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Author post-print (accepted) deposited by Coventry University's Repository

Original citation & hyperlink:
Grissom, T, McIlhatton, D, DeLisle, JR & Hardy, M 2019, 'Decision-theoretic behavioral analytics: risk management and terrorist intensity' Behavioral Sciences of Terrorism and Political Aggression, vol. 11, no. 1, pp. 73-112.
https://dx.doi.org/10.1080/19434472.2018.1551917

DOI 10.1080/19434472.2018.1551917
ISSN 1943-4472
ESSN 1943-4480

Publisher: Taylor and Francis

This is an Accepted Manuscript of an article published by Taylor & Francis in Behavioral Sciences of Terrorism and Political Aggression on 08/01/2019, available online: https://www.tandfonline.com/doi/full/10.1080/19434472.2018.1551917

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Decision-Theoretic Behavioral Analytics: Risk Management and Terrorist Intensity

Abstract

The focus of terrorist events on urban centers and mass gathering sites and the intensity in which they have occurred in recent times has greatly enhanced the need to ensure that terrorism risk is managed effectively. Recent attacks have resulted in significant societal harm, particularly in the context of loss of life and injury, economic losses, property damage and the breaking down of societal relations. In light of the terrorist threat, significant challenges exist for counter terrorism practitioners and policy makers with many of these attacks occurring spontaneously, without warning, and with limited intelligence (McIlhatton et al., 2018a; McIlhatton et al., 2018b). As a consequence, those tasked with managing terrorism risk require innovative and effective tools that can work towards a reduction in impact of these events, as well as a better understanding of terrorist decision objectives, behavioral characteristics, and potential loss exposures under uncertainty. This paper proposes a highly innovative methodological approach to understanding the potential impacts of terrorist actions, thus allowing practitioners and policymakers to manage terrorism risk more effectively and efficiently.

Introduction

The focus of terrorist events on urban centers and mass gathering sites and the intensity in which they have occurred in recent times has greatly enhanced the need to ensure that terrorism risk is managed effectively. Recent attacks have resulted in significant societal harm, particularly in the context of loss of life and injury, economic losses, property damage and the breaking down of societal relations. In light of the terrorist threat, significant challenges exist for counter terrorism practitioners and policy makers with many of these attacks occurring spontaneously, without warning, and with limited intelligence (McIlhatton et al., 2018a; McIlhatton et al., 2018b). As has been the case, it is unlikely that all terrorist actions in the future will be prevented, and we therefore need to to better protect society from the threat, risk and harm that terrorism presents. As a consequence, those tasked with managing terrorism risk require innovative and effective tools that can work towards a reduction in impact of these events, as well as a better understanding of terrorist decision objectives, behavioural characteristics, and potential loss exposures under uncertainty.

The purpose of this paper is to propose a highly novel approach for understanding the potentiality of terrorist actions through first, developing a methodological approach that measures impacts of events, and secondly, positioning this approach in the context of terrorism risk management practice and policy. As a consequence of its originality, This paper contributes significantly to the current risk management and terrorism knowledge base in several ways. First, from an operational perspective, it provides direct assistance to those involved in terrorism risk management by proposing an interactive analytical agent tool, ($\alpha_{\Omega i}(t)$), that seeks to address the ambiguous and diverse perspectives of terrorists ($\alpha_{\Theta i}(t)$) in their behavior and activities. Secondly, the framing of this interactive process reflects the way that such practitioners operate and has been carefully aligned to be independent of and in response to the divergent skills and capacities present in societies. As a result, security and stable management is offered even when exposed to an array of losses associated with differing objectives and levels of intensity driving terrorist agents. The structure of the proposed approach focuses on the spread in the intensity of operational goals and objectives of terrorists ($\alpha_{\Theta i}(t)$) relative to their probable skills, computational capacity, and choice paths employed by security/risk managers ($\alpha_{\Omega i}(t)$) (Chambers and Yenmez,2017). In achieving this, a computational comparative experiment model is developed that allows a structured consideration and frames the diverse perspectives of terrorism as they might nudge and divert anti-terrorist analysis to confuse strategic operations, thus restricting security efforts to tactical ad hoc responses. When this happens, we argue that the security responses ignore or minimize *a priori* strategic analysis. This in turn can limit risk management to a focus on *a posterior* event consequence. These situational constraints limit the predictive planning, conjectured experiments/actions and *a fortiori* possibilities that are employed as measures and influences (direct and latent) in states of uncertainty of control (at variant levels of security), information availability and accessibility (Shmaya and Yariv, 2016).

In delivering this innovative model for understanding the potential impact of terrorist actions, the paper develops the concept and approach using the following structure. Sections Two and Three explore the complexity involved in understanding terrorism, as well as establishing the problem context. Section Four develops the methodology, with the remaining sections presenting the model frames and discussions.

Terrorism as a complex concept

The need for an organized process/model considering the diverse behavioral intensity driving terrorist agents ($\alpha_{\Theta j}(t)$) and the ambiguity experienced in understanding the behavior and probable space of terrorism (Θit) shows a convoluted history in the array of characteristics identified and definitions developed. Turion (2000) states that terrorism as a strategy, a tool of political/social control, and as an operational weapon has evolved from the actions of the state (as defined by the will of a sovereign or pretender, or national/cultural collective) to a group or tribal political agitation and to the acts of individual violence against society or perceived "others" that may be driven by conflicting philosophies/beliefs. Historically, Smelser and Mitchell (2002) identified 212 definitions of terrorism, the notice of which contributes to and is reflective of the ad hoc perception of terrorism and the tactical and responsive perception of security and risk modeling. Indeed, many more definitions are evident in the more recent literature base adding further to the complexity involved in the framing of a solution.

A comprehensive review of terrorism definitions shows the use of violence across agents, classes and psychological perceptions (intensities) to achieve a goal or objective. A common attribute of these diverse goals and objectives is disruption, a potential loss, or annoyance to society or some other agency operating alternatively to and perceived in conflict with the terrorist agent. This focus enables a specification of terrorist operational path as a loss function (to others or society in general: $L_{\iota\Theta i}t$) operating in a rational choice model - see Victoroff (2005) and Elliot and Timmerman (2016). This supports a probabilistic conflict framing of decision outcomes conditionally subject to fuzzy choice specification and uncertainty of the actions of others. This further supports a decision –theoretic/game-theoretic construct.

The definitional range of terrorism noted by Hoffman (1998), Tucker (2016), Victoroff (2005) and Smelser and Mitchell (2002) is consistent with a decision-theoretic probability space (Richardson 1938 and1988; Coombs, et al 1970; and Hunt, 2007). This frame allows a conditional consideration of diversity in the intensity level characterizing terrorist behavior as it can include and fits a Kolmogorov probability space (triple) as discussed in the methodology -See Kolmogorov (1950).

The initial motivation of this research was to develop a terrorist index based on impacts associated with possible causal factors. The problem encountered is the lack of agreement by authorities or scholars as to a definition, concept or measure of terrorism and even a concise designation of terrorist activity. There is no universally accepted definition of terrorism as a basic behavior measure or offering a mathematical psychology/behavior frame and as indicated earlier in our work, many definitions of terrorism or perceptions of terrorism have been identified and this list is not exhaustive. Investigations suggest that many of these specifications are redundant or simple inconsistencies in sematic/jargon issues and terms, see Hunt (2007) and Coombs et al (1970). The literature and research of security agencies note some organising themes as key elements for the specification and analysis of terrorism. They are:

1. the use of violence (illegal and unjustified) and the creation of fear (terror, psychic fear) for a) political, b) religious, and/or c) ideological reasons. Further clarification is obtained in the latter category, where ideologies are identified as belief systems derived from worldviews that frame human social and political conditions. This is the state-space ($s(t)$) variable and probability space (σ-algebra) in our model that enables links between behavioral prediction and measure-theoretic anchors to systems as well as with individuals decisions (δ), see Heiner (1983) and Wilde, LeBaron and Israelsen (1985).
2. Events or actions (Ξ),taken directly against random or indiscriminate targets, which allows sample space sets (Ω, Θ), with subsets or event frames ($\mathcal{F}$). The direct action is against an indirect target, unlike assassination, where there is a directed victim.
3. The objective is publicity or acknowledgment of situations that are not considered by the majority of those in control. This in effect seeks to produce a motivation response that is awareness, knowledge, and/or cognition (specified as a loss ($L(\bullet)$, function) to others, or the creation of confusion, political agitation or general chaos).

As these organising themes are specified, analytics framing terrorism can be structured based on psychological and social elements of causation in a state of uncertainty, potentially involving uncountable, but measureable random variables. The three central themes characterizing the base nature of terrorism, are also elements of the six steps in the risk management process. The analytics of risk management are concerned with identifying possible occurrences and events ((Ξ), $E(\Xi)$), the frequency and magnitude/severity of occurrences ($\delta(\emptyset,\varpi)$, $\iota_{\Theta}(\emptyset,\varpi)$), techniques and valuation of measurements that fit events identified ($\mathcal{F}$**)**, management efforts and strategies to address, resolve and control the issues (Richardson ***k,ℓ,*** and other methods to be discussed, See Richardson (1950, 1988). These analytical techniques are then used in the operational steps of application with continued monitoring and follow up on these processes and techniques. These themes and management processes set the analytic frame of this research. This frame, in turn, supports the operation of an *a priori* strategic modelling of possible predictive issues that can then be compared to measures of *a posteriori* consequences of asymmetric positions. The frame varies from tactical management responses based on descriptive statistics of terrorist occurrences/reasons listed below. The list is derived from the literature, experiences and public notice.

The descriptive/tactical response literature previously noted has identified 15 causes of terrorism, though the reasons are complex and plentiful. The general motivations can be political, religious, economic, social, psychological, retaliatory effects often framed by local and temporal situations of asymmetric relationships (structures).

The 15 reasons identified are:

1. Religion: this is a behavioral perspective characterized by an extreme sense of ideological zeal complemented by a set of activities that express high dedication of one or more people to their own belief systems. This cause can create an infinite supply of terrorists agents ($\alpha j(t)|\Theta$), if the value system identifies with martyrdom.
2. Oppression: this class of terrorism is characterized by the betrayal of government, the elite or the controlling segments of society as being oppressive. This form of terrorism can be more specific and overlap with assassination. See Turchin and Nefedov (2009) and Turchin (2016), and Taylor and Qualye (1994).
3. Historical grievance: a function of experienced are perceived historical injustice. See Tucker (2016), Turchin and Nefedov (2009) and Turchin (2016), and Taylor and Qualye (1994).
4. Violations of international law: terrorists action is a function of a right being infringed.
5. Relative deprivation: response from poverty and/or a sensor perception of inequality.
6. Hatred of the global economic hegemony and potential shifts in hegemonic powers.
7. More individual or tribal singular or unitary issues or factors, such as: financial gain
8. racism
9. guilt by association (the level and degree of agency associations).
10. Empathetic support of sympathizers: deprivation as a mutual factor (enemies of my enemies).
11. mortality salience: anxiety over one's own death in association with a value system or factor (national, class or tribal decline)
12. narcissism: more prone to terrorist acts as a function of blaming personal inadequacies on external causes; Baader-Meinhof group, malcontents and lone wolves.
13. sensation seeking: risk prone adrenaline
14. failure of conventional channels of expression: limits on civil liberties or our perception of lost rights
15. communication and publicity
    Schweitzer and Sharber (2006), 2002

Information, data and observation derived from the list assist in data development used in this study to assist in frequency and severity/intensity measures used. Western politicians, economists, and knowledgeable security workers have focused on the unacceptable levels of death and destruction as a definition and measure of terrorism. This perspective supports tactical responses focusing on physical losses, static attributes (χit) and descriptive statistical measures ($\phi\chi$it) as they are employed as static attributes. This perspective specifies terrorism as a function of magnitude/severity of a loss function ($L(\bullet)|\chi$it, $\phi\chi$it) - see Chen (2015). This static attribute/descriptive statistical anchor and measurement position is uncoupled from the initial behavioral/agency cause ($\alpha_{\Theta j}(t)$). The essential description from an economic perspective is terrorists' production of "bads," (pain, loss to others) as opposed to goods (benefits, real/perceived to society). This can be modelled as a social loss function as used to calculate measurements of pollution or contagious diseases.

This construct allows a profiling of differences in a terrorist agent (**Θ_it**) behavioral intensity $\iota_{\Theta it}$ using terrorist self-identification in time as a functional range from reducing injustice or correcting policy to retaliate or compensate for perceived past and current injustice to extreme genocide regardless of their own selective self –description (such as self-identification as freedom fighters, jihadist, patriots, revolutionaries, etc). This fits in the continuum suggested by Taylor and Quayle (1994) who developed a profiling ranking continuum from their interviews with Irish and European terrorist groups. Many of those interviewed stated that they joined a terrorist group as a result of their own creation of a new identity linking to a singular design of a general perception. This infers a conditional probabilistic occurrence, where the outcomes are deterministic, ie. the H,T outcomes (χit measures) of a coin toss is conditioned on the randomness of the toss, the event frame or σ-field, decision set of skills or rules of the game/situation (s(t)) conditioning the "flip" or actions taken or expected (whether unobserved or uncountable factors) that may influence the event field. This is the Kolmogorov formulation or praxeology process that offers a frame for delineating decision processes in phase spaces. In specific, it links the systematic specification of terrorist expected utility, objectives and goals to an individual decision process as occurrences formed by intensity levels matching choices and chances to inflict a loss function ($L_{\iota\Theta it}(\chi it)|\alpha_{\Theta j}(t)$) that impacts the entire social system (**Ω_it),** which can vary as stability levels and risk management capacity (see figures 2 and 3) and the surprise these positions my generate. See Kahneman and Tversky (1982a) and Tversky and Kahneman (1981).

The focus of the terrorist as an individual optimization loss function decision, in probability outcome space allows it to be structured in an ideal operator decision-theoretic model. This model allows a comparative computational experiment (game-theoretic) between agents who are creating social goods and agents who are creating societal bads, loss function σ-algebra constructs (see Figure 4). This construct allows the analytics for comparative computations of inverse expected utility and expected value measures to reflect the asymmetry defining terrorist behavior as developed in the cited literature to variant risk management capacity profiles (see Figure 5 and Kahneman and Tversky (1982b), Richardson (1948, 1950)).

