware of their need for concrete evidence (who, where, why, how etc.) than 9 other CI's, and as such, unable to determine their usage of this heuristic. This tentatively contradicted Sternberg's ideas about procedural undertakings specifically. Depending on one's level of self-awareness, their capacity to plan, evaluate and monitor problem-solving activities (Sternberg, 1986) were different at each TQ level. This supported the principle that Constructed Development Theory is useful in a specific domain.

Metacognitive regulation describes how learners monitor and control their cognitive processes. Although Nelson and Naren's (1994) theory is aimed at school children and academic tasks, their ideas about metalevels and object levels being related hierarchically, and that parallel processing occurs between levels supports Constructed Development Theory. From an adult perspective, at the object level for example, cognitive strategies are used to help the individual achieve a particular goal. It would be reasonable to associate this thinking with Cognitive Intentions (heuristics) such as 'Towards', 'Sameness', 'Procedures' and so on. At the object level, however, the current study has shed some light on an individual's capacity to think about their thinking: they generally lacked the control processes of Nelson and Narem's (1990) theory at the lower levels and were thus unable to change their

resultant behaviour even with monitored feedback. This was extrapolated from the current data and needs to be tested in a qualitative environment for greater clarity.

Stage Development Perspective

As discussed and defined in the literature review, the concept of stages was somewhat contentious. Research on the fluidity of movement between stages could focus on either transformation or transition. 'Transition' was the movement from one stage to another, which can be described in small steps. These small steps were evidenced in the minor changes in Cognitive Intention scores, and resultant Thinking Style of the individual according to the Thinking Quotient scale.

Commons, et al., (1999) pointed out in the literature review that where one was able to step out of their own perspective and adopt a new perspective on a problem, he called *decentration*. Hindsight offered a perspective on development where Commons and Bresette (2006) framed the achievements of previous innovators as easier than expected due to the simple fact that the present is embedded in the 'now' and as such, everything has taken place since a particular innovation. These events were not available to the innovator at the time of conception or discovery, and any sense-making surrounding them was constructed wholly from a position of 'now'. This created a different lens through which to view the innovation or discovery (Commons & Bresette, 2006). This translated to thinking and awareness in a predictive fashion in that the earlier one was capable of stepping out of their own perspective in order to predict the outcome, the higher their potential Dynamic Intelligence (Figure 6.14).

Taking into account the 55 scores and self-report scores for the Thinking Quotient scale, it was possible to map out the transition process (from one level to the next) using an individual's level of awareness of their Cognitive Intention use. In other words, there was no stage of thinking *per se*, but there was a measurable journey/movement from one level of awareness to the next on the TQ scale. This propelled Constructed Development Theory



beyond the ideas of stage transition by offering a method of vertical growth by the manipulation of an individual's level of awareness of their CI choices in the moment.



It could also be described as a qualitative difference between the scores, as per Loevinger's perspective (1979) albeit with a quantitative scale (TQ). For example, the results demonstrated that a TQ score of 2.5 was indicative of a lesser capacity to choose between the CI pairs than a score of TQ4, and thus the individual had fewer options in behavioural choices. As suggested in chapter 5, should stages not exist, then the process of transition from one Thinking Style to the next would look like Figure 6.15.

In essence, Figure 6.15 illustrates the idea that developmental stages are not essential. They are simply well-rehearsed and reinforced patterns of thinking in response to the most regularly encountered stimuli in the most contiguous of contexts. This is a major contribution to the field of stage development.

As mentioned, each ring of the onion is an Intention. Each bubble a focus on a specific awareness of one Intention. As such, in order to facilitate a vertical move, the four pillars of Constructed Development offered a potential framework for stage transition and movement in a way that did not require a mathematical formula such as the Model of Hierarchical Complexity by Commons & Richards, (1984a).



Figure 6.15: The Constructed Developmental Onion

These four pillars were suggested in the literature review as Intention, Awareness, Choice and Response. By way of an explanation, Figure 6.15 shows an individual's overall development in blue, and each Cognitive Intention in a different colour. At a certain stage in one's life, one is required to focus on and thus develop a heuristic that offers a shortcut for future use in one's thinking. This could also be considered a cognitive bias. Once we have mastered this Cognitive Intention, it becomes part of our over-all development and available to us at a later stage. In order to grow our thinking, the opposite CI needs to be focused on (as demonstrated in study 3). Once the opposite CI is mastered, it then becomes a ring on one's development onion. Should we need it again, it does not need to be relearned, only revisited, hence the second turquoise ring at a greater circumference in Figure 6.15. As was mentioned in the previous chapter, this is akin to Siegler's (1996) overlapping waves theory.

Another stage development perspective mentioned in the literature review was that of Vygotsky (1978), who introduced the concept of the 'Zone of Proximal Development' (ZPD). He defined this as the ability of the child to learn only when interacting and

cooperating with people in their environment in order to eventually internalise the learning processes. They then become part of the child's independent developmental achievement (Vygotsky, 1978. p90). However, the manner in which the individual was offered growth becomes important. Vygotsky focused on tasks and processes with children's learning, whereas adults could question the facets of their thinking using Cognitive Intentions. By questioning the dialectic arguments within our thinking structure, we move beyond the process elements of proximal development and into the philosophical arena where a more dynamic cognitive development is realised. It is therefore argued that an extension to Vygotsky's (1978) ZPD is one that offers a Zone of Dynamic Development for adult thinking, which focuses on what is not yet seen by the individual and thus opens up the Cognitive Intention awareness within their Thinking Style. See Figure 6.16. The image shows those CI's that were either within awareness or used readily, those that require thought in order to propel the thinker to the Zone of Dynamic Development, and those that were out of reach, namely those in dimensions 4 and 5 of the factor analysis, as demonstrated in studies 2 and 3.

By combining the principles of the Dynamic Intelligence Awareness Model (Figure 6.14) and the Constructed Developmental Onion (Figure 6.15), the capacity and capability of an individual is stretched with the utilisation of Cognitive Intentions into the *Zone of Dynamic Development*.

This is a major differentiator from Vygotsky's theory (ZPD), as it extends his principles into the adult arena. The closer an adult is to choosing their behaviour in the moment, the smaller their Zone of Dynamic Development (see Figure 6.16). Conversely, the less aware they are, the greater their ZDD. In essence, Vygotsky's ZPD is horizontal growth, whereas the ZDD is vertical growth.





Finally, the results demonstrated that when individuals are presented with a description of some facets of their thinking, they can predict their use of some Cognitive Intentions to a satisfactory level of accuracy using an online questionnaire. This begged the question: could participants recognise their Thinking Styles in conversation? This could be tested in a final study which will need to be a qualitative interview methodology to tease out the lived experiences of the interviewees.

Figure 6.17 illustrates the actual movement between the self-report TQ scores and the IC TQ score. The arrows in black represent those participants who underestimated their thinking: in red, those who over-estimated their thinking and the ones in green were those who matched both SR and IC TQ scores.

Profile	TQ Score			SR Score	Profile
PHEJHU174	4.1 🔨			🗶 3.78	ANBAMA152
PELYPE175	3.813			7 3.57	ROBERA602
FRSHHA168	3.73 🔨		/	7 3.5	DAKAHU159
DOCAJO510	3.67 🗲			➡ 3.5	PELYPE175
JOCYMI172	3.67 🥿			 3.47 	DOCAJ0510
XIHOSU170	3.6 🔶			7 3.46	ATHGIA172
IABEMY600	3.6 👞			➔ 3.43	PAHIJA508-2
ROMAHE168	3.59	\sim		➡ 3.43	XIHOSU170
PACRUL	3.59 👞			★ 3.43	FRSHHA168
PAHIJA508-2	3.57			➡ 3.41	ROMAHE168
JDWARB752	3.57 👞	\sim		➡ 3.38	DECOSA168
DECOSA168	3.56			1.37	CAFIMI172
MASADA507	3.53 🔨	$\sim \times$		3.33	CHJE 503
ANBAMA152	3.5 🔨	\mathbf{X}		★ 3.33	JOCYMI172
MIJEGR502	3.5 🔨	\times \land \land		🧦 3.31	ARBRJO503
ATHGIA172	3.43 🗡	$\times \times$		🧦 3.3	DOKASP165B
STTRHI601	3.43 🔨		X	▲ 3.3	PHEJHU174
DAKAHU159	3.4 👗 🔪			3.27	DACALO165
EUYUNU503	3.4 🗲	\rightarrow		➡ 3.27	EUYUNU503
SVMABR503	3.4 🐂	$\wedge \times$	\times	7 3.25	CHAYEE164
ROMASL155	3.37 🔬			★ 3.25	PACRUL
ROBERA602	3.37 🧍 🔪		\times \times \sim	🧦 3.23	DAPAWI197
BRBAAN545	3.34 🔪	X		▶ 3.22	MIJEGR502
CHJE 503	3.33 🐴		XX	3.2	IABEMY600
DOKASP165B	3.267			3.17	LAGECO505
ARBRJO503	3.25	\times \times		 3.17 	ROMASL155
DACALO165	3.23 🗲			X 3.17	JDWARB752
RIPONA502	3.22 🔶		\times	🗶 3.13	IAELMC506
PAANAA159	3.2 🔶			✗ 3.13	CHBEMA500
ABCDEF222	3.2 🔸			3.13	GFULLE190
CHAYEE164	3.188			🔪 3.13	MASADA507
DAPAWI197	3.17 🥌			➡ 3.1	PAANAA159
LAGECO505	3.17 🥌			3.09	RIPONA502
NOSUTH602	3.17		X	3.07	WICASH508
GFULLE190	3.13			3.07	ABCDEF222
WICASH508	3.13 🗲			3.07	STTRHI601
JOCYMI508	3.13			3.06	JOCYMI508
CHBEMA500	3.07 🗲			➡ 3.03	ANLISI510
ENVELA160	3.07			→ 3	BILMAR600
ANLISI510	3.06			2.97	PASUGR509
BILMAR600	3.06			➡ 2.97	ENVELA160
IAELMC506	3.03			2.97	NOSUTH602
BIEVPR504	3.03 🗲			2.93	BONEBI508
CAFIMI172	3 🖊	\sim		2.9	TIJACR508
PASUGR509	3 🗸			2.9	SVMABR503
JANSYN123	3 🔶	\rightarrow		2.88	ERHAKO160
SAHIGI510	3 🔶			2.88	BRBAAN545
VICSER165	3	< $>$		2.84	JANSYN123
BONEBI508	2.97			2.77	SAHIGI510
DASYCR502	2.97			2.77	BIEVPR504
ERHAKO160	2.91			2.73	DASYCR502
IJACH508	2.83			2.73	VICSER165
ALMAMC503	2.7			2.6	ALMAMC503
KECACO167	2.6 🗲			2.53	KECACO167

Figure 6.17: TQ movement between SR and IC output

Limitations

The limitations of the study were related to the design and the sampling procedure. As the questionnaire was designed by the researcher, the limitations here were replicas of those in study 3, such as reliance on self-report data (Evans et al, 2009); a reliance on self-report

assessments of participation (Simpson et al., 2012; Staton-Tindall et al., 2007); a lack of control groups; the selection of already motivated participants (Harkins et al., 2011); and small samples (Vallentine et al., 2010). The sampling procedure was potentially limiting in that an online group of volunteers were recruited to participate, of whom some had experience of Cognitive Intentions. The potential for skewed data was addressed in the Discussion section. Ethnicity nor sex were considered a limiting factor.

Summary of Study 4

What was apparent from the current study was the inter-relatedness of the Cognitive Intentions, and the depth of this relating in the minds of the participants. Although the selfreport questionnaire asked the participant about 'Internal', their answer was dependent upon their ability to be aware of 'Sameness' (for example) in their Thinking Style. Exposure to this Cognitive Intention relationship thus became part of their development. This was a way of introducing them to their growth process and warrants further qualitative study to tease out the depth of their awareness.

The results of study 4 demonstrated that participants across the board were less selfaware than originally anticipated. However, self-awareness was prevalent across all levels of the Thinking Quotient, which contradicted some complexity psychologists, such as Kegan and Laske. This contradiction is an important finding and thus warrants further study in a qualitative environment. Therefore, a final study was necessary to determine if it were possible to qualitatively validate the findings of the previous four quantitative studies by adding the lived experience of the participants to the quantitative data, with the aim of applying experiential examples of thinking and behaving in accordance with the hypotheses in the thesis.

This informed the questions to be used in the next study so that the levels of intention,

awareness, choice and response between the specific Cognitive Intentions were uncovered in

an interview format.

Finally, in his book "Being Aware of Being Aware", Spira (2017, p12) had this to say about self-awareness:

"Although knowing or being aware is not itself an objective experience, in the sense that a thought, feeling, sensation or perception is an objective experience, nevertheless we are aware that we are aware. Therefore, although knowing or being aware has no objective qualities, it is at the same time known. It is in this context that I refer to the 'experience' of knowing or being aware. However, in order to distinguish knowing or being aware from all objective knowledge and experience, it is referred to as the non-objective experience of knowing or being aware. Knowing or being aware is not itself an objective experience, but without it there could be no experience. It is that which makes experience possible and yet is not itself an experience."

The current study had to some degree offered a quantitative refutation for this perspective in that the themes demonstrated that being aware of one's awareness (meta-aware) had objective qualities in that if we knew the construction of our thinking (using CI's), one can objectively measure our awareness, which then allows us to act on the awareness of this awareness. This was significant as it differentiated the findings here for Constructed Development Theory from the standard stage development tests (e.g. Loevinger's 1979 Sentence Completion Test) as well as the industry-standard psychometrics discussed in chapter 2. The final study will discover if this was accurate as it sought to validate the data via the lived experiences of a number of participants to determine how well their self-awareness served them and how much it limited them, thus exploring the dialectic.

Chapter 7

Study 5 Semi-Structured Interviews

Introduction

Based on the previous four quantitative studies, not only has the data supported the

hypotheses emerging from the literature review and methodology, they also allowed new hypotheses to evolve from the findings. These hypotheses warranted further study to demonstrate their validity from the participants' perspective:

- A participant's awareness of their Thinking Style
- A participant's lack of awareness of Cognitive Intention use
- The principles of Constructed Development as a framework within which participants think and act
- Constructed Development is measurable by an individual's Dynamic Intelligence and Dynamic Responsiveness via the TQ

To paraphrase Kant (1781/1965) from the *Critique of Pure Reason*, observation without concepts is blind, and concepts without observation are empty. A semi-structured interview was designed to glimpse into the participants' lived experience of the above hypotheses in order to qualitatively investigate the data.

This study aimed to investigate the conceptual framework (CDT) espoused in the previous four studies and to discover if the lived experiences of the interviewees supported the confirmatory data in studies 3 and 4. From a Dynamic Intelligence perspective, in order to grow an individual's thinking, it was necessary to disrupt their habituated cognitive patterns by engaging in polar thinking (Dunn, Griggs, Olson, Beasley & Gorman, 2010). In other words, where the individual would habitually think in an 'Options' pattern, as seen in Factor 1 of Table 5.24 in chapter 5, in order to develop their Thinking Style and offer greater choice in future activities (Intention, Awareness, Choice & Response) it was necessary to direct them to more 'Procedural' thinking. The current study explored this premise. The literature on self-awareness from chapter 6 suggested that individuals must engage in self-reflective

thought in order to have a heightened self-awareness (Eigel & Kuhnert, 2016). It was also pointed out in study 4 that this was a circular paradox as the more-capable thinker will have a more profound relationship with their self-awareness, and thus discover deeper facets of their self-awareness than a less self-aware thinker. This premise was investigated in the current study as it was demonstrated in study 4 that this was not strictly accurate: individuals can be self-aware with no self-reflection by simply being aware of habituated Thinking Styles, which had no impact on their capacity to actually change any behaviours as a result.

The Research Aim

The research aim in the current study was to further substantiate the theoretical underpinnings of Constructed Development Theory and the contribution this study makes to psychology as a whole. The emergent hypothesis that was tested in study 4 (chapter 6) was: *Individuals are not aware of their use of Cognitive Intentions in context, and thus not self-aware.* The research aim of the current study was thus a qualitative extension of the quantitative data derived from study 4 which demonstrated that individuals are not aware of their thinking in the moment, (Touw, Mejier, and Wubbels, 2015). The literature reinforced this perspective to some degree (Hayes, 2015; Kallio, Virta, and Kallio, 2018). Eurich (2018) also reinforced this finding in her research, which then reinforced the findings of Nelson, Kruglanski and Jost's (1998) meta-analysis of metacognitive literature, as mentioned previously. Peacocke (2007) also demonstrated this apparent inability to be self-aware.

Method

The current study was designed to discuss the results from study 4 where an individual's self-reported self-awareness TQ score was compared to their Identity Compass profile score. According to Okoli and Pawlowski (2004), a follow-up interview might yield additional information, therefore, a qualitative semi-structured interview methodology was used to provide first-person experience of the data interpretation generated in studies 3 and 4

as this connected the perceptions of the interviewees with the social world (van Manen, 1977). Rodwell (1998) highlighted that although it was not possible to hold both positivist and interpretive assumptions about inquiry, it was possible to conduct qualitative and quantitative research, whilst still holding to the epistemological positions of each perspective. The issue of the researcher being a neutral observer versus someone who co-constructs meaning with the interviewee was addressed, given that the participants responded to a specific questionnaire about meaning-making in the previous study using Cognitive Intentions, designed by the researcher.

The use of qualitative research methods to collect and analyse data has increased in popularity since the turn of the century as they give more room to participants to answer in terms of what is important to them (Strauss & Corbin, 2006). The most common method is the interview (Mason, 2002), including audio recordings, video and photographic data (Dicks, Mason, Coffey, & Atkinson, 2005; Mason & Dicks, 2001; Pink, 2007; Rich & Patashnick, 2002; Silver, 2011; Woods & Dempster, 2011). Mason (2002) identified three variations of qualitative interviews: in-depth, semi-structured and unstructured. These operate from the perspective that the interview should: "ensure that the relevant contexts are brought into focus so that situated knowledge can be produced" (Mason, 2002). It has also been claimed by Mason (2002) and Charmaz (2013) that many researchers utilise interviews as a primary data collection method inappropriately. However, the semi-structured interview is best suited for obtaining more descriptive insights (Bogdan and Biklen, 2003). By exploring the perceptions of individual interviewees, it was possible to obtain multiple in-depth perspectives on the use of Cognitive Intentions and their awareness of them, within a more naturally occurring discourse as the focus was on the thinking of those being studied (Merriam, 1998). Qualitative data in the form of interviews is often called "rich" data as they

offer complex relationships within, and the management of the data is nuanced and challenging (Gilbert, Jackson and Gregorio, 2014, p222).

As the current study was looking at the way the individual created and gave meaning to endogenous, socially-derived experiences using a new theory of constructed development, a qualitative approach was employed (Denzin & Lincoln, 1998, p.8). The study was interested in the *how* and *why* of this construction (ontology) from within the group being studied, and their level of awareness of this construction (their epistemic stance), hence the constructivist/constructionist approach (Charmaz, 2003). The previous four studies employed a quantitative approach where representations of the participants' worldview were symbolised numerically (Heppner, Kivlighan, & Wampold, 1999). The current study also investigated the context, as it was considered essential to the process of discovery (Heppner, et al., 1999, p.246).

Kvale (1996) points to seven stages of conducting in-depth interviews: thematising, designing, interviewing, transcribing, analysing, verifying, and reporting; of which face-to-face interviews are the most common. In order to identify variables within the theory being explored in the previous questionnaires, an interview technique was deemed appropriate (Cohen and Manion, 2000). This was intended to understand the lived experiences of the participants (Seidman, 2013). A semi-structured interview was used in the current study as this best-fitted with the study's own philosophical position (Roulston, 2010). Unstructured interviews can generate enormous amounts of data with little relevance to the study (Kvale, 2007). It was necessary to remain as close to the questions as possible whilst uncovering the depth of the participant's experiences (Gibson, 2004) hence semi-structured interviews were chosen. This would allow a negotiation of interpretations, and an exploration of the construction of meaning (Charmaz, 2013) which was an epistemological requirement of this fifth study.

The interviews were purposely semi-structured to allow for probing of participants' opinions and perceptions, to examine feelings, thoughts, opinions and experiences (O'Reilly, 2017). This was important when exploring subjective meanings that participants ascribe to the given concepts (Cognitive Intentions). This was particularly useful when in conjunction with an assessment instrument, such as the Identity Compass used throughout this research (Pfaffenberger, 2007).

The transcribed interview output was analysed using a thematic analysis according to Braun & Clarke's (2006) methodology. Thematic analysis is a poorly demarcated yet extensively used qualitative method (Boyatzis, 1998) within psychology. A thematic analysis should be seen as a foundational method for qualitative analysis as it is considered a generic skill within research (Holloway and Todres, 2003). In this sense, it could be considered not only a method of analysis but also a tool to be utilised across different methods. A thematic analysis is a flexible and useful research tool, capable of providing a rich and complex account of the data, which can be independent of theory and epistemology (Braun & Clark, 2006). This makes it compatible with the constructionist paradigms within the current study.

Constructivism sees the world as being internally created via constructs. As the Cognitive Intentions described in the previous 4 studies could be considered endogenous constructs (internal models), it was appropriate here to investigate their use in the interview process. Social Constructionism emerged from a sociological attempt to come to terms with the nature of a shared reality, where we build our internal models in a pseudo-shared way with others in our society (Berger and Luckman, 1967). From an education perspective, Piaget described *Constructivism* as the internal process a student uses to construct their unique system of knowing, whereas Papert (1991) expanded on this to describe *Constructionism* in terms of helping a student produce constructions that others can critique. Consequently, in the academic arena, *Constructivism* is more cognitive and *Constructionism*

more physical. The methodological approach to the current study attempted to elicit the interviewee's mental constructions of their self (constructivism) and world (constructionism) using Cognitive Intentions.

In order to encourage participants to clarify some responses, probing questions were utilised (Rubin & Rubin, 1995) and to explore core experience based on the cognitive shortcuts (Seidman, 2006).

Research Design

Stangor (1998) offered a succinct definition of research design as the specific method researchers use to collect, analyse, and interpret data. The objectives of the research usually dictate the design (Burns & Bush, 2006). As it is almost impossible to interview hundreds of participants for a study, the appropriate research method for a small number of interviewees was qualitative (Greenblatt *et al.*, 2004). The specific research objectives of this study were:

- To explore the lived experience of each participant from the perspective of Dynamic Intelligence. Primary data was gathered in study 4 and their Intention, Awareness, Choice and Response was hypothesised. These interviews will aim to identify similarities and differences between the two scores of the self-report questionnaire and the Identity Compass profile.
- The study aimed to begin to understand how participants make meaning out of the Cognitive Intention uses explored in the interviews. Interview data is situated, and thus contributes to the construction of the self and the world 'co-constructed' through the interviews.
- This study also aimed to examine, through detailed analysis of the transcribed data gathered through interview, the level of self-awareness of the participants, and to compare to study 4's self-report TQ scores.

It was demonstrated in studies 3 and 4 that individuals are not aware of their habituated Thinking Styles, and the current study aimed to investigate this assumption with direct experiential evidence from the interviewees.

Participants

All 55 participants of study 4 were solicited to participate in the current study, with ten volunteering, of whom three were male and 7 were female. The predominance of the volunteers being female was interesting in that it follows a general trend in females being more open to this particular kind of enquiry (APA, 2006) and more engaged than males

(Staton-Tindall et al., 2007). Further to this, Laske (2015) suggests that only a person above a certain stage of his developmental model would firstly, be aware they need to grow, and secondly, be capable of seeking out said growth. Every effort was made to ensure the population had no known bias. Due to the nature of the group from where some participants were recruited, there was a propensity to be familiar with Cognitive Intentions, which was evident in the output. Their suitability to participate was restricted to those participants who had previously successfully completed the self-report questionnaire and the Identity Compass comparison profile (chapter 6, study 4). Willingness to participate as well as availability were also factors. Participants in the current study spanned a range of TQ levels, and thus a range of self-awareness as depicted by the self-report score. See Table 7.30.

The names are fabrications to aid reading the results. There was no ethnicity data other than two participants being Scottish, the rest English.

Participant	TQ Score	Self-Report Score	Difference	Age	Sex
Abigail 1	2.73	2.63	0.10	67	Female
Bernie 2	3.27	3.30	-0.03	35	Female
Charlie 3	2.70	2.60	0.10	40	Female
Alan 4	3.60	3.40	0.20	42	Male
Brian 5	3.59	3.25	0.34	46	Male
Deborah 6	2.60	2.53	0.07	46	Female
Evie 7	3.03	3.13	-0.10	41	Female
Frankie 8	3.03	2.77	0.26	46	Female
Gloria 9	3.25	3.31	-0.06	52	Female
Callum 10	2.83	2.90	-0.07	34	Male

Table 7.30: Participant Data

Their ages ranged from 34 to 67, however this was not considered a factor in either the recruitment and selection, nor the output from a differentiation perspective. Laske (2015) has suggested that those under the age of 40 (forty) lack the requisite experience that would propel them to his Stage 4 (self-authoring). Conversely, Whitebread et al. (2009) found that children as young as 3 years of age exhibited both verbal and nonverbal metacognitive behaviours during problem solving, including articulation of cognitive knowledge and regulation. From a Constructed Development perspective, the age of the participant was not a factor in their level of self-awareness, as studies 1 and 2 demonstrated that self-awareness is measurable at any age, from students upwards. This will be addressed in the Discussion based on the findings.

Measures

All interview questions were derived from the results of the two previous questionnaires, with a view to understanding *how* and *why* the participant scored the selfreport questionnaire (study 4) the way they did, and their opinions on the comparison to the Identity Compass output. See <u>Appendix 9</u> for a full list of questions. The structure of the interview was led by the questions (below) and the results of the self-report questionnaire. For example, where one interviewee had scored 50% for their self-report score, and 50% for their Identity Compass score, they were asked specifically how they knew they utilised that Cognitive Intention (e.g. Internal) precisely.

The questions were written whilst considering the recommendations of Kvale, (2007) who suggested that researchers' questions are kept clear and concise using a variety of question types. He also emphasised the importance of silence to allow participants the time to reflect. Seidman (2006) and Polkinghorne (2005) recommended beginning interviews with mission-defining, contextual questions. Although these were all standard recommendations, the manner in which the participants were questioned relied upon them knowing their scores to the self-report questionnaire and the results of their Identity Compass. The researcher emailed the participant their scores, so each had their data in hand during the telephone interview. With this information, the participant was able to answer the questions, with the actual results for both the self-report and the IC output in hand. The questions devised for this study are below.

The first empty space in the first two questions allowed for the insertion of the relevant Cognitive Intention, e.g.: [Abstract]. The space adjacent to 'Time' was to insert the time within the interview that the researcher asked the question for ease of recall in the writing-up process. The interviewer had some latitude to probe and explore supplementary questions in response to what were deemed significant replies (Bryman, 2004). Kvale (2007) also encouraged the use of indirect questions, which the interviewer utilised. Both Laske (2008) and Kvale (2007) advocate listening as the key sense for developing understanding and themes in order to follow up intelligently.

(1) You got [] spot on. How do you think you knew this? [] Time: []
 (2) You got [] within 5%. That is very close. What lets you know you are []-Oriented? [] Time: []
 (3) You were []% away with your [] score. When we check this with your profile, you don't use [] very often. What does this suggest to you about []? []] Time: []]
 (4) Overall, you []-estimated your self-awareness. What are your thoughts on this looking back? []] Time: []
 (5) Having gone through the self-report questionnaire, do you consider yourself to be a little more aware of your thinking in the moment? [] Time: []
 (6) If we look at the score for your IC profile and compare it to your self-report score, what do you think is interesting about the results? [] Time: []
 (7) Have you got any questions for me, about your profile? [] Time: []

Seidman (2006) emphasised the intention that no phenomenological study would be complete without asking: "What else?". This study made use of this concept by asking each interviewee: *Do you have any questions for me*?

Procedures

A hermeneutic research perspective was adopted, which is defined as theoretical by Crotty (1998) and as a methodology by Lincoln and Guba (1985). This was used as it was important to understand the whole as a function of its constituent parts, and to understand the constituent parts as a function of the whole. This is called the hermeneutic circle (Reason and Rowen, 1981). The 'whole' being hypothesised as the participant's Thinking Style, and the constituent parts being the Cognitive Intentions. Hermeneutic phenomenology is focused on the subjective experience of individuals in order to discover how they experience their world via their own stories (Kafle, 2011). Phenomenology is effective when studying a small number of interviewees (n=10) to identify the core of their experiences in relation to the research question (Creswell, 2003). It is also useful to look for the patterns that meaningmaking produces as we build new knowledge (Moustakas, 1994).

All participants were interviewed for approximately 30 minutes. As each was a telephone interview, the audio was recorded using a smartphone (iPhone 8 Plus) with the written consent of each participant (see <u>Appendix 4</u>). Kvale (2007) recommends recording the interview to allow the researcher to focus on the content and maintain the dialogue, whilst its essence was being captured automatically. By doing so, the researcher captures the interviewee's representation of the conversation and their experience, thus enhancing rigour within qualitative research (Tobin & Begley, 2004). As each interview was unique, due to the dynamic of the researcher/interviewee interaction, the quality of the responses obtained from each varied significantly (Kumar, 2005). Some notes were taken by the researcher in order to aid transcription and accuracy, however, it was purposely limited as per the question set above to allow the researcher to focus on their answers.

To continue participant anonymity, each was assigned a *nom de plume* as seen in Table 7.30. All interviews were transcribed by an independent professional company. This

ensured a minimum standard of transcription where no point would be omitted due to potential bias by the researcher. Each was then proof-read by the researcher and analysed.

Analysing and Synthesising the Data

As per Bertaux, (1981), the first few interviews uncovered a wealth of perspectives that overlapped and also opposed each other. By the tenth interview, patterns were emerging in the language and the thinking of the interviewees. Guest, Bunce, and Johnson, (2006) discovered that saturation can be reached with as few as 12 interviews, with meta-themes appearing within 6. While the idea of saturation is conceptually useful, it offers little practical guidance for estimating sample sizes necessary for conducting quality qualitative research and the definition has become blurred, making the term problematic (Guest et al. 2006; Mason 2010; Janice & Morse, 1995).

All ten transcripts were loaded into Nvivo and themes were analysed based on the assumptions of the questionnaire output. These assumptions were tested on two transcripts, and a coding framework consisting of themes and sub-themes was developed. All ten transcripts were then subjected to the same theme analysis. Where a theme did not fit with the existing coding frame, a new theme was created, or an existing one adapted. This was especially true of the themes titled 'Cognitive Intentions'. Also, negative case analyses were used to check that developing themes accurately represented the data (Onwuegbuzie & Leech, 2007).

Once the qualitative data were collected, transcribed and read through, the transcripts were coded which, according to Creswell (2007) involved deconstructing the texts into 5 to 7 chunks and reconstructing them in a more meaningful way. A more deductive approach to coding was necessary in the current study to convert the interview responses into a quantifiable form in order to test the hypotheses carried over from studies 3 and 4. This involved open coding where the chunks of text (words, phrases and so on) were assigned a

shorthand code that constituted what this researcher understood to be the meaning behind the comment. Constant comparison techniques were used to ensure the coding was grounded in the data.

Hermeneutic-dialectics is the process by which meaning is ascertained and then compared and contrasted in situations, which according to Guba and Lincoln, (2001) is at the heart of constructivist enquiry. The hermeneutic-dialectic methodology aimed to produce as sophisticated a construction as possible (Guba, 1990).

Classifying, Coding and Condensing

According to Saldaña (2009, p3): "a code in qualitative enquiry is usually a short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data".

It was necessary to use coding to develop categories where common clusters of meaning-making facilitated the analysis of the connections (Miles, et al., 2014). The meaning was not necessarily contained within the words, but by virtue of the choice made to utilise that word in context (Bliss, Monk, and Ogborn, 1983). Coding also acts as the link between the data and the idea or hypothesis, which was specific in the current study (Miles, et al., 2014).

There are a number of ways to code text, depending on the result needed to be achieved. The current study focused on descriptive coding, in vivo coding and pattern coding. In pattern coding, the language used is coded for similarities, differences, frequencies and causation (Hatch, 2002). The number of codes utilised in a thematic analysis differs between researchers. According to Charmaz (2006), more codes reduces the chance for bias, whereas Friese (2012) recommends 120-300 codes in total; others such as Lichtman (2010) suggests 20-100; Creswell (2013) starts with 5-6 provisional codes.

The themes established in the interviews were included due to their connection to the self-awareness questions of study 4 (chapter 6) (Auerbach and Silverstein, 2003).

Results

Five overarching themes were developed from the data, and twenty sub-themes as derived from the questions in study 4 (chapter 6; see Table 7.31). The results of the semistructured interviews using the questions listed above supported the research question: *how self-aware are participants of their Thinking Style?* and the objectives due to the fact they were designed to qualitatively reflect the quantitative findings of the previous four studies.

