Adaptability, engagement and academic achievement at university

Collie, RJ, Holliman, AJ & Martin, AJ

Adaptability, Engagement, and Academic Achievement at University

Rebecca J. Collie

School of Education, University of New South Wales, Australia

Andrew J. Holliman

School of Psychological, Social and Behavioural Sciences, Coventry University, UK

Andrew J. Martin

School of Education, University of New South Wales, Australia

June 2016

Requests for further information about this investigation can be made to Dr Andrew J. Holliman, School of Psychological, Social and Behavioural Sciences, Coventry University, Coventry, CV1 5FB, United Kingdom. E-Mail: a.holliman@coventry.ac.uk. Tel: +44 (0) 24 7765 8208. Fax: +44 (0) 24 7688 8300.

Adaptability, Engagement, and Academic Achievement at University

Abstract

University entry is a time of great change for students. The extent to which students are able to effectively navigate such change likely has an impact on their success in university. In the current study, we examined this by way of adaptability, the extent to which students' adaptability is associated with their behavioral engagement at university, and the extent to which both are associated with subsequent academic achievement. A conceptual model reflecting this pattern of predicted relations was developed and tested using structural equation modelling. First-year undergraduate students ($N = 186$) were surveyed for their adaptability and behavioral engagement at the beginning of their first year. Following this, students' academic achievement was obtained from university records at the end of Semester 1 and 2 of first year university. Findings showed that adaptability was associated with greater positive behavioral engagement (persistence, planning, and task management) and lower negative behavioral engagement (disengagement and self-handicapping). Moreover, negative behavioral engagement was found to inversely predict academic achievement in Semester 1, which predicted academic achievement in Semester 2. The educational implications of the findings are discussed.

Keywords: adaptability; engagement; achievement; university/college students

Introduction

The start of university marks a period of immense change for students. It involves navigating a very different learning environment, a significant increase in personal autonomy and responsibility, a change in social networks, and often occurs concomitantly with other major life events (e.g., moving out of home, supporting oneself through part-time work; Gall, Evans, & Bellerose, 2000; Pittman & Richmond, 2008). The extent to which students are able to manage the transition to university plays a key role in their academic success in the first year of university and beyond (Pittman & Richmond, 2008; Stoeber, Childs, Hayward, & Feast, 2011). The successful navigation of such changes has been examined under a variety of approaches (for a review, see Richardson, Abraham, & Bond, 2012). The current study focuses on one additional approach that may help to shed further light on this important issue: students' adaptability. Adaptability refers to the extent to which individuals are able to modify their thoughts, actions, and emotions to appropriately respond to and manage the changing, new, and uncertain demands of university (Martin, Nejad, Colmar, & Liem, 2012). Given the new experiences that first-year university students typically encounter, we suggest that adaptability is particularly pertinent and may play a role in assisting positive academic outcomes among first-year university students.

Although recent research is documenting the positive impact of adaptability (e.g., on academic engagement and achievement outcomes), this work has focused on secondary school students (Author et al., 2016; Martin, Nejad, Colmar, & Liem, 2012, 2013; Martin, Nejad, Colmar, Liem, & Collie, 2015). The extent to which adaptability has a similarly positive impact among university students remains an empirical question. We suggest that a focus on university students is important because it will help to advance knowledge of university entry and first-year studies, which can be tumultuous times for students (e.g., Gall et al., 2000; Johnson, Taasoobshirazi, Kestler, & Cordova, 2015). The likelihood of failure is

heightened when individuals undertake new tasks, experience major transitions, and are faced with uncertainty (Heckhausen & Schulz, 1995)—experiences common to new university students. Moreover, given that university differs from secondary school in significant ways (degree of autonomy, level of teacher support, physical size, etc.), and given the financial and intellectual costs associated with degree non-completion (Grebennikov & Shah, 2012), a focus on adaptability among university students is timely and important.

In the current study, we sought to examine adaptability among first-year university students by testing a model of adaptability, engagement, and achievement. This model is shown in Figure 1. More precisely, we examined the impact of adaptability on university students' positive and negative behavioral engagement (where behavioral engagement refers to actions undertaken by students that promote active academic and social involvement in university; Fredricks, Paris, & Blumenfeld, 2004). We focused on behavioral engagement as this reflects the outward manifestations of student motivation (Skinner, Kindermann, & Furrer, 2009) that have been shown to be highly important for university success (e.g., Credé & Kuncel, 2008; Johnson et al., 2015). We also examined the impact of adaptability and the (positive and negative) engagement factors on subsequent academic achievement (Semester 1 and Semester 2 achievement in first-year university). Findings have the potential to advance knowledge of how first-year students manage the new demands they face and may provide information relevant to intervention efforts aiming to promote positive academic outcomes among university students.