Problem context

Given there is no universal definition of terrorism, yet the general operating notion is an inverse probabilistic phenomenological relationship with a vested and stable social order, a psychometric decision frame has been developed. This model allows a direct computational difference and risk measure between normative/positive economic agents ($\alpha_{\Omega i}(t)$), who seek to produce a 'good" or useful services directed towards meeting individual and social needs. This process is assumed or promulgated via axiom to operate in a secure or stabilized society. However, the state of uncertainty in choice and chance experienced by all agents ($\alpha_i(t)$) requires consideration of alternate phase states of risk management subsets (σ-algebra), of the universal probability space in the effort to seek solutions, given an array of terrorists agents ($\iota_{\Theta it}|\alpha_{\Omega i}(t)$) whose actions, goals and endeavors (from an economic, social or political perspective) are to deliver an operating loss function ($L(\iota_{\Theta it})$) to society in general. These actions can be modeled and compared as segmented event frames ($\mathcal{F}$***)***, see Figures 3, 4, and 5.

The dichotomy between goals/expectations and/or objectives between these two general agents (terrorist and risk managers) is defined by the diverse intensity of terrorist agents ($\alpha_{\Theta it}$) and heterogeneity of security or risk management agents ($\alpha_{\Omega it}$) based on variant capacities and skills. This comparative operational will be developed in progressive phase spaces of a decision-game theoretic computational experiment. This is achieved as agents operate in a general probability frame ($\mathcal{P}$) completing the Kolmogorov triple ($\mathbf{\Omega/\Theta}, \mathcal{F}, \mathcal{P}$). The base analytic frame ($\mathcal{P}$) is illustrated with two decision systems. See Figures 1a and 1b.

In order to develop the analytics of conflicting agent positions $[(\alpha_i(t)|\Omega_i) \neq (\alpha j(t)| \Omega_j)]$ verses $[(\alpha j(t)|\theta_j) \neq (\alpha_k(t)|\theta_k)]$, with in groups (risk management skill classes and terrorist intensities or between the agencies ($\alpha_{\Omega i}(t)$ vs $\alpha_{\Theta i}(t)$), it is essential to construct a framework to represent a probabilistic phase-spaces defined with σ- algebra constructs of decision-theoretic state-space probabilities ($\mathcal{P} = f$ (s(t))) to anchor, compare, compute and predict the path patterns and conflicting objectives of adverse competing agents ($\alpha_i(t)$). As a probabilistic state-space (space-time) decision frame, the base phase-space is illustrated in Figure 1a. As employed in the literature of decision-theoretic analysis, mathematics of behavior and economics and other social sciences, the phase space extents from pure uncertainty at the origin (0,0) to the complete accessible aggregation of information ($\varnothing$) depicted on the abscissa (x axis) as perfect and full knowledge (KN(O) or position 0,1). See Hunt (2007), Coombs, Dawes and Tversky (1970), Perloff (2008) and Dean and Carrol (1977) to address the history of decision-theoretic frames. The acquisition of knowledge/information at variant states (s(t)) is necessary in an uncertain world to achieve solutions offering stability and/or reducing risk. See Weisberg (2014), Kahneman and Tversky (1982a and 1982b). Stability and risk reduction is matched with and achieved by the acquisition and development of control of, and influence over, operation, event situations and outcomes and consequences. Levels and increments of control are achieved with the rational use of information and knowledge. This allows for the development of skills, via learning and experience to gain in wisdom and influence to enhance one's level of control. See Chambers and Yenmez (2017), Shmaya and Yariv (2016), Heiner (1983), Wilde, LeBaron, and Israelsen (1985) and Hirshleifer and Riley (1999).

Choice and matching theory supports the measurement of control and agent influence on the ordinate of Figure 1a, The probability field of control rises from the origin of pure uncertainty at

(0,0) in probability increments of control (ϖ) to total probability of situation control represented by the point at (0,1) symbolized by K(W) =1 at the upper left corner of Figure 1a. Extending this measure of total control parallel to the abscissa to the intersection of the vertical extension of KN(O) at (0,1) forms the corner position of (1,1), where K(W)= KN(O) =1. This maximal identity point represents, the theoretical and highly improbably unobtainable point of omnificence and omnipotence control and certainty in an uncertain universe. With limited knowledge and capacity to specify the nature, quality and quantity of the levels and incremental flows of information ($\Delta\varnothing$) and obtainment and incremental gains in control ($\Delta\varpi$) that a given agent ($\alpha i(t)$) can achieve in variant states of uncertainty (s(t)), a Laplace (equilibrium can be assumed, such that any accessed information ($\varnothing$) and any level control has an equal and even probability of occurrence and opportunity (ℓ =1/n). As such the LaPlace (ℓ) expected value in a probabilistic space based on time/probability is: ($E(V)|_{1/t, P\varnothing}$) = 0.5). This sets the vertical equilibrium threshold assisting potential acceptance or rejection decisions. This can be matched with a vertical LaPlace equilibrium based on levels of control in probability space where: ($E(V)|_{\varpi,, P}$) = 0.5). Both of these LaPlace equilibrium thresholds are illustrated in Figures 1a and 1b. If a LaPlace equilibrium is the operating standard employed, then any information access with a value/rank of less than 0.5 (due to uncertainty) is rejected or considered a weak signal and indication in assisting a choice or decision. Agents (($\alpha i(t)$) operating in this segment of the probable phase space are either ignorant of the general state of uncertainty or are risk/uncertainty tolerant or willfully ignorant. If the information level is greater than the Laplace equilibrium of 0.5 in this scenario or phase space, a level of strong signaling information is reflected. This level where $\varnothing > 0.50$ offers insight to support actions and operational decisions. This is a desirable phase space if stability and increased certainty (reduced uncertainty) is desired or required for operational decisions. A similar decision break point is used if a Laplace equilibrium is used to specify or delineate a desirable or operational level of control. As such $E(V)|_{\varpi, P}) > 0.5$, represents a positive potential to achieve control of operations. Any levels of control below 0.5 infers a level of negative or decay in operational control. Another concern for consideration in the use of Laplace equilibrium decision criterion, is that as specified, LaPlace model assumes independence between the operational levels of control and information, despite the axiom of their positive or negative relationships.

Despite the inherent state of uncertainty perceived and experienced in most decisions, an alternative structure can be used that fits the axiom that information contributes to power (control). This is achieved with the use of a Boolean equilibrium construct, based on a simple identity function using a unitary (one-to-one) relationship of expectations between information and the change in levels of control($\Delta\varnothing = \Delta\varpi$). This association is depicted as the diagonals (+/-) in Figure 1b. The inverse or decay rate in the relationship is illustrated with a unitary assumption of change, where an increase in the flow of information is reflected in a unitary (linear) decline in an agent's level of control ($\Delta\varnothing = 1/\Delta\varpi$). In aggregate, this illustrates the loss function ($L(\bullet)|_{\iota\Theta}$, $\alpha_{\Theta i}(t)$) contingent on the level of intensity to harm of a terrorist agent. The asymptotic frame of intensity also depicts an $\alpha_{\Theta i}(t)$ positional loss in control as information/intelligence and knowledge is gained by others. This can occur in the general society when a controlling or competitive agent ($\alpha_{\Omega i}(t)$) loses control as other agents ($\alpha_{\Omega k}(t)$) gain information/knowledge (Kn($\varnothing$) position.

The constructs presented in Figures 1a and 1b, framed by both the LaPlace and Boolean equilibriums, assist in developing the sample space (Ω,Θ) and $\mathscr{P}$, probability constructs of Kolmogorov's probability space triple required to develop a complete decision-theoretic frame to set up a strategic analysis of the behavior of interrelated operators. As adaptive agents, their specific positions in an uncertain frame must address their separate and distinct decision paths. This is set up with the development of their σ-algebra ($\mathscr{F}$) as it supports the specification of their actions and decisions in a probability phase state (s(t)). The basic frame and anchor of the $\mathscr{F}$ is depicted in Figure 2 as it employs the unit circle to delineate the thresholds of bounded rationality subject to potential decisions competitively defined by choices contingent on LaPlace and Boolean equilibriums.

The dynamics occurring with a shift from a Laplace to a Boolean identified function, operates like an augmented orthogonal shift (not limited to right angles only) in specifying the options occurring in a probabilistic phase state. This supports a dynamic construct that allows consideration of directional changes of the information/control matching positions as they alter possibilities. This suggests positive or negative (optimistic/pessimistic) changes in expectations, the consideration of elasticity in variable responses and relationships, and the consideration of matching measures of variables as decision functionals. This occurs in that possible outcomes of choice or chance are expanded. As an example, in an orthogonal shift the choices of a coin flip transitions from the probability of observing a (H,T), to the potential of generating a H, T, H or T or an empty set ({}) as potential out comes. In a finite phase space, a Borel field/set of operational choices (and restrictions) can assist in specifying stationary and explosive effects in relation to rational bounds on strategic capacity (Ω_1, $Sk_{\delta|\Omega 1}$: See Figures 2 , 3 and 5 for specifications and supportive tables). This is achieved with the introduction of functional analytics and the calculus of variation into the decision matrix and options open to and impacting conflicting agents as developed in the methodology section. This rotation and expansion of the probabilistic decision field assists in the choice and matching positions defining the operating paths (σ algebra) open to heterogeneous risk managers and the diverse levels of terrorist intensities they need to consider.

The understanding of behavioral variance at the core of psychometric analysis, is conditioned by probabilistic variation in difference agents' knowledge, $\alpha_{\Omega i}(t)|$ KN($\varnothing$)t, which is situational being delineated by its initial position as a function of its first variance ($d\varpi$/KN(W)) and temporally (s(t)) sensitive and thus contingent upon not only their access to information in time ($\varnothing$t), but also the skill and capacity of the agent to influence and control decisions and associations $\alpha_{\Omega i}$ (t)| $S_{Kn\delta(\varnothing)t.}$ The access to, accumulation of and the completeness of the information, if considered at its full and complete level is the notion of a full, all-knowing level of certainty and strong-form efficiency hypothesis. This is an expectation narrative or state condition (s(t)), where everything is known by everyone, conditional on the skills of all agents $\alpha i(t)|$ $S_{KN(O)t}$ involved. In this situation (s(t)), the optimal decision choice(s) has been or is expected to be achieved. Any additional information or knowledge cannot be exploited or expected to change the situation to a better position. This point illustrates a Lasso corner solution operating with (K_N(O))=1, K_N(W) =1**,** and K_N (W) = K_N(O). At this position K_N(O)- K_N (W) = 0. This is the 100 percent level as operates in the efficient market hypothesis (EMH) corner solution. This corner extremum of the unit circle sets the first variation position ($d\varpi$/KN(W) that anchors and characterizes the risk management skill level. These first variation differences and spreads in phase space between management skill sets ($Sk_{\delta i}(\varnothing\varpi)|t, d\varpi$) supports evaluation of relative frequency of computed outcomes. See Kahneman and Tversky (1979, 1982) and Tversky and Kahneman (1981)

This conceptual measure is illustrated in Figures 1a and b, 2,3,4, and5 as the right vertical axis beginning at point (K_N(O))=1 on the abscissa and depicted in upper right hand corner of all probability phase space figures where it meets with point **K_N (W) =1.** (K_N(O))=1 represents a level of knowing beyond time or it is at least at the edge of operational time. For this supratemporal condition to exist/operate requires that individual and interacting agents $\alpha(t)|\ S_{KN(\varnothing)t}$` would have to achieve the fully informed expected outcome, (K_N(O))=1. Therefore, $\alpha(t)|\ S_{KN(\varnothing)t}$ = **K_N (W) =1**. This zone of the phase space would be the fully rational and reasonable decision-makers assumed in the concept of *Homo economicus* in economics and/or the fully reasonable and knowledgeable man used to anchor decisions and findings in jurisprudence. See Lo (2017) and Chen (2015). The capacity of agents to achieve the standards of rational expectations, where the agent has the capacity to fully control and predict events/situations as they are undertaken and achieve the outcomes and positions characterized by a fully efficient standard of expectations. This sets the upper point of the decision matrix or probability state-space, where information and knowledge is achieved and paired with full cognitive ability, capacity and skill to achieve rational expectations of wealth, well-being and certainty.

As illustrated in Figures 1a and 1b, the probability state defined by the optimal point specified by K_N(O) = K_N (W) =1 enables additional insights and performance that cannot be feasibly obtained given boundaries on skills and capacities potentially lying outside the valid universe/sample decision set. This is concept represents the notion of perfect informational completeness and certainty. This is reflected as the complementary components of the Borel set bounds effectively lying outside the satisficing level of bounded rationality schedule labeled as $S_{K\delta\Omega 1.}$ in Figures 2 and 3, which is calculated as 1- $S_{K\delta\Omega 1.}$ This construct is developed with Equation 1 and arises because the orthogonal shift alters the probability space from the frame of $\mathscr{P}$ = 1 to a phase space dimension of $\mathscr{P} = 2^{\Omega=0.5}$. This construct sets the frame for the Kolmogorov probability space (Ω/Θ, $\mathscr{F},\mathscr{P}$) used in the behavioral model developed and illustrated with Figures 2-5. The unit/point measuring the decision frames are presented in Tables 1-9b.

Probabilities as illustrated in Figures 1a and 1b are viewed as objective or subjective. This division is specifically premised on theoretical positions that direct methods of measurement and modelling constructs. The objective perspective of probability is effectively a frequency measure with a descriptive origin expressed as the ratio of specified observation of concern, interest, focus or desire to the measure of all possible occurrences (outcome). This requires or restricts analytics/measures to finite data sets and observations. This creates complexities with measurement difficulties and definitional constructs in infinite frames supporting an empirical inductive analytic contingent on and biased towards discrete observations. The subjective perspective of probabilistic measure considers elements and levels and/or degrees of belief or expectations in relation to events, experiences, actions and/or observations. The issue is not just that things happen or attributes exist, but what is the response to, decision required or value of the observed situation. This context expands the frame of analysis from one of assigning a measure or specifically a frequency probability of an outcome as a point in space and time (ie. a 50-50 chance of a head/H or tail/T in a single coin flip, as per Cox's Theorem, where a probability is taken as a primitive and not further analyzed) to a stochastic framework of a space-time dynamic considering the interaction between physical and fundamental attributes with diverse agency capacities and situational phenomena that can significantly alter the measures and axioms promulgated by frequentist measures alone. The analysis considers the information, knowledge and experience involved in a decision or action. In effect the enquiry is not just limited to investigating the static attributes and their statistic relations as in the coin toss example, nor does it not focus on the analysis of the randomness of the flip (or general action; praxeology), it seeks to investigate the relationship of physical attributes, situational observations and occurrences and associate or frame them within the context of the conditional expectations of stochastics process. See Mikosch (1998). Anchoring on the stochastic nature of the actions (flip) taken or observed as an indication of expectations, expands the required analysis of the frequency measures beyond the observable static and physical attributes (χit) and resulting descriptive/static statistics ($\phi|\chi it$) that allows the use of assumptions and axioms like "a fair coin," "full knowledge," "parity in power/negotiation," "equilibrium," "rationality contingent on maximization behavior," allowing the deductive decision analytic considering alternative agents ($\alpha i(t)$) operating on alternative and diverse responses, thus generating dynamic attributes ($Zit|\chi it$) associated with observations and asset/issue attributes. For details see the definition of Arrow goods, Lucas (1976) and discussions of dynamic attributes by Ratcliff (1965), Graaskamp (1971), DeLisle (1985), Grissom (1986), which all infer a need for analytical development of dynamic attributes and in turn a formulation of the σ-algebra, $\mathcal{F}$ event sets of probability space.