Theme	Sub-Theme
Awareness	Awareness
	Experiential Awareness
	Feedback Awareness
	Lack of Awareness
	Risk Awareness
	Therapy Aware
Evidence of Theory	Direction of Intention
	Estimation of Self-
	Awareness
	Specific Question for Awareness
Interventions	
Level Thinking	Level 2 Thinking
	Level 3 Thinking
	Values-Based Response
Cognitive Intentions	Abstract / Concrete
	Future
	Global / Details
	Individualist / Team Player
	Internal / External
	Observer
	Options / Procedures
	Sameness / Difference
	Towards / Away From

Table 7.31: Emergent Themes from the interviews

The questions mirrored the suggestion in the data that the participants were not aware of their construction of self, using Cognitive Intentions. The interviews were designed to determine if this lack of self-awareness was specific to the use of Cognitive Intentions as constructions of heuristics, or if other factors emerged from the thinking styles of the interviewees.

'Awareness' was used as an over-arching theme that linked to the other themes to highlight where the interviewee demonstrated awareness of their thinking using a particular Cognitive Intention. For example, where one knew they used an 'Internal' heuristic, this was coded as 'Internal' and 'Awareness'. The same principle applied when an interviewee demonstrated a lack of awareness. Their vignette was coded as 'Internal' and 'Lack of Awareness'. This allowed for a distinction between those who used 'Internal' with and without an Intention. Where an interviewee had an awareness of a thinking style by virtue of previous therapy, this was not aligned with the 'Awareness' theme, but instead, a new theme was coded and called 'Therapy Aware', to offer a distinction.

Awareness Experiential Awareness

Ignoring the meta-themes of *Awareness* and *Lack of Awareness*, the most prominent theme that emerged from the interview data suggested that **experiential knowledge** was key to an interviewee's level of self-awareness. Tacit knowledge of over-worked patterns and habituated thinking styles showed that the main factor in self-awareness was not an awareness of how the participant thought, but of having experienced the activity previously, and aligned it unconsciously with the relevant Cognitive Intentions. In this example, Deborah demonstrated that in a given situation, she looked for 'Sameness' and also an element of prior experience in order to make sense of the situation:

I think for all of these things I look at the example in the question, the scenario it gives you, and I think, have I been in that scenario?

Alan matched past behaviours to his thinking style in order to gain an awareness of how he would react in the moment:

How do I know? Pattern of behaviour from the past, to be honest. If I reflect on my past behaviours...

Deborah worked with Cognitive Intentions in her daily work, albeit known by a different name (meta-programmes as per the literature review) and was aware of how she thought in accordance with the CI's. When asked how she knew what she knew about her CI use, and the combination of them, Deborah's response was directly applicable to the Language and Behaviour profile system that utilises CI's in a more simplistic way:

I explain the LAB criteria a lot. There is [sic] *all the Lab criteria, we use about five of them, and I spend a lot of time trying to give people examples.*

The LAB Profile was created by Bailey (1979). This was a potential bias on her part,

however, some of the participants were selected from an online group that specialised in

Neuro-Linguistic Programming, and thus some elements of Cognitive Intention familiarity

was inevitable. Abigail, when asked how she knew she was 'Detail'-oriented replied with an

experiential example:

I know from managing other people. I know some people cannot see Detail, and some cannot see the big picture.

When asked about her Thinking Quotient score and how it was aligned to the Identity Compass output so closely, her response regarding this matched level of self-awareness was to emphasise previous work on herself:

I think I've done a lot of work on myself. Long before I did the NLP training. But before that I'd done consciousness classes and raising awareness for women and meditation. All things that raise your self-awareness.

Frankie demonstrated an experiential awareness over time when asked how she knew she adopted Sameness and Procedures as shortcuts in her thinking at work. She recognised it was useful (to her) to perform the same procedural task in a report-writing context: I have observed myself doing that over the years.

The experiential awareness theme was not limited to behaviour. Individual Cognitive Intentions were also evidenced in this way. Evie recognised her 'External' bias was derived from her work environment and her need for feedback:

Because the type of work I do is I work on my own and I know that I need to get feedback from people when I have delivered a piece of work.

Gloria recognised her use of 'Global' as a driver for her thinking construction:

Yes, it is, but it's also a big canvass, it's the way I work, and pieces that go to bigger projects and... There is some detail in it, but actually, it's [mainly global]...

When probed further about her use of 'Global', the open questioning led on to her use of

'Options' and 'Procedures', as she was extremely 'Options'-oriented. She again gave an

experiential awareness response:

I've failed at a lot of things like that and also... Yes. And so, I really wasn't very good at school, wasn't very good at exams.

Gloria then aligned this failure at school with a failure in her business based on her lack of

capability to change from an 'Options' heuristic to a 'Procedures' heuristic:

...but actually, when it comes to implementation and consistency and things like that, that you get measured for, that would often be the area that I'd get my downfall,

Although this was not necessarily the case, it was deemed not the researcher's place to influence her Cognitive Intention use at this stage, as the interviews were for data gathering, not remedial interventions. This point was further exacerbated when Gloria was asked about her use of 'Internal' and 'External', which were about her locus of evaluation. Gloria scored 'External' at 15%, with the Identity Compass scoring it at 70%, which was balanced with 'Internal' at 75%. This demonstrated a distinct lack of awareness for 'External'. When asked about this discrepancy, Gloria responded with an experiential awareness:

I don't know. That is that... Internal, I suppose, is it experience more than anything? Life experience as well in terms of I'm doing a good job? Because I've been in this business for such a long time, I know I've been in different roles in it. But I feel very confident around this business, around what good looks like. I don't know, that...

From an 'Abstract' and 'Concrete' perspective, Gloria explained her use of 'Abstract' by linking it to her experience in her current role, again in a negative frame. When asked how she knew she was more 'Abstract' in her thinking, she replied:

Oh because... Well, I know my thinking is chaotic at times. I'm full of loads of bloody ideas, and some of them quite off the wall... Particularly in business I have really pissed people off in the past massively because it's like... You know, I get told, oh, you've got chaotic thinking. These ideas are a bit whacky and that kind of thing.

However, she clarified her point with a calmer rationale:

And actually to me it's like, well, they're not. It's just this is around trying to not always do things the same. It's around, we need to have some different thinking here.

This last vignette demonstrated Gloria's need for 'Difference' which was potentially the more 'chaotic' part of her contextual thinking. Her score for 'Difference' was high when compared to 'Sameness' which demonstrated a need for constant change. This need was influencing her working environment to the point she could not change her thinking and behaving. This was evidenced in her reinforcement of this experiential awareness when she stated:

I've been called a change junkie or a change agent. My last boss said that. And sometimes I like change for change sake because it's disruptive. Yes.

Deborah gave examples of the methods she used in a work context to evidence her Thinking Style. When asked how she knew she was 'External' and 'Procedural', she gave a description of her process:

In that case it's usually because I have spent far more time than most people crosschecking my facts. I've checked all of that. So I've absolutely checked them... Core research is subjective at the best of times, but if 50 people out of 51 have said it, it's probably right. And I have looked at ... all the respondent differences and I know that they're right and I've put it in a way that I think is clear... But I've usually checked it and checked it and checked it and read it out loud a couple of times and I'm usually relatively confident in it when I send it.

Finally, Brian emphasised the need for greater self-belief in a work context by virtue of his experiential awareness. His perspective that leaders who are successful have a lot of self-

belief manifested in outward behaviours, which was where their personal thinking and behaving was incongruent unless they could, in a work context, extol the virtues of a greater self-awareness:

...because I've become more self-aware, that I need to be actually, once I understand what my abilities are, then I can be confident about my abilities. See, I go along and I don't realise what my abilities are.

The current theme of Experiential Awareness also tied in with an element of Therapy

Awareness and Feedback Awareness. Therapy Awareness will be discussed as the next

theme.

Therapy Aware

This theme referred to a common occurrence in the interviews where a participant

demonstrated a particular awareness of their Thinking Style based on the fact that they had

had prior therapy of any kind. Their belief was that they were more aware than average

because of their therapy interventions:

Callum: I've had these things before like CBT and counselling and that, kind of, thing. And ACT as well, and I'm very aware I'm, I'm trying to trade in these kinds of things of, you know, choosing reactions rather than just having the reactions and not having the control over it.

However, Callum recognised that in order to progress, one must work at the therapy

interventions:

And sometimes it works, sometimes it doesn't, it's a long journey and it takes a lot of practice, but I find that ... where I'm just very, very busy, or when there's a lot of mental attention that has to go elsewhere, I don't have as much to spend on being self-aware in the moment.

When asked if he could stop doing what he was doing in order to focus on his self-awareness,

he responded with: "I don't think I could". However, this could be described as a meta-

awareness and will be explained in the next theme. This 'therapy awareness' was reinforced

by Gloria, who stated:

I've started to be, only in my recent years through stress management, be more aware of it. I had some counselling last year because I am my own worst enemy as well...

This therapy experience led to the belief that the individual was more aware than the average person, which can be seen in Table 7.30 where Callum scored higher in his self-report score than his Identity Compass score, counter to the norm. He also said:

I definitely feel that I know myself fairly well.

However, it will be demonstrated later that Callum was often surprised by various outcomes and thus not as aware as he thought he was. Interestingly, his level of awareness did extend to being aware of his limitations, except he was unable to make any cognitively constructed changes to influence his manifest behaviours. These are discussed throughout this chapter.

Lack of Awareness

The main findings of study 4 were that individuals had a lack of awareness of how their thinking is deconstructed using Cognitive Intentions. Further to this, all participants had a lack of awareness of their level of awareness (meta-awareness). This was meta-to the question set and demonstrated that by not being aware of their level of awareness, they were technically unaware. Laske (2008) referred to this as a person's epistemic stance: how they know what they know about their thinking. In terms of Constructed Development, this metaawareness forms the foundation for their Thinking Quotient score. This implied that interviewees had a measurable level of awareness and unawareness. Examples of how this meta-awareness manifested are discussed next. Frankie emphasised this perspective several times in her interview, but none more so clearly as when she said:

What I am saying is that I don't think that I am that self-aware. Or I'm not as self-aware as I'd like to be!

Logically, how could she know she was not as self-aware as she would like to be without being aware of her self-awareness in the moment? What had to be true for her epistemological position?
Abigail thought she interacted with teams well in her role. However, the outcome of the Identity Compass profile demonstrated she was an 'Individualist', preferring to work alone. This lack of awareness stemmed from her use of 'Internal' and 'Own'. She had a selfbelief that she was a team player. Regardless of whether she preferred to work in teams, she *believed* she did it well, thus demonstrating an 'Internal' perspective and lack of awareness of her CI use:

I like to think of myself as a really good team player, but what I actually am is a total Individualist. This is quite funny.

This belief propelled her behaviour in as much as an unconscious bias towards team work

could, however, as stated, the belief stems from a different habituated Cognitive Intention.

I thought I was a good team player...

What Abigail had done over time was to create a coping strategy (heuristic) for team playing

due to her discomfort at being in a team and having such a strong Individualist personality.

Let me give you an example. I usually get into hospital a bit early and go through the forms. If the counsellors haven't filled them in correctly, I usually do it for them. Then, when I get home, I usually email them to say they're forgetting to fill in the forms, or something. Because I just feel like a nagger, I try and email and say, how's your week going and wrap it up a bit. And when I go to team meetings, they all say to me, I love getting your emails. I'm going to make more mistakes so I get more emails.

On a deeper level, in her role, she demonstrated a lack of awareness of her need to push her

agenda on to her clients, regardless of their individual needs:

...when I'm working with clients, I want to empower them and I go to a lot of trouble that they feel it's their session, not mine.... because I'm passionate about people feeling empowered. Because I want them to buy into it. I want to be clear, if we haven't got a plan, how can we know we're getting there? I want them to think this is my plan.

Looking at the quote objectively, there was an element of fakery and control in Abigail's

behaviour habituated over time through experience. This lack of awareness at this level of

role operation was potentially damaging for her clients as it forced all clients to use Abigail's

preferred Cognitive Intentions of 'Procedures', 'Sameness' (she treated everyone the same)

and to the same process, 'Internal', 'Own' (my ideas are coming through, not theirs) and 'Activity'. The final one was about doing and getting the job done. However, without recognising that the 'job' was different for everyone, Abigail negated a personal approach and thus ignored the Cognitive Intention use of each client. An 'Options' client would feel uncomfortable with the process and potentially default on it relatively quickly.

From a feedback awareness perspective, once Abigail's Thinking Style had been uncovered, she was aware enough to then recognise her need for personal interventions:

So I think I'm probably fairly self-aware, but then I feel like we were talking about getting narked by people doing stupid stuff... it is a total waste of energy. And I'm not going to do anything with it... I could do something with that.

Bernie did not recognise herself in one aspect of the Identity Compass profile and her personal belief about how she constructed her thinking was almost diametrically opposed to the profile output:

[the] Concrete bit, because none of that resonates with me whatsoever. So, I wouldn't necessarily feel that I need facts and figures to get these right.

However, when it was pointed out that her IC score for 'Concrete' was 95% and her own score was 15%, her response was to say that she thought she was really poor at doing 'Concrete'-type thinking. The fact that she then over-compensated for this in the questionnaire demonstrated a distinct lack of awareness of this particular Cognitive Intention. She purposely skewed her results in favour of a bias she knew she did not use based on a belief she was not good at using it. As mentioned above, for Bernie, her level of 'External' validation superseded her perspective of self, and this score was derived from other people's perception of her capacity to utilise 'Concrete'. The implications here were that an 'External' individual will behave in an organisational role differently to an individual with a more 'Internal' perspective, and thus affect behaviour as well as thinking. This change in behaviour will be investigated in the Discussion section.

A lack of awareness can also have an effect in a negative way. Brian was far more balanced in his approach to thinking about his thinking, however, had such strong personal beliefs about his perceived lack of capacity that he articulated a much less-balanced approach.

Yes. I think that's the problem, because I'm so risk-averse, that it takes me a long time to [make a decision]...

However, his Identity Compass score for 'Towards' and 'Away From' showed balance, suggesting he was capable of choice in his risk awareness. Brian's perspective actually stemmed from his 'External' Cognitive Intention use, that propelled him to believe what he was told about himself:

Yes, okay, risk-aware. But, I have been told that I am, because of my negativity, that makes me more risk-aware. So, I'm looking for risk, I actually look at problems.

In reality, he was looking to mitigate risk, not look *for* risk. With regards to his scores for 'Sameness' and 'Difference', his self-report scores were almost matched to his IC output. However, when questioned on this, he expressed a balanced perspective, which was his lack of awareness of his balance:

It's like anything, you get that feeling of excitement. Something new. But, sometimes I don't want to do new things, because...

Brian's articulation of his thinking was balanced: *sometimes I do, sometimes I don't*. However, his thinking about his thinking adopted a more negative frame and propelled him to consider his manifest behaviours as negative.

Other ways in which an interviewee was considered unaware was in their self-report score for the individual Cognitive Intentions. The most unaware scores are in Table 7.32 where it can be seen that an individual was off their IC score by a wide margin. As was seen in the previous study (chapter 6) the difference between the Identity Compass output and the self-report output was marginal, yet not insignificant. Finally, from Table 7.32, the principle that emerged was the TQ score was predictably greater than the self-report score, as was discussed in study 4. For the current study, this gap in their TQ score was considered a measure of their self-awareness and, whether balanced or disparate, could be observed in the way they spoke about their thinking, which was a point made by Cook-Greuter (2010) in the literature review. There was, however, no discernible correlation between those who scored highly on the TQ and those who did not, and their self-report TQ score.

Profile	Internal	Internal SR	TQ	TQ SR
Abigail	25	41	2.73	2.63
Bernie	70	70	3.41	3.34
Charlie	75	92	3.17	2.90
Alan	65	50	3.67	3.47
Brian	70	41	3.30	3.35
Deborah	40	30	3.03	3.13
Evie	55	56	2.60	2.53
Frankie	65	68	3.75	3.41
Gloria	80	81	2.73	2.67
Callum	40	18	2.83	2.90

Table 7.32: Example IC & IC-SR Comparison

Interventions

Evidence of disequilibrium in the form of Cognitive Intention interventions was demonstrated by a number of interviewees. This supported the hypothesis that emerged from the quantitative data in chapter 5 that growth is only possible by disrupting existing Thinking Styles (Dunn, et al., 2010). The quantitative data supporting this hypothesis can be seen in Figure 7.18 which demonstrates the dimension 1-3 opposition.



Figure 7.18: Disequilibrium in the form of Cognitive Intention pairs

The principle here is that a therapist is using disequilibrium in the form of Cognitive Intention pairs to help their client with their issues, without consciously calling them CI's or necessarily aware that this is their process. A number of interviewees articulated this in their interview, and without going into any therapy detail, their comments and an explanation are listed below.

- Brian: ...I have to be reassured by other people [External]... to make sure I'm doing it right [Procedures]... I need to trust my own opinion, my own point of view [move to Internal].
- Brian: *What I'm trying to do is, I'm trying to look, before I help other people* [Caring for Others], *I want, I need to help myself first* [Caring for Self].
- Abigail: So, I need to be standing back [Observer] and thinking, is this my stuff or not [Own]? Abigail: I caught myself doing Individualist, Internal...

Finally, the theme of intervention awareness merged with a generic feedback awareness, which will be discussed next.

Feedback Awareness

This theme was derived from the immediate effects of the interviewer relating the

information about the interviewee's Cognitive Intention use and proved to be useful in the

moment. Charlie was forthcoming with her thoughts on her feedback awareness in the

moment and how she could take it forward to generate choice in her responses:

That's my point. Because this is what this is all about. We know you're external and we know you are caring for others more so than yourself. And now you're made aware of it, what behavioural changes have you made? And I'm hearing that you've made behavioural changes. AL Yes. DA The next step is to do that in the moment, to catch yourself. AL I see what you mean, so that it becomes more in the muscle. DA Yes, so that you can choose in the moment.

Yes, rather than choose almost retrospectively and go, oh, I noticed that...

Yes. And I think that's what happened in the meeting. It must just have been couple of weeks ago where I thought, I suppose the thing is I would then stop doing it at all, but what I'm doing is I'm noticing it and I'm referring to it as over-affiliating and I'm stopping it. But in some ways the next step is just not to be doing it at all.

When asked how she would ensure this awareness was taken forward, her response was to

demonstrate immediate awareness: I think probably a bit of pausing in the moment.

Callum had had a prior meeting with the researcher where it was pointed out that his

perspective was a 'Details' perspective, not 'Global' as he had thought. This was borne out in

the Identity Compass profile, and the realisation was articulated by him thus:

It is details, yes. And, you know, it's as well, actually I did think about it a little more after we'd had that conversation and I did... I am details, but the global thing is, sort of, different... I thought, initially I think I just said I was global, because, because I'm very generalist [in his role], but I realised that's not quite the same thing.

He extended his thinking in the intervening time between meetings and concluded that he

was more 'Detail'-oriented than he had initially thought. This was due to an innocuous

comment in a previous meeting that propelled Callum to take part in study 4 to determine his

self-awareness, and study 5 to explore it:

So, I think that's probably what I was more thinking about, but I did, I did agree, so between us having that conversation and me taking this, I did rethink about it and I did agree that I was probably more details.

Charlie again, was specific about the benefits she saw:

I think only because of the new awareness because of the profile. I don't think I had the awareness of the extent I was doing it before, but I now have and it's quite fascinating when I caught it. but what I'm doing is I'm noticing it and I'm referring to it as over-affiliating and I'm stopping it. But in some ways the next step is just not to be doing it at all.

This last realisation led Charlie to recognise the benefits from a Dynamic Intelligence perspective in the form of her Dynamic Responsiveness, which supported the objective from study 3 that the greater one's awareness in the moment, the greater their capacity to respond at choice:

Yes. I suppose actually giving myself a chance to respond rather than react.

Finally, Alan had a similar breakthrough in his awareness after a previous feedback session 18 months prior to the current study's profile. Initially, he had not been happy with the feedback. He did not agree with it at the time as his score on the Thinking Quotient scale had been lower than he had hoped or anticipated. This in and of itself was indicative of his lack of awareness, and thus validated his low score at the time (3.1); however, his second profile came out a substantial amount higher (3.6) due to a focus on personal growth and development in the intervening time. During the current study's interview, he expressed this growth as a reflection on his feedback:

It's interesting because I have to say I have internally and intellectually been a little bit at odds with some of your opinions towards this. But actually, as we talk and I understand better and I see how some of this stuff relates, it's starting to make a lot more sense to me. I'm far more on board with it.

The profile output was validated by a number of interviewees who, having gone through the feedback with the researcher, recognised their character, their thinking and their behaving in the data. Deborah said:

But at a general, a macro level I definitely recognise the sorts of things I would say about myself... Through the answering the questions, no, but talking to you about the questions, very much so...

This vignette also supported the notion that discussion about the profile output in a qualitative way was far more valuable as a reinforcer of the lived experience of the participants than data alone can offer (Kvale, 1983, p.174). From a thematic analysis

perspective, (Braun & Clarke, 2006), these articulations allowed for a generalisation of the abstract theory of Constructed Development from the ten interviewees on to the wider population as we saw the patterns replicated between participants despite none of them knowing the others. This was also an analytical method for validation of the construct favoured by Creswell (1998).

One of the reasons for an interviewee's objection to making changes in how they think stemmed from their level of risk awareness. Risk awareness was categorised (in Maus, 2019) as the difference between a participant's score for Towards and Away From. An individual pre-occupied with goals ('Towards') and achievement ('Achievement') and effectiveness tended to be blind to the nature of how they acquired this heuristic (Cook-Greuter, 2013). Almost every interviewee demonstrated an awareness of this particular heuristic to some degree. Some more than others:

Charlie: I think I tend to know I'm risk averse in that I would ensure for everything

Brian: Yes, that's one of my biggest downfalls, I overly risk averse.

- Brian: Yes. I think that's the problem, because I'm so risk-averse, that it takes me a long to [decide]
- Brian: Yes. Because it takes too long to make decisions, that's my point. Because of my risk assessment of everything, I take too long to make split-second decisions.

Deborah: And most examples I look for in my life I am risk averse and I don't like change. I don't like new things very much.

From a qualitative perspective, there were other evidences within the interviews that supported the objectives that emerged from the data. They were interesting in their own right as it was relatively straight forward to support the hypothesis from the quantitative output of the Identity Compass profiles, however, to hear it from the mouths of the interviewees opened up the concept of Constructed Development to potential refutation, or further support. This evidence will be discussed next.

In Support of the Theory Repeated Construction of Self

Frankie demonstrated a very important aspect to her self-construction when she said:

I have observed myself doing that over the years...

What she meant was: *I construct my thinking in this way repeatedly over time in order to maintain consistency in my self-identity*. She supported this position when discussing her need to interject in meetings where the chairperson is predominantly 'Procedural' (the opposite of her 'Options' pattern) and she recognised that her need to question everything was habitual. When asked if she were capable of <u>not</u> interjecting to question the chairperson's thinking, she responded with:

...I think it's such an intrinsic part of my character that... I do it because I realise I have to do it. It causes me an enormous amount of stress [if not]

This brief pattern will be investigated in the Discussion chapter regarding how an individual constructs their Thinking Style in the moment in the manner in which they have always constructed their thinking in order to maintain consistency in their self-awareness and thus avoid cognitive dissonance regarding who and how they are. This was essentially a lack of awareness of how one construct's their thinking in the moment, and was thus an habituated pattern out of awareness. This was addressed by Chater (2018) and Feldman-Barrett (2017) in their respective works.

Direction of Intention

When an interviewee had an awareness of their Cognitive Intention use, albeit it to a lesser or greater extent than their Identity Compass score, there was also the direction of this intention to consider. For example, where one knew they were more Internal than External, this mirrored their Identity Compass score for this CI pair, (e.g. 75/65) making the *direction* of this particular intention *towards* Internal. The current study aimed to discover *if* or *how* the interviewee knew they had this particular bias.

Callum knew he was Detail-oriented, so when probed about how he knew this, he

immediately linked it to past experience, as per the previous theme:

It comes from, just thinking back to when I was doing my undergraduate degree, and going back to my Masters degree, it would always be the kind of details that I was really good at. So, if it was an exam question that was going into detail about a very specific topic, I'd be really good at it...

Not only did he know he was good at Detail, he knew it as a function of being bad at

'Global':

but if it was an exam question that said can you compare and contrast this number of different things at a more, kind of, global level, I would always find that a bit harder.

When applied in context, his response to knowing how he does 'Detail' was to ground it in

experience. Callum's *direction of intention* thus linked to the previous theme:

But it's me knowing that eventually I'm going to have to produce something that talks about transformative learning and be assessed on it, I'd want to know the details and I won't be satisfied until I do.

When asked about 'Abstract' and 'Concrete', Callum also knew to a greater degree that his

thinking was 'Concrete' (see Appendix 2 for definitions of CI's). His IC score was 95% and

self-report score was also 95%. Callum's response to the question of how he knew this was to

compare 'Abstract' to his answer for 'Details' and link it to his experience in his current role:

Again, it's a similar, sort of, these kinds of things I've mentioned, you know, detail oriented and evidence based all, kind of, stitched together into what you described there as a scientist mindset. It's basically who I am, and I've had to recognise that and mill that to get as far as I have in the studies I've done.

This was an identity statement ('I am...') which could be interpreted as indicative of how

deeply the unconscious use of Cognitive Intentions goes when constructing one's 'self' in the

world. However, when probed about his use of 'Towards' and 'Away From', despite

attaining the correct direction of intention, Callum was asked if it were possible to use

'Towards' rather than 'Away From' purposely: can you choose to do Away From in the

moment? to which he responded:

You know, I don't think I can. I don't think I can because I'm thinking about, if I imagine a time when I'm being very towards and very goal orientated, it's been because I've had a lot of, maybe support there or I'm in a particularly, sort of, confident period. And when I'm using the more away from, it will be the inverse of that, I might be in a particularly, sort of, strong self-doubt period, and often I can't control that.

Again, this formed part of Callum's identity where he stated his identity was in doubt and he lacked the control to alter his perception.

Charlie reinforced this perspective with 'Abstract' when asked how she knew that her direction of intention was more towards 'Abstract' than 'Concrete'. She replied with an

Experiential Awareness:

I have always, I suppose I find it difficult to imagine things, so to look at things... Particularly in a work context I automatically almost just go to facts. Facts and figures. Which is partly my job.

With a further probing question, Charlie recognised that by virtue of the specific demands of her role, she knew she had to be more 'Concrete' in her Thinking Style. Facts, figures, who,

where, when and how were all facets of her role complexity, and it influenced her Thinking

Style immensely.

From a 'Towards' / 'Away From' perspective, Charlie knew she was more 'Away

From' which meant she was risk averse. She attributed this awareness to having undertaken

some Neuro-Linguistic Programming training (NLP) and went on to explain how she knew

this direction of intention:

I think I tend to know I'm risk averse in that I would ensure for everything. I have a central heating boiler plan because I hate the idea of getting an unexpected bill.

When it was explained that a common marketing principle also uses an 'Away From' pattern to capture the Thinking Style of the potential customer, such as "away from illness", Charlie knew this:

Yes, and I would definitely pick up on that. I'd go, oh, that's a risk, so therefore I will... it is getting away from ill-health more than being towards wellbeing.

When questioned on her awareness as a factor of her NLP training, Charlie knew she had issues with being overly External. When asked if she could change this direction of intention in the moment due to being ultra-aware, she responded with:

I can, yes, but I think only because of the new awareness because of the profile. I don't think I had the awareness of the extent I was doing it before, but I now have and it's quite fascinating when I caught it.

This tied in with the Feedback Awareness theme as discussed previously.

Evie relied on feedback forms as part of her business to gauge how well she was performing. This was an 'External' locus of evaluation and one which Evie was comfortable with as a Cognitive Intention:

So I hand out a survey at the end of the workshops, there's only a few questions, people fill it out. But I know that that is hugely important to me to get that feedback.

When asked if she understood that she was essentially allowing other people to gauge how

good she was, she replied:

That's exactly right. Exactly right. I need other people to tell me.

When asked if she were capable of gauging her own sense of achievement, and purposely

choosing to be 'Internal' in her locus of evaluation, her response was interesting:

That's one of those questions that go to the pit of my stomach because there's a fear associated with that for me, that if I knew... Plus there's a kind of level of arrogance associated with that I think for me.

This, again, could be construed as an identity statement. Evie perceived an Internal locus of evaluation as arrogance and would not want to be seen displaying this, especially in a work context. 'To be seen' is also an External frame.

Alan knew he was more 'Internal' than 'External' and also knew he was at choice, which married to the "Evidence of Theory" theme. When probed as to how he knew this, and how he achieved the same direction of intention as the profile scores, his response was a higher-level understanding of the facets of his own thinking: It would be a complex mix of factors, if I'm honest. It would depend on my perception of the other person's authority, a perception of how much I should be trying to influence the situation versus accept it, on a spectrum. You evaluate it in the moment. It's like, how much should I be trying to push this? How much do I care? Versus how much am I here actually just to provide an opinion that people can take or not at all versus push my ideas.

This was clear evidence that this individual either had training on Cognitive Intentions, had

experience of NLP and thus had exposure to CI's, or was simply very aware of his own

Thinking Style. When probed deeper as to his epistemology, his response was 'Internal',

'Observer', 'Own' and at choice:

Yes, I am. One thing I think that maybe has changed, I am better at observing myself these days... And actually, one of the methods that I use of observation is I'm more aware of what's going on in my body. I sense and feel a lot more and are able to pick up those signals and use those in...

When questioned about his awareness of his use of 'Global' and 'Details', from the

understanding that he was much more 'Global', Alan's response was to focus on the size of

the information coming in:

My natural inclination is to chunk down. I want to start a big picture and then fill in the details. That's my natural inclination. And that works in any projects that I work on. I want to understand what the broad brush is and then I'll go in and then I'll fill in the details. That's certainly a preference for me.

This also formed part of his Experiential Awareness as his occupation was as a project manager.

Conversely, Gloria preferred to demonstrate how she knew she was more 'Global' than 'Details' by focusing on what she *did not* like about her work environment. This is an important distinction as it allows for the same outcome (Global thinking) except with a different direction of intention. Particular attention is brought on the distinction between an interviewee being *Towards* Global as opposed to *Away From* Details. When asked how she knew she achieved the direction of intention towards Global thinking, as per the Identity Compass profile, her response was:

Yes. I get absolutely frustrated in trying to dot all the I's and cross all the T's, and for any project work or anything I usually zone out and literally deselect myself in that stage of the project. And actually, if we get too embroiled in the detail of implementation I will be constrained as well [inaudible] my idea because I'm just bored of it by that point. It's like, oh my God, I'm still talking about this, I would have done it by now.

The Cognitive Intention that drove the above vignette was 'Activity' where the participant

demonstrated a desire to get on and do something (I would have done it by now). It was not

asked if she were aware of this driver.

Other interviewees reinforced this perspective when asked how they knew what they

knew about their direction of intention in their thinking. Bernie knew she was goal-oriented

(Towards) and evidenced it by grounding it in the opposite Cognitive Intention by saying:

It doesn't make sense to me, as to how you could go towards achieving something if you're going to be risk averse to everything, and worried about it not working.

When asked if she could make an immediate change in her Cognitive Intention use based on

perceived risk, Bernie replied with:

Yes... I guess because I have to. I guess that's the nature of the role that I've done... If it was part of a bigger project perhaps, and I'd have to then suddenly change everything because of it coming up, and we'd done a lot of work on it, that would be frustrating. But I wouldn't not do it. I think it's the right thing to do, to get to the end goal.

This was then linked to her value system that emphasised the need for utility:

I guess, where I would struggle is if I can't see what are the benefits... because I could see no benefit to what we were being asked to do, and the way we were being asked to do things... If you can explain to me why this is helping us to be better with the business, I will 100% get behind it. But right now, I don't see it, I don't get it, and therefore it's really tough to get behind. So, I guess that would be an example where actually, for the first time in my career, I probably felt that I wasn't... What was it called, Towards? Forwards? Not really looking forwards.

A question that arises from the above statements was one of meta-awareness. Does knowing

one cannot choose a particular Cognitive Intention counter to their habituated bias constitute

a meta-awareness? An individual has an awareness of the bias, and then an awareness of their

lack of choice. The outcome (Dynamic Responsiveness) remained the same; however,

knowing it was superfluous if the end behaviour cannot be changed at choice. This lent itself to supporting a positive response to the research question that emerged from the literature review: *does Dynamic Intelligence exist as a conceptual measure of self-awareness in the moment*? The participant's inability to choose 'Away From' as a Cognitive Intention (bias) and their understanding that they were incapable of choosing 'Away From' was a measure of their Dynamic Intelligence. It demonstrated that although they were aware of their Thinking Style, they were not able to choose to respond differently, which was the premise of the concept and the phenomenon measured by the Thinking Quotient scale. The premise is illustrated in Figure 7.19. This implied that an individual at TQ2.5 was capable of noticing their limiting biases, however, was unable to change them. This was a significant result.