Research Methodology: Risk Management Skill Capacity Frames

The decision-theoretic methodology developed in this study is contingent on the event function ($\mathcal{F}$) σ-field that maps the decision choice path of conflicting agency groups of risk managers ($\alpha_{\Omega i}$ (t)) and terrorist ($\alpha_{\Theta i}$ (t)) and their variant subsets ($\Omega_{1,}\Omega_{2,}\Omega_{3,}\Omega_{4,}\Omega_{5,}\Omega_6$ and Θ_1, $\Theta_{2,}\Theta_{3,}\Theta_4$). Borel measure allows the continuous probability space of infinite options to be developed as finite probability state-space sets (s(t)) and Ω_{it} and Θ_{it} subsets, as they are specified as σ-algebra of the form: $Sk_{\delta\Omega i}(\emptyset,\varpi)|t$ for risk manager skill levels or $L_{\iota\Theta i}(\emptyset,\varpi)|t$, measuring the loss functions created at differenced terrorist intensity levels. These operator paths are comprised as pairs/match points jointly considering units/levels of information ($\emptyset$) and control (ϖ) that produce risk management functional, decision measures $\delta(\emptyset,\varpi)$ and $\iota_\Theta(\emptyset,\varpi)$ that can operate in the same integrated probability phase-space, but can be specified, defined and measured as the operations and objectives of differentiated and distinct agent perspectives and disposition functionals.

Risk management operators ($\alpha_{\Omega i}$ (t)) can be framed as path-independent choice rules of the form $Sk_{\delta\Omega i}(\emptyset,\varpi)|t$ employing positions matching/pairing trade-offs between levels of control/influence (ϖ) with levels of access to information ($\emptyset$), knowledge ($Kn(\emptyset)|t$) and experience ($K_\Xi(\emptyset)|t \rightarrow Kn(\emptyset)|t$). See Dean and Carrol's (1977) development of an uncertainty decision continuum with trade-offs and matchings of information and control as it is linked to specific statistical and decision choice techniques across state-space (s(t)). By building on the literature and operational experiences presented earlier, choice rules and matching positions can then be modified to account for specific terrorist subclasses (Θ_j) and productive economic security agent classes (Ω_i) as they operate in common phase space (s(t)) situations (i.e. *in situ*: state-space regimes). This allows the conflicting positions of diverse and heterogeneous agents ($\alpha_i(t)|\Omega_i) \neq (\alpha j(t)|\ \Omega_j$) seeking differentiated goals and objectives for specifics of economic endeavors, activities and assets. See Elliott and Timmermann (2016).

An objective of this study is to seek an awareness of the action of agents ($\alpha_{\Omega i}(t)$, $\alpha_{\Theta i}(t)$), decisions under uncertainty if not a full understanding as knowledge (Kn(∅)) is developed across states of uncertainty (s(t)). For society in general and specifically those agents seeking security and stability through risk management, the essentials are to optimize controls of stability and security given the functional possibility of skills to access and employ relevant information (∅) as knowledge accrues (Kn(∅). The ability to identify signals in information contributes to decision and management skills to develop through leaning or experience, the capacity to match information to desired or attainable level of control. The association of information with the dynamics of control (first and higher variations) allows development of decision data point functionals ($\delta(\varnothing,\varpi)$).

Diaz (1993), Diaz and Hansz (1997, 2000) and Gallimore (1994) conducting laboratory experiments and situational test on level of expert decision makers identified the impact and benefits of stepwise and selective introduction of information (∅) on agent decisions (values). Across the studies they also found the both decisions and the process of developing those decisions (process/procedures) was influenced by skills, knowledge and experience levels. These empirically exogenously developed behavioral findings, matching skill levels and decision capacity (control and choice σ-algebra: ($Sk_{\delta\Omega i}(\varnothing)$) as a direct function of accessible information (∅) and initial skill capacity contribute to computational measures (tested).

Wofford, et al, (2011) supports the structural frame of this investigation, linking decision processes (valuation) using translation of learning procedures (changes in knowledge) with consideration and understanding of risk understanding (cognitive risk). This construct ties to the ($Sk_{\delta\Omega i}(\varnothing)$) subject to differenced σ-algebra, noted in the prior literature.

Seiler (2016) offers an more endogenous perspective on behavioral decision processes linking neurological findings and performance to static attributes (χit) to allow differentiated psychophysical (Zit|χit) responses. This psycho-neurological measures when associated with exogenous comparisons between information cascades supports a specification of information based decisions in a probability phase space with segmented decision capacity.

The societal objective function of the decision-agents ($\alpha_{\Omega i}(t)$) operating as risk managers seeking stability and wellbeing is conditioned and constrained by the strategic resource capacity and operating skills available/possible in a community or nation (and the subsets that comprise and operate in all societies) to optimize access to information, separate signals from noise so as to achieve societal stability and operational control. See Silver (2012), Seiler (2012). The issues of alternative positions and objectives long have been analyzed in decision-theoretic spaces with the employed of Lorenze curves and wellbeing assumptions of Pareto Optimality. The objective function in a decision-theoretic frame effectively operates and can be specified as an agent's ($\alpha_{\Omega i}$(t)) strategic resource possibility frontier/indifference curves ($S_{K\delta}(\varnothing,\varpi)|t)$). This forms the adaptive strategic capacity curve and integral value based on the path-independent choices rules and matching decision functionals (δ) developed by pairing (point) levels of control (ϖ) with available/accessible information (∅), of the form δ(∅,ϖ). See Chambers and Yenmez (2017). The risk managers' strategic capacity is modelled with Equation 1:

$$\mathbf{\Omega it} = S_{K\delta(\Omega i)} = \int_{\Omega} (\delta(\varnothing,\varpi),d\varpi),d\delta/dt \qquad \text{Eq: 1}$$

Where: $S_{K\delta(\Omega i)}$ = reflects the skill level and capacity of risk management agent ($\alpha_{\Omega i}$(t))

δ(∅,ϖ) = the decision element of the choice rule, matching measures of information

Conditional with functional levels of control in specific states (s(t), $\mathscr{P}$) anchored to first variation measures dϖ.

Equation 1, specifies that the skill level of the risk manager is dynamic given the differential of decision skills (dδ) and control (dϖ) change as time (dt) within the phase space (s(t)) transpires. The change in the skill level $S_{K\delta(\Omega i)}|d\delta/dt$ magnitude (or value $\int_{\Omega}$) is subject to learning with improving knowledge based on increased control, operating as a change in functional relations (δ(∅,ϖ) as these positions are conditioned changes in the matching of accessed information with ability to offer security (control) as it is anchored to the first variance measure (dϖ) for each **Ωit** level. See Kot (2014)

Using Equation 1, the risk management skill levels accumulated probability spaces can be developed with initial differences a function of the first variance in control (dϖ) as it operates convergence to zero (0) in phase space. The initial Kn(W) probability illustrated in Figures 2 and 3, anchor the $S_{K\delta(\Omega i)}$ calculation derived from Equation 1. The developed data per **Ωit** is presented in Table 1. The first variance frames shown in the table can represent the differences in cultures, societal structures, organizations, economies or individual investment/development utilities as functions of capacity base or resources. This base anchors the skill sets ($S_{K\delta(\Omega i)}|d\delta/dt$) estimated with Equation 1 and presented in Table 1, to complete the probability space triple (Ω, $\mathscr{F}$,$\mathscr{P}$) allowing a standardized comparison across management skill levels. The ordered situation with this psychometric can then be applied to compare the heterogeneous data and measures attributes to localized events. See Kot(2014) and Kolmogorov (1950).

Figure 2, illustrates the fundamental construct of the skill capacity functional operating at the maximal bounded rationality frontier, $\Omega_1 = S_{K\delta(\Omega 1)}$, with the mapped data displayed in Column 3 of Table 1. This maximal decision capacity level illustrated Figure 2 with its maximal tangent and chord, is then compared with other cascading skill capacity subsets in Figure 3. The curves in Figure 3 are illustrated in uncertainty space with the data presented in Table 1. Figures 2 and 3 combine the probability space frame of (Ω, $\mathscr{P}$) developed in Figures 1a and 1b with the $\mathscr{F}$ event field developed with Equation 1. This allows the relative positioning of an array of skill capacity sets in decision-theoretic phase space presenting the probability triple for the unit circle bounded rationality σ-field illustrated in Figure 2 and this optimal/satisficing possibility set to be compared in stationary left-side unit root skill capacity frame being presented in Figure 3. The computational experiences and developed data used for the competitive skill levels are in Table 1 is then used for construct Table 2a. Table 2a uses the spread between the skill level calculations based on the first variance functional pairings per σ-algebra sample space and considers their differences. This is presented in the column headings of Table 2A as $(Sk_{\sigma|\Omega I} - Sk_{\sigma|\Omega j})|t$ where i= 1,2,3,4,5,6 and j= 2,3,4,5,6. Table 2A represents the exogenous effects defining skill differences. See Kahneman and Tversky (1982a and 1982b) and Tversky and Kahneman (1981) and Tversky (1967, 1969)

Figure 3, offers a structural frame addressing the endogenous psychometric responses and operations of diverse agents or operators subject to conditional decision constraints and options, using the calculation of Table 1 and illustrates the statistical probabilities of the spread in Table 2A. The figure is a depiction of a psychometric experiment to identify the underlying dimensions of variant behavior within the rigor of a mathematical decision model. The model frame combines axiomatic reasoning with probability calculus (specifically a calculus of variation). See Kot (2014) and Mikosch (1998). This modeling construct allows a comparative thought experiment of strategic resource possibility frontiers developed from the pairing of control positions in association with access to information presented in a decision-theoretic frame. This construct allows the specification and delineation of levels of control as functions of the skills, learning and analytic-decision capacity $(S_{K\delta\Omega i}(\emptyset t))$ with is the vector (path) of decision pairings of information and control $(\delta(\emptyset,\varpi)$. The $(\delta(\emptyset,\varpi)$ points can be specified for diverse agents $(\alpha_{\Omega i}(t),\alpha_{\Omega j}(t), ..\alpha_{\Omega m}(t), \alpha_{\Omega n}(t))|(\alpha_{\Theta i}(t), (\alpha_{\Theta i1}(t), (\alpha_{\Theta i2}(t), (\alpha_{\Theta i3}(t)\ldots(\alpha_{\Theta j1}(t), (\alpha_{\Theta j2}(t)\ldots (\alpha_{\Theta m1}(t), (\alpha_{\Theta m3}(t), (\alpha_{\Theta n}(t),(\alpha_{\Theta n+1}(t))$ within the probabilistic phase space functioning within bounded space in the left-tail of the unit root. This allows an analytic continuum across the probability state-space comprising a component of Boral set of social preferences/positions. The Boral complement calculations are illustrated in the last row of Tables 1 through 9B.

The incremental spreads that can be observed in Figure 3 and reflected in the prior table discussions, can also support the development of the data presented in Tables 2B1 and 2B2. These tables produce the spreads as permutations between each skill level functional point $\delta_{it}(\emptyset, \varpi)|\Omega it- \delta_{it}(\emptyset, \varpi)|\Omega jt$ and their integral $(\int_{\partial\Omega}|\partial\Omega it)$ as estimated using Equation 2.

$$\partial\Omega it = \int_T\int_{\Omega}{}_{it}(\emptyset, \varpi)|\Omega it-\delta_{it}(\emptyset, \varpi)|\Omega jt , d\varpi),/dt, d\delta/dt \qquad \text{Eq 2.}$$

$\partial\Omega it$ = is the difference area/value measure of the spread between risk

management skill levels across probability space and temporal phase space as determined by functional points.

$\delta_{it}(\emptyset, \varpi)$ = are the functional points per Ωit set and subject to the first variance $d\varpi$,

developed with Equation 1

This approach supports a general (Bayesian) association of possible behavioral variations framed by general expectations using the finding of Equation 1 and compared to Equation 2 as Framed and anchored with adaptive or independent equilibrium paths presented in probability sample spaces depicted with Figures 1a and 1b. These frames and anchors model the possible knowledge and learning positions ($K_n < K_N(O)$) defined, conditioned and measured by access to information ($\varnothing$). This allows the specification of variant levels of cognition ($K_n(\varnothing)$) that accumulate through wisdom and experience to register as full knowledge (omnificence, $K_N(O)$) discussed previously. See Wofford et al (2011). As noted, this is an improbable if not impossible potential level of achievement and learning given the limited capacity of the skills, experience and learning of operating agents ($Sk_\delta(\Omega|\varnothing,\varpi)$); specifically identified as $\alpha_{\Omega i}(t)|\ SK_\delta(\Omega i|\varnothing)$ for diverse risk managers (or the terrorist agents, $\alpha_{\Theta i}(t)|L\iota(\Theta j|\varnothing)$ to be discussed). Though this capacity is limited and specified at prescribed states of informational access, the accessed information can be accumulated as levels of human capacity or wealth, further specified as wisdom, experience and/or skill aggregation on the ϖ ordinate to a maximum level of ($K_N(W)$. As previously discussed this construct and aggregation represents positions of power and influence enabling control/management of strategic resource potential and skill endowment available to achieve diverse levels and conditions of stability and wellbeing at alternative states (s(t)) of risk and uncertainty across the probability phase space illustrated in Figure 3 and measured in Tables 2B1 and 2B2. The attainment of progressive levels of ($K_n(W)$ and incremental achievement of operational skills, $SK_\delta(\Omega|\varnothing)$ assist the differentiation of risk management skill capacity frontiers, that will be exposed to alternative levels and ranges of terrorism.