Figure 7.19: The Four Pillars Flow (Simplistic)

Conversely, someone at TQ4.0+ will notice and be able to change their bias in the moment. A way to achieve this change in direction of intention would be the use of interventions. These will be discussed next.

Charlie demonstrated how her evaluation of her situation always occurred retrospectively, which aligned with the Zone of Dynamic Development introduce in the previous chapter (Figure 7.20).



Figure 7.20: The Zone of Dynamic Development

The interviewer explained the concept of Dynamic Intelligence using the DI Awareness Model (see Figure 7.21) introduced in chapter 6, which indicates that the closer to the 'Now' one is when retrospectively noticing either Thinking Styles or one's Responses, the higher their Thinking Quotient score. However, the more able one is to <u>predict</u> the outcome of an encounter, the more facets of their thinking they are relating in the moment, and thus have a higher Dynamic Intelligence, resulting in an even-higher TQ score.



Figure 7.21: Dynamic Intelligence Awareness Model

Abigail demonstrated her lack of Choice in her Responsiveness by acknowledging she had the awareness that she was employing a futile behaviour (a Details heuristic) but lacked the capacity to change it despite this awareness. When asked how she knew she was performing this limited behaviour, she responded with an experiential awareness: I know I'm doing it because I get narked [annoyed]... But I don't feel able to go back to them and say, if you just changed the margins...

When confronted with the developmental question of: *can you change this response in the moment*? she replied:

Erm, no!

However, with further probing about her thinking and behaving, her response was to grasp

the consequences and understand the need for a Cognitive Intention-based intervention:

So, I need to be standing back and thinking, is this my stuff or not?

Deborah verified she accepted the profile for what it was: a reflection of her thinking in the moment:

So what do I take from this? What do I do as a result of this? What did this mean about who I am and how I deal? Just a lot of stuff to think about. I could definitely recognise myself in it.

Gloria rounds up the efficacy of the feedback process within the interview after hearing how her Thinking Style had unconsciously influenced her occupational roles, organisational movement and career progression by stating:

That's my career choices you just summed [up] if you look at my CV.

The reason she felt this was evidence of her career in general was due to the interview process emphasising her Cognitive Intention use being accurate for her Thinking Style that demonstrated greater 'Towards' thinking as well as greater 'Difference'. When combined, she could demonstrate boredom in some cases. This conformed to the work of Csikszentmihalyi (1990) who coined the phrase, bore-out:

If I think about... I have got bored and left and in one situation I was overwhelmed, I took on too much. It was too big and I burned out and then left.

Finally, Deborah summed up the whole process succinctly by acknowledging that as one progressed through the Dynamic Intelligence process to construct their awareness differently, growth was made possible by understanding everything is constructed:

You start to notice the nuances. It's almost like a virtuous circle. I mean, the more self-aware you become, the more self-aware you can become.

Stage-Based Thinking

As was demonstrated in studies 1 and 2 (chapters 3 and 4), the alignment of the Thinking

Quotient scale with Kegan's (1994) Levels of Adult Development was evidenced in the

responses given by the participants in the current study. In other words, where the TQ scale

reported a participant's score as '3' in line with Kegan's "Socialised Mind" stage 3 thinker,

the following comments by the participants demonstrated this stage in their choice (or

habituated pattern) of language.

Here is a brief exposé of these stage-based patterns by various interviewees that

demonstrated individuals were capable of thinking at different levels of development within

one interview frame:

Level 2

Abigail: It's nice but if it comes down to the crunch, I'm going to do what I'm going to do. Abigail: I know I'm doing it because I get narked. Gloria: I am quite sort of black and white on certain things.

Callum: ... preparing something is quite often making sure that nothing is wrong

Level 3

Abigail: because I'm passionate about people feeling empowered...
Bernie: actually, everyone says I'm not good at this stuff.
Charlie: because I'm external and, quite external and I've been told repeatedly that I need to stay...
Brian: And I have to be reassured by other people, to make sure that I'm doing it correct.
Callum: I will quite often need the guidance of people to tell me that I am on the right track...
Deborah: Thinking about all the examples of 'Externalness', and actually I do lack

confidence in quite a lot of things. I do something, but I'm not sure. ... Maybe I'll just let someone else look at it.

Evie: That's exactly right. Exactly right. I need other people to tell me.

Level 4

Bernie: *I guess, where I would struggle is if I can't see what are the benefits* [values-based judgement]

Charlie: Quite honestly, I'm not really motivated by either the carrot or the stick. Alan: It would be a complex mix of factors, if I'm honest. It would depend on my perception of the other person's authority, a perception of how much I should be trying to influence the situation versus accept it, on a spectrum. You evaluate it in the moment. Brian: Yes, depends on who's telling me, if I accept the information. Deborah: Apart from things like where does this take our brand, where does this take our company...

Gloria: ... hang on a minute, how is this actually providing any meaning or purpose to where we're trying to get to in terms of vision?

As mentioned in the literature review, Siegler & Crowly, (1991) theorised that there is extreme variability at all times at all levels of thinking. Although they were referring to children, the above quotes demonstrate that at any one moment, an adult is capable of thinking along the spectrum from 2 to 4 (of Kegan's scale), and yet be unable to live at the higher level permanently. This aligned with the findings of Fischer & Bidell (2006) who pointed out that individuals operate over a range of levels depending on context, domain, emotional state and more (p.163). However, as was also demonstrated in the current study, under conditions of stress, high fatigue or interference, a person will regress in their developmental thinking, thus limiting their capacity to perform (Reams, 2014). With this evidence, it is hypothesised that if an individual were capable of visiting TQ4, albeit temporarily, then it would be possible with the use of Cognitive Intention interventions to progress their thinking vertically more permanently. This will be addressed in the Discussion chapter (8).

Discussion

The majority of interviewees in the current study had sophisticated perspectives on their self-awareness. It was mentioned in chapter 6 that self-awareness was limited in the study population; however, the current study's findings alter this perspective somewhat.

What was interesting was even though one potentially knew they had a particular Thinking Style, as per Scheer's (2003) perspective on adult cognitive structures being relatively stable, their capability and capacity to act on this knowledge was limited. Only after various forms of feedback were they then able to address any inconsistencies in their thinking, whether that was from a therapy perspective or developmental perspective. As a result, an important theme to emerge was one of meta-awareness. The principle advocated here corroborates the quantitative findings in study 3 that demonstrated in the factor analysis (Table 5.24) those Cognitive Intentions in factor 1 were opposed by those in factor 3, which were described as supporting Piaget's (1987) 'disequilibrium' theory, Ashforth, *et al.* (2008)'s '*Identicide*' phenomenon and Laske's (2008) stage 5 representation of disequilibrium as a factor of growth. For Brian (interviewee 5), the move from 'External' to 'Internal' thinking was an intervention that disrupted his habituated heuristic and forced him to consider 'Internal' in opposition. This rethinking equated to cognitive change according to Piaget (1970); accommodation, and a greater self-awareness in Dynamic Intelligence terms due to the resultant increase in the participant's Intention, Awareness, Choice and capacity to Respond in the moment. These form the four pillars of Dynamic Intelligence, as per the research question, mentioned in chapter 6.

As was referenced in the previous study, Harney (2018) pointed out that just because something becomes an object of awareness does not mean it is automatically integrated. The current study goes some way to demonstrating this observation.

Metacognitive Perspective

This section links the current study to the ideas within the literature review in order to reify the results and recognise the output as significant from a metacognitive perspective. Nelson, Kruglanski and Jost (1998) demonstrated in their review of metacognition that the various sources of information made available when one tries to assess their self-knowledge (and knowledge of others) only really provided the 'raw materials' which then require interpretation in light of other implicit theories. This strongly contradicted the notion that we are in control of our thinking and behaving. The current study supported this hypothesis in that the majority of interviewees, although found to have sophisticated awareness of their Thinking Style, had very little control over their capacity to respond in the moment. The 'raw

materials' mentioned by Nelson, et al., (1994) could be considered the Cognitive Intentions described in the current thesis. This would then conform to the notion that what we think we know is a result of a complex construction process (Lories, et al., 1998) of, in this case, Cognitive Intentions. This capacity to construct our thinking will be discussed further in the Discussion chapter (8). A similar principle was examined by Elliott & McGregor (2011), who found that students' thinking was carried out on an intuitive level as they do not instinctively operate in a metacognitive manner. This was also true of the adults interviewed in the current study, with the evidence being their awareness was generally increased by the feedback process. Their meta-awareness was still lacking.

According to Sternberg, metacomponents are responsible for "figuring out how to do a particular task or set of tasks, and then making sure that the task or set of tasks are done correctly" (Sternberg, 1986b, p. 24). These executive processes involved planning, evaluating and monitoring problem-solving activities. It was mentioned in the literature review that what was not clear was how a student knows how to evaluate their task in relation to the context and themselves. The current study identified differences in how thinking was constructed in different contexts, and as such, Sternberg was not aware of Cognitive Intentions (specifically as heuristics) and thus could not take them into account when constructing his theory. From the findings of the current study, it was apparent that a number of interviewees had different Thinking Styles in different contexts. Interviewee 2 (Bernie) developed a metacognitive strategy to compensate for her lack of 'Detail' in her thinking. However, this was only true for her in her work context. Interviewee 1 (Abigail) would often say no to activities that produced more work for her in a work context, but had no problem doing things for friends outside of work. Finally, interviewee 10 (Callum) knew that his patterns were context specific: "...in your current position what other thinking styles do you use, which is not necessarily going to be the same as if I was doing something else...".

'Knowledge of cognition' states what we know about our cognition (Brown, 1987; Jacobs & Paris, 1987) and includes declarative knowledge, which includes knowledge about ourselves as learners. Most adult learners know the limitations of their memory and can plan an appropriate action based on this understanding. However, the current study has demonstrated that it was not so much a 'plan' as an habituated thinking shortcut, embedded over time. This linked to procedural knowledge which is knowledge about strategies and procedures. Again, this was demonstrated here to be an embedded process habituated over time as the best form of action intention.

To form coherent thinking strategies requires self-reflection, and analysing the strengths and weaknesses of a student's learning style, encourages and reinforces independent study (Loehlin, et al., 2014). From Figure 5.8 it can be demonstrated that differing levels of the TQ scale offered different levels of self-reflection. Loehlin et al., (2014) did not consider cognitive complexity or self-awareness in their studies, but had they included them as facets of their methodology, their results would have been different.

This principle extends to other disciplines, such as personality, profiling, general intelligence and stage development. Stage development will be discussed next. Personality and profiling will be discussed in chapter 8.

Given the contextual nature of the interviews in the current study, and the manner in which the thinking of each interviewee was deconstructed using Cognitive Intentions, it is conceivable that CI's could be considered a facet of metacognition according to the definition by Kostons and van der Werf, (2015) and Thurstone, (1938) who stated that metacognitive knowledge was when the learner acknowledges awareness of learning or perceives his or her style of learning. The current study demonstrated how an interviewee was aware of their strategies for learning and behaving, but not able to change said strategies, even after receiving standard therapy. This aligned with the ideas of Brown (1987) and Flavell (1979).

As mentioned in the previous study, Cleary, et al., (2012) commented that with awareness comes a higher level of thinking where the individual recognises their awareness and seeks to repeat the action in question in order to synthesise the thought process. It was argued here that the current study demonstrated this metacognitive perspective was not necessarily true for adults.

Finally, the literature pointed to the learning strategies of students. However, the adults in the current study have demonstrated the same principles espoused by Nelson and Narens, (1990) regarding metacognitive regulation and their realisation that a strategy used in a work context was not working, thus the adult learner chose another strategy. Except in the interviews discussed here, the adults demonstrated they were capable of knowing their strategies, but not capable of changing them. Thus, it is suggested here that this is a form of metacognitive regulation, albeit with a lack of choice in one's capacity to respond in the moment.

This was extended to the principles of Constructed Development based on the phenomenon of measuring one's awareness of this metacognitive knowledge in relation to the Cognitive Intention usage by the Thinking Quotient scale.

Stage-Based Perspective

As mentioned in the literature review, the concept of stages is somewhat contentious. Also mentioned was that research on the fluidity of movement between stages can focus on either transformation or transition. However, there is no reason to use stages as the *de facto* measure. It would be equally valid to ask about developmental phases, levels, cycles, layers, seasons and so on (Levinson, 1986). Thus, by using Cognitive Intention combinations, it was demonstrated in the current study that it was possible to move an individual's thinking vertically by offering greater choice in their response. In other words, the most important

contribution of the Constructed Development framework is that it is offering a 'thing' that can be changed (CI) which produces 'transition' and eventually 'transformation'.

With this in mind, the current study goes some way to supporting the Thinking Quotient scale derived from the level of awareness of Cognitive Intention use in studies 1, 2 and 3, with study 3 validating the approach via quantitative means. The current study showed that the TQ scale was indicative of an individual's level of awareness, and as such, offered a means of increasing this awareness in the moment by the manipulation of the CI's within one's thinking. It was stated in the literature review that this thesis was interested in the transition between these stages of development as the explanations of Loevinger & Blasi (1976) as well as Commons (1984) or Kegan (1982) did not actually specify what has changed in order to demonstrate growth. This then was simply an offer of the 'what' of transition. Were an individual capable of changing their use of 'Internal' or 'External' in relation to the other, then their level of awareness of both increased, which could only lead to a different way of being in the world due to a new, more balanced perspective where once they were limited. This new construction of self allowed for a new construction of meaning and thus a new map of the world (Korzybski, 1958), conforming to Crotty's (1998) perspective on Constructionism, contingent upon human interactions and transmitted in a social context such as academia. Further to this, it is argued that each CI acts as a 'shell' in microdevelopment terms. They are the tangible 'bridge': the 'object' that moves for adult thinking, in terms of Granott & Parziale's (2002) perspective.

Lourenço (2016) suggested it is necessary to have stages in order to have the heuristics for mapping development on a continuum. To paraphrase Voltaire (1768), if stages did not exist, it would be necessary to invent them. The preceding four studies have shown that it is possible to have growth in one's thinking as a direct result of awareness-raising,

without the need for stages, despite the labelling of the combination of Cognitive Intentions as a scale.

The nativist approach attributes development to maturation of innate abilities (Gesell, et al., 1940). Although seen specifically in language development (Chomsky, 1965; Fodor, 1975), the themes discovered in the current study supported this approach (experiential awareness theme). Other researchers align an individual's actual experiences as the driver for development (Gottlieb, 1991; Scarr, 1993), which was also a theme in the current study.

Cognitive complexity, as mentioned in the literature review, was represented in adult stage development by its defining features (Crockett, 1965): cognitively complex individuals have a breadth of schemata that allowed them to see a spectrum of possibilities between two fixed perspectives, thus they can pull from a greater resource list when interpreting situations. They were also more able to make deeper inferences and develop alternatives to existing strategies when predicting outcomes (Burleson and Caplan, 1998). The current study has demonstrated that using the combination of fifty Cognitive Intentions in the construction of cognitive themes offered an almost infinite number of schemata on the spectrum of possibilities, thus aligning the theory of Constructed Development with cognitive complexity more explicitly.

Loevinger's ego development model, for example, stated that personality structures can evolve (Dweck, 2011) and that this was affected by social dimensions, such as environment, in line with Vygotsky. Environment was key to understanding how a person constructs themselves in the moment, determined their unconscious intention and responded accordingly as individuals were capable of constructing themselves differently depending on the context (Cook-Greuter, 2010). To sum up the Constructed Development perspective on environment, it would appear from the findings that it was the most impactful intervention.

With the above in mind, the evidence from the current study suggested that although this appeared to be a facet of metacognition and constructivism, the simple fact that a guide to an individual's construction was offered by way of the fifty Cognitive Intentions suggested it was not strictly metacognition, but a merging of the fields of metacognition and stage development, thereby creating a new psychological endeavour, referred to throughout as Constructed Development. This new field has the capacity to inform not only stage development, but also thinking and personality.

Taking into account the section in this thesis on *essentialism*, where it outlined the issues with naming a "thing" and acting as if it were real (in psychological terms), it was important to understand how a participant deconstructed their thinking based on the hypothesised framework of Constructed Development Theory. The data in study 3 supported the principles, however, it was important to ensure it was also supported in the lived experiences of the participants. In other words, where the researcher had renamed Meta-Programmes to Cognitive Intentions and devised a benchmarking tool to validate the idea of Thinking Styles (the TQ), it was imperative in the current study to determine that participants *actually* utilised those CI's in their (un)conscious thoughts, in order to support their measurement with the TQ and the overall theory. The findings of the current study more than adequately supported the use of Cognitive Intentions by interviewees, Thinking Styles and Constructed Development as a measure of self-awareness in the moment.

Finally, as mentioned in the literature review, in his book, *Science and Sanity (1958)*, Korzybski tells how one constructs one's reality based not on what is real, but on our map of our *perceived* reality, and this model is executed largely unconsciously. The findings of the current study offered qualitative support for this theory in the responses of the interviewees, and further support in the use of Cognitive Intentions being used to map their unconscious intention. This was further reinforced by the use of different combinations of Cognitive

Intentions for each individual to construct a different map of the world. Thus, reality is not based on stages, but on the combination and construction of cognitive shortcuts! This will be discussed further in the next chapter.

Establishing Trustworthiness

Reliability refers to the extent to which research questions can be reproduced. In social research, Denscombe (2002) emphasised that two main questions need to be addressed when trying to determine reliability: Is the data valid, and are the methods reliable? From a constructivist perspective, and to align the current study with similar reliability as the previous four quantitative studies, the researcher ensured credibility by triangulating the data. This was achieved by validating themes that emerged with more than one source, such as all transcribed interviews (Lincoln & Guba, 1985). By doing it this way, it ensured more accurate and authentic outcomes (Silverman, 2006).

To increase *conformability* (*objectivity*), the researcher endeavoured to control for bias by constantly obtaining multiple viewpoints regarding the same emergent themes (Strauss & Corbin, 1998), as well as evidencing negative instances of the phenomena, and checking and rechecking data (Marshall & Rossman, 1989). As Nowell, Norris, White and Moules (2017) explained, the credibility of the research process is questionable if the thematic analysis is not sufficiently rigorous. In contemporary social science, the term *validity* refers to whether a method examines what it intends to examine (Zikmund, 2000). The term *construct validity* (Cronbach, 1971) concerns the social construction of knowledge, or to the measurement of theoretical constructs, such as *"intelligence and authoritarianism, by different measures; it involves correlations with other measures of the construct and logical analysis of their relationships*" (Kvale, 2002, p. 22).

Strengths and Limitations of the study

The current study captured an in-depth understanding of how individuals constructed themselves using Cognitive Intentions, the levels of awareness one had of this construction, and the potential for interventions based on the CI's. This added a considerable contribution to the research on self-awareness by the addition of a new scale (Thinking Quotient) for measurement of self-awareness, as well as the new interpretation of what was previously called 'Meta-Programmes'. The methodology allowed interviewees to develop their opinions (Kitzinger, 1995) which was felt to be important to both the researcher and the interviewee. Qualitative research also places a degree of interpretative trust in the researcher, thus care was taken to minimise any potential for bias.

The number of interviewees falls within the range of sample size for a qualitative study. However, it is possible there could be a degree of under-sampling which implies there are other lived experiences that the current study did not identify.

A final limitation in the current study was interesting as it illustrated the principles being investigated in the thesis: the self-awareness of the interviewer (his Dynamic Intelligence). If the interviewer were not sufficiently high on the TQ scale to notice the patterns of the interviewees, he would miss potentially important information offered by an interviewee. This could lead to misinterpretation and the incorrect message in the transcripts. Conversely, should he be too high, he would not be able to relate to the interviewee and be too inaccessible in his approach.

Conclusions

The current study has provided support for the substantiation of the theory that Cognitive Intentions are heuristics in our thinking and are used with minimal awareness until such a time as they are made explicitly aware.

Very little prior research has investigated how individuals deconstruct their thinking using Cognitive Intentions, and those that have, did not use the hypothesised Constructed Development framework (Intention, Awareness, Choice & Response) as a guide to understanding how individuals think in context, whether they are aware of their intention, and if they can choose to respond differently in the moment. This is considered a major contribution to the field of stage development psychology, as well as offering a platform for substantial research on personality theory as a function of Constructed Development.

The current study demonstrated a meta-awareness in as much as each interviewee verified the findings of the factor analysis in study 3 (chapter 5) by evidencing that each was aware of their habituated Thinking Style, aware they could not change it, and some were even aware that they were aware of this lack of capability. The ramifications of this trilemma will be discussed in the main Discussion in chapter 8. However, suffice to say it has the potential to impact the entire field of talking therapies by offering a new CDT foundation for psychological awareness and growth not currently used in context by traditional therapists.

Chapter 8

General Discussion

"In the natural sciences, each succeeding generation stands on the shoulders of those who have gone before, but in the social sciences, each generation steps on the face of its predecessors" - Zeaman, (1959).

Introduction

The purpose of the five studies that constitute this thesis was to advance the understanding of the connections between our thinking and behaving from a self-awareness perspective, with a view to determining whether this dynamic relationship is derived from intention, awareness and choice, and is then measurable and predictable. A variety of measures were applied to holistically address the research question. Study 1 aimed to test the methodology to ensure it was an appropriate way to address the deconstruction of student thinking. Study 2 sought to replicate this methodology on a larger number of post-graduate students. In this second study, the links between Cognitive Intentions and stage development were established. Although the data were non-significant, there emerged an academic Thinking Style, as well as a benchmark tool for the Identity Compass profile tool (the Thinking Quotient). The third study sought to support the findings of the second study but in a larger dataset acting as a control group. Figure 5.6 illustrated the existence of Thinking Styles as well as the various levels within the Thinking Quotient scale. Quantitatively speaking, the principles of Constructed Development were supported. The fourth study was designed to test the facets of thinking construction on participants from an awareness perspective. The results showed that 55 participants had relative awareness of their Thinking Style, so it was necessary to determine to what extent they were in awareness in the moment. Finally, the fifth study aimed to qualitatively connect the previous four studies' quantitative findings together in the lived experiences of ten volunteer interviewees.

This chapter will integrate the findings of the above five studies contained in the thesis, discuss their implications and identify areas that refute or support the existence of the theory of Constructed Development and offer areas requiring further research. The aim was to determine initially if there exists a number of heuristics so far missed in metacognition, stage development and constructivism that allows for the deconstruction of our thinking sufficient to provide evidence for habituated styles based on the combination of those heuristics, now called Cognitive Intentions. This allowed the researcher to advance the understanding of the links between how, initially a post-graduate student thinks and the resultant behaviour in context, with regard to their level of awareness of each stage of the process. Each of the five studies reported in chapters 3 through 7 contributed a confirmatory finding that supports the hypotheses. Collectively, the five studies support positive links between the use of 'Cognitive Intentions' as a descriptive term, the constructivist approach to thinking in post-graduate students and the stages of adult development from a stage transition perspective. Both can be aligned with the use, consciously and unconsciously, of Cognitive Intentions, leading to a relative choice and response, dependent upon an individual's level of self-awareness.

Due to the impact of the findings from study 2, which led to the methodologies of the second and third studies, the question morphed from: *how does the thinking of post graduate students map across to the Identity Compass profile tool?* To: *does Dynamic Intelligence exist as a conceptual measure of self-awareness in the moment?* And eventually, with the introduction of the higher-level theory, the question is now: *Does Constructed Development exist as a conceptual measure of Dynamic Intelligence in the moment?*

The following discussion presents the key findings of these five studies, their theoretical implications, practical interventions, and proposes avenues for future research.

Main Findings

The findings of this Thesis evolved throughout the studies to include and incorporate the

thinking behind self-awareness from a number of angles. What began as the deconstruction

of post-graduate thinking using Meta-Programmes ended with a framework for thinking

construction based on the lived experiences of ten interviewees. The objectives throughout

the thesis flowed with each new hypothesis discovered within each study. Beginning with the

methodological approach of study 1, and leading to the interviews in study 5, the Objectives

flowed in this manner:

- 1. To determine if there are Meta-Programmes common to all post-graduate students.
- 2. To determine if a specific combination of MP's creates an academic thinking style.
- 3. To create a benchmarking score to normalise the Identity Compass output for ease of comparison to other profiles.
- 4. Changed Meta-Programmes to Cognitive Intentions (TQ)
- 5. To determine if there are Cognitive Intentions common to 8,200 profiles
- 6. To determine if the Thinking Quotient scale is valid for 8,200 profiles as it was for 177
- 7. To determine to what extent participants are *aware of their use* of Cognitive Intentions in their thinking style
- 8. To determine to what extent participants *understand their use* of Cognitive Intentions in their own thinking style
- 9. Constructed Development is measurable by an individual's Dynamic Intelligence (via the TQ)

The objectives and the aims helped to formulate the main hypotheses:

- Certain Cognitive Intentions have more of an effect on the profile than others and thus could be classed as "driver programmes".
- The benchmark tool will determine different levels of self-awareness based on the different combinations of Cognitive Intentions.
- Kegan's Levels of Adult Development can be aligned to the benchmark output scale.
- Individuals are not aware of their use of Cognitive Intentions in context
- Each level of the Thinking Quotient has a unique combination of Cognitive Intentions which equates to different Thinking Styles
- Individuals are not aware of their Thinking Style using CI combinations
- Thinking Styles, and thus behaviour, can be influenced by polar CI intervention
- Individuals are not aware of their self-awareness (meta-awareness)

The exploratory study and study 2 demonstrated that a subset of dimensions within the 50

Cognitive Intentions exists, as per objective 3, specific to post-graduate student thinking.

However, the overall regression model was non-significant and none of the five factors

predicted the outcome variable TQ. The average TQ score for the students was 3.19. This is marginally higher than the general population of 3.12, which, if correlated with Kegan's levels of adult development, the average post-graduate student has a measure of thinking construction marginally higher than the average population. This suggests that in order to be a post-graduate student, it would be beneficial to think in a style pursuant to academic achievement, shown in the first dimension of Table 4.14.

Study 3 extended this principle and allowed the theory to move beyond post-graduate students as the data for Thinking Styles. Instead, it focused on a larger dataset from the Identity Compass profile tool (n=8,243) and utilised the same statistical measures as per studies 1 and 2. This time the data were highly significant and the subset of latent dimensions as per objective 3 was supported. All five cognitive factors predicted the TQ at 1% or 3% level of statistical significance. This was a very important discovery from a Constructed Development perspective.

Study 4's findings focused on the inter-class correlational aspects of self-report versus profile report of the same facets of thinking. The two raters were (1) each participant and (2) the Identity Compass profile tool. Out of 54 participants, the mean of the self-report scores for the participants' TQ was 3.12, and the mean for their IC report was 3.25, demonstrating that on average, the participants under-estimated their level of self-awareness based on Cognitive Intention use, which supported the hypothesis that participants are not aware of their level of awareness, nor their use of Cognitive Intentions. Twelve participants over-estimated their self-awareness based on Cognitive Intention use.

Finally, the qualitative findings from Study 5 showed five overarching themes emerged from the data, and twenty sub-themes as derived from the questions in study 4. The themes mirror the suggestion in the data that the participants do utilise Cognitive Intentions in their thinking, however, they are not aware of their construction of self, using them. These themes allowed the interviewees to establish how and why they constructed their Thinking Styles in the way that they did, as well as the level of awareness of this construction. The output of the awareness factor demonstrated that an interviewee at each level of the TQ is capable of being aware of their habituated patterns. However, the lower level scorers were less able to make significant changes to their thinking and behaving even after feedback.

Introducing Constructed Development Theory

Essentially, all models are wrong; but some are useful –Box (1976)

Constructed Development Theory takes its name from its central premise: that self-awareness and cognitive growth are *concepts* that are *constructed* by the brain. The aim of this chapter is to introduce the Constructed Development Theory (CDT) as it emerged from the literature review and subsequent supporting data within this thesis. The aim of the theory is to develop perspicacity. The flow of the theory is thus:

Constructed Development Theory focuses on how human beings utilise shortcuts in their thinking in order to construct their Intention, Awareness, Choice and Response in the moment. The greater their awareness of their intention based on the use of fifty Cognitive Intentions, the greater their capacity to respond in the moment.

Dynamic Intelligence is the process by which we construct our thinking in the moment in order to determine the path from (unconscious) Intention to Awareness, then Choice and finally Response. The greater our awareness of our intention, the more choice we create in our responses in the moment, thus, the greater our Dynamic Intelligence.

The **Thinking Quotient** is the tool created to measure the relationship between the fifty Cognitive Intentions that are the building blocks of our Dynamic Intelligence. The score derived from this measure is one's level of Dynamic Intelligence. This scale is the benchmark for one's Constructed Development.

A graphical representation can be seen in Table 8.33 where it illustrates the level at which one is either aware or unaware of the fact that this construction occurs, which in turn

affects one's ability to construct. At the lower TQ levels, a complete lack of awareness of this construction lends itself to habituated responses without an acknowledged Intention, whereas the higher levels of awareness allow the individual to construct their response in the moment according to their immediate self-awareness.

TQ Level	Construction	Thinking Style	Cognitive Intentions
TQ2 Unaware	Unaware of any construction, of any patterns. Construction would focus on immediate Own, Self, Values, and be out of awareness	Unaware of any thinking style thus unable to construct a style appropriate for the immediate present. Their focus is predominantly on own needs and habituated thinking.	Own, Self, Internal. Unaware of their opposite CI. Focused on using the same CI's that have always worked for them.
TQ3 Other- Unaware	Constructing themselves according to other people's needs	Predominantly concerned with Other, Partner, External and is thus focused on other's needs. It could be within or without awareness. The key is they cannot change it.	Other, Partner, External, Caring for Others - predominantly based on what others need
TQ4 Other- Aware	Still constructing self according to the needs of others, but beginning to recognise the separation of self from group.	Focused on the needs of the other and although this might be within awareness, they do not know how to stop doing it	Gaining balance between Internal/ External and Own/ Partner. Ability to choose which in context
TQ5 Self- Constructing	Aware of the constructed nature of self. Able to construct themselves in the moment up to a point.	Aware of the nature of their Thinking Style and able to choose to be self or other- oriented in context.	Balance between Self and Other. Balanced in their driver Cl's and can choose which to use.
TQ6 Construct Aware	Recognition that everything is constructed, from self to culture to politics and are able to do it in the moment, as necessary.	Fluid. It changes from requirement to requirement in the moment. Also aware of Long Term, Abstract and Global perspectives.	Able to choose which CI is needed on the fly, according to the context and environment. Welcomes Dissonance as a growth factor.

Table 8.33: Constructed Development Grid

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Cognitive Intentions serve as a means of constructing one's own personal psychology as per schema presented by Kelly (2003) and Huang et al., (2014). Such a framework puts in place a blueprint for thinking, and how this determines what knowledge an individual has constructed about the world around them (Kelly, 2003). Constructed Development is such a blueprint.

Taken from the previous studies within this thesis, Dynamic Intelligence is a measure of our level of awareness of our construction of self that determines our choice of response in the moment. To meet the developmental criterion of an intelligence, a construct must have the potential to improve over time (Coté, Christopher, & Miners, 2006). As this study has

determined that the natural way to measure Dynamic Intelligence is by Cognitive Intentions,

then improvement over time is absolutely measurable. This could be demonstrated further

with a longitudinal study. By extension, the meaning we are measuring is not necessarily

meaning-making, but unconscious Intention.

The basic propositions of Constructed Development Theory are the following:

- 1. People actively construct ways of understanding and making sense of themselves and their world.
- 2. There are identifiable patterns of intention-construction that people share in common with one another; these are traditionally referred to as stages, orders of consciousness, ways of knowing, levels of development, organising principles, Thinking Styles, or orders of development.
- 3. In CD terms, orders of development unfold in a non-specific sequence, with each successive order transcending the previous order, but not necessarily sequentially.
- 4. A higher-TQ person has a different Thinking Style to the lower-TQ person and is capable of combining their Cognitive Intentions to replicate the lower TQ style.
- 5. Conversely, the lower-TQ thinker is not capable of balancing their Cognitive Intentions in such a way as to think at a higher order without guidance from a higherorder thinker who can see their imbalance.
- 6. In general, people do not regress; once a grade on the TQ scale has been constructed, the lower orders lose their organising function, but remain as a perspective that can be reflected upon.
- 7. Because subsequent orders are more balanced in their CI awareness, they support a more comprehensive understanding than earlier orders; later orders are not better in any absolute sense.
- 8. Developmental movement from one order to the next is driven by growth in the current way of identifying and constructing awareness; this can happen when a person faces increased complexity in the environment that requires a more dynamically intelligent way of understanding themselves and the world.
- An individual's order of development influences what they notice or can become aware of, and therefore, what they can describe, reflect on, and change. This process is their Dynamic Intelligence. - (Derived from Cook-Greuter (2004) in Palus, Magellan & Steadman (2016))

Alignment of CI's to Stages of Adult Development

In order to discuss the objectives above, it was necessary to understand how

Cognitive Intentions fit into the development arena. A number of psychologists have

undertaken this, such as Cook-Greuter, (1999); Linder-Pelz (2010), Loevinger (1976), Kegan

(1994), Fowler (1981), Kohlberg (1969), Torbert (2004), Gebser (1985), Commons (1984),
Piaget (1983), and if one is to understand the thinking of post-graduate students within an academic context, it would be beneficial to understand how to get to complexity from CI's.