Terrorist Differenced Intensity Methodology and Frame

This section develops the σ-algebra and event probabilities $\mathcal{F}$ mode needed to construct the terrorist loss functions ($L\iota_\Theta\,(\varnothing,\varpi)$ as they vary in levels of intensities across probability space. As note in the problem statement, terrorism is and can have a negative impact on society, social relations and the economy. A generalized socio-economic perspective of terrorism, frames terrorism as a downside cognitive risk or direct loss. The variances/loss can be measured with the probability triple as required in risk management process. Unlike the frequency distribution arising from external forces directly impacting the first variance estimation, terrorism is a behavioral and subjective phenomena. Terrorist behavior in probability space is a subjective measure of phenomenological probability constructs contingent on the perception, dispositions and expectation conditionals of the specified terrorist agencies ($\alpha_{\Theta i}(t)$) being profiled. See Kahneman and Tversky (1982a) and Mosch (1998). Terrorism as a contra-positive strategy conditionally positioned to an established order of social welfare (well-being) is ranked or ordered as a range of objectives effectively seeking to alter or destroy a specified culture, nation, society, institution, government or enterprise. The range of possible positions, motivations and objectives specifying purpose and agent perspectives can range (as defined) from the use of violence to change policy or receive recognition or material gain to a goal of total chaos and destruction. These potential loss intensity functions in phase space are identified as loss function paths of $L\iota_{\Theta i}$, with i=1,2,3,4 denoting the levels of loss intensity tracked in this study. The most intensity terrorist profile seeking maximum loss in any society of skill capacity is $L\iota_{\Theta 1.}$ Those seeking to advance a power increase in the current society or to generate variant levels of political agitation with the use of violence is modeled as $L\iota_{\Theta 4}$, in the calculations, tables and illustrations to follow. An example of an $L\iota_{\Theta 4}$ profile might be representative of the IRA's evolution from a militant group to a political party (Sein Finn). $L\iota_{\Theta 4}$ might also track the path-pattern of functional points depicting violence actions of war between nation-states with goals of expanded territory, resources acquisition or trade rights from another. This is noted by Turchin and Nefedov (2009) discussion of conflicts between Burgundy and Tudor England. These conflicts entailed levels of controlled violence and aggravation in hopes and expectations of gains/profit and control of existing assets and resource (avoidance of total or massive destruction). At the other extreme of violence as a tool or action is the objective to inflict total destruction on opponents. This was voiced by the former Hezbollah leader. He stated, "we are not fighting so that the enemy recognizes us or offers us something. We are fighting to wipe out the enemy." See Hoffman (1998). This is the intensity loss function of $L\iota_{\Theta 1}$. These levels of agency intensity $L\iota_{\Theta i}$ are shown in Table 3 and depicted in Figure 4. As illustrated, the extreme $L\iota_{\Theta 1}$ path pattern, fits the construct of the predictive market in pricing a non-gain (0), but requires a decay path contingent of the initial position or beginning with optimistic expectations of gain or achievement at KN(W) =1. This sets the frame for a phenomenological probability field operating as variant degrees of uncertainty defining alternative situations or outcomes. See Kahneman and Tversky (1982a and 1982b). This suggested format is consistent with Richardson's (1948, 1950, 1988) mathematic constructs for threat responses between conflicting agents. See Equation 3:

$$\Theta it = L\iota_{\Theta it}(\varnothing,\varpi,|(\Theta i) = \int_{\Theta} \iota_{\Theta it}(\varnothing,\varpi)\, d\varpi/dt,\, d\iota/dt \qquad \text{Eq: 3}$$

Where: $L\iota_{\Theta it}(\varnothing,\varpi,|(\Theta i)$ = the loss function of terrorist actions as a function of $\alpha_{\Theta i}(t)$ behavior and object/goal intensity seeking loss infliction on or chaos to others

$\iota_{\Theta it}(\varnothing,\varpi)$ = functional (matching point) measure contingent of terrorist σ - algebra as a function of phenomenological intensity.

Equation 3, produces information path-pattern in probability space that is inversely related to levels of control ($1/\varpi$) in specific states (s(t)). This characterizes behavior path comprising a decline in social control relating to diminishing benefits to units of accessible information ($\varnothing$|s(t)). This relationship and its measurement is contingent on matching changes in intensity with changes over time in phase space ($d\varpi/dt$, $d\iota/dt$). This disposition allow behavioral propensity accounting for decreasing intensity of hurting others as inflicted loss aggregates and time passes. [1]

While the risk management levels are sensitive to exogenous uncertainty impacts on the initial position, the phenomenological implications of terrorist intensity spreads is characterized by the rate of directional decline and the spread between alternative loss scenarios, ($L\iota_{\Theta i}\,|\alpha_{\Theta i}(t)$), where i= ($L\iota_{\Theta 1}$ $L\iota_{\Theta 2}$ $L\iota_{\Theta 3}$ $L\iota_{\Theta 4}$). The dynamics of chance or choices that form the perceptions and decisions are functions of beliefs of inflicting loss and intensity of actions $\iota_{\Theta i}$ ($\varnothing,\varpi$) to create fear and chaos to increase uncertainty. As such, the $L\iota_{\Theta i}$ are structured and designed to decrease the degrees of freedom associated with information, skills and knowledge. The general formulation is achieve decay in potential control as information and time (for learning) expand. The asymptotic patterns of the ($L\iota_{\Theta i}$ |$\alpha_{\Theta i}$ (t)) functions are shown in Figure 4, using data presented in Table 3. As illustrated the initial point at KN(W) =1 is the corner denoting perfect control without useful information. The functional points composing the terrorist σ-algebra mode reduces the benefits of information associated with states of control. In effect the chaos creates and acceleration of noise relative to the benefits of signals gained with knowledge levels and directional potential of learning. Table 3 shows the intensity spreads as well as the range of $L\iota_{\Theta i}$ considered. As illustrated by the spread in intensities of terrorist loss functions and patterns in Figure 4, shows that as loss intensity accelerates, the probability space of uncertainty contained in the Borel measurement compliment (1- $L\iota_{\Theta i}$) regardless of control/information functionals ($\iota_{\Theta i}$ ($\varnothing,\varpi$)) operating (see last row, Table 3).

Given the endogeneity of the terrorist loss functions as conditional on agent intensity levels requires attribution consideration of terrorist ($\alpha_{\Theta i}$ (t)) characteristics and terrorist actions related to the event ((Ξ), E(Ξ) they create as functions of attributes and conditions: χit|Θit, Θit|s(t), and eit|Θit (idiosyncratic differences experienced). These case-specific measures and static attributes can be associated and regressed with the intensity-spreads presented in the three right columns of Table 3. An evaluation of causal links to the potential endogenous and subject probability spreads illustrated in Figure 4 and presented in Table 3, allows a decision valuation matrix events in of societal states-regimes (s(t)). This process is consistent with the differences noted by Turchin (2016) and Turchin and Nefedov (2009) between ruling elites or other controlling agents (($\alpha_{it(\Theta)}$ |($\alpha_{it(\Omega)}$, s(t)| $\alpha_{it(\Omega)}$)). Also, this attribution construct supports function specification of terrorist strategic function that may be operating when a government is at war with its "people" or a revolution is nature of conflict. See Tucker (2016). It can also support the calculation across the states of uncertainty and control that form terrorist and objectives of nihilistic, anarchist, cults and religious fanatics or other agents of an 'extrasocietal' element or outsider psychological frame seeking mass and total destruction (as voiced by the prior Hezbollah strategy).

Decision Theoretic Analysis of Risk Management, Terrorist Loss Functions and Threat Effects

With the development of the probability space triples for both risk management skills (Ω, $\mathscr{F},\mathscr{P}$) and alternative intensities in levels of of terrorist loss functions (Θ, $\mathscr{F},\mathscr{P}$), it is possible to analyze these conflicts between distinct but simultaneous operating agents ($\alpha_{\Omega i}$(t)≠ $\alpha_{\Theta i}$(t))|s(t)) subject to heterogeneous behavioral perspectives and decision preferences. The uncertainty of interaction arises given differences in preferences and intuitive perspectives, as noted in the profiles of agent/actors noted. The diversity in preferences, influences the decisions made (as well as the process employed: $\mathscr{F}$). The decision made and its process of action chosen results in the outcome or occurrence observed. It is often these observations and their descriptors (χit, ϕ|χit) that become the focus of the tactical responses, measures undertaken and policies enacted. A focus on outcomes of specific events may limit the learning and cognitive risk concerns needed to benefit society and develop of risk management skills. As noted it is the understanding of relationships linking of preferences ($\Omega/\Theta \rightarrow \mathscr{F} \rightarrow \mathscr{P}$) that offers benefits to investigation (gathering information, $\emptyset$) and intelligence (analytics and solutions, ϖ, $d\varpi \rightarrow Kn(W)it$) that may offer the peace and stability axiom fundamental to social order.

The development of the probability triples for both risk managers and terrorist (Ω/Θ, $\mathscr{F},\mathscr{P}$), offer and potential interactive understanding (learning/ behavioral cognition), with certain measurement adjustments and augmentations. The decision theoretic frame allowing a comparative computation experiment between alterative risk management skill levels and terrorist intensity loss function is illustrated in Figure 5. This is effectively a composite of Figures 3 and 4 and reflects the functional data points developed and presented in Tables 1-3.

Figure 5 illustrated the six risk management skill capacity modes ($Sk_{\Omega\delta it}$) and the four terrorist loss functions ($L_{\iota\Theta it}$) developed and identified as the function in probability phase space. Despite the potential of this analytic to offer solutions via risk measurement, potential mis-measurement and hence decisions and outcomes may be mis-specified.

As noted in the attribution analytics developed to quantify skills and intensity functional measures ($\mathscr{F}|$fields), the risk management probabilities where anchored to objective/frequentist probability measures ($\mathscr{P}$) that are exogenous in origin, focused on first variance positions with the subsequent incremental points conditional to $Sk_{\Omega\delta it}$ modal. Alternatively, the loss functions conditioned by terrorist intensity diversions are based on phenomenological, subjective probabilities (like Bayesian *a priori* measures) that are functions of agent beliefs or intensities, in reducing control relative to knowledge in and uncertain world (s(t)). As such a terrorist 0.20 $\neq$ to a risk managers 0.20 measures. See Kahneman and Tversky (1982a, 1982b), Weisberg (2014), and Wofford et al (2011) for details of these cognitive measurement issues.

A two-phase process is developed and presented in Tables 4a-9b address these issues. Though the origins of the probability are not altered their process and orientations are standardized for comparative purposes. This is achieved by developing both probability triples as endogenous measures of the forms using the Equations 4a and 4b as follow:

$$\mathscr{P}(\Omega it) = dSk_{\delta|\Omega\iota}t/dt \qquad \text{Eq 4a}$$

$$\mathscr{P}(\Theta it) = d\, L_{\iota\Theta i}/dt \qquad \text{Eq 4b}$$

These measures are incrementally developed across time using and standard unit time measure linked to a unit probability frame. These measures are presented in Column 6, as $\mathscr{P}(\Omega it)$ based on Equation 4a and in Columns 4 and 10, for the less and more intense loss function per table. These endogenous calculations are depicted in Columns 4, 6 and 10, for Tables 4a-9b. Tables 4a-9b also show the $Sk_{\delta|\Omega\iota}t$ and $L_{\iota\Theta i}t$ vectors shown in Tables 1-4.

Tables 4a-9b also consider an exogenous probability calculation for each terrorist and risk manager profile. This relative frequency probability measure standardizing terrorist loss functions with risk management skill capacity if developed using an augmented threat measure conceived by Richardson (1948, 1950 and 1988). Using pre-WWI armament statistics and data available through the inter-war period, violence potential threat proxy using a posteriori probability evert set with a fortiori framing of a mathematical psychology construct for possibility of war or peace as a function changes in armament tonnage production/procurement across nations. He developed a $\boldsymbol{k}$ statistic denoting the change in nation's arm development to the current armament level of a potentially adversarial nation. He then calculated an $\boldsymbol{\ell}$ factor that reverse the national ratio of change to fund level.

For the purpose of this behavioral analytic, $\boldsymbol{k}$ statistic as per Equation 5a is the ratio of the change in a given terrorist loss-intensity function in relation to the specified risk skill level. As a computational complement, an $\boldsymbol{\ell}$ factor is developed as a ratio of the rate of change in aggregated management skills in relation to the magnitude to the loss function possible for an identified terrorist intensity profile. See Equation 5b:

$$\boldsymbol{k} = dL_{\iota\Theta i}/Sk_{\delta|\Omega\iota}t = d\,\Theta it/\,\Omega it \qquad \text{Equation 5a}$$

$$\boldsymbol{\ell} = dSk_{\delta|\Omega\iota}t/\,L_{\iota\Theta i} = d\,\Omega it/\,\Theta it \qquad \text{Equation 5b}$$

The application of Equations 5a and 5b, show that the $\boldsymbol{k}$, $\boldsymbol{\ell}$, Augmented Richardson threat response factors, developed as objective/exogenous probabilities are presented in Columns 7, 8 and 11,12 in Tables 4a-9b. These construct expand the decision-theoretic frame to a more complex game-theoretic frame, reflecting the impact of terrorist loss positions and intensity changes on risk management responses, and risk management strategy changes and skill levels on terrorist loss and belief expectations. A key implication is that as indicated in incremental time/space units and in the moment and distribution measures, uncertainty implicit with the action of others increases uncertainty potential and risk exposures. This finding across terrorist profiles and risk skill positions, exogenous risks exposure reflecting a game-theoretic probability space, indicates higher levels and incremental impacts of risk and uncertainty. This is consistent with the variants in uncertainty and intuitive statistical findings noted by Kahneman and Tversky (1982a, 1982b) and Tversky and Kahneman (1981).

Conclusions and Future Research

The components of the analysis used to develop the variables and relationships include the behavior of decision agents ($\alpha(t)$) as shown in Figure 2,3, 4 and 5. The analytic is contingent on , and a function of, a number of variables; the function of divergent agents' variant ability and capacity to access and utilize information; the differences in their skills and capacity to influence and control situations they undertake, inflict or are exposed to; and the risks and probabilities measures contingent on these exposures. The skills and abilities required given the issues that arise and the exposures to be experienced are functions of their access to information ($\varnothing$t) in and over time and the agents' ($\alpha(t)$) ability ($SK_{n\varpi}(\varnothing)$) to learn, develop and grow in knowledge ($Kn(\varnothing)t$). Knowledge ($Kn(\varnothing)t$) as to be measured and defined is a capitalization of information into skills paired with variations in the capacity to control or influence decision processes. Over time this capacity is a function of experience assisting in the development of operational skills conditioned by ability and cognition. This power to control ($K_N(W)$) is reflective of conditioning the capacity of knowledge and skills to influence and control decision-making, thus allowing, managing risk/uncertainty, ($\alpha_{\Omega}(t)|s_{kn(\varnothing)t}$)) or exploiting and creating these states of risk and uncertainty to maximize loss and damage ($L\iota_{\Theta it} \rightarrow(\chi it)|$ L(Zit|χit)) as desired by terrorist ($\alpha_{\Theta i}(t)|$ $L\iota_{\Theta it}$)).

The information and capacity of influence/control pairings, sets the probability structure illustrated in Figure 1a ad1b which will be further developed in the methodology section and the other figures. The structural probabilistic framed in Kolomgorov's (1959) probability space fitting Lo's (2017) prediction market and the decision-theoretic frame of Von Neumann and Morgenstern (1947) and Luce and Raiffa (1957). This decision frame sets up behavioral associations/relationships that consider and can be extended to respond to physical/real (static) attributes (χit) operating as decision stimuli as it can link to case specific measures.

The decision-theoretic probabilistic state space frame can operate as an alternative to data measures generated with Monte Carlo simulation. The reason for an alternative to this well-established procedure is that the multiple variables simulated via Monte Carlo and similar procedures develop distributions that are independent of one another and to not recognize the interaction and adaptive interdependence that is operating in many of the social and economic relationships operating across and between decision agencies and their expectations, especially as relates to political, social and economic state-space and space-time delineated regimes. The implication of these errors in estimation are made evident by the augmented $\boldsymbol{k}$ and $\boldsymbol{\ell}$ relative to the endogenous phenomenological probabilities observed in many behavioral measures.

Behavioral specification of terrorist typology, allows a frame for further research in psycho-physical coefficient measurement relative to security costs/premiums that are missing from the measures of loss (human and property) that deal only with the local descriptive statistics and attribute measures of specific occurrences. This is much like defining proposed development risk, by looking at the current success and/or failure of past production, not looking at proposed products relative to future needs and preferences, and risks associated with the development process as it seeks to meet and achieve planned and proposed expectations.

This basic frame and analytic will be used in future research on terrorist and risk management conflicts. The path-independent choice rules develop allow a general specification of σ-algebra and Borel sets that can frame and define the decision options and loss function intensities possible in uncertain phase space. The complex base space frame developed can be compared to specific interactive/response measures as suggested by Richardson (1948, 1950 and 1988) and DeLisle (1986). The constructs can be used to support the forecast and *a fortiori* constructs to test an array of choice and chance situations in addition to the terrorist dynamics and risk management strategies characterized in this paper. The structure developed in this paper can be extended to a psycho-physical measurement problem in future research. The psycho-physical association formulated in case specific scenarios will then be applied to a long term large data sets such as of terrorist events, testing Graham and Timmermann (2017) conjecture of a direct association between decision-theoretic probabilistic phase space and forecasting terrorist activities and behavioral profiles. Indeed, the technique(s) developed assist a more complete application of risk management process. Terrorist violence is indiscriminately supplied but a risk exposure (loss to general society). The descriptive information and statistics developed are insufficient to assist the needed strategic risk analysis of the risk management process, needed to develop more complete intelligence capacity. The process sets up the psychometric scaling component of a psychophysical (Fechner model) that can be linked to the descriptive data and observations/outcome of a given terrorist event allowing a structured analysis of individual cases study – allowing a comparison of heterogeneous occurrences. The behavioral component of this study for psychophysical analysis can extend beyond the case issue and be used to test issues framed by attribution theory (causal relations across events). The Terrorist behavior and decisions and risk management analysis and decisions presented in the event functions/σ-algebra (probability measure models per agent can be used as functional decisions/action inputs and anchors for testing terrorist or risk exposures in the structure or frame of threshold signal detection (TSD), Sensitivity threshold (terror intensity) and receiver operating characteristics (ROC) and ROC curves as these tools are used to relate information to risk exposures. Reactions to solutions. Strategic capacity to exposures. TSD, ROC and Sensitivity threshold where models initially used by RAF to analysis and strategically respond with use of radar info/signals to Axis moves. Our $\mathcal{F}$ equate to ROC curves and inverse to terrorist intensities – this allows extension to any physical/descriptive statistical construct (χit, $\phi|\chi$it) components in our model. In an aggregated construct (macro-level) the behavioral measures developed per event and phase space with our model can be used as weights, adjustment and modifiers across the many heterogeneous terror events to adjust as any data to be considered in an index or data base to formulate a HPM (hedonic pricing model) – improving a standardized comparison between events like the Military-Math Complex at U of Wisconsin to the first WTC attack or 9-11.

Endnote

1 The asymptotic pattern produced with Equation 3 was suggested in practice by Mikey Day, a British military and intelligence veteran and current news correspondent, who in discussing interrogation and the use of torture, inferred that the signal value of information declines asymptotically with time. The most relevant data is gained in the short term as opposed to information gained other time as personal relations are developed.

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Figure 1a: Decision Probabilistic LaPlace Frame