Whilst Laske (2009) differentiates between social-emotional complexity and cognitive complexity, Kegan (1982) does not, instead focusing on social-emotional complexity. Laske assumes that humans struggle with two contradictory tendencies continuously: the need to be autonomous and the need to belong to a group. Adults oscillate between the two, and it is this oscillation that defines their social-emotional life (Laske, 2008: p37).

Using Laske's work, it would be reasonable to assume that Cognitive Intentions could be differentiated using the same criteria. The Cognitive Intentions can thus be subcategorised into Social-Emotional and Cognitive types depending on the output of the individual programme (see Table 8.34). For example: if an individual is predominantly 'Procedural', this is an indication of how they make sense of their actions, and as sensemaking is a cognitive attribute as per Laske's, (2008) Cognitive Development Framework (CDF), it was a natural assumption to align Procedure with Cognitive complexity. According to the literature, the 'opposite' pattern of intention is 'Options' and would be considered an emotional response to a task, which is about meaning-making (Kegan, 1982). The same principle can be applied to the other 48 Cognitive Intentions in order to give a key to how we interpret our thinking in three potential ways: meaning-making; sense-making, and an overall epistemic stance.

Table 8.34 illustrates the SE and C breakdown of Cognitive Intentions. The TQ scale is thus a measure of one's epistemic stance. A basic notion is that from Laske's CDF (2008), there are certain thinking capacities (in context) that are available to individuals at the higher levels of complex thinking that are not available to the lower level thinkers.

Social-Emotional	Cognitive
Achievement	Abstract
Affiliation	Activity
Away From	Concrete
Caring Others	Details
Caring Self	Difference
Consensus	Future
Doing	Hearing
External	Individualist
Feeling	Information
Global	Internal
Influence	Long Term
Listening	Looking
Options	Observer
Own	Polar
Partner	Pre-Active
Past	Procedures
People	Q. Control
Places	Reading
Present	Realisation
Re-Active	Sceptic
Relationship	Seeing
Sameness	Task
Short Term	Things
Team Player	Towards
Trustful	Vision

Table 8.34: Table of Cognitive Intentions broken down by SE or C Intention

It can be seen that the left side of Table 8.34 pertains to either an emotional or a social aspect of thinking (e.g. interactions with people are socially-based and affect emotions primarily; External thinking, in extremis, subsumes self in favour of the other person's needs), including our ability to form relationships, consider our partner's feelings and get our rules from an external source (Hall & Bodenhamer, 2006).

From a complexity perspective, the statistical data results of study three (the five dimensions: see Table 8.35) essentially short-cut the CDF interview process, and eliminates the need for an interview/interviewer, a subsequent transcription of said interview, and then an interpretation of the results, all of which relies on a subjective intervention by a trained

individual. By demonstrating the use of Cognitive Intentions unavailable to the participant, it is known which level of adult development they are not necessarily capable of attaining. An example would be where a participant has a very low score for 'Abstract' in comparison to 'Concrete', it can be evidenced (from the data) that the person is not sufficiently self-aware in their Thinking Style, and thus not Stage 4 (Laske, 2007) or above.

Cognitive intentions – study 2								
Academic	Socialised	Conscious	Self-Perspective	Higher Level				
Achievement	Team Player	Quality Control	Own	Abstract				
Information	Relationship	Details	Places	Global				
Activity	Caring for Others	Procedures	Internal	Vision				
Long-term	People	Sameness	Non-external	Towards				
Future	Collectivist	Away From	Influence	Options				
Caring for Self	Affiliation	Things		Polar				
Pre Active	Partner	Past		Seeing				
Realisation	Trustful	Reactive		Listening				
Task	Concensus	Doing		C				
Difference		Sceptic						
Concrete		Short-term						
Observer		Hearing						
		Reading						

Table 8.35: Five dimensions of Cognitive Intentions – study 2

This removes any interviewer bias and allows the client to tell the interviewer *how* they think as well as their level of self-awareness to the *extent that they know it about themselves*, rather than have the interviewer tell them, as is common with profile tools. This runs counter-to the principles discussed in the Methodology (chapter 2) regarding the conventional wisdom for psychometric tools of this kind.

The Cognitive Intentions in Dimensions 4 and 5 in Table 8.35 are different in that they determine how we perceive information, process that information, consider our own perspective in a situation, and how, for example, we perceive a task whilst in a work context. The principle that Dynamic Intelligence determines a construction of intention in the moment is not in contradiction to the field of adult development, but that the field could be expanded to include an 'and/both' approach to determining an individual's capacity and capability. With the fifty Cognitive Intentions divided by their social-emotional or cognitive intention, as per Table 8.34, it is now possible to align them with the output behaviours of Kegan's and Laske's individual stages of Adult Development.

Evidence of this can be determined from Laske's definition of his Stage 2 mindset (ibid: p39) where he states that:

"People at S-2 can only hold a single perspective – their own – and this cognitive limitation necessarily leads them to act as they can be observed to do. Consult your resident teenager."

From the literature on CI's, it is apparent that an individual having the unconscious Cognitive Intention of 'External', 'Partner', and others is demonstrating what Laske says level 2 cannot: second-positioning, and thus the participant is *not* TQ2. However, as was mentioned, if they are not balanced in their Cognitive Intention pairs, they are also not TQ4.

Stage Development Perspective

An interesting perspective that emerged from the findings of studies 2 and 3 was that the Thinking Quotient resembled a stage development interpretation of Constructed Development. If we were to take the TQ as a scale, the levels of self-awareness for postgraduate students might look like Figure 8.22.

However, as was emphasised in studies 2 and 3, this is not necessarily the case and the argument that supports this perspective is one of the negation of discrete levels as false classifications, in favour of a more dynamic measure in immediate time/context. This is done with the foreknowledge that it could be a measure of an individual's centre of gravity around which an individual's thinking/responding (DI) coalesces.

	TQ2	TQ3	TQ4	TQ5
View of Lecturers	Only there as tools to learn from.	Others used to reflect and validate own education direction.	Others as collaborators and autonomous learning partners.	Others seen as valuable for growth & balance of education as a whole.
Level of Self Insight on Developmental Needs	Very limited self awareness with no choice of response. "I'm just here to get the certificate."	Growing awareness but little choice of response unless related to others' progress.	Strong awareness, high choice of response. "I learn for me, for you."	Very strong awareness and choice of response both physically and mentally.
Learning Values	Improve self first. Competitive, win-lose, survival. Going harder/faster will "win".	Self-other: Collaborative, mutually supportive; "University is a communitytogether we can do more."	Express Self: Autonomous learning. "Education is what you make it develop for growth in both skills and aptitude.	Transcend Self: Purpose driven. It's not about <u>my</u> learning but the good of the education system. "Life is contribution, for the greater good of"
Own Developmental Needs	Meet own needs above the needs of others. Would cheat but wouldn't want to get found out. Only interested in passing the grade.	Dedicated to the process. Learns primarily to help others.	Recognises the symbiotic relationship of the learners. Understands that improving the other improves oneself.	Honour & Commitment. Obligations-limitations. I'm here as a resource for others.
Need to control	Strong need to control others, environment, results	Need to control tempered by need for relationship	Self-responsibility & accountability.	Contribution not cause- effect. Minimal control.
Communication	One way. Dogmatic, opinionated. Not able to listen for cognitive growth.	Mutual exchange. Information gathering. Needs positive feedback from Supervisor.	Dialogue. Teasing out for understanding of own capabilities.	Clean, clear, concise. Honest unambiguous communication
University Orientation	Self-Promotion. Progression for power,status, reward & recognition.	Collaborate for mutual support and validation. Shared responsibility. Defers to Supervisor's knowledge.	Responsible. Organise resources, define the steps for growth; develops people	Thought Leader. Develops insights for value- add to all of Academia. Break the mould.

Figure 8.22: The TQ Post-Graduate Student Awareness Grid

Fischer & Bidell, (2006) pointed out that it is not appropriate to assume people operate at one constant level, but instead they operate over a range of levels depending on context, domain, emotional state and more. The qualitative findings of study 5 support this perspective. Also, under conditions of stress or fatigue, an individual will regress in their developmental thinking, thus limiting their capacity to perform in the moment (Reams, 2014).

Scaffolded levels of performance require assistance from someone with more skill (as per Vygotsky's ZPD (1978)) or a more complex strategy for thinking as per the ZDD model (Figure 8.29 below) and this sequence of attainment will vary according to many factors, one of which is the role of emotion in development (Fischer & Bidell, 2006). As argued in the section on Vygotsky in the literature review and in study 3, it is not simply a more emotionally-developed person that is required, but a more 'dynamically intelligent other' that can pull from their dynamic library of emotional responses built up over time and experience, to offer an alternate perspective on emotional scaffolding that ultimately moves through emotion in to cognition in order to be a more Dynamically Intelligent thinker. From this

perspective, Emotional Intelligence could be considered a facet of Dynamic Intelligence, which has important implications for the field once it is understood how the insertion of the four pillars of Constructed Development impact the thinking behind EI and thus change its emphasis and outcome going forward.

On the current Thinking Quotient scale, it was demonstrated how a less-balanced approach to socialised Cognitive Intentions such as External, Partner, Affiliation and People will produce an alignment with Kegan's stage 3 'Socialised Mind' where one is more concerned with the social aspects of their thinking. This offers a real understanding of their lack of self-awareness due to their externalised locus of evaluation and as such, the capacity to move away from the inference of a stage would benefit this individual's construction of self. With this in mind, a new scale that offers a definition of CI-balance rather than socialemotional and cognitive complexity would be a more useful indicator of Dynamic Intelligence.

Thinking Styles

Following on from the literature review where it stated that there is no empirical evidence to suggest learning styles exist (Lilienfeld et al., 2010; Pashler et al., 2009; Willingham, 2009), and Riener and Willingham (2010) stated: "*students may have preferences about how to learn, but no evidence suggests that catering to those preferences will lead to better learning*" (p. 35), it is evident from the findings of the five studies within this thesis that previous discussions on *learning styles* were missing the potential for habituated patterns of *thinking construction*, that would lead to a student's preferred way of learning. This was shown in study 2 where a post-graduate student with a bias for the 'Procedures' CI had a very different approach to essay completion than a student with an 'Options' bias. A student with 'Global' higher than 'Detail' will have a different construction of their thinking that would lead potentially to a much larger frame when writing an essay.

Had those psychologists exposure to the potential for a more constructed development, there could have emerged a bridge between Constructivism and Constructionism. This is a valuable contribution to theory.

Essentially, our thinking is constructed in the moment based on the habituated and unconscious use of Cognitive Intentions which combine to form a specific *style* of thinking for that individual. This style also manifests as a behavioural response in the moment, with or without awareness. Study 3 supported this perspective with the factor analysis on a large dataset and the subsequent automorphic graph illustrated the principle (Chapter 5, Figure 5.7, p.225). Study 5 supported study 3's findings in the lived experiences of the interviewees who demonstrated behaviours based on CI awareness.

Continuing the principles behind the findings of Daniels (2010) from the literature review on thinking patterns, the concept of Dynamic Intelligence is concerned with the combination of Cognitive Intentions and alignment to levels of adult development. This raises a number of important questions from an evidentiary perspective: (i) does one CI influence the other more significantly? (ii) If so, how does a combination of CI's influence the thinking of the individual differently from an alternate combination? (iii) Is a Thinking Style indicative of a single level of capacity and capability as per Laske's (2009) Cognitive Development Framework, or (iv) can a thinking style have multiple levels within? Conversely, (v) is it possible for a level of capacity and capability as depicted by the Thinking Quotient, to have different thinking styles within?

For now, it is sufficient to point to the concept of Thinking Styles as both levels and unique combinations of Cognitive Intentions that construct the individual's thinking in the moment, allowing for a measure of awareness that leads to a choice of response.

Figure 8.23 illustrates the point that each level is defined by a different combination of Cognitive Intentions, and as such, there is no need for TQ3 to include and subsume TQ2's

Cognitive Intentions in the way one would expect developmental stages to do. The inference in the image is that in order to be a TQ4 thinker, one must begin with a different set of Cognitive Intentions that frame one's thinking in the first instance. This does not mean that a person at TQ4 is not capable of matching the combination pattern of TQ3, only that those are not their natural drivers. The outcome, from a developmental perspective is that the TQ4 thinker is capable of matching the Thinking Style of the TQ3 thinker as they can choose which CI's to utilise in the moment that replicates the level of balance in the TQ3 Thinking Style. However, the TQ3 thinker cannot match the TQ4 thinker's Style because they lack the requisite choice in CI combinations.



Figure 8.23: An example of level-specific Thinking Styles by CI combination

With this concept in mind, the Thinking Style can be visualised as in Figure 8.23. This was seen in study 5 where the thinking and behavioural outcomes of the interviewees were matched to Kegan's (1994) Levels of Adult Development in language. Those capable of constructing their thinking in the moment had a greater behavioural capacity as well as thinking capacity as evidenced in their response to questions from the researcher.

Dynamic Responsiveness

As mentioned above, the main premise of one's Dynamic Responsiveness through awareness of habituated Thinking Styles is better-served through a bespoke scale rather than aligned to Kegan's Levels of Adult Development. As was illustrated in study 3 (chapter 5), the Automorphic Development Onion offers a potential framework for vertical growth via Cognitive Intention awareness. It was stated that the principle of the onion avoids the inherent assumption of betterment on a numbered scale. However, the idea of a scale is still useful in that it represents *a level of awareness* of the level of awareness. In other words, on a new scale behind the Thinking Quotient that looks solely at the Cognitive Intention differences, one might score 'TQ5', and another might score 'TQ9'. This informs the reader automatically that the individual who scored 'TQ9' has a greater choice between CI pairs in the moment and is more capable of choosing between Cognitive Intentions in order to respond appropriately to the environmental stimuli than the individual who scored 'TQ5'. This means that their Dynamic Responsiveness is greater at TQ9 than TQ5. This principle of a new scale warrants further research.

It was also proposed in Study 3 that a TQ 'stage' could be considered a specific Thinking Style as per objective 2 (Chapter 5). The data demonstrated in the factor analysis that at each level of the TQ, there are five different dimensions, which supports the hypothesis of automorphic Thinking Styles based on the combination of Cognitive Intentions. This is a major contribution to stage development theory as it demonstrates that differing levels of self-awareness amount to different constructions of self in the moment.

The principle here is that it evidences the Cognitive Intention combination as the driver behind the TQ level which is the 'Thinking Style' such as Kegan's 'Socialised Mind'. This is a major discovery as it supports the perspective that there are new and simpler ways to

arrive at an individual's developmental stage without the need for human intervention in the form of interviews, as per other adult development approaches.

It also accounts for the myriad combinations of CI's around TQ3 that begin with many different Cognitive Intentions, yet all converge (i.e. Thinking Style) on a more socialised aspect of thinking. According to the data, a 5% difference in one CI pair is the difference between TQ3 and TQ3.1. This elevates Constructed Development Theory above existing systems as it has a more developed and nuanced output than other profile tools are capable of.

Dynamic systems theories attempt to identify all those interactions that impact development and arrange them into a comprehensive explanation (Taylor, 2005). Dynamic systems theorists such as Thelen & Smith (1994) assume that development is continuous and thus quantitative, whereas Kohlberg (1984) suggests change is discrete and discontinuous as he separates moral content from moral structure. It has been demonstrated here that development from a Cognitive Intention perspective is quantitative, and as per chapters 6 and 7, where it is shown that developmental stages do not need to exist, then the process of transitioning from one Thinking Style to the next would appear to be simpler when viewed algorithmically, and thus could resemble the Developmental Onion. See Figure 8.24. Study 5 discussed how, when one wishes to change a Cognitive Intention bias, one must focus on its polar CI (e.g. Internal-External). Once the paired CI has been mastered (however long that takes) then that new CI is always available to the individual. This creates a choicepoint for the individual where one did not previously exist. This the definition of vertical development. This can be seen in Figure 8.24 where the second turquoise ring is at a greater circumference, inferring the individual has mastered 'Towards' thinking and can thus utilise it at a later stage as they deem appropriate.



Figure 8.24: Constructed Developmental Onion

The literature review showed how the research on stage transition is less clear on *how* the transition occurs, despite, for example, the ideas of bridging within microdevelopment (Granott, Fischer & Parziale, 2002). As shown in studies 3 and 5, the Constructed Development framework offers a 'facet' that transitions between discrete stages of self-awareness by exposure to those facets of thinking that are habituated and out of awareness. This is a major contribution to the theory of stage transition.

It is also possible from Study 5's findings to align each Cognitive Intention with the 'bridge' we saw in microdevelopment in the literature review. As each CI acts as the 'shell' that attracts the growth (albeit not empty) according to Granott, Fischer and Parziale (2002), Constructed Development thus offers an *object* that can be brought to awareness that would facilitate vertical development. This is a more robust explanation of incremental growth than Granott, *et al*'s empty shell bridging theory as it offers the "*what*" of change, as mentioned in study 3 (chapter 5).

Further to this perspective, it is hypothesised here that should the four pillars of Constructed Development factor into other stage development models, it could offer a clearer path through which growth could be established. See Figure 8.25. By offering the scales of Kegan and Laske a '*what*' regarding their movement from self-sovereign (2) mind to socialised mind (3), CDT effectively maps the growth through their respective stages using Cognitive Intentions. The result is akin to raising awareness of their Dynamic Intelligence in order to know, specifically, how their thinking has become more 'socialised'. Dimension 5 of the factor analysis in study 3 would be the indication for this thought process, as it contains the socialised CI's: Relationships Affiliation, People, External and so on. This is a major contribution to Kegan's and Laske's theories as it categorically shows how the construction of a Socialised Mind occurs.

Kegan	Laske	Anderson Adams	Stevens
Self-Sovereign Mind	Instrumental	Egocentric	Unaware
Intention	Intention	Intention	Intention
Awareness	Awareness	Awareness	Awareness
Choice	Choice	Choice	Choice
Response	Response	Response	Response
Socialised Mind	Socialised Mind	Reactive	Other-Unawareness
Intention	Intention	Intention	Intention
Awareness	Awareness	Awareness	Awareness
Choice	Choice	Choice	Choice
Response	Response	Response	Response
Self-Authoring Mind	Other-Dependent	Creative	Other-Awareness
Intention	Intention	Intention	Intention
Awareness	Awareness	Awareness	Awareness
Choice	Choice	Choice	Choice
Response	Response	Response	Response
Self-Transforming	Self-Authoring	Integral	Self-Aware
		Intention	Intention
		Awareness	Awareness
		Choice	Choice
		Response	Response
		Unitive	Construct-Aware

Figure 8.25: Example developmental stage comparison

Thus, it is not a stage process of growth, but a continuum of ever-increasing balance of Cognitive Intention awareness and choice. An interesting question arises at this juncture that asks: *if it is possible to intersect existing stage theories with the four pillars of Constructed Development Theory, in order to determine intention and awareness within, would it then be* useful to disassociate CDT completely from any stage theory in order to focus on the facets of self-awareness as the factors for cognitive growth?

Rather than align the Thinking Quotient to Kegan (1994) or Laske (2008)'s theories, as per studies 2 and 3, where socialised thinking was defined by specific Cognitive Intention combinations, a scale based on the relationship between all CI pairs would result in a TQ score that offers no adult stage development alignment. However, it would allow for a specific scale of self-awareness.

The proposition that removes this scale from adult development alignment requires a new interpretation of the scale, which would look like Table 8.36. The principle behind the change is the relationship between the Cognitive Intention pairs (e.g. Internal/External) and how it is scored. Where it is aligned in studies 1 to 4 via each Cognitive Intention to Kegan's ideas of a socialised mind (stage 3) the new scale would disregard socialised (S3) or self-authoring (S4) thinking in favour of a scale solely based on the relationship between the Cognitive Intention pairs. This would then become a purer measure of self-awareness and Dynamic Intelligence.

The way this would be achieved is by assigning higher TQ scores to the lower CI differences. See Table 8.36. A participant who scored a balance between a CI pair would score '10' for that pair, indicating their choice of CI, whereas a participant who had a difference greater than 40% would score '2', indicating an habituated, out-of-awareness Cognitive Intention. Further research is required to examine the possibility of this new scale.

Group	Cognitive Intentions	s Original Scale			New Scale											
		0	0.05	0.1	0.15	0.2	0.25	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
	Own=Partner=Observer	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10
	Own>Partner>Observer	0	4.5	4	3.5	2.5	2	10	9	8	7	6	5	4	3	2
	Own>Partner=Observer	4	4	3	3	2.5	2	10	9	8	7	6	5	4	3	2
	Own=Partner>Observer	3.5	3	3	3	2.5	2	10	9	8	7	6	5	4	3	2
	Own=Observer=Partner	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10
	Own>Observer>Partner	0	4	3.5	3	2.5	2	10	9	8	7	6	5	4	3	2
	Own>Observer=Partner	0	4	3.5	3	2.5	2	10	9	8	7	6	5	4	3	2
	Own=Observer>Partner	4	3.5	3	2.5	2.5	2	10	9	8	7	6	5	4	3	2
	Partner=Observer=Own	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10
	Partner>Observer>Own	0	3.5	3	3	3	2.5	10	9	8	7	6	5	4	3	2
e	Partner>Observer=Own	3.5	3.5	3.5	3	3	3	10	9	8	7	6	5	4	3	2
ectiv	Partner=Observer>Own	0	4.5	4	3.5	3	3	10	9	8	7	6	5	4	3	2
ersp	Partner=Own=Observer	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10
Ā	Partner>Own>Observer	0	4	3	3	3	3	10	9	8	7	6	5	4	3	2
	Partner>Own=Observer	0	4.5	4	3.5	3	3	10	9	8	7	6	5	4	3	2
	Partner=Own>Observer	0	3.5	3.5	3	2.5	2	10	9	8	7	6	5	4	3	2
	Observer=Own=Partner	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10
	Observer>Own>Partner	0	4.5	4.5	4	3.5	5	10	9	8	7	6	5	4	3	2
	Observer>Own=Partner	5	5	4.5	4.5	5	5	10	9	8	7	6	5	4	3	2
	Observer=Own>Partner	4	4	4.5	4.5	4.5	5	10	9	8	7	6	5	4	3	2
	Observer=Partner=Own	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10
	Observer>Partner>Own	0	4.5	4	4	4.5	5	10	9	8	7	6	5	4	3	2
	Observer>Partner=Own	5	5	4.5	4.5	5	5	10	9	8	7	6	5	4	3	2
	Observer=Partner>Own	0	4.5	4	3.5	3	3	10	9	8	7	6	5	4	3	2

Table 8.36: TQ Scale aligned to Adult Stages of Development versus New Scale

Constructed Development Theory, with its constituent parts of Dynamic Awareness and Dynamic Responsiveness, is the principle observation that allows for the explanation and predictability of an adult's development in thinking in the moment and over time. Dynamic Intelligence can thus be summarised as Awareness [of intention] Over Time:



Figure 8.26: Awareness / Time

The above equation can be broken down further in order to demonstrate its relationship with Dynamic Awareness (DA) and Dynamic Responsiveness (DR). Thus, DR is a function of DI over DA. This creates the choice in the moment. See Figure 8.27. In other words, as evidenced in studies 3 through 5: how aware one is will depend on their DI and their ability

to conceptualise a choice. The more choice one has, the greater their capacity to respond (DR).



This set of functions could be considered the conceptual framework as seen in study 5, (Constructed Development) and allows us to extrapolate out to a Dynamic Intelligence Awareness Model, as introduced in study 4 (Chapter 6).



Figure 8.28: Dynamic Intelligence Awareness Model

The Zone of Dynamic Development represented in Figure 8.28 in green, allows for a certain level of prediction on the individual's part (span of discretion). The principle being: the further from the present the individual can predict the outcome, the greater their capacity to create the connections that lead to the multitude of ramifications in their decision-making process, and thus the higher their level of Dynamic Intelligence. This predictive facet ensures that Vygotsky's ZPD is horizontal development, and the ZDD is vertical development.

The model can be deconstructed using Cognitive Intentions, beginning with the capacity to be Pre-Active in one's thinking, and Re-Active in one's behaving. This will be explored further in the next section.

Metacognitive Perspective

It was stated in the literature review that Tobias and Everson (2002) suggest that metacognition is measured on the basis of observations, dialogues and individuals' selfreports, and that there is no single tool that can measure metacognition alone (Akturk & Sahin 2011). However, if Cognitive Intentions are an adult's way of thinking about their thinking, especially after feedback, it is possible to argue that Constructed Development is capable of showing the process of thinking about one's thinking using Dynamic Intelligence.

If we were to take the description of metacognition from Palincsar (1986) where he states that: '*metacognition is the ability to plan, implement and evaluate strategic approaches to learning and problem solving*', then we can see from the output of studies 2 and 3 that with post-graduate students, the actual implementation of these facets of metacognition depend greatly on the student's Constructed Development, and are directly affected by their position on the Thinking Quotient scale.

By this, it is meant that an individual post-graduate student who favours the 'Procedures' CI differs in their approach to essay-writing to one who favours 'Options'. This difference impacts not only the behavioural output of their Thinking Style, but also their metacognitive strategy when considering how they tackle the assignment, as illustrated in study 2. Young students have not been tested to determine their Cognitive Intention preference as yet. However, should a test be developed in the future, then the output could offer a way to develop the student in a bespoke manner that better-represents their actual Constructed Development rather than assuming all young students utilise metacognitive strategies as currently understood.

Further to this, a common theme in metacognition studies is that "*students with high prior knowledge perform well regardless of the scaffold offered*" (Raes et al., 2012). This suggests that scaffolding does not achieve its claimed aims and is secondary to existing

knowledge. It also suggests that a ZPD-based scaffold is an incorrect choice for some students, and a more ZDD-based scaffold is required, (see Figure 8.29).



Figure 8.29: The Zone of Dynamic Development

In other words, those students with high prior knowledge performed well at downloading and repeating information, which is horizontal development (as is any academic course) and only requires process and structure. Conversely, a student exposed to more complex adaptive problems would require vertical scaffolding such as the Zone of Dynamic Development addressed in study 5. For this reason, Constructed Development would supersede metacognition from a child or adolescent perspective and offer an adult a more complex adaptive solution to problem solving. As was mentioned in the literature review (chapter 1) Schraw (2009) highlighted the difficulty of measuring metacognition and suggested that a connection to, and a measurement of metacognitive processes simultaneously does not exist. Tobias and Everson (2002) also highlighted this point when they explained that observation and self-report tools are insufficient for measuring metacognition. As mentioned above, there is currently no single tool that can measure the many facets of metacognition (Akturk & Sahin, 2011). However, given the supporting data here, Constructed Development Theory should be considered metacognition for adults, and the TQ benchmark tool, a measure of adult metacognition, thus impacting psychology across a number of fields.

Azevedo & Hadwin (2005) defined self-regulation as individuals' efforts at planning, monitoring, regulating, and controlling their "cognition, motivation, behaviour, and context" (p. 201). Researchers suggested that collaborative or cooperative learning structures encourage the student development (Kramarski & Mevarech, 2003; Schraw et al., 2006). From a post-graduate perspective, this implies that the common understanding of metacognition in a learning environment is second to the Constructed Development of the adult students, and their Thinking Style. This can be explained by the fact that in Schraw, et al., (2006)'s comment, an individual requires a prompt to be self-reflective. That is in itself the opposite of the principle behind a high self-awareness that provokes self-reflection.

The Difference between Awareness and Choice

The findings in studies 4 and 5 demonstrate how the Theory of Constructed Development is capable of moving between a domain-general perspective to domain-specific. It was initially confusing how a person who scored lower on the Thinking Quotient scale was able to recognise their Thinking Style when the prevailing research on cognitive complexity suggested those at the lower stages were not able to recognise their developmental needs (Kegan, 1994; Laske, 2008; Cook-Greuter 2010). Yet the findings of study 4 emphasised a latent innate knowing of the participants' Cognitive Intention use, and study 5 demonstrated their Thinking Style awareness in the interviews.

Consequently, it was hypothesised that the 'awareness' the interviewee had regarding their use of CI pairs was focused on the fact that they knew they favoured one over the other (e.g. 'Internal' rather than 'External'), however, could not change their response in the moment due to their lack of awareness of their unconscious intention and not knowing the opposite Cognitive Intention response. This was true even with the themes 'Feedback Aware' and 'Therapy Aware' being in awareness. This is hypothesised as the difference between awareness and choice in the CDT framework and would be better represented in a new

Thinking Quotient scale that focuses solely on the CI pair scores, as mentioned in the previous section.

With a new scale in mind, if we look deeper into the dimensions from study 3 (chapter 5), it was discussed that dimension 3 acted as the disequilibrium for the content of dimension 1. These two dimensions are the generic heuristics in every context. As was explained in study 3, if an individual is imbalanced across dimension 2, their TQ score goes down. However, dimensions 4 and 5 also offered an element of disequilibrium in that they opposed each other, as well as offered the potential differentiation between Kegan's stage 3 (socialised mind) and stage 5 (self-aware) which although both focused on 'other', the level of cognitive awareness is very different. Kegan's stages 2 and 4 are about self, however, with the same cognitive separation as mentioned for 3 and 5. So the scale for both Kegan and Laske would be "Self – Other – Self – Other".

Dimensions 4 and 5 help to differentiate these within the TQ scale in that the CI content of dimension 4 is: 'Own', 'Individualist', 'Internal', 'Influence' and 'Caring for Self'. Each is a heuristic towards the self, and too much imbalance means your TQ score goes down because your Thinking Style is about 'you'.

Dimension 5 contains: 'Relationships', 'Affiliation', 'People', 'External', 'Listening', Team Player', 'Places' and 'Partner'. Each is a heuristic towards the other person, and too much imbalance means your TQ score goes down because your emphasis is weighted towards their needs, not your own.

This is an important differentiation for the concept of Thinking Styles. It helps to explain from an awareness perspective that an individual who is predominantly focused on dimension 4 CI's with scores dramatically above those CI's within dimension 5, is going to be aligned with Kegan's stage 2 thinker (Self-Sovereign Mind). Whereas another individual with high scores for dimension 5 would lean towards Kegan's stage 3 thinker (Socialised

Mind). From a domain-general and domain-specific perspective, it could be argued that dimension 1 is foundational in everyone's thinking, hence their place in the factor analysis, and dimension 3 keeps dimension 1 CI's in check. Dimensions 2, 4 and 5 would then offer context specificity in that an individual scoring highly on dimension 5 might become a nurse (Socialised-Mind) for the reasons mentioned above.

The important aspect of understanding this is that an individual who is balanced across all Cognitive Intentions is going to score higher on the TQ scale, as they can effectively choose to consider either the first-person position (self), second person (other) and even the third person position (meta-position) and thus be recognised as a balanced thinker with greater self-awareness in the moment, with a greater Dynamic Intelligence.

Due to the fact that there are fifty variables (CI's) in the construction of one's thinking, the act of trying to name a specific sequence is futile. This implies that we could pick any stage development protagonist such as Loevinger or Torbert (see Table 8.37), choose one of their stages, and we would be no more a 'Conformist' than we are an 'Individualist' (Cook-Greuter, 1999) at any point in time due to the nature and complexity of the construction of our thinking. In other words, by virtue of the requisite Dynamic Responsiveness at each of Cook-Greuter's stages, a 'Conformist' could not become an 'Individualist' as they lack the Cognitive Intention Awareness, Choice and Response (i.e. balance).

With stage theory expressed in this manner (Commons et al, purport to have 16 stages of development (2008)), the psychologists are absolved from the understanding of how the stages transition, as was mentioned earlier. They effectively find evidence of a minor change (in cognition or emotion) and automatically label it to differentiate it (Commons, et al., 1998). Again, as was mentioned in the literature review, what is seldom addressed is the mechanisms of the transition.