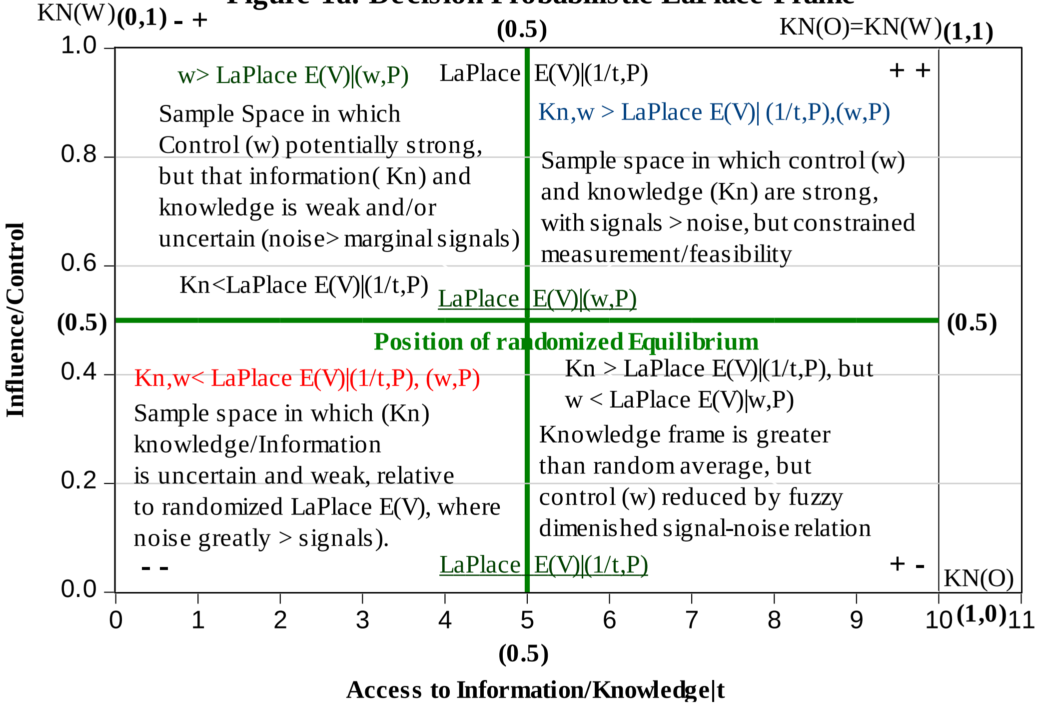

Figure 1b: Decision Probabilistic Boolean Frame

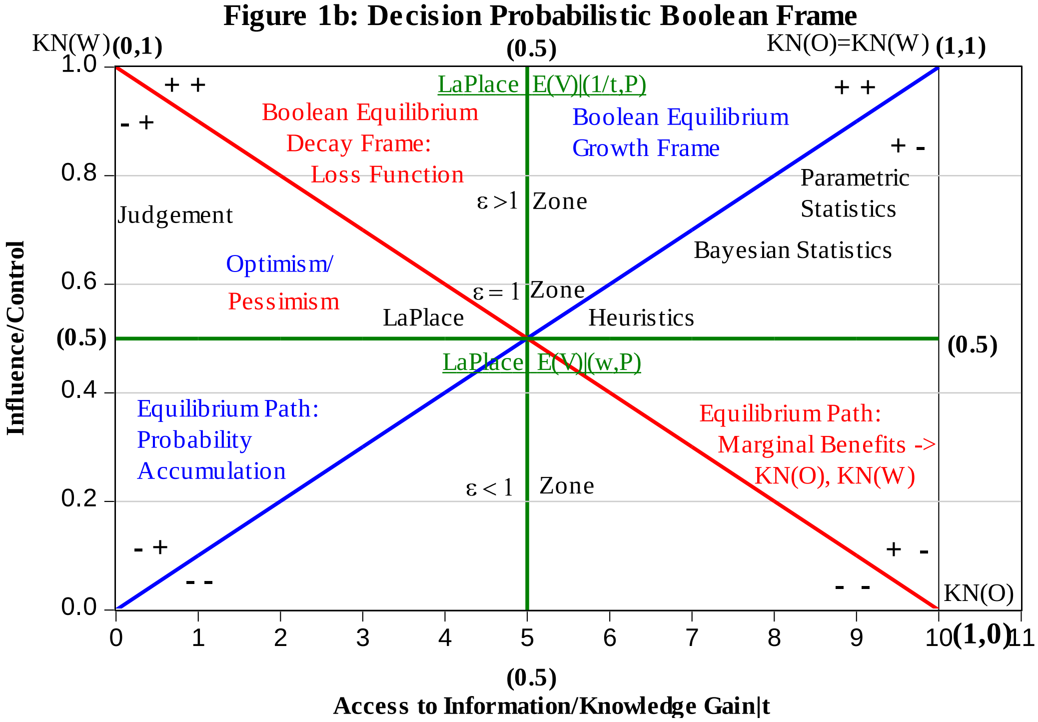

Figure 2: Bounded Rationality Strategic Capacity

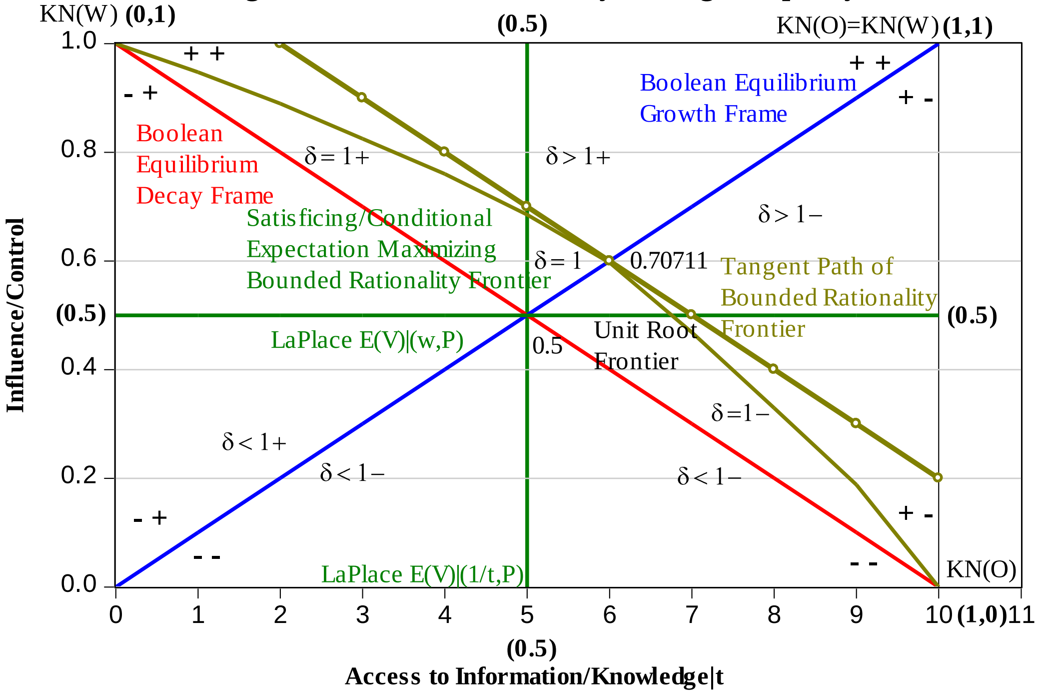

Figure 3: Risk Management Skill Capacity Frontiers

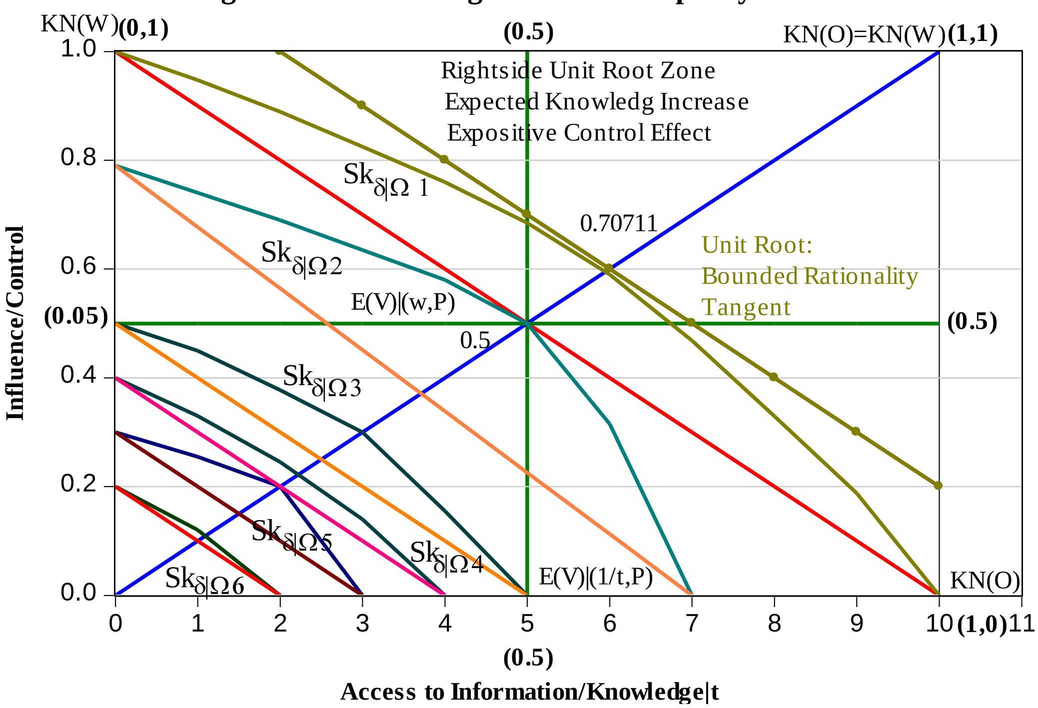

Figure 4: Terrorist Agent Intensity and Loss Function

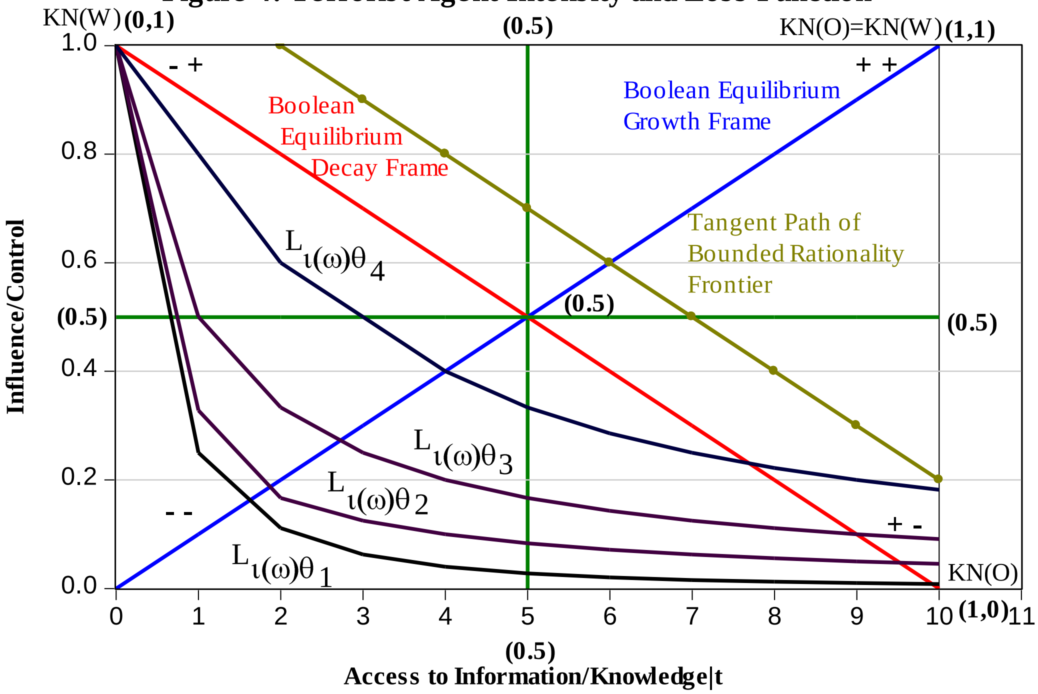

Figure 5: Borel Set, Probability Space, Risk Skill Capacity and Terror Intensity

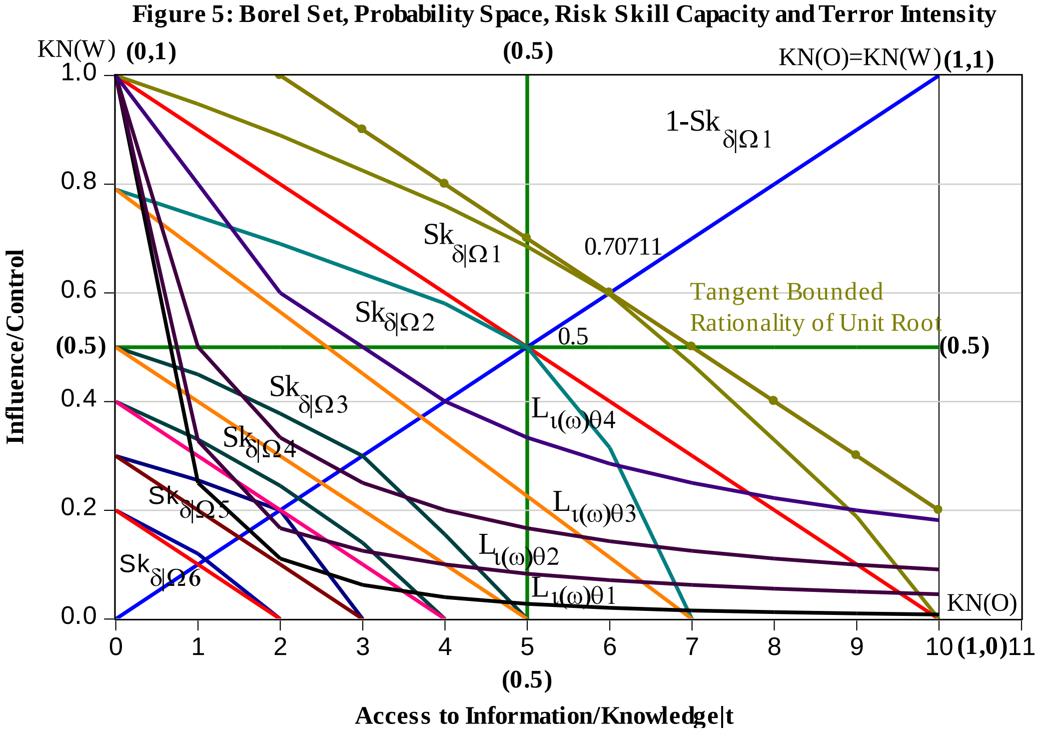

Table 1: Probability Space, Events $\mathcal{F}$ Considering Frontiers of Risk Management Skill Capacity

Time(t)	Percentage (%)	Sk $_{\delta\|\Omega1}$	Sk $_{\delta\|\Omega2}$	Sk $_{\delta\|\Omega3}$	Sk $_{\delta\|\Omega4}$	Sk $_{\delta\|\Omega5}$	Sk $_{\delta\|\Omega6}$
0	0	1.00000	0.79000	0.50000	0.40000	0.30000	0.20000
1	0.1	0.94728	0.74000	0.45000	0.33000	0.25500	0.12000
2	0.2	0.88928	0.69000	0.37750	0.24500	0.20000	0.00000
3	0.3	0.82500	0.63500	0.30000	0.14000	0.00000	
4	0.4	0.76000	0.58000	0.15500	0.00000		
5	0.5	0.68500	0.50000	0.00000			
6	0.6	0.59700	0.31500				
7	0.7	0.46845	0.00000				
8	0.8	0.32924					
9	0.9	0.18800					
10	1.0	0.00000					
Average		0.60811	0.53125	0.29708	0.22300	0.18875	0.10667
Sum		6.68926	4.25000	1.78250	1.11500	0.75500	0.32000
Fair Average		0.66893	0.60714	0.17825	0.11150	0.18875	0.10667
Standardized Percentage (%/T)		0.66893	0.53125	0.29708	0.22300	0.18875	0.10667

Borel Complement	1- Sk $_{\delta\|\Omega\iota}$	0.33107	0.46875	0.70292	0.77700	0.81125	0.89333

Table 2B1 Risk Management Frontier $\mathscr{F}$ Incremental Differences Per Skill Capacity Level From σ- Algebra Boundary Anchor

Time(t)	%	$(Sk_{\delta\|\Omega 1} - Sk_{\delta\|\Omega 2})\|t$	$(Sk_{\delta\|\Omega 1} - Sk_{\delta\|\Omega 3})\|t$	$(Sk_{\delta\|\Omega 1} - Sk_{\delta\|\Omega 4})\|t$	$(Sk_{\delta\|\Omega 1} - Sk_{\delta\|\Omega 5})\|t$	$(Sk_{\delta\|\Omega 1} - Sk_{\delta\|\Omega 6})\|t$	$(Sk_{\delta\|\Omega 2} - Sk_{\delta\|\Omega 3})\|t$	$(Sk_{\delta\|\Omega 2} - Sk_{\delta\|\Omega 4})\|t$	$(Sk_{\delta\|\Omega 2} - Sk_{\delta\|\Omega 5})\|t$	$(Sk_{\delta\|\Omega 2} - Sk_{\delta\|\Omega 6})\|t$	$(Sk_{\delta\|\Omega 3} - Sk_{\delta\|\Omega 4})\|t$	$(Sk_{\delta\|\Omega 3} - Sk_{\delta\|\Omega 5})\|t$	$(Sk_{\delta\|\Omega 3} - Sk_{\delta\|\Omega 6})\|t$
0	0	0.210000	0.500000	0.600000	0.700000	0.800000	0.290000	0.390000	0.490000	0.590000	0.100000	0.200000	0.300000
1	0.1	0.207278	0.497278	0.617278	0.692278	0.827278	0.290000	0.410000	0.485000	0.620000	0.120000	0.195000	0.330000
2	0.2	0.199284	0.511784	0.644284	0.689284	0.889284	0.312500	0.445000	0.490000	0.690000	0.132500	0.177500	0.377500
3	0.3	0.190000	0.525000	0.685000	0.825000		0.335000	0.495000	0.635000		0.160000	0.300000	
4	0.4	0.180000	0.605000	0.760000			0.425000	0.580000			0.155000		
5	0.5	0.185000					0.500000						
6	0.6	0.282000											
7	0.7												
8	0.8												
9	0.9												
10	1.0												
Ave		0.207652	0.527812	0.661312	0.726640	0.838854	0.358750	0.464000	0.525000	0.633333	0.133500	0.218125	0.335833
Sum		1.453562	2.639062	3.306562	2.906562	2.516562	2.152500	2.320000	2.100000	1.900000	0.667500	0.872500	1.007500
Fair Ave		0.207652	0.527812	0.661312	0.726640	0.838854	0.307500	0.464000	0.525000	0.633333	0.133500	0.218125	0.335833
%/T		0.145356	0.263906	0.330656	0.290656	0.251656	0.215250	0.232000	0.210000	0.190000	0.066750	0.087250	0.100750
Borel Comp	$1-Sk_{\delta\|\Omega_\iota}$	0.854644	0.736094	0.669344	0.709344	0.748344	0.784750	0.768000	0.790000	0.810000	0.933250	0.912750	0.899250

Table 2B2 Risk Management Frontier ℱ Incremental Differences Per Skill Capacity Level

From σ- Algebra Boundary Anchor, Continued

Time(t)	%	$(Sk_{\delta\|\Omega 4} - Sk_{\delta\|\Omega 5})\|t$	$(Sk_{\delta\|\Omega 4} - Sk_{\delta\|\Omega 6})\|t$	$(Sk_{\delta\|\Omega 5} - Sk_{\delta\|\Omega 6})\|t$
0	0	0.100000	0.200000	0.100000
1	0.1	0.145000	0.210000	0.135000
2	0.2	0.045000	0.245000	0.200000
3	0.3	0.140000		
4	0.4			
5	0.5			
6	0.6			
7	0.7			
8	0.8			
9	0.9			
10	1.0			
Ave		0.107500	0.218333	0.145000
Sum		0.430000	0.655000	0.435000
Fair Ave		0.107500	0.218333	0.145000
%/T		0.043000	0.065500	0.043500
Borel Comp	$1-Sk_{\delta\|\Omega t}$	0.957000	0.934500	0.956500

Table 2A: Risk Management Frontier $\mathcal{F}$ Per Skill Capacity Level Thresholds Differences

(σ-Algebra, $\mathcal{F}$ Path Sample Space Spreads)

Time(t)	%	$(Sk_{\delta\|\Omega 1} - Sk_{\delta\|\Omega 2})\|t$	$(Sk_{\delta\|\Omega 2} - Sk_{\delta\|\Omega 3})\|t$	$(Sk_{\delta\|\Omega 3} - Sk_{\delta\|\Omega 4})\|t$	$(Sk_{\delta\|\Omega 4} - Sk_{\delta\|\Omega 5})\|t$	$(Sk_{\delta\|\Omega 5} - Sk_{\delta\|\Omega 6})\|t$
0	0	0.21000	0.29000	0.10000	0.10000	0.10000
1	0.1	0.20728	0.29000	0.12000	0.07500	0.13500
2	0.2	0.19928	0.31250	0.13250	0.04500	0.20000
3	0.3	0.19000	0.33500	0.16000	0.14000	
4	0.4	0.18000	0.42500	0.15500		
5	0.5	0.18500	0.50000			
6	0.6	0.28200				
7	0.7					
8	0.8					
9	0.9					
10	1.0					
Ave		0.20765	0.35875	0.13350	0.09000	0.14500
Sum		1.45356	2.15250	0.66750	0.36000	0.43500
Fair Ave		0.20765	0.35875	0.13350	0.09000	0.14500
%/T		0.14536	0.21525	0.06675	0.03600	0.04350
Borel Comp	$1-Sk_{\delta\|\Omega\iota}$	0.85464	0.78475	0.93325	0.96400	0.95650

Time(t)	Percentage (%)	$L_{\iota\Theta 1}$	$L_{\iota\Theta 2}$	$L_{\iota\Theta 3}$	$L_{\iota\Theta 4}$	$L_{\iota\Theta 2}- L_{\iota\Theta 1}$	$L_{\iota\Theta 3} - L_{\iota\Theta 2}$	$L_{\iota\Theta 4} - L_{\iota\Theta 3}$
0	0	1.00000	1.00000	1.00000	1.00000	0.00000	0.00000	0.00000
1	0.1	0.25000	0.32787	0.50000	0.80000	0.07787	0.17213	0.30000
2	0.2	0.11111	0.16667	0.33333	0.60000	0.05556	0.16667	0.26667
3	0.3	0.06250	0.12500	0.25000	0.50000	0.06250	0.12500	0.25000
4	0.4	0.04000	0.10000	0.20000	0.40000	0.06000	0.10000	0.20000
5	0.5	0.02778	0.08333	0.16667	0.33333	0.05556	0.08333	0.16667
6	0.6	0.02041	0.07143	0.14286	0.28571	0.05102	0.07143	0.14286
7	0.7	0.01563	0.06250	0.12500	0.25000	0.04688	0.06250	0.12500
8	0.8	0.035	0.05556	0.11111	0.22222	0.04321	0.05556	0.11111
9	0.9	0.01000	0.05000	0.10000	0.20000	0.04000	0.05000	0.10000
10	1.0	0.00826	0.04545	0.09091	0.18182	0.03719	0.04545	0.09091
Average		0.15498	0.20424	0.29290	0.43392	0.04816	0.08473	0.15938
Sum		1.54977	2.04235	2.92897	4.77309	0.52978	0.93207	1.75321
Fair Average		0.15498	0.20424	0.29290	0.47731	0.05298	0.09321	0.17532
Standardized Percentage (%/T)		0.15498	0.20424	0.29290	0.47731	0.05298	0.09321	0.17532

Borel Complement	1- $L_{\iota\Theta i}$	0.84502	0.79576	0.70710	0.52269	0.94702	0.90679	0.82468

Table 3: Terror Intensity $\mathcal{F}$ Frontier and Difference Spreads Between Loss Function σ-Algebras

Table 4A:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_1t Skill Level at Lesser Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 4}$	$d L_{\iota\Theta 4}/dt$	$Sk_{\delta\|\Omega 1}t$	$dSk_{\delta\|\Omega 1}t/dt$	k = $d L_{\iota\Theta 4}/Sk_{\delta\|\Omega 1}t$	**ℓ =** $dSk_{\delta\|\Omega 1}t/L_{\iota\Theta 4}$	$L_{\iota\Theta 3}$	$d L_{\iota\Theta 3}/dt$	k = $d L_{\iota\Theta 3}/Sk_{\delta\|\Omega 1}t$	**ℓ =** $dSk_{\delta\|\Omega 1}t/L_{\iota\Theta 3}$
0	0	1.00000	0	1.00000	0	0	0	1	0	0	0
1	0.1	0.80000	-0.200	0.94728	-0.05272	-0.21113	-0.06590	0.500	-0.50000	2.00000	-0.105444
2	0.2	0.60000	-0.200	0.88928	-0.05799	-0.22490	-0.09666	0.333	-0.16667	0.50000	-0.173983
3	0.3	0.50000	-0.100	0.82500	-0.05928	-0.12048	-0.11857	0.250	-0.08333	0.41667	-0.237135
4	0.4	0.40000	-0.100	0.76000	-0.06200	-0.13021	-0.15500	0.200	-0.05000	0.20000	-0.310000
5	0.5	0.33333	-0.067	0.68500	-0.08300	-0.09732	-0.24900	0.167	-0.03333	0.16667	-0.408000
6	0.6	0.28571	-0.048	0.59700	-0.08800	-0.07976	-0.30800	0.143	-0.02381	0.14286	-0.630000
7	0.7	0.25000	-0.036	0.46845	-0.12855	-0.07624	-0.51419	0.125	-0.01786	0.12500	-1.132370
8	0.8	0.22222	-0.028	0.32924	-0.13921	-0.08437	-0.62645	0.111	-0.01389	0.11111	-1.252893
9	0.9	0.20000	-0.022	0.18800	-0.14124	-0.11820	-0.70622	0.100	-0.01111	0.10000	-1.412434
10	1.0	0.18182	-0.018	0.00000	-0.18800	-0.01818	-1.03400	0.091	-0.00909	-0.00909	-2.068000
Average		0.43392	-0.074	0.60811	-0.09091	-0.10553	-0.35218	0.275	-0.08264	0.34120	-0.702751
Sum		4.77309	-0.818	6.68926	-1.00000	-1.16080	-3.87398	3.020	-0.90909	3.75321	-7.730259
Standardized Percentage		0.47731	-0.082	2.22975	-0.10000	-0.11608	-0.38740	0.302	-0.09091	0.37532	-0.773026

(%/T)											

Table 4B

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_1t Skill Level at Higher Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 2}$	$d L_{\iota\Theta 2}/dt$	$Sk_{\delta\|\Omega 1}t$	$dSk_{\delta\|\Omega 1}t/dt$	$k = d L_{\iota\Theta 2}/Sk_{\delta\|\Omega 1}t$	$\ell = dSk_{\delta\|\Omega 1}t/L_{\iota\Theta 2}$	$L_{\iota\Theta 1}$	$d L_{\iota\Theta 1}/dt$	$k = d L_{\iota\Theta 1}/Sk_{\delta\|\Omega 1}t$	$\ell = dSk_{\delta\|\Omega 1}t/L_{\iota\Theta 1}$
0	0	1	0	1	0	0	0	1	0	0	0
1	0.1	0.32787	-0.67213	0.94728	-0.05272	-0.70954	-0.16080	0.25000	-0.75000	-0.79174	-0.21089
2	0.2	0.16667	-0.16120	0.88928	-0.05799	-0.18127	-0.34797	0.11111	-0.13889	-0.15618	-0.52195
3	0.3	0.12500	-0.04167	0.83000	-0.05928	-0.05020	-0.47427	0.06250	-0.04861	-0.05857	-0.94854
4	0.4	0.10000	-0.02500	0.76800	-0.06200	-0.03255	-0.62000	0.04000	-0.02250	-0.02930	-1.55000
5	0.5	0.08333	-0.01667	0.68500	-0.08300	-0.02433	-0.81600	0.02778	-0.01222	-0.01784	-2.44800
6	0.6	0.07143	-0.01190	0.59700	-0.08800	-0.01994	-1.26000	0.02041	-0.00737	-0.01234	-4.41000
7	0.7	0.06250	-0.00893	0.46845	-0.12855	-0.01906	-2.26474	0.01563	-0.00478	-0.01021	-9.05896
8	0.8	0.05556	-0.00694	0.32924	-0.13921	-0.02109	-2.50579	0.01235	-0.00328	-0.00996	-11.27604
9	0.9	0.05000	-0.00556	0.18800	-0.14124	-0.02955	-2.82487	0.01000	-0.00235	0.00000	-14.12434
10	1.0	0.04545	-0.00455	0.00000	-0.18800	0.00000	-4.13600	0.00826	-0.00174	0.00000	-22.74800
Average		0.18980	-0.08678	0.60930	-0.09091	-0.09887	-1.54104	0.14164	-0.09016	-0.09874	-6.11788
Sum		2.08781	-0.95455	6.70226	-1.00000	-1.08754	-15.41043	1.55803	-0.99174	-1.08615	-67.29672
Standardized Percentage		0.20878	-0.09545	0.67023	-0.10000	-0.10875	-1.54104	0.15580	-0.09917	-0.10861	-6.72967

(%/T)											

Table 5a:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_2t Skill Level at Lesser Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 4}$	$d L_{\iota\Theta 4}/dt$	$Sk_{\delta\|\Omega 2}t$	$dSk_{\delta\|\Omega 2}t/dt$	k = $d L_{\iota\Theta 4}/Sk_{\delta\|\Omega 2}t$	ℓ = $dSk_{\delta\|\Omega 2}t/L_{\iota\Theta 4}$	$L_{\iota\Theta 3}$	$d L_{\iota\Theta 3}/dt$	k = $d L_{\iota\Theta 3}/Sk_{\delta\|\Omega 2}t$	ℓ = $dSk_{\delta\|\Omega 2}t/L_{\iota\Theta 3}$
0	0	1.00000	0	0.79000	0	0	0	1	0	0	0
1	0.1	0.80000	-0.200	0.74000	-0.05000	-0.27027	-0.06250	0.500	-0.50000	-0.67568	-0.10000
2	0.2	0.60000	-0.200	0.69000	-0.05000	-0.28986	-0.08333	0.333	-0.16667	-0.24155	-0.15000
3	0.3	0.50000	-0.100	0.63500	-0.05500	-0.15748	-0.11000	0.250	-0.08333	-0.13123	-0.22000
4	0.4	0.40000	-0.100	0.58000	-0.05500	-0.17241	-0.13750	0.200	-0.05000	-0.08621	-0.27500
5	0.5	0.33333	-0.067	0.50000	-0.08000	-0.13333	-0.24000	0.167	-0.03333	-0.06667	-0.48000
6	0.6	0.28571	-0.048	0.31500	-0.18500	-0.15117	-0.64750	0.143	-0.02381	-0.07559	-1.29500
7	0.7	0.25000	-0.036	0.00000	-0.31500	0.00000		0.125	-0.01786		
8	0.8	0.22222	-0.028					0.111	-0.01389		
9	0.9	0.20000	-0.022					0.100	-0.01111		
10	1.0	0.18182	-0.018					0.091	-0.00909		
Average		0.43392	-0.074	0.53125	-0.09875	-0.14682	-0.18298	0.275	-0.08264	-0.18242	-0.06786
Sum		4.77309	-0.818	4.25000	-0.79000	-1.17452	-0.79000	3.020	-0.90909	-1.27691	-0.47500
Standardized		0.47731	-0.082	0.53125	-0.09875	-0.11745	-0.09875	0.302	-0.09091	-0.18242	-0.06786

Percentage (%/T)											

Table 5B:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_2t Skill Level at Higher Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 2}$	d $L_{\iota\Theta 2}$/ dt	$Sk_{\delta\|\Omega 2}t$	$dSk_{\delta\|\Omega 2}t$/ dt	k = d $L_{\iota\Theta 2}$/ $Sk_{\delta\|\Omega 2}t$	ℓ = $dSk_{\delta\|\Omega 2}t$/ $L_{\iota\Theta 2}$	$L_{\iota\Theta 1}$	d $L_{\iota\Theta 1}$/ dt	k = d $L_{\iota\Theta 1}$/ $Sk_{\delta\|\Omega 2}t$	ℓ = $dSk_{\delta\|\Omega 2}t$/ $L_{\iota\Theta 2}$
0	0	1	0	0.79000	0	0	0.00000	1	0	0	0.00000
1	0.1	0.32787	-0.67213	0.74000	-0.05000	-0.90829	-0.15250	0.25000	-0.75000	-1.01351	-0.05000
2	0.2	0.16667	-0.16120	0.69000	-0.05000	-0.23363	-0.30000	0.11111	-0.13889	-0.20129	-0.05000
3	0.3	0.12500	-0.04167	0.63500	-0.05500	-0.06562	-0.44000	0.06250	-0.04861	-0.07655	-0.05500
4	0.4	0.10000	-0.02500	0.58000	-0.05500	-0.04310	-0.55000	0.04000	-0.02250	-0.03879	-0.05500
5	0.5	0.08333	-0.01667	0.50000	-0.08000	-0.03333	-0.96000	0.02778	-0.01222	-0.02444	-0.08000
6	0.6	0.07143	-0.01190	0.31500	-0.18500	-0.03779	-2.59000	0.02041	-0.00737	-0.02340	-0.18500
7	0.7	0.06250	-0.00893	0.00000	-0.31500	0.00000	-5.04000	0.01563	-0.00478		
8	0.8	0.05556	-0.00694					0.01235	-0.00328		
9	0.9	0.05000	-0.00556					0.01000	-0.00235		
10	1.0	0.04545	-0.00455					0.00826	-0.00174		
Average		0.18980	-0.08678	0.53125	-0.06786	-0.16522	-0.71321	0.14164	-0.09016	-0.22577	-0.06786
Sum		2.08781	-0.95455	4.25000	-0.47500	-1.32176	-4.99250	1.55803	-0.99174	-1.35459	-0.47500
Standardized Percentage		0.20878	-0.09545	0.53125	-0.04750	-0.13218	-0.49925	0.15580	-0.09917	-0.13546	-0.04750

(%/T)											

Table 6a:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_3t Skill Level at Lesser Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta4}$	d $L_{\iota\Theta4}$/ dt	$Sk_{\delta\|\Omega3}t$	$dSk_{\delta\|\Omega3}t$/ dt	k = d $L_{\iota\Theta4}$/ $Sk_{\delta\|\Omega3}t$	ℓ = $dSk_{\delta\|\Omega3}t$/ $L_{\iota\Theta4}$	$L_{\iota\Theta3}$	d $L_{\iota\Theta3}$/ dt	k = d $L_{\iota\Theta3}$/ $Sk_{\delta\|\Omega3}t$	ℓ = $dSk_{\delta\|\Omega3}t$/ $L_{\iota\Theta3}$
0	0	1.00000	0	0.50000	0	0	0	1	0	0	0
1	0.1	0.80000	-0.200	0.48297	-0.01704	-0.41411	-0.02129	0.500	-0.50000	-1.03527	-0.03407
2	0.2	0.60000	-0.200	0.45500	-0.02797	-0.43956	-0.04661	0.333	-0.16667	-0.36630	-0.08390
3	0.3	0.50000	-0.100	0.42500	-0.03000	-0.23529	-0.06000	0.250	-0.08333	-0.19608	-0.12000
4	0.4	0.40000	-0.100	0.38500	-0.04000	-0.25974	-0.10000	0.200	-0.05000	-0.12987	-0.20000
5	0.5	0.33333	-0.067	0.00000	-0.38500	0.00000	-1.15500	0.167	-0.03333	0.00000	-2.31000
6	0.6	0.28571	-0.048					0.143	-0.02381		
7	0.7	0.25000	-0.036					0.125	-0.01786		
8	0.8	0.22222	-0.028					0.111	-0.01389		
9	0.9	0.20000	-0.022					0.100	-0.01111		
10	1.0	0.18182	-0.018					0.091	-0.00909		
Average		0.43392	-0.074	0.37466	-0.08333	-0.22478	-0.23048	0.275	-0.08264	-0.28792	-0.45799
Sum		4.77309	-0.818	2.24797	-0.50000	-1.34870	-1.38290	3.020	-0.90909	-1.72752	-2.74796
Standardized		0.47731	-0.082	0.22480	-0.05000	-0.13487	-0.13829	0.302	-0.09091	-0.17275	-0.27480

Percentage (%/T)											

Table 6B:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_3t Skill Level at Higher Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 2}$	d $L_{\iota\Theta 2}$/ dt	$Sk_{\delta\|\Omega 3}t$	$dSk_{\delta\|\Omega 3}t$/ dt	k = d $L_{\iota\Theta 2}$/ $Sk_{\delta\|\Omega 3}t$	ℓ = $dSk_{\delta\|\Omega 3}t$/ $L_{\iota\Theta 2}$	$L_{\iota\Theta 1}$	d $L_{\iota\Theta 1}$/ dt	k = d $L_{\iota\Theta 1}$/ $Sk_{\delta\|\Omega 3}t$	ℓ = $dSk_{\delta\|\Omega 3}t$/ $L_{\iota\Theta 2}$
0	0	1	0	0.50000	0	0	0	1	0	0	0
1	0.1	0.32787	-0.67213	0.48297	-0.01704	-1.39168	-0.05196	0.25000	-0.75000	-1.55291	-0.06814
2	0.2	0.16667	-0.16120	0.45500	-0.02797	-0.35429	-0.16779	0.11111	-0.13889	-0.30525	-0.25169
3	0.3	0.12500	-0.04167	0.42500	-0.03000	-0.09804	-0.24000	0.06250	-0.04861	-0.11438	-0.48000
4	0.4	0.10000	-0.02500	0.38500	-0.04000	-0.06494	-0.40000	0.04000	-0.02250	-0.05844	-1.00000
5	0.5	0.08333	-0.01667	0.00000	-0.38500	0.00000	-4.62000	0.02778	-0.01222	0.00000	-13.86000
6	0.6	0.07143	-0.01190					0.02041	-0.00737		
7	0.7	0.06250	-0.00893					0.01563	-0.00478		
8	0.8	0.05556	-0.00694					0.01235	-0.00328		
9	0.9	0.05000	-0.00556					0.01000	-0.00235		
10	1.0	0.04545	-0.00455					0.00826	-0.00174		
Average		0.18980	-0.08678	0.37466	-0.08333	-0.38179	-0.17195	0.14164	-0.09016	-0.40620	-2.60997
Sum		2.08781	-0.95455	2.24797	-0.50000	-1.90894	-0.85975	1.55803	-0.99174	-2.03098	-15.65982
Standardized Percentage		0.20878	-0.09545	0.22480	-0.05000	-0.19089	-0.08597	0.15580	-0.09917	-0.20310	-1.56598