Laske (2008)	Instrumental 2.0	Socialised Mind	3			Other-Dependen		Self-Authoring	Style 4.0		Self-Aware	
Anderson Adams 2016	Egocentric	Reactive		Creative				Integral	Unitive			
Eigel & Kuhnert 2016	LDL2	1013		LDL4								
Jaques	V Conceptual - Declarative	N	Conceptual- Cumulative			IV	Conceptual- Serial		VIII Conceptual- Parallel			
Commons et <i>al.</i> , 2011	Primary	Concrete		Abstract		Formal	Systematic	Metasystemati c	Paradigmatic	Cross- paradigmatic		
Kegan (1982, 1994); Kegan & Lahey 2009	Self-sovereign mind (2nd order of consciousness)	Socialized mind (3rd order) Traditionalism		Self-authoring mind	(4th order)	Modernism		Self- transforming mind		(5th order)	Postmodernism	
Joiner & Josephs 2007	Enthusiast	Operator	Conformer	Expert	-	Achiever	Catalyst	Co-Creator			Synergist	
Rooke & Torbert 2005	Impulsive (2)	Opportunist (2/3)	Diplomat (3)	Expert (3/4)	-	Achiever (4)	Individualist (4/5)	Strategist (5)		Alchemist (5/6)	Ironist (6)	
Cook-Greuter 1999	Impulsive	Self-protective	Conformist	Self-aware		Conscientious	Individualist	Autonomous		Construct Aware	Unitive	
Hall 1995	Authoritarian/ Paternalistic	Manager		Facilitator		. others della		Servant leadership	-		Visionary	
Hy & Loevinger 1996	Impulsive E2	Self-protective E3	Conformist E4	Conformist E4 Self-aware E5		Conscientious E6	Individualist E7	Autonomous E8			Integrated E9	
Maslow 1968	Physiological needs	Safety needs	Belonging and love	Esteem needs		Know and understand	Aesthetic needs	Self- actualization		Self-	transcendence	
Stage	Preconventional		Conventional			Transitional Postconventional		Postconventional		Transpersonal		

Table 8.37: Stage Development Table of Theorists

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It was also discussed how Commons (1984) considered his approach to complexity solely from a task perspective. However, if one were to consider thinking on a dynamic scale, with complexity demands increasing as one ascends, then the act of thinking becomes the task and 'competence' would exist by a different name: dynamic intelligence. The findings of the current study emphasise the perspective that thinking must come before the task, and any such task complexity is thus secondary (regardless of whether the actor can complete the task). This implies that Commons' focus on the task was one step ahead of where the actual complexity was taking place, and should he wish to use the same principles of scalable complexity, then Dynamic Intelligence could be a determinant of capacity to complete one of his research tasks.

If one were to insert the Four Pillars of Constructed Development (Intention, Awareness, Choice and Response) into Commons' research, it is possible that task complexity was an indeterminant factor if the completion of the task was not the participant's intention as it was an instruction from a researcher. This is akin to the point made previously that suggested children performing educational tasks in order to determine their metacognitive regulation was limited by the lack of personal intention and awareness due to the task being an instruction from their teacher.

Can Dynamic Intelligence be considered an intelligence?

According to Gardner (1983), and Kornhaber, Fierros & Veneema (2004), there are

certain criteria for the identification of an intelligence:

- It should be seen in relative isolation in prodigies, autistic savants, stroke victims, or other exceptional populations. In other words, certain individuals should demonstrate particularly high or low levels of a particular capacity in contrast to other capacities.
- It should have a distinct neural representation: that is, its neural structure and functioning should be distinguishable from that of other major human faculties.
- It should have a distinct developmental trajectory. That is, different intelligences should develop at different rates and along paths which are distinctive.
- It should have some basis in evolutionary biology. In other words, an intelligence ought to have a previous instantiation in primate or other species and putative survival value.
- It should be susceptible to capture in symbol systems, of the sort used in formal or informal education.
- It should be supported by evidence from psychometric tests of intelligence.
- It should be distinguishable from other intelligences through experimental psychological tasks.

• It should demonstrate a core, information-processing system. That is, there should be identifiable mental processes that handle information related to each intelligence.

The criteria listed above could be considered out of date and a misrepresentation of what an intelligence could be. If one were to create a theory on a new intelligence framework, it must also conform to what Wilson, (2019, p3) suggests:

"...a theory... is required to tell us what to pay attention to and what to ignore. We must theorize to see. A new theory doesn't just posit a new interpretation of old observations. It opens doors to new observations to which the old theories were blind."

The aims of a scientific theory are, according to Popper (1972), twofold: (1) theoretical understanding (which can also be termed *explanation*); and (2) practical understanding (which incorporates *prediction* and *technical explanation*). Popper emphasised that the aim of science is to provide '*satisfactory explanations*' of things that are '*in need of explaining*' (p. 191). To do so, scientific enquiry requires testable hypotheses. As Popper (1972) observed:

"An analysis and comparison of the degrees of testability of different theories shows that the testability of a theory grows with its degree of universality as well as with its degree of definiteness, or precision" (p. 356).

It has been argued here that the findings of this thesis have demonstrated Popper's conditions have been met to a large extent for Constructed Development Theory and Dynamic Intelligence. It has been explained in previous studies within this thesis as well as in the current chapter, and its capacity to predict thinking and behaving in individuals has been demonstrated in studies 4 and 5. Also, it is stated that any test item that requires cognitive effort measures (at least partially) intelligence (Lubinski & Humphreys, 1997).

However, from a measurement and intelligence perspective, we must look at the constructs as described here and define them appropriately. As Constructed Development is proposing the use of constructs within a framework (mentioned in study 5, Chapter 7), a suitable definition from the literature of a construct that is multidimensional would be:

"when it consists of a number of interrelated attributes or dimensions and exists in multidimensional domains" (Law, Wong, & Mobley, 1998, p. 741).

Also, a multidimensional construct '*refers to several distinct but related dimensions treated as a single theoretical concept*' (Edwards, 2001a, p. 144). From this perspective, it is through the CDT lens with which we view the world (Merriam, 2004). Finally, Campo, (2001) appropriately described a conceptual framework as "*a structure of what has been learned to best explain the natural progression of a phenomenon that is being studied*".

In this instance, Constructed Development Theory is a multidimensional construct as it consists of interrelated dimensions such as input data, filtering and generalising (Cognitive Intentions), intention, awareness, resultant choice and finally response in the moment (Locke, 1968). CDT offers a logical structure of these connected concepts that helps build a picture of how the ideas and findings within the five studies in this thesis are related into the theoretical framework. This demonstrates that CDT is more than a string of concepts as it is a way to illustrate the epistemological and ontological view of how we construct our thinking in the moment, supported by the data in study 3 and the testing of the principles in study 5. Further to this, within the conceptual framework is the definition of the concepts within the problem of self-awareness (Luse, Mennecke, & Townsend, 2012).

The relationship between Constructed Development and its facets were explained in the introduction, as this is an important step (Law et al, 1998). The reason for this is because should the dimensions be defined differently, then different conclusions will be reached regarding the relationship between those dimensions and the over-all construct, as discovered in an empirical study by Law and Wong (1999). This is important to note here from a theory development perspective as the fundamental Thinking Quotient background data could change in order to demonstrate it is possible to disassociate from stage development theories completely. Future research on this potential change is important as it would allow CDT to stand alone as a theory of self-awareness measurement, or the measure of adult metacognition.

According to Barrouillet & Lecas (1999), the construction of mental models relies on working memory. From a dual-process perspective, Verschueren, Schaeken, and d'Ydewalle (2005) proposed to unite the probabilistic and the mental model accounts of conditional reasoning. They noted that the reasoning process based on probabilities is heuristic in nature, as suggested by Oaksford and Chater (2001). The manipulation of these mental models in order to reach conclusions as well as the search for counter-examples are deliberate and controlled, reflective analytical processes. However, this misses the underlying cognitive complexity of the individual being asked to perform any such task. For those who were capable of producing fast responses, the variations in those responses were better-explained by variations in likelihood information. With more options to choose from, those variations offered the thinker a greater pool of choices from which to pull. This is the principle of a high Dynamic Intelligence. On the other hand, slow responses depended on the availability of counter-examples. Verschueren, et al., (2005) also concluded that analytical reasoning could override the conclusions produced by probability estimates, without mentioning the cognitive complexity of the participants examined. From a Constructed Development perspective, it is possible that a misinterpretation of the underlying structure of thinking led to these conclusions. An individual capable of choosing a response based on greater Dynamic Intelligence might appear to be using counter-examples when in essence, they are simply more dynamically intelligent (DI), more capable of pulling in greater numbers of factors and considering their ramifications in the moment (DR).

Based on a greater awareness of their construction of the problem rather than available probabilities, an individual could score highly on the inferential tests, unwittingly adding to the statistics without the researcher's understanding that to see what is not seen is a developmental problem (a problem of the dialectic), not a problem for memory. Where the example of a flightless bird is given in the research, a more Dynamically Intelligent

individual would potentially not make the mistake of thinking all birds can fly as they would ask: "*what am I not seeing that is equally important*?" This extrapolation would include flightless birds as it is an example of Hegel's dialectic (1989).

The Issue of Measurement – Thinking Quotient

Studying a concept together with the way it is measured creates a virtuous cycle of better measurement and a better theoretical understanding (Borsboom, Mellenbergh, & van Heerden, 2004; Hood, 2009). Laske (2011) provided a process for analysing the content of interviews to ascertain the most likely stage of adult development, based on the *structural form* of the interview content, rather than the content itself. This is a lengthy process and far too onerous, which leaves it open to bias by the human interviewers. Inter-rater reliability is in danger of impacting a client's score both positively and negatively. This issue would be mitigated with an automated system. If we go back to the point made by Lewin (1935) in his report of behaviourism, the issue he encountered was that of measurement. He stated that: '*a behavior at a given point in time is a function of the person and his or her momentary context*'. For this he devised a heuristic equation:

$$B = f(P, E,)$$

Lewin treated the person and the situation as transactional factors, separate and inseparable, from which the behaviours emerged. From this perspective, mental events and behaviours are derived from context (Markus, 2008; Steele, 1997). One reason why individuals would construct their thinking differently is touched on by Shoda, Mischel, & Wright, (1994) who stated that only those aspects of the physical environment that are pertinent to the goal aspirations of the individual are taken into account. In other words, two people in the same environment would construct their thinking differently based on differing goals. This could also be interpreted via Constructed Development Theory as: two people within the same environment will have different Thinking Styles. In effect, the mind constructs the psychological niche within which the personality fits (Mischel, 2004). Again, this lends itself to a constructed environment. However, where Constructed Development contributes to the field is in its perspective on a person's level of awareness of this contextually-derived behavioural response, and a person's level of choice in the moment to either adopt an habituated pattern, or to employ a different pattern after considering the ramifications of said behavioural choices. See Figure 8.27.

Although Likert scales (1932) are used throughout the profiling industry, there is an inherent problem when it comes to addressing choice from a Constructed Development perspective: there is no black and white thinking (either/or) because there are only shades of grey (Laske, 2015). A Likert scale does allow for a scaled response; however, it does not allow for an 'and/both' option, which means it does not allow for the measure of capacity and capability. With this in mind, how would a person who has a high Dynamic Intelligence demonstrate on a scale that their response is from a position of awareness and thus choice? Even with a modified Likert scale, it would still be difficult to ascertain meaning. See Figure 8.30. This issue is overcome in the Thinking Quotient as it addresses the question of bias indirectly, thus allowing for an *inference* of awareness by the participant rather than a direct measure.



Figure 8.30: Modified Likert scale example

That is not to say that future incarnations of the TQ questionnaire will not use a Likert scale: only that it would require some constructive redesigning to elicit intention and awareness, not the participant's opinion. Conscious self-report versus unconscious intention and awareness.

Given the above, an alternative scale would be the frequency-based format (Edwards & Woehr, 2007), which is known to be less susceptible to deliberate distortion, which can increase predictive validity (Fleisher, Woehr, Edwards, & Cullen, 2011). Unlike Likert scales, a participant is asked to rate their most recent behaviour, and how true it is for them that they were 'the life and soul of the party' using a timescale. They are thus supposedly describing their behaving, not their personality.

Dynamic Intelligence

Essentially, all models are wrong; but some are useful – George Box (1976)

As mentioned in the Introduction, Dynamic Intelligence is the process by which we construct our thinking in the moment in order to determine the path from (unconscious) Intention to Awareness, then Choice and finally Response. Each Cognitive Intention is a specific Intention, and the greater one's awareness of the intention, the more choice it creates in the response in the moment, thus, the greater one's Dynamic Intelligence.

Following on from the issues of measurement outlined above (Akturk & Sahin, 2011), the natural flow of Dynamic Intelligence is illustrated in Figure 8.31, which offers a simple graphical explanation of the flow from conscious Intention to conscious Response.

The diagram illustrates how a completely unconscious thinker would follow the path left to right, being unconscious of their Intention, Awareness, Choice and Response, and end up at the bottom of the TQ scale: 2.0. An individual who is completely conscious of their intention all the way through to their choice to many responses in the moment would come out at the top of the TQ scale: 5.0.



Figure 8.31: Simplistic View of the Flow of DA to DR

An individual with an unconscious Intention has a maximum developmental level of TQ3.4, and thus in order to grow their thinking, one must go back to the last point of unawareness and bring it into conscious awareness. This approach could solve the problem of adult metacognition measurement.

An unconscious awareness could be described as a lack of understanding of the unconscious intention driving the awareness. In other words, it is what is described as 'second nature', and the difference between primary attention and secondary attention. The former is in awareness until the latter takes priority. There is no real choice in it until we are jolted out of our unconscious state. An example would be what is referred to as 'Highway Hypnosis': driving a car on 'autopilot' until a cat leaps out in front of the car and the driver breaks immediately. The unconscious awareness is present; however, it is not *in* awareness (conscious). One is unconsciously aware, constructing our immediate present according to the environment until the disruption of a cat occurs. And then the driver's memory of similar events takes over and the immediate construction of the (potential) event takes place. For a more profound understanding of Constructed Development, it could be argued that the cat would be killed by a driver with fewer connections to dynamically draw upon (or 'past precedents' (Chater, 2018, p.486)) and the driver with the greater experience would be able to avoid the cat as more past-experiential options are available in the (unconscious) moment. This interpretation is in effect, a construction based on past interpretation of the same disruption (cat) (ibid. p473).

This leads to the potential argument of modularity when addressing the mind: ever since Fodor's landmark book *The Modularity of Mind* (1983) where he posited that behaviour is the product of independent, functional components, realised in discrete physical systems, and that these components are minimally interactive. Fodor (1983) limits his perspective on modularity at the low-level systems underlying language and perception, whereas post-Fodorian theorists such as Sperber (2002) and Carruthers (2006) argue that the mind is wholly modular. Originally advocated by advocates of evolutionary psychology (Sperber, 1994, 2002; Barrett, et al., 2010; Pinker, 1997; Barrett, 2005; Barrett & Kurzban, 2006), the hypothesis has received its most comprehensive defence by Carruthers (2006), who argued that should massive mental modularity be possible, then a module cannot be that which Fodor initially termed. Instead, it could be that a module is a function-specific processing system (ibid. p12). The Constructed Development Theory extension to this perspective is that Cognitive Intentions are a natural consequence of modular thinking in context in that our need to be consistent results in patterned, habituated thinking styles, borne of these function-specific processes.

Contrary to this is Prinz's (2006) perspective that modularity is not a useful construct when doing mental cartography. In effect, Prinz's conclusion is that: '*the mind is a smattering of modular parts at best*', and Fodor essentially over-stated his position as his definition left no room for the process of ontogenetic development. It suggested that modules emerge through growth, rather than via learning and experience. This suggests a certain

innateness, whereas Quartz and Sejnowski (1997) suggest sensory mechanisms are acquired through interactions with our environment (as per the Constructivist perspective).

However, from the data in the current study, it could be argued that the modularity Fodor, (1983) and Carruthers, (2006) discuss is actually a battle between the conscious awareness of fifty Cognitive Intentions directing our thinking in the moment. The construction that 'wins' is the Thinking Style that emerged from study 3. This argument can be taken one step further with Feldman-Barrett's constructed emotions theory, as discussed in the literature review.

Constructed Emotions

Emotion categories are as real as any other conceptual categories that require a human perceiver for existence – Feldman-Barrett, (2017)

Feldman-Barrett's (2017) book '*How Emotions are Made'* has emphasised mechanisms within our thinking that allows our brain to predict what is going to happen based on what has already happened (Feldman-Barrett, 2006, 2017). This supports the conclusions in metacognition for children as seen in the literature review, and in the literature section of study 4 regarding self-awareness. Feldman-Barrett states that: "*predictions are the basis for every experience that you have and every action that you take*" (p90). She goes on to say that predictions seem primal and help us to make sense of the world (p6) and their purpose is to minimise prediction error. Once this has happened, a prediction becomes a perception or experience. Our brains do not react to the world: instead, they use past experience to predict and then construct our experience in the world (p69). Finally, she states that: "*a brain implements an internal model of the world with concepts because it is metabolically efficient to do so*" (Feldman-Barrett, 2017). It could be reasonable to assume at this point that a representation of this idea from an adult's perspective is a Cognitive Intention.

Barrett goes on to say that if we were to change the ingredients our brains use to construct an emotion, we are effectively teaching our brain to predict differently, which she

calls '*being the architect of our experience*' (p160). Thus, Cognitive Intentions could be a way of reducing one's prediction error, and thus keeping us safe, by replicating previous known safe patterns of thinking/behaving. As mentioned, this could explain a factor of microdevelopment (Granott, Fischer & Parziale, 2002) that has so far been missed by researchers: one that implies it is difficult to move up the standard scale of development as this would require a level of prediction that would take the actor out of their predictive comfort zone. Thus, if one is aware of which Cognitive Intentions one uses to construct their thinking and responding in the moment, albeit based on the predictive value of prior experience as per Barrett, then one could become the architect of their Constructed Development. Dynamic Intelligence then becomes a graduated scale of self-awareness as informed and developed by the individual in response to the momentary stimuli, a measure of adult metacognition. This leads to a need for a deeper look at construction.

A Flat Mind

In his book *The Mind is Flat* (2018) Chater states that there is no high-level intention and there are no high-level frames or values or anything else, as the mind is flat. However, there has to be a differentiator for one's response to a situation as a teenager (TQ2) and as a middle-aged adult (TQ4). From the findings of the studies within this thesis, the awareness of the intention behind the response is the differentiator that can be discerned from the data that changes the meaning-making. If the intention were to remain constant, an adult would find themselves at TQ2 once they reach 50 years of age, and potentially in prison (Laske, 2015, p130). From a neurological perspective, Chater is saying that an individual at TQ2 has a smaller neural network of available thinking space. This perspective is also supported in the field of personality neuroscience which suggests that the brain is the proximal source of human behaviour, and thus those with different behaviours must also have some aspects of their brain structured differently (Yarkoni, 2013). As was mentioned in the literature review, some psychologists have suggested that children grow their cognition as they age simply due to the fact that the physical brain grows, and Piaget was describing the inevitable, not a profound cognitive difference between developmental stages. From the findings of study 5 where a theme emerged called 'Experiential Awareness', which demonstrated that an interviewee knew how they thought based on prior experience of their thinking and could then recognise it in a new situation. This supports Barrett's research and allows the current study to reflect on the possibility that experiential awareness is simply a habit, for which one's Cognitive Intention construction equates to a lack of awareness, not the opposite. This was highlighted in study 5 with Frankie's demonstrations of habituated constructions of self over time, which were out of awareness until this construction was pointed out by the researcher. Therefore, one cannot be the architect of one's Constructed Development if it is a repeated pattern of thinking/behaving out of awareness. It is thus not a deliberate intention but experiential evidence that produces the lack of choice, as seen in study 5. This creates the lack of awareness and an habituated response in the moment. Chater also says that we do not look inwards on our mental world, but instead, we invent a story moment-by-moment (ibid, p30). The Constructed Development Theory principles are supported by Chater's ideas in that a greater experience allows for a greater Dynamic Intelligence which leads to a greater Dynamic Responsiveness. This is then supported by a larger neural network of decision possibilities. To ensure this connection is robust, an element of post-doctoral work would be necessary.

Chater goes on to say that we are not really conscious of 'things' such as apples or people as we are only conscious of our interpretation of our sensory experience of them (p446). It is this interpretation of the sensory experience that could be coded as a Cognitive Intention. If we are not aware of our awareness in the moment, then there has to be an element of automaticity in our construction of our thoughts, and that could provide the

answer as to why Cognitive Intentions arose in the first instance. Further to this, the deeper one goes in their quest to understand which of these heuristics impact our thinking the most, the greater our capacity to bring to awareness those heuristics. Thus, an individual who has worked to understand their thinking construction would have a better representation of their sensory input based on more CI awareness. This would obviously manifest in a high score on the Thinking Quotient, and it would also look like Figure 8.32.



Figure 8.32: Constructed Development Iceberg

Figure 8.32 demonstrates that those individuals capable of uncovering the Cognitive Intentions shown in study 3 as least-accessible (Relationship, External, Places, etc) are going to display more socialised thinking in the form of Kegan's stage 5 thinker. Those CI's in green are from dimension 1 of Table 8.37, and those at the bottom of the image are from dimension 5 of the same. The more balanced one is in those least-accessible CI's, the greater their Dynamic Responsiveness. However, as Chater specifies, it is only the answers to the unconscious question we uncover, not the origins of the mental process behind it (p435). With that in mind, Constructed Development is not asserting it knows *how* the unconscious process of 'Internal' is created, only that it is used to propel one's thinking in the moment. Chater states that an iceberg analogy is misleading as there are no conscious and unconscious thoughts: *"there is just one type of thought, and each such thought has two aspects: a conscious read-out, and unconscious processes generating the read-out."* (p451). He goes onto say that 'ice is ice' and what is hidden can be made visible, and vice versa (p448).

The metaphor suggests that the very same thought could be either conscious or unconscious (p448) and as this is the principle of Constructed Development, the iceberg works well as a metaphor for bringing unconscious cognitive heuristics to awareness, with the resultant Dynamic Responsiveness: in other words, the unconscious process and the conscious read-out.

Finally, Chater says that perhaps our inner-oracle has a simple, intuitive psychology, guided by common-sense theories nothing like those existing in psychology so far (p45). He writes:

"... psychology should be aligned with the arts and the humanities rather than the sciences; perhaps understanding ourselves is inevitably just a matter of eliciting, reflecting on, analysing, challenging and reconceptualizing our interpretations of thought and behaviour; and interpretations of other people's interpretations; and so on, indefinitely. If so, then perhaps we should create a psychology in which everyone has a valid perspective on themselves and everyone else, in which any view can be reanalysed, contested, overturned or revived, which sees the understanding of mind and behaviour as an open-ended discussion, where there are no 'right answers' and never could be."

This quote will be unpicked and expanded upon in the following section.

Contributions to Theory

"The mind is carried by habit, upon the appearance of one event, to expect its usual attendant, - David Hume (1711 - 1776)

The fundamental proposition that binds this thesis together is that everything is constructed.

From the self to our thoughts, from patterns to habits and from our environment to culture.

The knowledge that everything is constructed is a developmental point in and of itself. It is our awareness of this construction and our capacity to change it that separates CDT from orthodox constructivist theory, and from the adult development literature. CDT thus links adult development to cognitive neuroscience via Chater's and Barrett's work.

Intention, Awareness, Choice and Response are the Four Pillars and the foundation of CDT. These are integral to an individual's level of self-insight, their capacity to construct their personality in the moment, their capability within their organisational role, and the determinant factor in their cognitive complexity. In other words, Constructed Development Theory, when applied to existing theories stands out as the psychological common denominator that unites stage development, stage transition, intelligence theories, constructivist theories, heuristics, and adult development, including but not limited to, the works of Piaget, Vygotsky, Wadsworth, (2004), Bruner, Flavell, Gardner, Kelly, Dweck, Hall, Woodsmall, Brown, Evans, Kegan, Laske, Commons, Chater and Feldman-Barrett.

The following short list outlines the support within this thesis for the existing literature:

- The factor analysis (study 3) supports Piaget's Disequilibrium idea (1978) and Ashforth's Identicide (2008).
- The Factor Analysis also supports Piaget's (1952) accommodation and assimilation ideas (dimensions 1&3)
- Thinking Styles support Kegan and Laske's work on Social-Emotional and Cognitive developmental stages.
- CDT bridges domain-specific and domain-general thinking by bridging the definition of both.
- CDT interventions support Palus & Drath's perspective on short term intervention validity.
- DI supports Dunn et al's (2010) stretching of students' perspective for cognitive growth.
- CDT offers a '*what*' for change regarding stage transition.
- CDT supports both Chater and Feldman-Barrett's perspectives on a constructed world view.

However, it is important to note that where CDT supports the existing literature, it then goes

some way to expand on the principles and extend the thinking using its own framework as the

basis for a new approach.
Firstly, CDT contributes to theory with the creation of Cognitive Intentions and Thinking Styles. With an almost infinite combination of CI's that create an almost infinite number of Thinking Styles, CDT can be considered the link between constructionism and constructivism which Chater (2018) implies is necessary but until this thesis, not described in the literature. This propels CDT beyond the bounds of more traditional psychometrics.

When we look at both Feldman-Barret (2017) and Chater (2018) in the context of construction based on Cognitive Intentions, what becomes important is the principle of self-awareness as the key to cognitive and emotional growth. Indeed, this is the foundation to CDT being the common denominator. According to Pascual-Leone and Johnson (2013), measurable changes in one's mental capacity are responsible for developmental change, not associative learning mechanisms. This thesis has demonstrated that an individual's mental capacity as measured from their awareness of their CI use is the developmental change to which they refer.

A further contribution to theory is that it does not matter *which* facets of selfawareness are measured. The fact that self-awareness *can be* measured (via the TQ) is a significant contribution by this study. The implications of a constructed world as per Feldman-Barrett (2017) and Chater (2018) emphasise the foundations of Constructed Development Theory as not necessarily solely Cognitive Intentions. It is equally plausible that any facet of self-awareness could be measured, and the results would still equate to an individual's level of Dynamic Intelligence. As Chater states: ' *each of us is a tradition, guided and shaped by our past... we continually build and rebuild ourselves* ' (p489). In simple terms, Constructed Development Theory offers a number of facets that facilitate this rebuilding. To take further and reframe Chater's quote using CDT language, *each of us is a habit. How aware we are of this habit is key to our self-construction*. It is established that

CDT is the foundational construction behind Chater's 'inner-Oracle': the intuitive psychology *nothing like those existing in psychology so far* (ibid. p45).

This leaves the door open for a plethora of post-doctoral research into how future researchers could utilise Constructed Development Theory as a framework for cognitive growth, using any facet of self-awareness that can be measured as a function of one's Dynamic Intelligence. The four pillars of Intention, Awareness, Choice and Response would then be supported with a greater number of measurable facets, reinforcing its contribution to psychology as a legitimate stand-alone field.

As has been shown, the fundamental challenge Constructed Development Theory puts to existing theory is that one must use a version of stages or scales (Sinnott, 2010) in order to grow one's cognitive capacity or complexity.

Zone of Dynamic Development

As discussed in study 4, Vygotsky (1978) focused on tasks and processes with children's learning, whereas it has been shown here that although adults have the capacity to question the construction of their thinking using Cognitive Intentions, seldom do they deviate from their habituated Thinking Styles. By questioning the dialectic arguments within our thinking structure, we move beyond the process elements of proximal development (Vygotsky, 1978) and into the adult development arena where a more dynamic cognitive development is realised.

CDT contributes to existing theory here by offering a Zone of Dynamic Development for adult thinking, which focuses on what is not yet seen by the individual and thus unlocks the Cognitive Intention awareness within their Thinking Style (see Figure 8.33).



Figure 8.33: The Zone of Dynamic Development

The image shows those CI's that were either within awareness or used readily, those that require thought in order to propel the thinker to the Zone of Dynamic Development, and those that are out of reach. By combining the principles of the Dynamic Intelligence Awareness Model (Figure 8.28) and the Constructed Developmental Onion (Figure 8.34), the capacity and capability of an individual is stretched with the balance of Cognitive Intentions into the *Zone of Dynamic Development*.

This is a major differentiator from Vygotsky's theory (ZPD), as it extends his principles of proximal development into the adult arena, extending it up to and including the full range of an adults' capacity to grow (TQ10). The closer an adult is to choosing their behaviour in the moment (e.g. TQ8), the smaller their Zone of Dynamic Development (see Figure 8.34). Conversely, the less aware they are, the greater their ZDD. A major contribution to theory is the understanding that Vygotsky's ZPD is horizontal growth, whereas the ZDD is vertical growth.



Figure 8.34: Zone of Dynamic Development

The Development Onion

The Constructed Development Onion is an illustration of growth within the framework of CDT via Cognitive Intention awareness. It helps to propel CDT beyond the theory of stage development and stage transition by illustrating how the focusing of one's Awareness on a specific Cognitive Intention creates a more balanced outlook and a greater Dynamic Intelligence. See Figure 8.35.

The Development Onion demonstrates visually how stage movement is not a staircase, but instead is constructed of increasing circles of awareness of one's Cognitive Intention use. The onion avoids the inherent assumption of betterment, as seen in Laske's (2008) or Kegan's (1994) scales where one might assume Stage 4 is 'better' than Stage 2 by virtue of it being numerically higher, when in reality, from a Constructed Development Theory perspective, it is simply a *different combination* of Cognitive Intentions and a different Awareness of their use, thus a different way of constructing oneself in the moment.



Figure 8.35: The CDT Onion

Using the Onion, it is possible to take the ideas of stage transition (vertical) and typical skill acquisition (horizontal) to another level by offering an insight into an individual's horizontal development and vertical development depending on which way the onion is hypothetically sliced. See Figure 8.36.

Figure 8.37 shows a horizontal slice through the Development Onion. This denotes those activities that are typical of one's movement through time, such as training programmes, skill acquisition and process-oriented manual activities. It is apparent that these are not development, but skills-based and knowledge-based. This separation propels CDT beyond the current definitions of learning and development in industry by differentiating between potential outcomes. This requires further longitudinal studies to verify the principles laid out here.



Figure 8.37: Horizontal Developmental Slice

Adult Metacognition and Stage Transition

It was demonstrated in study 3 that despite the many theories of stage movement and development, none offered the concrete facets of thinking that can be pointed to and changed in order to facilitate a vertical move. Study 4 demonstrated that it is possible to map out the vertical stage transition process using an individual's level of awareness of their Cognitive Intention use. In other words, there is no stage of thinking *per se*, but there is a measurable movement from one level of awareness to the next using the TQ scale. Each Cognitive Intention is the bridge and the scaffolding to the next level of complexity (Granott et al., 2002). The recognition and awareness that Internal (for example) is 10% and External is 80% is the bridge to developmental balance. This is a major contribution to the ideas behind stage transition.

This propels Constructed Development Theory beyond the principles of stage transition by offering a method of movement by the manipulation of an individual's level of awareness of their CI choices in the moment. This was illustrated in the Developmental Onion (Figure 8.35). It shows visually how CDT requires no stages in order to develop one's thinking. Each ring of the onion is an Intention. Each bubble an Awareness.

The four pillars of Constructed Development offer a framework for stage transition and movement in a way that does not require a mathematical formula such as the Model of Hierarchical Complexity (Commons, 1984). By changing an individual's relationship with their awareness of one Cognitive Intention, such as Internal or External, their overall Dynamic Intelligence changes, propelling them up the TQ scale as their relationship with their awareness becomes balanced over time.

The Dynamic Intelligence Awareness Model

A further contribution by CDT to adult development is the DI Awareness Model (Figure 8.28). This model highlights one's capacity for thinking and awareness in a predictive fashion in that the earlier an individual is capable of stepping out of their own perspective in order to predict the outcome of a given event, making use of their awareness of their use of Cognitive Intentions in the moment, the higher their potential Dynamic Intelligence. Up to this point, using awareness as the key for predictive cognitive growth had not been established in the literature.

The Thinking Quotient

Objective 5 asked if a benchmark score can be created to normalise the Identity Compass output. This was achieved by mapping the relevant Cognitive Intentions to the behavioural output of Kegan's (1994) Levels of Adult Development from a social-emotional perspective, and Laske's (2008) Cognitive Development Framework from a cognitive perspective.

An individual's capacity to choose their thinking/behaving aligned with Kegan's notion of Subject/Object behaviour in that if they hold the two CI's as Object, they could choose to do either in a given context (Kegan, 1994). This was opposed to the individual being 'Subject to' one of the Cognitive Intentions due to its unconscious nature. However, CDT and Dynamic Intelligence are indicative of the thinking *before* Kegan's Subject/Object behaviour as their initial construction would dictate just how Subject they were if they were unaware of their Intention in the moment. This profoundly implies that CDT is the foundational thinking behind Kegan's system. This principle would tie in with the Development Awareness Model in that greater Awareness of one's Intention in the moment leads to greater Choice in one's Dynamic Responsiveness, thus further supporting the principle that stages are not required for cognitive or emotional growth. This major contribution to theory helps to cement the Thinking Quotient scale as the *de facto* measure of an individual's capacity to choose a response in the moment (DR).

Emotional Intelligence

It was highlighted at the beginning of this chapter that Emotional Intelligence could be considered a facet of Dynamic Intelligence, as one's trait-based behaviour is indicative of how an individual would choose (or not) to respond in the moment, similar to Kegan's Subject/Object thinking. By inserting the four pillars of Constructed Development Theory into OCEAN (or any trait-based personality studies) an entirely new approach to personality would emerge: one that emphasises how deliberate an individual's personality is. In other words, when one is aware of their construction of self in the moment, and has mastered this construction to TQ4.2 or above, personality is a choice. This would profoundly impact the thinking behind EI and thus change its emphasis and outcome going forward.

Finally, from these contributions to the literature emerges distinct contributions to practise, based on the fundamentals of Constructed Development Theory and the support found in study 5 of this thesis.

Contributions to Practice

The movement from abstract theory to the supportive data, qualitative feedback, and practical application, leads to how Constructed Development Theory will eventually become a field within academia. Study 3 offers quantitative support for the facets of CDT in that there is statistical evidence for Thinking Styles based on the combinations of Cognitive Intentions, which leads to the four stages of the Thinking Quotient scale. Study 4 demonstrates that individuals are not as aware of their Thinking Styles from a Dynamic Intelligence perspective. Conversely, they are aware of specific Cognitive Intention biases in their thinking, as seen in study 5, primarily based on prior longitudinal experience of those biases. Whereas study 5 offers qualitative support for the theory as interviewees demonstrated their awareness and lack of awareness of study 4's output. What has been discussed is that despite some adults thinking about their thinking, (metacognition), it is more often the case that an

individual needs to have their biases exposed by a More Complex Other before any remedial action is possible. This will be discussed next.

Constructed Development Interventions

Flavell stated that adults should be taught how to monitor their thinking in order to make wise and thoughtful life decisions (1979, p. 910). Interventions within the framework of Constructed Development are possible with a simple exposure to limiting Cognitive Intention bias. Using the four pillars (IACR), and following the data findings of study 3, those Cognitive Intentions that had the greatest impact on the TQ score would be the obvious place to begin a bespoke intervention programme. Where one is high on 'Internal' and low on 'External' with a lack of empathy based on 'Partner' and 'Own', the way to focus the individual's thinking construction to become more balanced would be to implement a strategy with an emphasis on greater externalisation of evaluation. For example: *how does my thinking and behaving affect others? What aspects of my thinking impact others negatively? Can I create a decision path that excludes all personal benefits?* There are exercises based on this that would physically move the individual into second and third positions to influence an external perspective on their thinking construction. This would support Flavell's perspective and ensure adults were capable of thinking about their thinking with great utility.

Awareness Intervention

From a CDT intervention perspective and how awareness of the use of Cognitive Intentions is key, Figure 8.38 illustrates a typical output sheet for a Thinking Quotient profile. Where there is a number in the 'Count' column adjacent to a low 'Score', this indicates the Cognitive Intentions that require an intervention.

Profile: AT001P_GÜREWE175	Thinking Quotient 3.65		
Summa	ry	Target Values	Sustaining Values
Score	Count	- Lot Experilies perpertuins	
2	3	Motivation	Development
2.5	0	Trust	Growth
3	5	Colaboration	Collaboration
3.5	10	Honesty	Honesty
4	7	Fairness	Growth Potential
4.5	2	Effectiveness	Effectiveness
5	4	Cooperation	Cooperation

		PERC	EPTION		
			Average	Dif.	Score
Dalaran latarat	People	95.00	-	10.00	3.50
	Places	90.00		5.00	4.00
Primary interest	Activity	70.00	85.00	-15.00	3.50
	Information	85.00		0.00	5.00
	Own	75.00		10.00	3.50
Perspective	Partner	70.00	65.00	5.00	4.00
	Observer	50.00		-15.00	0.00

		MOTIVATI	ON PROCESS		
			Average	Dif.	Score
Comparison	Sameness	60.00	60.00	0.00	5.00
comparison	Difference	60.00	60.00	0.00	5.00
Drimony Ponction	Consensus	65.00	65.00	0.00	5.00
Primary Reaction	Polarity	-	65.00	-	
Wark Orientation	Relationship	95.00	85.00	10.00	3.50
work Orientation	Task	75.00	85.00	-10.00	4.00

MOTIVATION FACTORS					
			Average	Dif.	Score
	Influence	65.00		-8.33	0.00
Motives	Affiliation	90.00	73.33	16.67	3.00
	Achievement	65.00		-8.33	0.00
Direction	Away From	85.00	90.00	-5.00	4.50
Direction	Towards	95.00		5.00	4.00
Defenence	Internal	70.00	65.00	5.00	3.50
Reference	External	60.00	65.00	-5.00	4.50
Diamata - Chair	Options	55.00	61.67	-6.67	4.00
Planning Style	Procedures	90.00		28.33	2.00
Drimony Attention	Caring for Self	40.00	67.50	-27.50	3.00
Primary Attention	Caring for Others	95.00	07.50	27.50	3.00

		INFORMATIC	N PROCESSING		
			Average	Dif.	Score
Information Ciza	Global	65.00	72.50	-7.50	3.50
information Size	Details	80.00		7.50	3.50
Thinking Style	Abstract	35.00	65.00	-30.00	2.00
minking style	Concrete	95.00	65.00	30.00	2.00
	Team-player	85.00		12.50	3.50
Working Style	Group Player	-	72.50	-	
	Individualist	60.00		-12.50	3.50
	Past	65.00	71.67	-6.67	0.00
Time Orientation	Present	95.00		23.33	3.00
	Future	55.00		-16.67	0.00
Time France	Long-term	55.00	60.00	-5.00	4.00
Time Frame	Short-term	65.00		5.00	3.00
Consideran Stratem	Sceptic	70.00	65.00	5.00	3.50
Convincer Strategy	Trustful	60.00	65.00	-5.00	4.00

Figure 8.38: The Thinking Quotient Output Sheet

For example, the score for 'Thinking Style' is '2.00'. This is a low TQ score and shows a disparity of 60% between 'Abstract and 'Concrete'. In terms of remedial interventions, to whomever this profile belonged would have been asked how they construct "knowing" and what is important to them about knowing the facts (of a situation). This would have allowed for further deconstruction using CI's, until the driver CI was found for their lack of awareness of an Abstract position. They have a lack of choice in their response: they can *only* focus on control and lack the capacity to go above the task and consider the ideas, principles and levels of abstraction (higher level thinking, as mentioned) that a more aware thinker can achieve in context.

Their Planning Style is also limited to an Options pattern (TQ2). From a Dynamic Intelligence perspective, they do not consider the potential for Options and thus limit their Dynamic Responsiveness by reverting to Concrete and Procedural thinking only. A More Complex Other would see this and be capable of pointing it out as an opportunity for development.

Coaching Intervention

Whether these interventions are generic or individualised, they require a physical 'other' who is capable of seeing the limiting Thinking Style of the client and disrupting their construction of self, enough to jolt them out of their habits, whilst ensuring no psychological harm comes to them. This points to the need for a coach or mentor with a sufficiently higher TQ than the client. The argument for a developmental relationship was put forward by Laske (2007) who stated that unless a coach is one stage higher in their cognitive complexity than their client, they are more damaging to the client than developmental.

From a Constructed Development Theory perspective, Figure 8.39 illustrates this principle, where the green arrow indicates a developmental relationship, the amber arrow is conversational, and the red arrow is damaging.



Figure 8.39: Constructed Development Coaching Hierarchy

Interventions also point to the Constructivist view of reality in that many therapies rely on Constructivism as a foundation for change in one's thinking. As mentioned in study 5, the Therapy Aware theme encountered by some interviewees could be described using Cognitive Intentions, which illustrates the connection between constructivism and social constructionism. The way in which an individual constructs their thinking is both an internal cognitive process (constructivism) and a result of social interchange (constructionism) as described by Guterman (2006). Constructed Development Theory is thus how we perceive ourselves in the world, uniting constructivism with constructionism. This principle contributes to theory and practice.

To reinforce this principle, Figure 8.40 illustrates the cycle of understanding an individual has with their own thinking. Loewen (2011) said that thought, rather than action

forms the basis of the situation. Loewen references the power we give to the meaning of the words we use in our interactions with our world, and how these cognitive constructs have a greater influence than the interaction itself. However, this meaning-making is limited as seen in studies 4 and 5. Development is often depicted as a spiral, with the implication that self-reflection equals vertical growth. It is this limitation that drives a circular self-reflection that does not allow vertical (spiral) growth. Individuals are not aware of their self-awareness, and thus need a More Complex Other to facilitate vertical growth. The MCO will be capable of seeing the client's patterns and habituated Thinking Style using Cognitive Intentions and offer a path to growth. Without the MCO, the individual is limited to, and by their level of self-awareness, (e.g. TQ2.5; see Figure 8.40) as discussed previously, and as such, would have a limited relationship with their capacity to grow their thinking. The MCO would guide them to the next level of self-awareness by virtue of their own greater awareness of their Thinking Style and more nuanced view of their state, offering greater articulation in the moment (Feldman-Barrett, 2017).



Figure 8.40: Circular Flow of Awareness

This principle could be investigated further with a longitudinal study. The objectives in studies 1 and 2 that asked if Cognitive Intention awareness resulted in a greater self-

awareness in order to impact an individual's response in the moment is validated. Further research on longitudinal interventions is essential in order to solidify Constructed Development Theory as a functional standalone theory.

A CDT Approach to Talking Therapies

To extend these principles to talking therapies, as an extension to study 5, the development grid created as part of the mapping of CDT and Thinking Quotient levels will be used in future studies as a way of improving the psychodynamic approach. The psychodynamic therapist would usually be treating the patient for depression or anxiety related disorders.

Another approach is Compassion Focussed Therapy by Gilbert (2014), which ultimately forces proponents into Kegan's stage 3 thinking (Socialised Mind). It has been argued throughout that an individual at Stage 3 is not capable of coaching someone at Stage 4. Gilbert (2014) explains the psychological issues of socially constructed hierarchies as having a huge impact on people's psychological and physiological health and well-being (Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012; Sachs, 2012), and that it is now recognised that mental health issues arise out of this false construction of society. He goes on to say that it is the context as much as the 'inner motivational system' that is the issue. This aligns with CDT's perspective on the environment being the greatest intervention. However, where CDT takes Gilbert's ideas one step further is in the capacity and capability of the individual to construct a different environment in the moment with the appropriate CDT intervention questions, thus moving the patient away from any emotional constraints.

This has huge implications for the person receiving therapy as CDT assesses those offering therapy and ensures there is no conflict between TQ stages that could lead to a detrimental relationship for either therapist or patient (see Figure 8.39). This is essentially a protective factor for the patient as it is important that a registered therapist can ascertain, but more importantly, is capable of ascertaining the right level of developmental support for their

patients. This was evidenced in study 5 where Abigail (Interviewee 1) mapped her own process to every patient, regardless of their psychological requirements, and more importantly, completely out of her own awareness. Had Abigail utilised CDT in the way described, she would have avoided imposing her own model onto her client.

Thus, CDT changes radically how we think about interventions and the way we think about the suitability of the coach or therapist. They become, with awareness, an interventionist, moving away from the idea of a coach and therapist entirely. However, as mentioned, it is not an interventionist approach whereby the system is *applied to* the client; it is a *pull-from* the client perspective, which is called here: Real-Time Modelling. In essence, RTM offers a methodology but not a theory as it does not try to impose a model onto a client. It is thus respectful and offers its own ethical framework.

By utilising a method of RTM that emphasises a developmental dialogue (i.e. not therapy) to tease out an individual's thinking construction in the moment, and writing down key phrases they use, it is possible to ask the client to place those phrases on the corresponding grid reference (see Figure 8.41) in order to ascertain their own perceived level of development for their own language. This then allows the CDT Interventionist to ask the most appropriate developmental questions. Having the patient tell the Interventionist where their thinking stands developmentally is not how current talking therapies work.

Finally, the TQ system can differentiate between an individual who requires a traditional therapy approach (TQ2) and one who requires a constructed conversation with a CDT Interventionist (TQ4).

This is a major contribution to practise that impacts not only coaching and talking therapies, but the practitioners themselves. This will be addressed next.

TQ Level	Construction	Thinking Style	Cognitive Intentions
TQ2 Self-Unaware	Unaware of any construction, of any patterns. Construction would focus on immediate Own, Self, Values, and be out of awareness	Unaware of any thinking style thus unable to construct a style appropriate for the immediate present. Their focus is predominantly on own needs and habituated thinking.	Own, Self, Internal. Unaware of their opposite CI. Focused on using the same CI's that have always worked for them.
TQ2.5 Other- Unaware	Constructing themselves according to other people's needs	Predominantly concerned with Other, Partner, External and is thus focused on other's needs. It could be within or without awareness. The key is they cannot change it.	Other, Partner, External, Caring for Others - predominantly based on what others need
TQ3 Other-Aware	Still constructing self according to the needs of others, but beginning to recognise the separation of self from group.	Focused on the needs of the other and although this might be within awareness, they do not know how to stop doing it	Gaining balance between Internal/External and Own/ Partner. Ability to choose which in context

Figure 8.41: Constructed TO Grid

Impact on Practitioners

A final major contribution to theory and practice is the use of CDT to determine the ability of a psychologist's capacity and capability from a construction perspective. It is posited here that a psychologist familiar with their construction of self in the moment will also be familiar with their client's construction of self, and the differences in their respective constructions on their respective thinking style. These practitioners will be less prone to emotional exhaustion, as is the case in psychotherapeutic practice today (McCormack, et al., 2018) as they will understand that they do not need to enter the construction of their client and thus not get taken in by their emotional trauma. Understanding that the client's emotional trauma is simply a construction is the key to more adaptable and robust psychology.

Finally, the impact of Constructed Development Theory on both theory and practice

can be summed up with the following list:

- The creation and explication of Cognitive Intentions as heuristics
- The creation of Thinking Styles as habituated behavioural maps
- Adult Metacognition as a means to understanding adult thinking
- Zone of Dynamic Development
- The Development Onion
- The Thinking Quotient
- The DI Awareness Model
- The Four Pillars of Constructed Development

- The Constructed Development Grid
- EI as a facet of DI when IACR are considered
- The process for differentiating between a client's coaching or therapy needs
- DI can be determined by more than just CI awareness thus cementing CDT in external research going forward

Further to these contributions, CDT can be abbreviated as such:

- CDT reveals hidden infrastructure (algorithms)
- CDT reveals hidden patterns of thinking (styles)
- CDT enhances understanding of relationship between unconscious biases and responses to environment
- CDT highlights limitations to learning and thinking and responding
- CDT highlights interventions for improvement
- CDT highlights interventions for personal development
- CDT highlights interventions for development of praxis

Limitations of the Research

This research has a number of potential limitations which were considered. As all 5 studies were testing an hypothesis and theory application, Mook (1983) argues that the sample of participants does not matter, as do Bello et al., (2009) and Pernice, van der Veer, Ommundsen, & Larsen, (2008).

However, this issue was addressed in study 3. The 8,200 profiles are from differing countries where cultural differences influence ways of thinking (Wodak and Boukala (2015). From the information gained from the profile owner, the profiles were predominantly of middle-to-upper management in a variety of large organisations across the world. This suggests that the starting point for their [Constructed] development would be around the median to higher stages. There is no gender or age data other than those mentioned explicitly. Other limitations of survey-based questionnaires include a difficulty to convey feeling and emotion; an issue of interpretation and meaning-making; a participant could have a particular bias in their responses; unconscious responses; social desirability, and survey fatigue.

A final limitation for the entire thesis, as mentioned in study 4, illustrates the theory being investigated in all 5 studies: the self-awareness of the interviewer (his Dynamic Intelligence). If the researcher is not sufficiently high on the TQ scale to notice the patterns of the interviewees, he will miss potentially important information offered by an interviewee. This could lead to misinterpretation and an incorrect message in the transcripts. Conversely, should he be too high, he would not be able to relate to the interviewee and be too unattainable in his approach.

Strengths of the Findings

The aim of the five studies in this thesis was to build on the hypothesis that an adult's Thinking Style is due to the accumulated effect of their awareness of fifty cognitive heuristics (Cognitive Intentions), guiding and influencing decision-making in an unconscious manner until they are brought into awareness. This thesis also aimed to provide a contribution to psychology in the form of a new framework for cognitive construction utilising said Cognitive Intentions, their combination and subsequent creation of Thinking Styles; our awareness of the relationship between the Cognitive Intention pairs, and the resultant choice emerging from that relationship. Finally, the evidence for the four pillars of Constructed Development and its capacity to intersect all stage development theories in order to elicit unknown Intentions, Awareness, Choices and Responses highlights a future for Constructed Development Theory that goes beyond its current form.

As discussed in the previous two sections, the five studies reported here have a number of significant strengths. First, different methodologies were employed ranging from self-report online questionnaires with quantitative results (studies 1 to 3), a self-report questionnaire designed to elicit awareness (study 4), a comparison of self-report versus standardised questionnaire results (study 4) and a qualitative semi-structured interview process (study 5) to gauge the lived experiences of the participants from a Constructed Development perspective.

Secondly, findings reported in this thesis on the awareness of the relationships between the Cognitive Intentions are strengthened by the use of quantitative and qualitative methods of assessing their conscious or unconscious use. Previous research had focused on a variety of methods to discern self-awareness as well as metacognitive processes in children, however, they have been somewhat lacking in adult cognition, thus this thesis contributes to the field significantly.

Finally, the correlation between high levels of self-awareness and complexity were implied and aligned using the output of the Thinking Quotient scale to Kegan's (1994) and Laske's (2008) complexity scales. As has been highlighted, this finding will positively impact adult maturity and stage development psychology going forward.

Future Research

From the findings in the current thesis, it can be surmised that there exists a dichotomy when it comes to personality: there are those individuals who are deliberate in their personality, and those who are passive. The goal of much personality research is to determine to what degree individuals differ, which has resulted in the proliferation of a between-persons approach. On the other hand, the maintenance of a consistent personal behavioural style across contexts is often related to behavioural consistency, as opposed to negatively related to behavioural change (Sauerberger & Funder, 2016). As has been mentioned, there is no research that determines choice in one's trait-based behaviours. The closest to a definitive conclusion stipulates that: *"the maintenance of a consistent personal behavioral style in no way rules out an ability to respond flexibly to changing situational circumstances"* (Sauerberger & Funder, 2016: p271).

Studies have empirically shown that individuals fluctuate massively in their behaviour even on a daily basis (Fleeson, 2001; Heller, Komar, & Lee, 2007). Understanding why they fluctuate is key to understanding personality beyond the boundary of trait theory (Wilson,

Thompson, & Vazire, 2017). As was mentioned in the literature review, the thing that comes before a trait can manifest as a behaviour is one's thinking. It is this starting point from which trait theory would benefit from a reconsideration. By way of example, in their seminal paper on whole trait theory, (Fleeson & Jayawickreme, 2015) ask the following question:

The first test of Whole Trait Theory is whether the manifestations of the Big 5 have characteristics of something producible by social-cognitive mechanisms. This requires discovering what is described in a person when a trait level label is applied to him or her. When a person is described as moderately agreeable, for example, what does that mean about how agreeably he or she acts? (p. 84)

This is suggesting that the evidence of any trait is a pattern of observable behaviour, as though traits were black boxes labelled 'Agreeable'. This thesis considers what leads to such behaviour; what patterns of thinking-feeling and brain-neurology lead to responses to external stimuli. A much bigger, more complex system view. The argument against Trait theory presented here is that it is too simplistic. "Agreeable" discounts the attributes of the wider system and offers no criteria for evaluation of what "Agreeable" means to the individual (a matter for complexity, as mentioned in the literature review), a level *meta-to* the question in the paragraph above.

From a CDT perspective, the question that arises from Fleeson's paragraph above is not the one put forward by the authors, but the following: *When a person is described as moderately agreeable, to what extent is she aware of her agreeableness, and can she choose not to be agreeable in the moment*? This goes one level above the trait question by determining her Intention, Awareness, Choice and Response in relation to Agreeableness. Although there are a number of more recent studies that touch on Traits as potentially developmental constructs (Durbin & Hicks, 2014; Roberts & Jackson, 2008), their explanation is that they combine both continuity and incremental change over a prolonged period for any meaningful changes (Roberts, Luo, Briley, Chow, Su & Hill, 2017; Roberts, 2006). So far, no profile tool has begun the process of trait behaviour from a cognitive heuristic beginning, sufficient to demonstrate that a person who is deliberate in her thinking has much more control over how she constructs herself in the moment than someone who is passively or emotionally reacting to situations, and thus has the potential for choice in her trait use. As mentioned in the Methodology (Chapter 2), such profile tools do not offer choice in their responses. It is therefore feasible to ask how would trait theory benefit from a new approach to understanding its origins and application in personality theory? This question forms the basis for potential future research utilising existing and established tools. Two examples are given below.

MBTI

Personality testing is now a \$500 million global industry and is growing steadily (Muldoon, 2020). The updated versions of the Myers-Briggs Type Indicator (1971) Step I and Step II assessments provide a standardised experience regardless of geographic location (Thompson, 2019). From its own literature, it purports to have developed the new Step II assessment using representative samples of the global population which makes it suitable for use by anyone in the world as it is based on a population sample of over 16,000 people. Finally, it uses new statistical techniques, including cutting-edge Latent Class Analysis, which is designed to group data into categories, thus better aligning with MBTI theory of dichotomies (Thompson, 2019). However, as discussed in chapter 2, the MBTI is generally regarded as artefactual amongst profile psychologists and has sustained constant scrutiny over the years (Stein and Swan, 2019; Pittenger, 20005; see Stromberg & Caswell, 2015 for reviews).

However, if it were to adopt the principles of Constructed Development Theory outlined in this thesis, it would be divisible by more meaningful factors (Intention, Awareness, Choice and Response) and thus offer clients a more developmental output. MBTI could differentiate from other trait-based systems by offering the 16 categories of personality at each level of the Thinking Quotient scale (I or II), thus increasing their output potential by 400% and creating a far more robust system at the same time.

Figure 8.42 illustrates the CDT principle in that the MBTI category definition of INTJ (for example) is a very different personality outcome at TQ2 than TQ5. It could also lead to the notion that INTJ is not accessible to TQ2 individuals, due to the nature of their thinking capacity. This would disrupt the MBTI system and potentially cause concern for proponents across the field as it exposes the limitations within, even with their new Step II system, as they are still only descriptions of traits, not actual origins of thinking and behaving. These limitations are very well documented in academia (Stein and Swan, 2019) and offering the four pillars of CDT as explored in the current thesis would ensure a more robust and rigorous outcome for the MBTI system.

	ISTJ	ISFJ	INFJ	INTJ
TOF	ISTP	ISFP	INFP	INTP
IQS	ESTP	ESFP	ENFP	ENTP
	ESTJ	ESFJ	ENFJ	ENTJ
	ISTJ	ISFJ	INFJ	INTJ
TOA	ISTP	ISFP	INFP	INTP
IQ4	ESTP	ESFP	ENFP	ENTP
	ESTJ	ESFJ	ENFJ	ENTJ
	ISTJ	ISFJ	INFJ	INTJ
тоо	ISTJ ISTP	ISFJ ISFP	INFJ INFP	INTJ INTP
TQ3	ISTJ ISTP ESTP	ISFJ ISFP ESFP	INFJ INFP ENFP	INTJ INTP ENTP
TQ3	ISTJ ISTP ESTP ESTJ	ISFJ ISFP ESFP ESFJ	INFJ INFP ENFP ENFJ	INTJ INTP ENTP ENTJ
TQ3	ISTJ ISTP ESTP ESTJ ISTJ	ISFJ ISFP ESFJ ISFJ	INFJ INFP ENFP ENFJ INFJ	INTJ INTP ENTP ENTJ INTJ
TQ3	ISTJ ISTP ESTP ESTJ ISTJ ISTP	ISFJ ISFP ESFP ESFJ ISFJ	INFJ INFP ENFP ENFJ INFJ	INTJ INTP ENTP ENTJ INTJ INTP
TQ3 TQ2	ISTJ ISTP ESTP ESTJ ISTJ ISTP ESTP	ISFJ ISFP ESFJ ISFJ ISFJ ISFP ESFP	INFJ INFP ENFP ENFJ INFJ INFP ENFP	INTJ INTP ENTP ENTJ INTJ INTP ENTP

Figure 8.42: MBTI with TQ levels

OCEAN

Many of the issues arising out of the MBTI model, such as dividing people into categories, lack of validity and reliability have been corrected by the Big Five model (Muldoon, 2020). The MBTI is an indicator of personality type. It will tell you how likely you are to be an Extrovert, whereas the Big Five is trait-based and will tell you how much of an Extrovert you are. However, as was mentioned in the literature review, a personality test will not tell you anything new: it will only tell you what you tell it (Scott, 2020).

According to the Five Factor Model (FFM) of personality, there are five universal factors of personality (Goldberg, 1990). Since Bowler, Bowler & Philips (2009), this has been contested, especially from a position of cognitive complexity. The FFM is the best-known model of personality (Funder, 2001) and despite this popularity, the nature of the appropriateness has been continually debated (De Young, 2010; Srivastava, 2010). The actual number of factors is one of the most contested aspects of the research (see Simms, 2007; Bowler, et al., 2009). However, as was demonstrated throughout this thesis, from a Constructed Development perspective, the implications of social perception on the Big Five are interesting. Srivastava (2010) noted that it is impossible to separate measures of personality from the inaccuracies of human perception. The principle being that the FFM represents 'dimensions of perceived personality' (Saucier and Goldberg, 1996), and Fiske (1994) noted that the FFM is useful for understanding "*how people perceive people*" (p. 124) and is based on "*interpretations or small generalizations from perceived behavior*" (p. 123).

With this in mind, it would be interesting to extend the findings of study 5 and discern whether a high level of self-awareness manifests as a high level of 'other-awareness' in the sense of thinking and behaviour prediction. This begins with an issue for the FFM model in that Bowler, Bowler and Cope (2012) determined, rather unsurprisingly, that cognitive complexity has an impact on the FFM where those at the lower end of the complexity scale

had a different personality structure to those at the higher end. Despite Bowler et al.'s (2012) study utilising the Construct Repertory Test by Bieri et al. (1966), these findings would be consistent with the findings of studies 3 to 5 in this thesis.

Roberts, Walton & Viechtbrauer (2006) published a meta-analysis of longitudinal studies of mean-level personality trait change across a lifespan. Ninety-two longitudinal studies synthesised the Five Factor Model into six factors by dividing Extraversion into Social Vitality (general sociability and gregariousness) and Social Dominance (confidence, autonomy and dominance) as these were two aspects of Extraversion that changed differently with age (Helson, Jones & Kwan, 2002). Agreeableness, Conscientiousness, Social Dominance and Emotional Stability means increase over time, which could be a reflection of personality maturity in adults (Caspi, Roberts & Shiner, 2005). From an CDT perspective, it is not established in the longitudinal studies if the changes were due to increases in either Dynamic Intelligence, cognitive complexity or simply greater life experience (which would contribute to DI), and it is for this reason that future research on OCEAN would be an interesting extension to the current study. It would again offer a reason for, and a means to facilitate trait-based growth where none exists currently.

Extending this principle, the research question would be: *What impact would Constructed Development Theory have on the facets of OCEAN*? As traits are habituated behavioural responses, and trait measures make no reference to their psychological roots, or the cognitive process that generates them, the subsequent hypothesis would be that any traitbased psychometric is representative of only the Response pillar of CDT (IACR) and if the other three pillars were introduced to the facets of OCEAN, then the output of any FFM profile system would have greater meaning due to the interjection of a measure for Intention, Awareness and Choice within the system. These are currently missing from all trait-based profile tools. This principle has the potential to be a major contribution to trait-based systems.

OCEAN is an acronym for the following personality traits:

- Openness
- Conscientiousness
- Extraversion
- Agreeableness
- Neuroticism

These Big Five are then sub-divided into 31 further facets that are then the basis for questions that help a psychologist to determine how one thinks about their willingness to be 'open to new experiences', or how they 'charge their batteries once exhausted by life'.

Whole Trait Theory (Fleeson & Jayawickreme, 2015) proposed that the socialcognitive mechanisms explain the Big Five grouping by virtue of accretion. In other words, the narrow traits (e.g. Activity, Assertiveness within Extroversion (see Figure 8.43)) become linked together and then psychologically influence each other and their container trait.



Figure 8.43: An example of the breakdown of OCEAN facets by CI's

It is argued here that this is not an explanation but a description, as has been the contention throughout this thesis. That is, the explanatory part of traits indeed does consist of countless narrow traits relating specific features of situations to specific behaviour reactions. However, these narrow traits accrete over time into broader traits. Accretion means that the narrow traits become linked together and influence each other psychologically. It is these accepted definitions and behavioural outcomes that Constructed Development Theory will challenge in future work, which begins with a lack of choice, and ends with a prophetic action of imitation of the results (rather than being a true depiction of personality). For example, a study from the University of Oregon found that the Big Five model does not apply among older populations in Western countries (Scott, 2020). What are the underlying reasons for this, if not an individual's potentially greater Dynamic Intelligence as they have aged and gained experience? Further to this, a team of researchers in Bolivia found that personality traits did not cluster into the Big Five groupings when they surveyed members of a tribe of hunter-gatherers (Stirrett, 2020). If the Big Five traits are not consistent across different cultures, generations and geographies, then the test is not measuring "stable" human traits, and individuals are not truly being compared with the overall population. Nevertheless, the Big Five traits have been found in more than 50 countries around the world, meaning they can be seen as being relatively consistent across different cultures (Stirrett, 2020).

For the purposes of future research, building upon the findings within the current study, it is hypothesised that the facets of OCEAN are divisible by the facets of Constructed Development Theory and that the process of Dynamic Intelligence offers a more robust depiction of a person's intentions as a driver of personality, which in turn offers a better definition of who and how they are in the world. In other words, their personality is a function of their construction of self in the world, based on their awareness of their constructed intention. As such, tools that profess to measure personality have, so far, failed to determine the level to which an individual is capable of constructing their personality, and to what degree certain facets of their personality are a choice.

Personality could thus be considered a function of one's Constructed Development and better-measured by the four pillars: Intention, Awareness, Choice and Response, and by Dynamic Intelligence than systems that neither understand choice nor seek it by questioning thinking in the moment. Using Dynamic Intelligence as the foundation for measurement, 'Conscientiousness' thus becomes an intention. It would then be possible to measure an individual's *intentional Conscientiousness* rather than simply implying they are conscientious. An example of the deconstruction of 'Extraversion' and its additional facets by Cognitive Intentions can be seen in Figure 8.43.

An alarming output of the OCEAN system is the obvious overlap of the facets of each trait when deconstructed using Cognitive Intentions (*seen in red in Figure 8.43*). For example, in order to be "assertive" one needs to demonstrate 'Forceful'. However, from a meaning-construction perspective, can one be assertive without being forceful? Further to this, how does the meaning change between an individual at 20 years of age, and when they reach 40 years of age? The argument is that the word's meaning remains constant, and thus a question based on 'Assertiveness' has construct validity over time due to the same person using it in context each time.

However, the manner in which an individual uses 'assertive' behaviour is quantifiably different according to the results of Study 5 depending on their Thinking Quotient level. At TQ2, an assertive person is less-aware of their construction of self and the ramifications of their assertiveness than a person at TQ5. This affects *how* they are assertive, which is not interpreted by the trait-based questionnaires. At TQ2, the individual is not assertive with choice: they are simply acting assertively in an habituated manner, which is tantamount to bullying in various contexts. This is also omitted by the traditional trait-based psychometrics and further reinforces the perspective that they only represent the Response pillar of CDT.

Thus, measuring Dynamic Intelligence within the OCEAN system, would determine how much of each facet is a choice. See Figure 8.44. This would contribute to personality theory and trait theory dramatically.



Figure 8.44: The TQ scale as applied to the facets of OCEAN

Cognitive Development Framework

Finally, the true test of a system is when it is pitted against an existing system and can either produce equivalent results or supersede the benchmark in its output. In the same way Loevinger (1976) used psychometrics to validate her work, it could be argued that the ultimate test of Constructed Development Theory, Dynamic Intelligence and the Thinking Quotient will be to validate the TQ output against Laske's Cognitive Development Framework (Laske, 2015: p47) via a professor at Flanders University, Belgium, who has, in conversation with the researcher, agreed to help test the Thinking Quotient output.

This will be achieved by the professor putting forward twelve interviewees whom he has taken through the CDF and has validated their cognitive complexity level (e.g. 3.2) based on Laske's CDF. Each will undertake an Identity Compass profile and then the results will be fed through the Thinking Quotient system, and an alignment of their CDF Stage and their TQ score will be measured and compared.

The hypothesis is that it will be possible to differentiate those CDF profiles at the higher end of Laske's scale from the lower end based on their TQ scores. In other words,

where someone scores 4.0 or above on Laske's system, they would be expected to score higher on the TQ (4 or above), thus demonstrating that a more balanced awareness, or higher Dynamic Intelligence, is directly comparable to cognitive and social-emotional complexity. Should this be the case, it would offer support for the assertions made here that stage development does not necessarily exist, and that Dynamic Intelligence is intrinsic in vertical growth, with the facets of growth being those component Cognitive Intention combinations that form our Thinking Style.