(%/T)											

Table 7A:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_4t Skill Level at Lesser Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 4}$	d $L_{\iota\Theta 4}$/ dt	$Sk_{\delta\|\Omega 4}t$	d$Sk_{\delta\|\Omega 4}t$/ dt	k = d $L_{\iota\Theta 4}$/ $Sk_{\delta\|\Omega 4}t$	ℓ = d$Sk_{\delta\|\Omega 4}t$/ $L_{\iota\Theta 4}$	$L_{\iota\Theta 3}$	d $L_{\iota\Theta 3}$/ dt	k = d $L_{\iota\Theta 3}$/ $Sk_{\delta\|\Omega 4}t$	ℓ = d$Sk_{\delta\|\Omega 4}t$/ $L_{\iota\Theta 3}$
0	0	1.00000	0	0.40000	0	0	0	1	0	0	0
1	0.1	0.80000	-0.200	0.33000	-0.07000	-0.60606	-0.08750	0.500	-0.50000	-1.51515	-0.14000
2	0.2	0.60000	-0.200	0.24500	-0.08500	-0.81633	-0.14167	0.333	-0.16667	-0.68027	-0.25500
3	0.3	0.50000	-0.100	0.14000	-0.10500	-0.71429	-0.21000	0.250	-0.08333	-0.59524	-0.42000
4	0.4	0.40000	-0.100	0.00000	-0.14000	0.00000	-0.35000	0.200	-0.05000	0.00000	-0.70000
5	0.5	0.33333	-0.067					0.167	-0.03333		
6	0.6	0.28571	-0.048					0.143	-0.02381		
7	0.7	0.25000	-0.036					0.125	-0.01786		
8	0.8	0.22222	-0.028					0.111	-0.01389		
9	0.9	0.20000	-0.022					0.100	-0.01111		
10	1.0	0.18182	-0.018					0.091	-0.00909		
Average		0.43392	-0.074	0.22300	-0.08000	-0.42733	-0.15783	0.275	-0.08264	-0.55813	-0.30300
Sum		4.77309	-0.818	1.11500	-0.40000	-2.13667	-0.78917	3.020	-0.90909	-2.79066	-1.51500
Standardized		0.47731	-0.082	0.22300	-0.04000	-0.42733	-0.07892	0.302	-0.09091	-0.27907	-0.15150

Percentage (%/T)											

Table 7B:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_4t Skill Level at Higher Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 2}$	d $L_{\iota\Theta 2}$/ dt	$Sk_{\delta\|\Omega 3}t$	$dSk_{\delta\|\Omega 4}t$/ dt	k = d $L_{\iota\Theta 2}$/ $Sk_{\delta\|\Omega 4}t$	ℓ = $dSk_{\delta\|\Omega 4}t$/ $L_{\iota\Theta 2}$	$L_{\iota\Theta 1}$	d $L_{\iota\Theta 1}$/ dt	k = d $L_{\iota\Theta 1}$/ $Sk_{\delta\|\Omega 4}t$	ℓ = $dSk_{\delta\|\Omega 4}t$/ $L_{\iota\Theta 2}$
0	0	1	0	0.40000	0	0.00000	0.00000	1	0	0.00000	0.00000
1	0.1	0.32787	-0.67213	0.33000	-0.07000	-2.03676	-0.21350	0.25000	-0.75000	-2.27273	-0.28000
2	0.2	0.16667	-0.16120	0.24500	-0.08500	-0.65797	-0.51000	0.11111	-0.13889	-0.56689	-0.76500
3	0.3	0.12500	-0.04167	0.14000	-0.10500	-0.29762	-0.84000	0.06250	-0.04861	-0.34722	-1.68000
4	0.4	0.10000	-0.02500	0.00000	-0.14000	0.00000	-1.40000	0.04000	-0.02250	0.00000	-3.50000
5	0.5	0.08333	-0.01667					0.02778	-0.01222		
6	0.6	0.07143	-0.01190					0.02041	-0.00737		
7	0.7	0.06250	-0.00893					0.01563	-0.00478		
8	0.8	0.05556	-0.00694					0.01235	-0.00328		
9	0.9	0.05000	-0.00556					0.01000	-0.00235		
10	1.0	0.04545	-0.00455					0.00826	-0.00174		
Average		0.18980	-0.08678	0.22300	-0.08000	-0.59847	-0.59270	0.14164	-0.09016	-0.79671	-0.68125
Sum		2.08781	-0.95455	1.11500	-0.40000	-2.99235	-2.96350	1.55803	-0.99174	-3.18684	-2.72500
Standardized Percentage		0.20878	-0.09545	0.22300	-0.04000	-0.02850	-0.02822	0.15580	-0.09917	-0.31868	-0.27250

(%/T)											

Table 8A:

Augmented Richardson Conflict Model Adaptive k, **ℓ** Response Measures for the Ω_5t Skill Level at Lesser Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 4}$	$d L_{\iota\Theta 4}/dt$	$Sk_{\delta\|\Omega 5}t$	$dSk_{\delta\|\Omega 4}t/dt$	k = $d L_{\iota\Theta 4}/Sk_{\delta\|\Omega 4}t$	**ℓ =** $dSk_{\delta\|\Omega 4}t/L_{\iota\Theta 4}$	$L_{\iota\Theta 3}$	$d L_{\iota\Theta 3}/dt$	k = $d L_{\iota\Theta 3}/Sk_{\delta\|\Omega 4}t$	**ℓ =** $dSk_{\delta\|\Omega 4}t/L_{\iota\Theta 3}$
0	0	1.00000	0	0.30000	0.00000	0.00000	0.00000	1	0	0.00000	0.00000
1	0.1	0.80000	-0.200	0.25500	-0.04500	-0.78431	-0.05625	0.500	-0.50000	-1.96078	-0.09000
2	0.2	0.60000	-0.200	0.20000	-0.05500	-1.00000	-0.09167	0.333	-0.16667	-0.83333	-0.16500
3	0.3	0.50000	-0.100	0.00000	-0.20000	0.00000	-0.40000	0.250	-0.08333	0.00000	-0.80000
4	0.4	0.40000	-0.100					0.200	-0.05000		
5	0.5	0.33333	-0.067					0.167	-0.03333		
6	0.6	0.28571	-0.048					0.143	-0.02381		
7	0.7	0.25000	-0.036					0.125	-0.01786		
8	0.8	0.22222	-0.028					0.111	-0.01389		
9	0.9	0.20000	-0.022					0.100	-0.01111		
10	1.0	0.18182	-0.018					0.091	-0.00909		
Average		0.43392	-0.074	0.18875	-0.07500	-0.44608	-0.13698	0.275	-0.08264	-0.69853	-0.26375
Sum		4.77309	-0.818	0.75500	-0.30000	-1.78431	-0.54792	3.020	-0.90909	-2.79412	-1.05500
Standardized		0.47731	-0.082	0.18875	-0.03000	-0.17843	-0.05479	0.302	-0.09091	-0.27941	-0.10550

Percentage (%/T)											

Table 8B:

Augmented Richardson Conflict Model Adaptive k, ***ℓ*** Response Measures for the Ω_5t Skill Level at Higher Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 2}$	$d L_{\iota\Theta 2}/dt$	$Sk_{\delta\|\Omega 5}t$	$dSk_{\delta\|\Omega 5}t/dt$	$k = d L_{\iota\Theta 2}/Sk_{\delta\|\Omega 5}t$	$\ell = dSk_{\delta\|\Omega 5}t/L_{\iota\Theta 2}$	$L_{\iota\Theta 1}$	$d L_{\iota\Theta 1}/dt$	$k = d L_{\iota\Theta 1}/Sk_{\delta\|\Omega 5}t$	$\ell = dSk_{\delta\|\Omega 5}t/L_{\iota\Theta 2}$
0	0	1	0	0.30000	0.00000	0.00000	0.00000	1	0	0.00000	0.00000
1	0.1	0.32787	-0.67213	0.25500	-0.04500	-2.63581	-0.13725	0.25000	-0.75000	-2.94118	-0.18000
2	0.2	0.16667	-0.16120	0.20000	-0.05500	-0.80601	-0.33000	0.11111	-0.13889	-0.69444	-0.49500
3	0.3	0.12500	-0.04167	0.00000	-0.20000	0.00000	-1.60000	0.06250	-0.04861	0.00000	-3.20000
4	0.4	0.10000	-0.02500					0.04000	-0.02250		
5	0.5	0.08333	-0.01667					0.02778	-0.01222		
6	0.6	0.07143	-0.01190					0.02041	-0.00737		
7	0.7	0.06250	-0.00893					0.01563	-0.00478		
8	0.8	0.05556	-0.00694					0.01235	-0.00328		
9	0.9	0.05000	-0.00556					0.01000	-0.00235		
10	1.0	0.04545	-0.00455					0.00826	-0.00174		
Average		0.18980	-0.08678	0.18875	-0.07500	-0.86045	-0.51681	0.14164	-0.09016	-0.90891	-0.96875
Sum		2.08781	-0.95455	0.75500	-0.30000	-3.44182	-2.06725	1.55803	-0.99174	-3.63562	-3.87500
Standardized Percentage		0.20878	-0.09545	0.18875	-0.06000	-0.86045	-0.51681	0.15580	-0.09917	-0.36356	-0.38750

(%/T)											

Table 9A:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_6t Skill Level at Lesser Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta4}$	d $L_{\iota\Theta4}$/ dt	$Sk_{\delta\|\Omega6}t$	$dSk_{\delta\|\Omega6}t$/ dt	k = d $L_{\iota\Theta4}$/ $Sk_{\delta\|\Omega6}t$	ℓ = $dSk_{\delta\|\Omega6}t$/ $L_{\iota\Theta4}$	$L_{\iota\Theta3}$	d $L_{\iota\Theta3}$/ dt	k = d $L_{\iota\Theta3}$/ $Sk_{\delta\|\Omega6}t$	ℓ = $dSk_{\delta\|\Omega6}t$/ $L_{\iota\Theta3}$
0	0	1.00000	0	0.20000	0.00000	0.00000	0.00000	1	0	0.00000	0.00000
1	0.1	0.80000	-0.200	0.12000	-0.08000	-1.66667	-0.10000	0.500	-0.50000	-4.16667	-0.16000
2	0.2	0.60000	-0.200	0.00000	-0.12000	0.00000	-0.20000	0.333	-0.16667	0.00000	-0.36000
3	0.3	0.50000	-0.100					0.250	-0.08333		
4	0.4	0.40000	-0.100					0.200	-0.05000		
5	0.5	0.33333	-0.067					0.167	-0.03333		
6	0.6	0.28571	-0.048					0.143	-0.02381		
7	0.7	0.25000	-0.036					0.125	-0.01786		
8	0.8	0.22222	-0.028					0.111	-0.01389		
9	0.9	0.20000	-0.022					0.100	-0.01111		
10	1.0	0.18182	-0.018					0.091	-0.00909		
Average		0.43392	-0.074	0.10667	-0.06667	-0.55556	-0.10000	0.275	-0.08264	-1.38889	-0.17333
Sum		4.77309	-0.818	0.32000	-0.20000	-1.66667	-0.30000	3.020	-0.90909	-4.16667	-0.52000
Standardized		0.47731	-0.082	0.10667	-0.02000	-0.16667	-0.03000	0.302	-0.09091	-1.38889	-0.17333

Percentage (%/T)											

Table 9B:

Augmented Richardson Conflict Model Adaptive k, ℓ Response Measures for the Ω_6t Skill Level at Higher Intensity Loss Functions

Time(t)	(%)	$L_{\iota\Theta 2}$	d $L_{\iota\Theta 2}$/ dt	$Sk_{\delta\|\Omega 6}t$	$dSk_{\delta\|\Omega 6}t$/ dt	k = d $L_{\iota\Theta 2}$/ $Sk_{\delta\|\Omega 6}t$	ℓ = $dSk_{\delta\|\Omega 6}t$/ $L_{\iota\Theta 2}$	$L_{\iota\Theta 1}$	d $L_{\iota\Theta 1}$/ dt	k = d $L_{\iota\Theta 1}$/ $Sk_{\delta\|\Omega 6}t$	ℓ = $dSk_{\delta\|\Omega 6}t$/ $L_{\iota\Theta 2}$
0	0	1	0	0.20000	0.00000	0.00000	0.00000	1	0	0.00000	0.00000
1	0.1	0.32787	-0.67213	0.12000	-0.08000	-5.60109	-0.24400	0.25000	-0.75000	-6.25000	-0.32000
2	0.2	0.16667	-0.16120	0.00000	-0.12000	0.00000	-0.72000	0.11111	-0.13889	0.00000	-1.08000
3	0.3	0.12500	-0.04167					0.06250	-0.04861		
4	0.4	0.10000	-0.02500					0.04000	-0.02250		
5	0.5	0.08333	-0.01667					0.02778	-0.01222		
6	0.6	0.07143	-0.01190					0.02041	-0.00737		
7	0.7	0.06250	-0.00893					0.01563	-0.00478		
8	0.8	0.05556	-0.00694					0.01235	-0.00328		
9	0.9	0.05000	-0.00556					0.01000	-0.00235		
10	1.0	0.04545	-0.00455					0.00826	-0.00174		
Average		0.18980	-0.08678	0.10667	-0.06667	-1.86703	-0.32133	0.14164	-0.09016	-2.08333	-0.46667
Sum		2.08781	-0.95455	0.32000	-0.20000	-5.60109	-0.96400	1.55803	-0.99174	-6.25000	-1.40000
Standardized Percentage		0.20878	-0.09545	0.10667	-0.02000	-0.56011	-0.09640	0.15580	-0.09917	-0.62500	-0.14000

(%/T)											