Chapter Summary

If we take into account the findings of Chater, (2018) where he states that his studies demonstrate we do not have any internal processing of information, biases or otherwise, the natural conclusion to this thesis is one of abject prediction. Further to this, if Chater's findings are true, then they impact every field and discipline within psychology. Emotions do not exist (Feldman-Barrett, 2017), and thus EI does not exist. There is no complexity in our thinking by virtue of the lack of depth, and thus stage development does not exist. We cannot know our processing in the background, and even though we could try to 'go inside' in order to meditate on the self-reflection, it is impossible to know the unconscious mind.

However, there is an element of construction in both Barrett's and Chater's work, as discussed, and it is this conscious or unconscious need to be consistent in our construction of self over time that Constructed Development Theory offers as a process and measure for this construction, utilising Cognitive Intentions as component parts of Barrett's and Chater's thinking. By understanding that there are fifty Cognitive Intentions as we undertake any endeavour, (domain-general) whether it be a post-graduate course in university, or a decisionmaking process in a large organisation, our Style of thinking can be deconstructed into specific combinations of Cognitive Intentions. This gives a contextual measure (domainspecific) of one's capacity and allows for a more accurate prediction of behaviour. It is this

measure that simultaneously unites and separates Constructed Development Theory with/from stage development.

It also allows us to focus in on domain-specific thinking by virtue of the combination of Cognitive Intentions employed by the individual in context. The theory of Constructed Development can thus bridge the gap between domain general and domain specific thinking.

The reframe on their meaning and combination into Thinking Styles is the measure of Dynamic Intelligence, as it allows us to know our awareness of our Cognitive Intentions in the moment. The greater our awareness of our intentions, the greater our Dynamic Intelligence. Chater (2019) states: "*The search for meaning is the object of each cycle of thought; and finding meaning is about finding coherence.*" (p.463). This is interpreted as support for the concept of Cognitive Intentions from a timeframe perspective. One searches for similar meaning over time in order to remain authentic, hence the creation and repeated use of Cognitive Intentions. Also, this is the misconception behind personality research, to which CDT contributes a new understanding.

Finally, it is not necessarily the Cognitive Intentions that are key to self-awareness, and not necessarily the building blocks of Constructed Development. If self-awareness is akin to cognitive complexity, as has been suggested here with the alignment to Kegan's and Laske's frameworks, then in essence, one could measure any facet of self-awareness and apply the four pillars of Constructed Development to the output in order to gauge an individual's level of Dynamic Intelligence. Thus, the level to which one is self-aware becomes the function of Constructed Development, not the CI facet itself.

Thesis Conclusion

As was mentioned in the literature review, by '*thought*', Descartes meant anything '*marked by awareness or consciousness*' (principle I9). It is the very mental acts of thinking, doubting, believing, or sensing that proves one's existence. The awareness that one is doing

one of these things amounts to the awareness that one exists, because we cannot do these things without existing. Descartes' intention was to prove we think and thus exist. It has been argued throughout this thesis that a more appropriate phrase would now be:

cogitandi mea intentio est, ergo sum - 'my thinking has intention, therefore I am'.

This thesis has developed over time to allow a new concept of thinking construction and awareness to emerge that goes some way to explaining how and why adults think and behave in a domain-general and a domain-specific way. It was also demonstrated that two people operating within the same environment can have two different Thinking Styles, resulting in very different behaviours. The emphasis has been on their capacity to be aware of their thinking and behaving in the moment, which has been shown to be measurable via the Thinking Quotient scale; and further to this, to be aware of their awareness of their thinking in the moment, which is a metacognition for adults. Propelled by the findings of Daniels (2010), whose clinical study found that changes in thinking patterns would give rise to changes in behavioural patterns, the relationship between thinking and behaving is thus dynamic and measurable.

This is a contribution to science and psychology in as much as adult metacognition has not been addressed before from the perspective of Intention, Awareness, Choice and Response (CDT). The combination of Cognitive Intentions has been shown to produce different levels of self-awareness, which manifests in different Thinking Styles and thus different outward behaviours (called here Dynamic Responsiveness). These outward behaviours have been shown to influence and impact an individual's personality and offer a more robust measure of personality than current trait-based products.

Thinking Styles can be categorised and labelled on a scale that offers an explanation of Dynamic Responsiveness as a result of increased choice in one's Cognitive Intention

awareness. This scale was shown quantitatively in study 3 to be significant and thus supportive of the theory.

Where it was stated in the Literature Review (chapter 1): "... whereas Piaget's [developmental] stages are perfectly accepted as descriptions of behaviour, they have no status as explanatory constructs" (Brainerd, 1978, p.173) it has been argued throughout this thesis that the use of Cognitive Intentions and their combination into bespoke Thinking Styles has provided a developmental causation for differing behaviours at the various stages of the Thinking Quotient scale. With future research, the ideas presented here could impact child stage development enormously as researchers discover more about how a child (student or otherwise) constructs their thinking based on habituated Cognitive Intention use. This would be a new approach to understanding behaviour for children in context and would establish CDT as a foundational theory in the evolution of thinking and behaving going forward.

The qualitative data in study 5 further substantiated the theoretical underpinnings of the theory with the lived experiences of the interviewees supporting the construction of self based on the Cognitive Intention combinations, and the inherent awareness (or lack of) that resulted in an appropriate score on the Thinking Quotient scale. The aim of the Discussion chapter has been to emphasise the underlying theme throughout this thesis as levels of selfawareness and the resultant adult metacognition as the foundation for one's cognitive development.

It is this concept of <u>how</u> we construct our thinking in the moment in order to build on our awareness as a springboard to cognitive development that this research has been shown to support. By researching those common denominators between similar psychological constructs found in the literature review and reframing their main aims, this study has combined elements of metacognition, stage development, general intelligence, epistemic philosophy and others, into a new umbrella conceptual framework that has emerged from the

literature review and through the five studies that could be considered *adult metacognition*. This framework has been termed "Constructed Development Theory" due to the nature of the momentary awareness that separates it from traditional metacognition.

As discussed in chapter 8, if in the future, Constructed Development Theory is configurable into a discrete psychological field of study, then one could eventually become a *Constructed Developmental Psychologist*.

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Appendices

Appendix 1 – A Description of Laske's Stages

This information is taken from Laske's (2015) book: *Measuring Hidden Dimensions: The Art and Science of Fully Engaging Adults* (volume 1). Interdevelopmental Institute Press (IDM Press).

Stage 2: Clients can only hold a single perspective, their own, and therefore:

Others are only known as instruments of satisfying clients' own needs and desires. Imagining *others*' thinking and feeling about others is not possible. Others' thinking and feeling do

not influence or determine clients' goals, decisions, and actions.

Competitive careerism is in the foreground. Individuals at this stage cannot function as change agents since their grasp of their environment and others' needs is cognitively inadequate.

Stage 3: Clients define themselves by the expectations of physical and/or internalized others, and therefore:

- They *cannot* distinguish internalized others (conventions) from their own authentic and unique self (which they have not yet developed).
- They do *not* have a self-authored system of values and principles in place, and therefore act according to consensus.
- They experience loss of self (abandonment) *when not approved by the group or community*, and thus cannot "go it alone" and stand up for their own decisions.
- They are *not aware of how embedded they are* in the social fabric and are therefore confused as to where failures come from.
- They *cannot* "manage," and even less, "lead," others, even if their social position requires it and they espouse doing that.
- They are *not* good change agents since they *cannot oppose and act beyond consensus*.

Stage 4: Clients define themselves by their unique, history-derived individuality that determines their integrity, and therefore:

- They find it hard or impossible to stand back from their own peculiar individualistic values and principles (ethics).
- They can respect others but not really stand in others' shoes or motivate others.
- They are able to go beyond consensus and act on principles, but may be relentless in applying principles (*their own unreflected principles*).
- They are potentially good change agents but may *not* think systemically enough to take their environment, and their own limitations, sufficiently into account.
- They may be *out of touch with their team(s)*, following the voice of a *lonely rider* or hero.

Stage 5: Clients have transcended their idiosyncratic life history, career successes and failures and, no longer identified with a particular part of themselves, can "lead" others. This entails:

- While they are good change agents, able to embrace divergent opinions and motivate others, they may lack true peers operating at their own level.
- They may be "lonely" and feel misunderstood, undervalued, and unseen.
- They may be seen as "weak" because they are not interested in control.
- They may be unable to elicit others' truthful feedback, especially when in a position of power that hinders others' truthfulness from emerging.
- They may be acting on behalf of a vision they cannot fully convey and may thus fail to get the support they need to benefit the whole.

Alternative Stage Descriptions for comparison

Qualities of a Socialized Mind (adapted by DeLauer *et al.*, (2014) from McGuigan & Popp 2007)).

1. Literal, descriptive understanding of processes.

2. Unquestioned conformity to peer, social, or legal norms.

3. Guilt, hyper-awareness of others needs even if those are imagined, e.g., "I am responsible for your feelings and vice versa."

4. Differences threatening.

5. Invisible and unquestioned assumptions.

6. Ambiguity challenging.

7. Criticism as destructive to self – need a sense of belonging, driven by need to be

understood, aligned with, validated by and connected to a person, group or philosophy.

Qualities of a Self-Authoring Mind (Adapted by DeLauer *et al.*, (2014) from McAuliffe (2006)).

1. Aware and sensitive to others' feelings but not responsible for them.

2. Differences respected and valued.

3. Former assumptions examined, accepted or rejected.

4. Concern with consequences for personal integrity and meeting one's own standards.

5. Integrates others' perspectives including criticism as one perspective among many.

6. Self-initiating, correcting and evaluating rather than dependent on others to frame problems and determine if things are going well.

7. Conceives of processes from the outside - can see one's part in relation to the whole.

Qualities of a Self-Transforming Mind (Adapted by DeLauer *et al.*, (2014) from Rooke & Torbert 1998)

1. Engages with others to self-evaluate.

2. Experiences internal paradox, contradiction, and ambiguity as normal.

3. Allegiance to larger principles not rules.

4. Embraces the tension of not knowing something to purposely take on multiple perspectives on issues.

5. Recognizes that ambiguity is the norm and that standards and methods are constructed in a world in which dialogue is the only foundation for knowing – understands that all knowledge is constructed through human interaction – more comfortable engaging in collaborative inquiry where meaning emerges.

Appendix 2 – Meta-Programme List and Definitions

This information is taken from Arne Maus' (2019) book: *Getting People Right*! (p62 - 125). The Meta-Programmes (or Cognitive Intentions) are listed in order of the Identity Compass output. These are direct copies of the definitions, replicated here with permission from the author.

Seeing

People who have a preference for seeing can be easily recognised by their rapid speech. A picture says a thousand words, and our mental pictures can change in an instant. So, when these people try to share the images they have in their minds, in whole or even just in part, they must naturally speak very quickly. This fast speaking necessitates a way of breathing that occurs primarily in the area of the chest. The eyes frequently look upward. These people use such expressions as, "I cannot picture that.", "This is clear.", "I see what you mean!" etc.

Hearing

People who have a preference for hearing are recognised by a musical manner of speech. Their speech is noticeably slower than that of visual people, and they make skilful use of pauses. Their breathing comes from the diaphragm. Their eyes frequently look to the right or left. They use such expressions as, "That sounds familiar.", "That's in tune!", "That sounds good." etc.

Feeling

People who have a preference for feeling can be recognised by a deliberate way of speaking. They talk very slowly and make frequent pauses in their discourse. Their breathing comes from the lower abdomen. Their eyes often look down. They use such expressions as, "I can't quite grasp that.", "It is difficult to get the sense of it.", "That feels good." etc.

People

People with this thinking preference direct their attention toward other people. In their work they want, more than anything else, contact with people. Basically, this preference, in combination with the sensory preference "hearing", enables a person to remember names very well, or, in combination with the sensory preference "seeing", to remember faces. These people are person-oriented.

Places

For people with this thinking preference, their attention lies chiefly with their surroundings. They do quite well in new situations. They have a sense for spatial patterns or a good sense of direction. If you arrange a meeting with this kind of person, you would do well to choose an attractive meeting place with a pleasant atmosphere. For these people, where they work is important, especially what kind of ambience it has and what kind of view they have from it.

Activities

People who pay attention to activities are primarily interested in what they can do. Even at work they like to be in motion. They interest themselves in the "how" and the "what" and "what kind" of activity they are currently taking part in. For them it is important to know what they can undertake.

Information

People who are concerned with information are interested most of all in what knowledge they can glean about the situation they find themselves in. They take an interest in the history of the firm and in the relevant facts and figures. It is also important for them to know the exact time. They have a fundamental desire to learn new things, either in a new situation or on the job. Low scores may indicate a tendency to arrogance.

Things

People who pay attention to things are mostly interested in what physical items they are able to work with in their jobs, such as automobiles, computers or other technological devices, jewellery, etc. They are especially happy when they are able to handle the kind of equipment that interests them. Their attention is fixed primarily on concrete objects.

Own

This is the emotional perspective. We are very much attached to our own values and feelings. This perspective is important for achieving an awareness of one's self and one's own needs. People that score low in the preference "own" have little or no awareness of their own needs; it is likewise the opposite with people who score high in this preference. This does not depend on whether or not the perceived needs are being satisfied. That is another matter and is characterised as "caring for self" under the thinking structure "primary attention" (see the section "Primary Attention").

Partner

This is the empathetic perspective. Here we are more concerned with the values and feelings of the person we are interacting with. If someone functions exclusively in this perspective, it can lead to burn-out. This perspective is important for understanding others. Good counsellors and salespersons often adopt this attitude.

Observer

This is the neutral perspective. This perspective is not in any way associated with feelings. It is important for understanding how to deal with another person. Since this attitude is unemotional, it helps people to stay "cool", even in volatile situations. For example, the observer perspective is very desirable among air traffic controllers and similar professionals. On the other hand, a client would not like a therapist to have that as a strongly preferred perspective. For a therapist to operate from this position would prevent them having an empathic understanding of the client. He would be perceived by the client as cold and aloof.

Influence

Some people are especially motivated by the will to exert influence. This is likely to be found with particular frequency in politicians. Wanting to control things is especially important for managers. Otherwise, they run the risk, not of leading, but of being led. This is their strength, to lead, to run things, and, if necessary, to be forceful about it.

Affiliation

Behind this motive is the desire for attachment — the wanting to belong. What these managers want from their employees is simply to be loved. They feel themselves to be the kind fathers or mothers of the organisation. In their collaboration with others, they think in terms of creating win-win situations. They are often very cooperative.

Achievement

People with this motive take great pleasure in competition — not competition with other businesses, but a fair contest between people. These people want to prove themselves through accomplishment. It is important to them to reach goals and find solutions.

Away From

When you are working together on a project with a colleague who has as their primary tendency "away from", it will soon become apparent to you that, in the course of discussion, this colleague is repeatedly spelling out why something is likely to go wrong, what risks might arise, etc.

"Away-from" people are problem-oriented. In their mind, they are playing out a problem-avoidance strategy. Their attention is drawn to things that are not supposed to happen; they see that there are always more things that need to be considered. Every idea is analysed to find out whether it will work or not and to see what risks there might be. In innovation teams especially, this approach will be felt as a hindrance. The employees who particularly need this capability are the ones in quality assurance, quality control or the office of the controller.

Towards

When you are working together on a project with a colleague who has as his primary tendency "towards", you will soon notice that in discussions this colleague will repeatedly explain what the actual goal is. If you get into lengthy discussions about problems, then they will want to direct the general focus back to the goal. If they cannot do this, they will become impatient or inwardly shut down. Indeed, when the "towards" preference shapes a person to an excessive degree, the compulsion to reach the goal may overshadow their ability to see problems that might possibly arise. People like this sometimes behave like little children who run right into the street to retrieve a ball. In their eagerness, they forget to watch out for the traffic.

Internal

Internal people evaluate their performance or their work results for themselves. They are autonomous in their judgement. When this tendency is strong, these people have a hard time accepting suggestions from others or dealing with any feedback they may receive. If they do receive feedback, they will first consider how competent the giver of it is.

External

External people need feedback from outside themselves. They depend almost entirely on someone else to judge what they do. And they are barely able to evaluate their own performance for themselves.

Options

Does this sound familiar? After the delivery of some new technological gadget, people who are option-oriented unpack the device and start to just play around with it until it works. Only when they have gotten as far as they can by trial and error will they turn to the instructions for help. Then they take a quick look at the handbook to solve the specific problem they are facing. The crucial question for them is: "How else could this work?" Instructions, plans, exact specifications — these things make them feel restricted and de-motivated.

Procedures

Procedure-oriented people will take the new gadget and set it up with the aid of the instruction manual. They will look for the "proper way" and will ask themselves, "What must I do?" They work within established systems and in accordance with proven models. Once they have found a path that leads them to their goal, they will probably pursue that same path over and over again. It is important to realise here that these people's thinking is neither simple nor simplistic. Picture in your mind the complete circuit diagram of a computer. It is anything but simple. It is highly complex. And it is perfectly procedure-oriented. Every time you press the "A" key, that signifies an "A" for the computer. It cannot ever interpret it any other way.

Caring for Self

Self-caring people are concerned first and foremost with themselves. These people are generally good at looking after themselves. They know what they need and are able to obtain it without much advice. They usually treat themselves with care and are very attentive to their own needs. (This does not mean that they are egotists.)

Caring for Others

People who are oriented toward caring for others are perceived to be helpful, considerate and courteous. This is because they are concerned first with others and only then with themselves. So, they are very good at looking after other people.

Pre-active

Pre-active people react pre-emptively. When notice is given that a re-organisation of two departments in a company will take place within the coming year, this alone will prompt pre-active people to act, even though there is still absolutely nothing concrete in the works and the time frame is still unclear. This thinking preference is ideal in job functions that are concerned with issues of prevention (for instance, warehousing, etc.). The foresight such people possess is also important for quality assurance.

Active

Active people, on the other hand, act spontaneously. They begin to act exactly when a problem first arises. Their thinking is normally less foresighted, and they do not make plans for every contingency.

Re-active

Re-active people analyse; they weigh pros and cons. First, they form an image of the entire situation, and then they act. This thinking preference is important in areas where quality is an issue.

Non-reactive

"Non-reactive" here does not mean "doing nothing". Rather, it means "not reacting to external influences". Once they have begun to pursue a path, non-reactive people will not let anything divert them from it. They are persistent and are good at "riding things out". This thinking preference is important when it is necessary to persevere — to push something through in the face of much adversity.

Sameness

When sameness-oriented people find themselves in a new situation, they first try to determine what is similar about the new situation, as compared to earlier ones. That which is stable and familiar gives them a sense of security and therefore also motivation. They have problems perceiving differences, and they do not like major changes. This is why they pay so much attention to similarities. This thinking preference is important for discerning patterns.

Sameness with Exceptions

When people with the orientation "sameness with exceptions" find themselves in a new situation, they, too, will notice first what is already familiar to them. They also try to identify what is different. They want everything, on the whole, to stay the way it is, but they accept changes and can deal with them. This thinking preference is important when gradual processes of development are involved.

Difference with Exceptions

When people with the orientation "difference with exceptions" are in a new situation, they will quickly realise what is different from their previous experiences. Only after that will they turn their attention to the ways in which the new situation resembles former ones. This thinking preference makes it possible to adapt rapidly to new circumstances, as well as helping to maintain a stable environment.

Difference

When difference-oriented people find themselves in a new situation, they first try to determine in what way this new experience differs from previous ones. For instance, they can tell at a glance what has changed within a room. On the other hand, they have difficulties recognising patterns. They pay attention to differences, because they love the variety that comes with change. This thinking preference is important for detecting errors.

Consensus

Consensus-oriented people are likely to be team-oriented. They respond to others with conformity, and thus they normally do what they are told. It comes naturally to them to be in agreement with others. They are interested in forming consensus.

Polar

Polar-oriented people are likely to have a contrary reaction to others. They normally do exactly the opposite of what is expected of them. These reactions of polar opposition are dissociating responses, which these people use to emphasise their independence.

Vision

Vision-oriented people exhibit a great deal of creativity, willingly putting forth new ideas. The question that drives them forward is, "What can we do?" If a person is strongly vision-oriented, they will sometimes not be able to conceive of how an idea can best be put into practice. Most of the time, then, exercising control over quality is what these people would least prefer to do. Their thinking is far removed from that of people who have a great predilection for quality control. These are the doubters, so to speak, the ones who take the splendid proposals of the visionaries and find fault with them, to their considerable annoyance.

Realisation

Realisation-oriented people love taking what has been planned and putting it in motion. They are not so interested in the "what". The question in their hearts is, "How can we do it?" They are the engines of implementation. When someone says to them, "Say, I have an idea, namely... But I have no idea how to go about it doing it", this brings out the best in them. They are very creative in finding ways to take an idea and make it real.

Quality Control

Quality-control-oriented people are fixated on taking an idea and detecting the inconsistencies in it. They are eager to examine and test ideas to see what flaws, errors or other problems there may be. In this way, they try to ensure the quality of a product or service. The driving question for them is, "Why is this the way it is?" They might also ask, "Where is the catch?" Or, "Where is the proverbial fly in the ointment?" For them, vision-oriented people are often merely dreamers, who have little or no connection to reality.

Relationship

Relationship-oriented people focus more on the persons involved. It is important to them that the working climate is agreeable and that everyone in their vicinity also feels at ease. A person with high scores in relationship may fall behind in their assigned tasks.

Task

Task-oriented people, on the other hand, look upon the accomplishment of an assigned task as their primary goal. They want to complete their assignments, meet deadlines, and get everything done as quickly as possible. When this thinking preference is very strongly pronounced in a person, there will be a danger that they will demand too much of themselves or their colleagues. This is because the task will have absolute precedence over their own sensitivities as well as those of their colleagues.

Global

Global-oriented people see only the forest and cannot tell at first glance if the trees are spruce or fir. By contrast, detail-oriented people can see the woodpecker sitting on a branch, before they become aware of the forest all around them. Global-thinking people can easily detect connections and patterns. They like to keep sight of the broad view and are inclined to generalisations. Their learning style leads them from the general to the specific. If you give them too many details, they quickly lose interest. They will lose track of the big picture, and this will cause them to become bored.

Detail

Detail-oriented people need the details first. They create a broad view for themselves by assembling the details piece by piece — like putting together a puzzle. They focus on the particulars of a task and like to discuss examples. Precision and accuracy are important to them. Their learning style leads them from the specific to the general. If you give them only general information, they can easily become confused or even distrustful.

Abstract

Abstract-oriented people prefer to think in terms of relations and principles. They like to work with symbols, as for instance in mathematics. They begin by making sketches, designs and plans for themselves, before trying to implement an idea. If a person who is both global oriented and an abstract thinker looks at a forest, he will contemplate the meaning of the forest for the environment. An abstract thinker who is also detail-oriented will not see the forest; he will look at the structure of a leaf and ponder the meaning of all those lines and patterns for the life of the tree.

Concrete

Concrete-oriented people look for and need plain facts and specific examples. In the example above, the person who is both detail-oriented and concrete-oriented will simply perceive the structure of the leaf. "Ah, a leaf," they will say. The person who is global and concrete-oriented simply sees the forest and says, "Ah, a forest."

Team-players

People who are team-oriented prefer to accomplish their work assignments in teams. It is important to them to share both the work and the responsibility, and to work collectively on a partnership basis. Because of the team, they are more motivated and work faster.

Group-players

People who are oriented as group players like to have people around them, but want to have their own area of responsibility. They will gladly share the work, but not the responsibility.

Individualists

Individualist-oriented people prefer to accomplish their tasks by themselves. They want to schedule their time independently, and they do not like it at all when others try to interfere in the performance of their duties. They do not like to share either work or responsibility.

Past

In new situations, past-oriented people think about their experience and remember similar situations in the past. Thus, they have the ability to learn from the past.

Present

Present-oriented people live in the here and now. They have easy access to what is actually happening, and they do not let themselves be influenced by the past. They are also not quick to think about what might happen in the future. Thus, these people are very much "in the moment" and are often very spontaneous.

Future

Future-oriented people are quick to develop future plans out of present situations. They look at a situation as an unfinished story, and they are eager to tell the next chapter. They are always asking themselves what the present situation can reveal about the future.

Long-term

Long-term-thinking people make plans. That means they feel at ease when they have a concept of what will happen over the course of weeks, months or, if necessary, even years. These people understandably find it difficult to make last-minute changes in their timetable. This is especially true when they are procedure-oriented at the same time.

Short-term

These people find it difficult to allocate their time and to make plans. They are spontaneous and do not plan very far ahead. Long-term timetables are anathema to them, because they have the feeling of being bound by them.

Looking

Looking-oriented people like to observe their fellow human beings. They want to take a look at what is going on, and they decide in favour of something if it "looks good" to them.

Listening

Listening-oriented people get their decision-making criteria from talking about a situation and discussing it with others. It has to "sound right" for them to decide in favour of something.

Reading

Reading-oriented people love prospectuses, documents, test reports and transcriptions of customer opinion surveys, even professional journals. They put their trust most of all in what they have read, and they will decide in favour of something if it "makes sense".

Doing

Doing-oriented people try everything out for themselves before they decide on something. The basis for their decisions is their own experience. That is why people who make hiring decisions, for example, often like to work together with an applicant for some time, to get a "feel" for how they work, before making a decision about them. They need to know how someone works, and only by working with them can they experience this "up close".

Sceptical

Sceptical people generally exercise caution before becoming truly convinced. They are continually sceptical and maintain a basic distrust of everybody and everything. This is an important preference for quality control, because they are always checking everything and everybody over and over again. This kind of person is eminently suited to aircraft maintenance and other types of safety-related activities.

Trustful

Trustful people, on the other hand, approach an issue with the basic feeling that everything is okay. They need neither evidence nor witnesses to believe that something works or is true. Their strategy is to trust first and verify afterwards.

Appendix 3 – List of Personality Profiles

The list of tests for "personality" is almost endless! However, this appendix contains a list of the better-known tests as well as those mentioned in the thesis. It is not intended to be a definitive description of each test and its capabilities. It is purely for information purposes.

Eysenck's Personality Theory

Eysenck (1952, 1967, 1982) proposed a theory of personality based on biological factors, arguing that individuals inherit a type of nervous system that affects their ability to learn and adapt to the environment.

Cattell's 16PF Trait Theory

Cattell (1965) disagreed with Eysenck's view that personality can be understood by looking at only two or three dimensions of behavior. Instead, he argued that that is was necessary to look at a much larger number of traits in order to get a complete picture of someone's personality.

Allport's Trait Theory

Allport's theory of personality emphasizes the uniqueness of the individual and the internal cognitive and motivational processes that influence behavior. For example, intelligence, temperament, habits, skills, attitudes, and traits. Allport (1937) believed that personality is biologically determined at birth, and shaped by a person's environmental experience.

Authoritarian Personality

Adorno et al. (1950) proposed that prejudice is the results of an individual's personality type. They piloted and developed a questionnaire, which they called the F-scale (F for fascism).

Adorno argued that deep-seated personality traits predisposed some individuals to be highly sensitive to totalitarian and antidemocratic ideas and therefore were prone to be highly prejudicial.

DISC basic personality types model

There are different interpretations of this model, based on the same underpinning structure. This presentation of the DISC model borrows from various interpretations. The colours mainly emphasise the columns - they are not part of the original DISC theory - but they also reflect the logical correlations to two of the Four Temperaments and Keirsey main types (D = Phlegmatic/Rational; I = Choleric/Idealist) and the Jungian Extravert-Introvert 'attitudes'. Other than this there is no attempt here to overlay the DISC model or personality traits directly onto any other personality model. There are overlaps and correlations between DISC and other personality systems but not a direct overlay.

Belbin® Team Roles

Dr Meredith Belbin, UK academic and consultant developed the Belbin team roles model in the late 1970s. Belbin's work at Henley Management College demonstrated that balanced teams comprising people with different capabilities performed better than teams that are less well balanced. Belbin's key book 'Management Teams - Why They Succeed or Fail', was first published in 1981. According to Belbin publicity (Belbin founded Belbin Associates, who produce and provide psychometrics (personality and behavioural testing) instruments and other related services based on Belbin's theories) the Belbin Team Roles model is used by over 40% of the UK's top 100 companies, and thousands more internationally.

The Big Five - OCEAN

According to McCrae & Costa (1987) is typically shown as:

- Neuroticism (vs Emotional Stability)
- Extraversion (vs Introversion)
- Openness to experience (vs Closedness to experiences)
- Agreeableness (vs Disagreeableness)
- Conscientiousness (vs Lack of conscientiousness)

Firo-b®

FIRO-B® stands for Fundamental Interpersonal Relations Orientation-Behaviour.

Developed by William Schutz in 1958, Schutz first used the FIRO-B® tool to assess how teams performed in the US Navy.

The FIRO-B® is an assessment tool used to help individuals and teams better understand their preferences in satisfying **three basic social needs**:

• Inclusion (the degree to which one belongs to a group, team or community)

- **Control** (the extent to which one prefers to have structure, hierarchy and influence)
- Affection (one's preference for warmth, disclosure and intimacy).

The Birkman Method®

The Birkman Method® consists of ten scales describing motivations (Interests) and occupational preferences. It also has eleven scales describing 'effective behaviors' (Usual behaviors) and eleven scales describing interpersonal and environmental 'expectations' (Needs). A corresponding set of eleven derived scales describe the associated 'less than effective' (Stress) behaviors when expectations are not fulfilled. Together, these eleven scales are titled Components.

Birkman method® and The 'Big Five' Factor Model of Personality Comparison

The Birkman Method® aligns with the FFM (<u>Five Factor Model or 'Big Five' or OCEAN model</u>), but also has sub-factors for Emotive, Social and Control Orientations. This provides additional insight into the personality and productiveness dynamics.

FFM Constructs ('Big Five' or OCEAN model)	Birkman Orientations	Associated Birkman Components
Neuroticism	Emotive Orientation	Empathy, Thought, Activity
Extraversion	Social Orientation	Esteem, Acceptance
Conscientiousness	Process Orientation	Structure
Agreeableness	Control Orientation	Advantage, Authority
Openness	Change Orientation	Change

This is included to demonstrate the futility of the creation of many tests that essentially measure the same thing. As mentioned in the thesis, they do not measure the underlying intention, awareness and choice or response an individual gains from knowing they use these in the moment.

Lumina spark

The Lumina Spark system was created in 2009 by Stewart Desson, founder of UK company Lumina Learning®. According to Desson, Lumina Spark was designed to expand on the <u>Big Five</u> models by measuring both ends of a measurement scale separately, i.e., not 'forcing choice' on a subject. High scores in a certain area therefore do not necessarily mean low scores in another, and participants can claim qualities at opposite ends of a polarity. The system also focuses on visual representation, creating engaging personality 'portraits' that are said to be easy for users to decode and use.

PRISM Brain Mapping

PRISM Brain Mapping is an online neuroscience-based instrument specifically designed to identify the behavioural (US-spelling behavioral) preferences that directly relate to personal relationships and work performance. Aside from the core 'Brain Mapping' instrument, PRISM systems also embrace and offer other established profiling and HR tools.

OPQ

Which stands for: Occupational Personality Questionnaire.

PARIO

PARIO (oiginally named PRISM, and since changed to PARIO, to avoid confusion with a different PRISM system) is a relatively very modern personality model and psychological profiling system, developed by occupational psychologist David Sharpley in the late 1990s.

Enneagram of Personality Types

The nine-point model developed by Gurdjieff et al during the 1900s.

DiSC

Introduced by Walter Clark in 1940, the DiSC personality profile was designed to measure dominance, influence, steadiness, and conscientiousness.

HEXACO Model of Personality Structure Personality Inventory

Website: Hexaco.org

The HEXACO model was constructed in the year 2000 to assess some of the personality dimensions, and theoretical interpretations, that had been outlined in earlier studies.

The model measures six major personality dimensions, namely: Honesty-Humility, emotionality, extraversion, agreeableness, conscientiousness, openness to experience.

Revised NEO Personality Inventory

Website: <u>Acer.edu.au</u>

Developed by Costa and McCrae in the 1970's and later finalized in 2005, the Revised NEO Personality Inventory (NEO-PI-R) was designed to measure and test the Big-5 personality traits that are outlined in the fivefactor model - namely: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism.

Myers-Briggs Type Indicator

Website: Myersbriggs.org

The MBTI measures whether an individual is extroverted or introverted, whether they have a sensing preference or an intuitive preference when it comes to processing information, whether they prefer to make decisions by thinking or feeling and whether they have a judging or perceiving preference about how they do things.

Minnesota Multiphasic Personality Inventory

Website: PearsonClinical.com

Introduced by Hathaway and McKinley in 1939, the Minnesota Multiphase Personality Inventory (MMPI) can be used to assess adult personality and psychopathology across 10 scales: hysteria, depression, paranoia, hypochondriasis, psychopathic deviate, masculinity/femininity, psychastenia, schizophrenia, hypomania, and social introversion.

Values and Motives Inventory

Website: PsyTech.com

The Values and Motives Inventory is designed to identify what drives and energises a person and where they are most likely to gain satisfaction from work.

The inventory measures interpersonal, intrinsic and extrinsic values as well as summarising possible motivating and demotivating factors to an individual at work.

Hogan Personality Inventory

Website: HoganAssessments.com

Also introduced by Hogan and Hogan in the 1980's, the Hogan Personality Inventory (HPI) is based on the five-factor model and the socio-analytic theory.

The HPI measures personality across key behavioural tendencies: adjustment, ambition, sociability, interpersonal sensitivity, prudence, inquisitiveness and learning approach.

Hogan Development Survey

Website: HoganAssessments.com

This psychometric measure was also introduced by Hogan and Hogan in 1994. The survey is designed to measure dark personality in an occupational setting across 11 traits: excitable, skeptical, cautious, reserved, leisurely, bold, mischievous, colourful, imaginative, diligent and dutiful.

Californian Psychological Inventory

Website: Psychometrics.com

Introduced by Harrison Gough in 1956, the Californian Psychological Inventory is designed to describe 'everyday behaviour' across 18-scales.

The inventory can be used for employee selection, individual development, succession planning, employee selection, employee retention, executive coaching and can outline performance improvements and motivation of individuals.

Personality Assessment Inventory

Website: SigmaAssessmentSystems.com

The Personality Assessment Inventory was introduced by Leslie Morey in 1991 to assess personality and psychopathology across four scales:

(1) clinical scales, which measures neurotic, psychotic and problematic behavioural tendencies; (2) treatment consideration scales, which measures aggression, suicidal ideation, nonsupport, stress and treatment rejection;

(3) interpersonal scales, which provides an assessment of whether someone is warmly affiliative versus coldly rejecting, or dominant versus submissive; and (4) validity scales, which are there to ensure the test is valid.

Personality and Preference Inventory

Website: MeritSolutions.com

Designed by Max Kostick in the early 1960's, the Personality and Preference Inventory is designed to comprehensively cover aspects of personality that are relevant to the workplace and is designed to elicit behaviours and preferences that are appropriate to vacant positions in the workplace.

Keirsey Temperament Sorter

Website: Keirsey.com

David Keirsey expanded on the temperament theory that was originally introduced by Hippocrates (outlined in the introduction to this blog).

The questionnaire measures personality across four temperaments: artisan, guardian, idealist and rational.

True Colours

Website: My-personality-test

Introduced by Don Lowry in 1978, the True Colours test was designed to measure four basic learning styles: independent thinkers, pragmatic planners, action-oriented, people-oriented.

Each of the learning styles represents a colour (hence the name), and each person can be a unique blend of all of four colours.

Caliper Profile

Website: Caliper.com.au

The Caliper profile is an employee and applicant assessment instrument that measures an individuals job performance potential and can find out which person is best suited for the job based on their intrinsic motivation.

Rorschach Inkblot Test

Website: TheInkBlot.com

Invented by Hermann Rorschach in the 1960s, the inkblot test is perhaps one of the most unique and 'quirky' personality tests out there.

Typically done in person, the inkblot test is an assessment where an examiner presents the participant with an inkblot, and the participant tells the examiner what they see.

Szondi Test

Website: Learning-Mind.com

Developed by Leopold Szondi in 1935, the Szondi test is based on the systematic drive theory and the dimensional model of personality.

During the test, participants are shown a series of facial photographs which represent people who have been classified as homosexual, sadist, epileptic, hysteric, catatonic, paranoid, depressive and a maniac.

The participants then pick the most appealing and most repulsive pictures, and it is believe that the one deemed most 'repulsive' displays something about our personality as we have formed an aversion, or become repressed to that psychological state.

TEIQue PAQuestionnaire Facet 5

For a full explanation of the majority of tests, please go to:

https://www.businessballs.com/self-awareness/personality-theories-and-types/

https://www.workstyle.io/best-personality-test

https://en.wikipedia.org/wiki/List of tests

Appendix 4 – Informed Consent Forms STUDY 2

Study 5 – Audio Consent Form

I, the undersigned, consent to the use of my words, images, images of my work or recordings of my voice being used within Coventry University publications or video case studies. I understand that this may be used for educational, marketing, and/or commercial purposes, and that copyright will reside with Coventry University.

I acknowledge that the quote, image or recording may also be used in, and distributed by, media pertaining to Coventry University's activities other than a printed publication, such as, but not limited to CD-ROM, DVD or the World Wide Web.

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Please complete the Participant details below and return the form to Darren Stevens, the University contact;

Participant's details:

Coventry University Contact:

Appendix 5 – Statistical Output *Table App5.38: Normality tests for 50 cognitive intention variables*

	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
Seeing	.129	32	.190	.935	32	.054	
Hearing	.152	32	.058	.958	32	.245	
Feeling	.153	32	.054	.938	32	.066	
People	.124	32	$.200^{*}$.902	32	.007	
Places	.092	32	$.200^{*}$.980	32	.809	
Activity	.225	32	.000	.890	32	.004	
Information	.172	32	.018	.898	32	.005	
Things	.119	32	$.200^{*}$.970	32	.502	
Own	.140	32	.114	.946	32	.110	
Partner	.115	32	.200*	.977	32	.712	
Observer	.126	32	$.200^{*}$.957	32	.221	
Influence	.122	32	$.200^{*}$.951	32	.151	
Affiliation	.145	32	.084	.947	32	.119	
Achievement	.130	32	.180	.967	32	.418	
AwayFrom	.126	32	$.200^{*}$.966	32	.402	
Towards	.181	32	.009	.879	32	.002	
Internal	.156	32	.045	.951	32	.154	
External	.145	32	.087	.965	32	.381	
Options	.139	32	.120	.960	32	.270	
Procedures	.145	32	.086	.945	32	.101	
CaringforSelf	.183	32	.008	.919	32	.019	
CaringforOthers	.118	32	$.200^{*}$.977	32	.697	
PreActive	.183	32	.008	.950	32	.142	
ReActive	.201	32	.002	.906	32	.009	
Sameness	.110	32	$.200^{*}$.971	32	.529	
Difference	.146	32	.080	.933	32	.046	
Consensus	.153	32	.055	.962	32	.309	
Polar	.166	32	.025	.936	32	.059	
Vision	.159	32	.038	.930	32	.039	
Realisation	.127	32	$.200^{*}$.951	32	.152	
QualityControl	.133	32	.163	.947	32	.118	
Relationship	.129	32	.188	.951	32	.158	
Task	.175	32	.014	.912	32	.012	
Global	.137	32	.131	.960	32	.272	
Details	.185	32	.007	.894	32	.004	
Abstract	.096	32	$.200^{*}$.964	32	.356	
Concrete	.173	32	.016	.891	32	.004	

Tests of Normality

Teamplayer	.144	32	.087	.965	32	.377
Individualist	.134	32	.153	.954	32	.182
Past	.236	32	.000	.849	32	.000
Present	.116	32	$.200^{*}$.964	32	.352
Future	.137	32	.136	.968	32	.453
Longterm	.136	32	.141	.951	32	.158
Shortterm	.140	32	.111	.957	32	.230
Looking	.185	32	.007	.934	32	.049
Listening	.127	32	.200*	.962	32	.315
Reading	.154	32	.051	.966	32	.397
Doing	.215	32	.001	.926	32	.031
Sceptic	.106	32	.200*	.971	32	.536
Trustful	.105	32	.200*	.983	32	.872

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table App5.39: Pattern Matrix with factor loadings

Pattern Matrix ^a							
	Component						
	1	2	3	4			
Influence	.889						
Seeing	.819						
Looking	.772						
Internal	.726		346				
Abstract	.724						
Vision	.711						
Global	.709						
Teamplayer	.653	322					
Observer	.623						
ReActive	.614		.382				
People	.607						
Partner	.597						
Doing	.565						
Listening	.549						
Achievement	.546	.399					
Future	.521						
Difference	.504						
Affiliation	.483						
Feeling	.480	.361					
Present	.472						
AwayFrom	.455		.385				
Polar	.442		.353				

Options	.439	.409		
PreActive		.836		
Individualist		.798		
Past		.700		
Sceptic		.662		
Shortterm		.607		
Concrete		.571	.459	.328
Own		.519		
Task		.503	.323	
Activity		.482		
Towards	.419	.434		
Information		.398		.374
QualityControl			.806	
Hearing			.726	
External			.689	
Longterm			.683	
Details			.635	
Reading			.592	349
Realisation			.569	
Consensus			.554	.332
Things			.497	
Procedures			.385	
Places			.368	324
CaringforOthers				.823
Relationship		344		.650
Sameness				.630
CaringforSelf			.395	444
Trustful	.399	395		.404

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 17 iterations.

Table App5.40.	: Structure matrix with	correlations of each	item with components
----------------	-------------------------	----------------------	----------------------

Structure Matrix									
	Component								
	1	2	3	4					
Influence	.844								
Looking	.818		.401						
Seeing	.812		.342						
Observer	.738		.463						
Vision	.730	.379							

C1 1 1	702			
Global	.703		150	275
Doing	./02		.456	.375
Abstract	.688	500	401	.393
Achievement	.6/4	.560	.421	
People	.667		.416	
Future	.666		.534	401
Teamplayer	.658		10(.401
Partner	.657	527	.426	
Feeling	.657	.537	.528	
ReActive	.656	102	.527	
Polar	.656	.493	.597	
Listening	.644		.383	
AwayFrom	.640	.361	.594	
Towards	.619	.553	.443	
Present	.617		.469	.350
Difference	.566		.345	
Internal	.563			
Options	.561	.508		
Affiliation	.499			
Information	.469	.460		.404
PreActive		.846		
Individualist		.790		
Sceptic		.769	.481	
Past		.660		
Task	.428	.659	.512	
Concrete		.653	.612	.322
Shortterm	.402	.620		
Own	.392	.611		
Activity	.361	.555	.326	
Hearing	.441		.800	
QualityControl			.757	
Details	.351	.482	.724	
Longterm			.682	
Reading	.449		.673	
External			.669	.336
Consensus	.490		.645	.432
Realisation	.329		.638	
Things		.378	.572	
Procedures	.483	.417	.549	
CaringforSelf	.343		.473	374
Places			.354	
CaringforOthers				.812
Relationship	.348			.730

Sameness		.335	.618
Trustful	.455		.516

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalisation.

Meta Programme	COGNITIVE INTENTION	0	0.05	0.1	0.15	0.2	>20
	ВОТ	0	0	0.05	0.1	0.15	Ô.2
	UP	0	0.05	0.1	0.15	0.2	
Sensory Channel	Seeing						
	Hearing						
	Feeling						
Primary Interest	People	4	3.5	3.5	3.5	3	3
	Places	4	4	4	4	4	4
	Activity	4	4	3.5	3.5	3	2.5
	Information	5	4.5	4.5	4.5	5	5
	Things	5	0	0	0	0	0
Perspective	Own=Partner=Observer	5	5	5	5	5	5
	Own>Partner>Observer	0	4.5	4	3.5	2.5	2
	Own>Partner=Observer	4	4	3	3	2.5	2
	Own=Partner>Observer	3.5	3	3	3	2.5	2
	Own=Observer=Partner	5	5	5	5	5	5
	Own>Observer>Partner	0	4	3.5	3	2.5	2
	Own>Observer=Partner	0	4	3.5	3	2.5	2
	Own=Observer>Partner	4	3.5	3	2.5	2.5	2
	Partner=Observer=Own	5	5	5	5	5	5
	Partner>Observer>Own	0	3.5	3	3	3	2.5
	Partner>Observer=Own	3.5	3.5	3.5	3	3	3
	Partner=Observer>Own	0	4.5	4	3.5	3	3
	Partner=Own=Observer	5	5	5	5	5	5
	Partner>Own>Observer	0	4	3	3	3	3
	Partner>Own=Observer	0	4.5	4	3.5	3	3
	Partner=Own>Observer	0	3.5	3.5	3	2.5	2
	Observer=Own=Partner	5	5	5	5	5	5
	Observer>Own>Partner	0	4.5	4.5	4	3.5	5
	Observer>Own=Partner	5	5	4.5	4.5	5	5
	Observer=Own>Partner	4	4	4.5	4.5	4.5	5
	Observer=Partner=Own	5	5	5	5	5	5
	Observer>Partner>Own	0	4.5	4	4	4.5	5
	Observer>Partner=Own	5	5	4.5	4.5	5	5
	Observer=Partner>Own	0	4.5	4	3.5	3	3
Motive	Influence=Affiliation=Achieveme	5	5	5	5	5	5
	Influence>Affiliation>Achieveme	0	3	2.5	2.5	2	2
	Influence>Affiliation=Achieveme	0	3.5	3	3	2.5	2
	Influence=Affiliation>Achieveme	0	3	3	3	2.5	2
	Influence=Achievement=Affiliati	5	5	5	5	5	5
	Influence>Achievement>Affiliati	0	2.5	2.5	2.5	2	2
	Influence>Achievement=Affiliati	0	2.5	2.5	2	2	2
	Influence=Achievement>Affiliati	0	4.5	4	3.5	3	2.5
	Affiliation=Achievement=Influen	5	5	5	5	5	5
	Affiliation>Achievement>Influen	0	3.5	3.5	3	3	3

Appendix 6 – Full MP Alignment to LoAD

Table App6.41: Full Meta-Programme Alignment to Levels of Adult Development

	Affiliation>Achievement=Influen	0	3.5	3.5	3	3	3
	Affiliation=Achievement>Influen	0	4	3.5	3.5	3	3
	Affiliation=Influence=Achieveme	5	5	5	5	5	5
	Affiliation>Influence>Achieveme	0	3.5	3.5	3	3	3
	Affiliation>Influence=Achieveme	0	3.5	3.5	3	3	3
	Affiliation=Influence>Achieveme	0	3	3	3	2.5	2
	Achievement=Affiliation=Influen	5	5	5	5	5	5
	Achievement>Affiliation>Influen	0	3.5	3.5	3.5	3	3
	Achievement>Affiliation=Influen	0	4	3.5	3.5	3	3
	Achievement=Affiliation>Influen	0	4	3.5	3.5	3	3
	Achievement=Influence=Affiliati	5	5	5	5	5	5
	Achievement>Influence>Affiliati	0	4	35	3	2.5	2
	Achievement>Influence=Affiliati	0	4	4	4	4	2 4
	Achievement=Influence>Affiliati	0	4 5	4	35	3	25
Direction	Away From	5	4.5	4	3.5	3	2.5
Direction	Towards	5	ч.5 4 5	т 1	3.5	3	2
Reference	Internal>External	5	4.5	3 5	3.5		2
Kelefellee	External Internal	5	4.5	3.5	2.5	4	2
Dianning Style		5	4.5	4	25	3	25
Planning Style	Options/Procedures	5	4.5	4	5.5 2.5	5 25	2.5
Drimory Attention	Coving for Solf-Coving for Others	5	4.5	4	3.5	2.5	2
Primary Attention	Caring for Others Caring for Others) 5	4.5	4	5.5 2.5	2.5	2
	Caring for Others-Caring for Self	5	4.5	4	3.5	3	3
Comparison	Sameness>Difference	2	4.5	4	3.5	3	3
	Difference>Sameness	5	4	3	3.5	4	4
Primary Reaction	Consensus>Polar	2	4.5	4	3.5	3	3
	Polar>Consensus	2	4	3.5	3	2.5	2
Work Orientation	Relationship>Task	5	4.5	4	3.5	3	3
	Task>Relationship	5	4.5	4	3	2.5	2
Information Size	Global>Details	5	4.5	4	3.5	3.5	4
	Details>Global	5	4	3.5	3	2.5	2
Thinking Style	Abstract>Concrete	5	4.5	4	4	4.5	5
	Concrete>Abstract	5	4	3.5	3	2.5	2
Working Style	Team-player>Individualist	5	4.5	4	3.5	3	3
	Individualist>Team-player	5	4.5	4	4	4	4
Time Orientation	Past=Present=Future	5	5	5	5	5	5
	Past>Present>Future	0	3	2.5	2.5	2	2
	Past>Present=Future	0	3	3	3	2	2
	Past=Present>Future	0	4.5	4	3	2.5	2
	Past=Future=Present	5	5	5	5	5	5
	Past>Future>Present	0	4	3.5	3	2.5	2
	Past>Future=Present	0	3.5	3	3	2.5	2
	Past=Future>Present	0	3.5	3	2.5	2.5	2
	Future=Present=Past	5	5	5	5	5	5
	Future>Present>Past	0	4	3.5	4	4.5	5
	Future>Present=Past	0	4.5	4	4	4.5	5
	Future=Present>Past	0	4.5	4	3.5	3	3
	Future=Past=Present	5	5	5	5	5	5
	Future>Past>Present	0	4	3	3	3	3
	Future>Past=Present	0	5	4.5	4.5	4.5	5

	Future=Past>Present	0	4	4	3.5	3	2.5
	Present=Future=Past	5	5	5	5	5	5
	Present>Future>Past	0	4	3.5	3.5	3	3
	Present>Future=Past	0	5	4.5	4	3	3
	Present=Future>Past	0	4.5	4	3.5	3	3
	Present=Past=Future	5	5	5	5	5	5
	Present>Past>Future	0	2.5	2.5	3	3	3.5
	Present>Past=Future	0	3.5	3	3	3	3
	Present=Past>Future	0	3.5	3	3	2.5	2
Time Frame	Long-term>Short-term	5	4.5	4	4	4	4
	Short-term>Long-term	5	4	3	3	2.5	2
Convincer Strategy	Sceptic>Trustful	5	4	3.5	3	2.5	2
	Trustful>Sceptic	5	4.5	4	3	2.5	3
Appendix 7 – Gatekeeper Letter from Arne Maus

Content removed on data protection grounds

Appendix 8 - Study 3 - Pattern Matrix with factor loadings

Item	Factor				
	1	2	3	4	5
Future	.665				
Abstract	.660				
Vision	.612				
Longterm	.598				
Difference	.504				
Options	.499				
Polarity	.455	.374			
Observer	.452				
Global	.446	400			
Towards	.437		410		
Seeing	.348				
Activity	.340		332		
Reading	.328		317		
Hearing	.305				
Looking	.300				
Doing					
PreActive					
Sceptic		.611			
Trustful		501			
Things		.363			
AwayFrom		.358			
Procedures			695		
Concrete			646		
Realisation			563		
QualityControl			537		
Task			499		309
Shortterm			483		
Details		.472	478		
Consensus			441		.352
Information	.403		437		
Present			428		
ReActive	.376		376		
Sameness			360		
Past			346		
Feeling			340		
Achievement			305		
Own				.667	

Table App8.42: Pattern Matrix with factor loadings, part 1

Item			Factor		
	1	2	3	4	5
Individualist				.629	
Internal				.625	
Influence				.437	
CaringforSelf				.353	
Relationship					.713
Affiliation				.302	.586
People					.550
External					.453
Listening					.447
Teamplayer					.428
Places		.337			.414
Partner	.359				.394
CaringforOthers					.300

Table App8.43: Pattern Matrix with factor loadings, part 2

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

Rotation converged in 25 iterations.

Appendix 9 – Study 4 Self-Report Question Set

Question 1:

The **Towards** cognitive intention has an aim and a direction. You know where you are going and you are focused on a goal in the future. You are motivated to have, get, achieve etc. With this intention, you tend to be good at managing priorities, which is useful for either PhD candidates or industry leaders.

A common language if you have this cognitive intention is that you tend to talk about what you gain, achieve, get, have, and so on. You would be focused on the goal of getting your PhD or a promotion at work. This is useful for your progress as you attain new targets, you will set your sights on achieving them, and solving the requisite problems.

In the extreme you might ignore problems - or take greater risks - as you might not pay attention to what could go wrong. This could have an effect on your outcome, unless you notice it first. By being so focused on the goal, you ignore the immediate problems thrown up by your Towards intention.

Question 2:

Away From: This cognitive intention allows you to notice what should be avoided. You can see when something is likely to go wrong. You might be familiar with this intention when you hear your colleague say: 'you should avoid doing that', or, 'take this action to ensure this problem doesn't occur.' An example would be: "don't give [person] anything to criticise by ensuring you have everything covered."

In the extreme, you might have trouble focusing on your goals set by your ordinate team as you get distracted into responding to negative situations elsewhere in your life.

On the other hand, this cognitive intention is excellent for trouble shooting and solving problems. This will allow you to pick out possible obstacles that may be in your way when planning your work projects, or literature review for PhD students.

Question 3:

Sameness: This cognitive intention suggests you look for solutions to your current problems based on your past experience. It is a way of ensuring stability. How is my current journey similar to my previous journey and how can I apply what I know to it? From a PhD perspective, you might look for similarities in stage 2 to stage 1. From a business perspective, you are good at your routine tasks and enjoy what you do. This is why organisations and universities have frameworks replicated across stages of work.

You notice patterns easily and can spot what is familiar to you very quickly. But that also means you might strive for the comfort of familiarity, and not like change very much.

Finally, you might have difficulties noticing differences, which can lead to staleness and lack of innovation.

Question 4:

Difference: This Cognitive Intention is about change and noticing change. You get bored with stable environments. At the extremes, you like changes to be dramatic and revolutionary. So how do you cope with the routine and similarities in your work environment, whether Post-Graduate or organisational?

So, as you consider what the relationship is between this year and last year on your PhD journey, or in your work role, do you think it is the same, different or radically different? If radical, you are subject

to this cognitive intention. If so, you might often focus on the destination and ignore the journey, which ties in with Towards above.

People with this cognitive intention first recognise any differences based on their past experience, and are excellent at spotting mistakes. When they enter into a room, or meet a new situation, they can immediately detect what is different compared with what they know from the past. They might have difficulties in recognising patterns or similarities, and they like change.

Question 5:

Internal: This cognitive intention is an internal locus of evaluation and allows you to decide for yourself on the quality of your own work. You might have trouble accepting feedback from others if they don't meet your own standards of their expertise. If you receive negative feedback on something you believe you have done well, you will question the judgment of the person giving the feedback. You take orders as information. As a result, you could be difficult to supervise, or it can cause conflict with your team as you make your mind up quicker than most. You like to make your own decisions.

From a PhD perspective, you like to gather information from outside sources - old papers, etc - and then you will decide on it based on your own standards. From an organisational perspective, performance criteria must be made very clear at the beginning of a project and then you might like to be left to get on with it.

In the extreme, people who are subject to an Internal cognitive intention might do things as they see fit without any consideration for what others think.

Question 6:

External: If you have this cognitive intention, you like to receive feedback. It is an external locus of evaluation. You rely on others to tell you whether you have done a good job or not, and sometimes, if the feedback is negative, it can hurt!

Sometimes, you have difficulty in evaluating whether you are on track to achieve your outcome. Whether in an organisation or on a PhD, there are milestones that help this cognitive intention, and you actually enjoy face-to-face meetings. This cognitive intention generally prefers to be given standards and procedures.

If you are subject to this, you will criticise yourself when you experience corrective feedback. For this reason, if you are aware of this pattern, ensure you have strategies to retain high self-esteem when receiving corrective feedback.

Finally, you prefer to have someone else decide for you, and you take information as instruction. This makes your team meetings much easier - for your colleagues!

Question 7:

Abstract: People with this cognitive intention tend to think in combinations, principles and symbols. You like to search for an abstract solution, perhaps take a step back and look for the principles at play before making any firm decisions on a direction.

From a research perspective, you're looking for the principles behind the research, and examining the connections perhaps those original authors hadn't seen.

From an organisational perspective, you look for the concepts being used by your business and keep in mind an overview of the theories at play.

A potential point for conflict would be if you are talking in principles and your supervisor or manager isn't as aware of this particular cognitive intention as you are, you might "lose them" in conversation, and end up explaining yourself and your ideas continually. They could also think your head is in the clouds, rather than on the ground, getting the facts.

Question 8:

Concrete: This cognitive intention is where you get those facts: if you like to know who, where, why, when, how and what, then you are subject to this cognitive intention.

From a research perspective, you are happy with the post-graduate framework as it allows you to take the facts of the process and it gives you a decent idea of how it will go, and what will be the outcome. From an organisational perspective, you make a great project lead as you stay focused on the facets of the process as well as the outcome.

Your team will hold you accountable to your plan, but this isn't a problem for you as much as it might be for someone who doesn't have this cognitive intention. You already have an image of what your PhD, or your project outcome will look like!

Question 9:

Global: Usually, if you have this cognitive intention, you generalise a lot. If you are being given information, you like the overview first, or the 'big picture'.

You concentrate on the general direction of your research, or your role, and seeing where it fits into the over-all strategy. You are good at, and like spotting the relationships between decisions and consequences. Even longer-term ones.

You work best when you delegate to others, especially the Details of your research or your job, which you struggle with. From a PhD perspective, it probably didn't take you long to come up your research question, but a lot longer to focus it down. From an organisational perspective, if you're delivering a project brief, you will be giving the big picture and the outcomes, but not the detail. Someone else will do the detail for you.

Question 10:

Detail: If you have this cognitive intention, you focus on the details of your research, or your role. If you are doing a Post-Graduate dissertation, you are very good at getting down to the nitty gritty of the research and seeing the small points within. If you're in a business role, your attention to detail makes you a great project lead or team member.

Details are important to you. Being vague is not useful and you can't see the point of it! So when you discuss your research with your supervisory team, or your progress with your manager, you might hear them ask you not to go into so much detail in the meeting, but instead to give them the overview.

You value being precise and accurate. If something is worth doing, it's worth doing properly! You are very good at dealing with the elements and components of your thinking, as you are able to chunk up or down in to the fine structure.

Question 11:

Own: If you demonstrate this cognitive intention, you are strongly committed to what is important to you. You are looking at the world from your own perspective, values, emotions and beliefs. The PhD or your job is your own journey, and you're aware of how you want it to fit your thinking.

If you are subject to this cognitive intention, in order to push your ideas through in meetings, you would state your point and stand up for it because your ideas are important to you.

On the other hand, if you were low on this cognitive intention, you might sit quietly in the meeting and despite thinking your idea is better, simply say nothing.

Question 12:

Observer: If you have this cognitive intention, you potentially have the ability to stop, step back and consider your position from a dispassionate, objective stance.

This could be useful when accepting feedback from your supervisors or your boss, as you will listen to their words, and consider their perspective from the position of what it might mean to you, and for you. It is not a case of being right or wrong: it's more about improvement.

You also question the dynamic of your relationship with each member, and as a team. What are they saying that you are not getting? What are you saying that they are not getting? As you consciously consider this, you demonstrate a high level of abstract thinking too.

Question 13:

Future: If you have this cognitive intention at hand, then you are able to spend your time consciously painting pictures of what your future will look like, metaphorically speaking. You also like to make long term plans because you are capable of making plans. What does the end of your PhD look like? What will your job look like in 12 month's time once you get that promotion?

From a research perspective, this is useful for your development and that of your study. You are capable of considering the consequences of your thinking and acting in context. How will your actions today influence the outcome in 2- or 3-years' time? Are you already making plans for that?

Long term for you could mean anything from 2 years to 20 years. On a research programme, you are limited by the academic timeframe. But in an organisation, you might have 20 years to consider. If you are not subject to this cognitive intention, then you are possibly caught up in the present, or you consciously choose to be in the present.

Appendix 10 – Qualitative Support for Intervention Efficacy

Hello Darren

It is a month since we spoke. I said I would get back to you about how I got on changing my response when things make me 'narked'.

I've been quite good about remembering, and asking myself 'Am I going to do something about this?' I was quite surprised at how often I said 'yes!' (About 5 times in the last month. Some big things and some small things. Not Brexit, though!)

I have a core belief about giving positive feedback if something is good, and not sitting idly by if things are not right.

You have to be honest with people. You have to have great respect for yourself. If you see something that is not right, You must do something about it. - Annie Wauneka (Freedom Award Winner - Navajo Indian Health Initiatives)

I noticed that when I do take action, I feel settled and can let it go. It is working better, so I think I will carry on with it!

Thanks Darren - very helpful intervention! Hope your research is going well.

Best wishes XXXXXXXXX

Appendix 11 - Gardner's 8 Intelligences Deconstructed by CI's (Gardner, 1983, 1993, 1999, 2006abc)

Table App11.44: Gardner's 8 Intelligences Deconstructed by CI's

Gardner's Intelligence	Definition	Cognitive Intentions	
Musical-rhythmic	These individuals are sensitive to	Auditorv	Hearing
	sounds, rhythms, tones, and music.	Feeling	Internal
	They have sensitivity to rhythm	Listening	Activity
	nitch meter tone melody or	People	rictivity
	timbre and an mite diagonian	Ontions	
	timore, and are quite discerning	Options	
	listeners.	Present	
X 7• 1 /• 1		A1 / /	F (
Visual-spatial	This area deals with spatial	Abstract	Future
	judgment and the ability to	Own	Information
	visualize with the mind's eye.	Places	Looking
	Spatial ability is one of the three	Concrete	Long Term
	factors beneath g in the hierarchical	Details	Observer
	model of intelligence.	Difference	Seeing
	_	Visual	C C
Verbal-linguistic	People with high verbal-linguistic	Visual	
8	intelligence display a facility with	Auditory	
	words and languages. They are	Kinaesthetic	
	usually good at reading writing	Reading	
	telling stories and memorising	Listening	
	words. Verbal ability is one of the	Hearing	
	most g loaded abilities	Abstract	
	most g-roaded admities.	Austract	
Logical mathematical	This area has to do with logic	Abstract	
Logical-mathematical	abstractions, reasoning, numbers	Abstract	
	abstractions, reasoning, numbers	Observer	
	and critical thinking. This also has	Global	
	to do with having the capacity to	Details	
	understand the underlying	Concrete	
	principles of some kind of causal	Relationship	
	system. Logical reasoning is closely	Realisation	
	linked to fluid intelligence and to	Sceptic	
	general intelligence (g).		
Bodily-kinaesthetic	The bodily-kinaesthetic intelligence	Doing	
	augers control of one's motor skills	Activity	
	and the capacity to handle objects	Concrete	
	skilfully. Gardner elaborates to say	Feeling	
	that this also includes a sense of	Details	
	timing, a clear sense of the goal of a	Abstract	
	physical action, along with the	Information	
	ability to train responses. People	Re-Active	
	who have high bodily-kinaesthetic	Procedures	
	intelligence should be generally	Quality Control	
	good at physical activities such as	Realisation	
	sports dance acting and making	Tosk	
	sports, dance, acting, and making	1 dSK A ffiliation	
Internet and an al	unings.	Annauon Esternal	Clabal
interpersonal	In theory, individuals who have		
	nigh interpersonal intelligence are	Partner	reople
	characterised by their sensitivity to	Team Player	Information
	others' moods, feelings,	Seeing	Affiliation
	temperaments, motivations, and	Hearing	
	their ability to cooperate in order to	Feeling	
	work as part of a group. Those with	Abstract	
	high interpersonal intelligence		

	communicate effectively and empathize easily with others, and may be either leaders or followers. They often enjoy discussion and debate." Gardner has equated this with emotional intelligence of Goleman		
Intrapersonal	This area has to do with introspective and self-reflective capacities. This refers to having a deep understanding of the self; what one's strengths or weaknesses are, what makes one unique, being able to predict one's own reactions or emotions.	Abstract Observer People Present Past Relationship Towards Places	Affiliation Feeling Hearing
Naturalistic	It seems to me that the individual who is readily able to recognize flora and fauna, to make other consequential distinctions in the natural world, and to use this ability productively (in hunting, in farming, in biological science) is exercising an important intelligence and one that is not adequately encompassed in the current list.	Not an intelligen (Cohen & Squire	ce! , 1980)

Appendix 12 – Ethical Approval



Certificate of Ethical Approval

Applicant:

Darren Stevens

Project Title:

A mixed-methods study using two self-report online questionnaires to determine a participant's perceived level of self-awareness of certain cognitive intentions

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

20 December 2018

Project Reference Number:



PROJECT 1

Applicant:

Darren Stevens

Project Title:

A qualitative semi-structured interview process to discover a participant's level of selfawareness as determined by their participation in P75986.

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

18 April 2019

Project Reference Number:



Applicant:

Darren Stevens

Project Title:

Creation and Implementation of a Focus Group to Investigate a Scenario-Based Question Set for a PhD Research Experiment.

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

09 July 2018

Project Reference Number:



Applicant:

Darren Stevens

Project Title:

Validation of the Identity Compass profile system and the Thinking Quotient Profile Extension

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

09 October 2017

Project Reference Number:



Applicant:

Darren Stevens

Project Title:

Collation of a number of MBA 'High Flyers' students at Coventry University London to act as a control group for the MRes project (P46176) researching stage-based cognitive patterns in PhD students at Coventry University main campus.

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

05 April 2017

Project Reference Number:



Applicant:

Darren Stevens

Project Title:

Is there a correlation between the pre-disposed thinking preferences of PhD students at each academic year?

This document is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk.

Date of approval:

22 February 2017

Project Reference Number:

Content removed on data protection grounds

Content removed on data protection grounds