<<FIGURE 1 ABOUT HERE>>

Adaptability

As noted above, adaptability refers to cognitive, behavioral, and emotions adjustments that individuals make to manage changing, novel, and uncertain situations and events (Martin, Nejad et al., 2012, 2013). This is known as the tripartite model of adaptability and

was recently developed by Martin, Nejad et al. (2012, 2013, 2015). The present study follows

from their work to investigate their adaptability framework in the higher education context.

Cognitive adjustment refers to modifying one's thoughts, behavioral adjustment refers to

modifying one's actions, and emotional adjustment refers to modifying one's affective

responses, all to manage changing, new, or uncertain events (Martin, Nejad et al., 2012,

2013). This focus on novelty and change means that adaptability is different from cognate

constructs that are concerned with individuals' responses to adversity such as coping

(Lazarus & Folkman, 1984), resilience (Howard & Johnson, 2000), and buoyancy (Martin &

Marsh, 2009; Putwain, Connors, Symes, & Douglas-Osborn, 2012).

Of note, adaptability has been linked with important outcomes in research. For

example, adaptability has been associated with higher levels of positive behavioral

engagement (e.g., greater class participation) and lower levels of negative behavioral

engagement at secondary school (e.g., lower disengagement; Martin, Nejad et al., 2013,

2015). Moreover, it has been associated with greater academic well-being (e.g., greater

academic buoyancy, lower anxiety) and non-academic wellbeing among adolescents (e.g.,

greater life satisfaction, higher sense of meaning and purpose; Martin, Nejad et al., 2012,

2013, 2015). More recently, positive links between adaptability and secondary school

students' academic achievement have emerged (Author et al., 2016; Martin, Nejad et al.,

2012). Together, therefore, there is a growing body of work highlighting the significance of

adaptability for students' engagement and achievement outcomes. However, research among

university students remains limited. Moreover, the extent to which adaptability uniquely

influences engagement and achievement when examined simultaneously (and appropriate

controls for shared variance are applied) has not been examined. In sum, therefore, examining

adaptability among university students is important for developing knowledge of the

adaptability construct, its unique associations with positive outcomes, and how it functions at different educational stages.

Conceptual Underpinnings for the Current Study

Conceptualizing from several theoretical approaches is harnessed alongside the tripartite model of adaptability in order to describe the conceptual basis for the current study's investigation. In turn below, we describe these conceptual underpinnings including the lifespan theory of control (Heckhausen, Wrosch, & Schulz, 2010), theorizing in the area of self-regulated learning (e.g., Winne & Hadwin, 2008), and Buss and Cantor's (1989) model of individual functioning (for a more complete review of this theorizing with respect to adaptability see Martin, Nejad et al., 2012, 2013). Together, the three frameworks demonstrate the foundations of the adaptability construct and provide an idea of how it functions in relation to students' outcomes.

Lifespan theory of control. The lifespan theory of control proposes that individual development across the lifespan is impacted by individuals' capacity to actively and effectively adapt to the opportunities and constraints they face in their social environment (Heckhausen et al., 2010). A central aspect in determining positive development is the extent to which the individual experiences control. Of particular pertinence to adaptability is the idea of compensatory control, which refers to adjusting one's thoughts or actions to effectively deal with environmental demands or situations (Tomasik, Silbereisen, & Heckhausen, 2010). Whereas the lifespan theory concerns cognitive and behavioral adjustments, however, adaptability also encompasses emotional adjustments. Despite this difference, the lifespan theory of control provides important understanding of the underlying mechanisms of adaptability via the concept of compensatory control.

Self-regulated learning. Self-regulated learning involves monitoring, directing, and controlling one's thoughts and actions to meet learning goals, build expertise, and improve

skills (Zimmerman, 2002). With respect to adaptability, models of self-regulation tend to include a final phase where individuals self-evaluate their performance and identify thoughts and actions needed to improve in future (e.g., the adaptation phase; Winne & Hadwin, 2008). The tripartite model of adaptability is relevant to this phase of self-regulation (see Martin, Nejad et al., 2013). At the same time, adaptability extends prior conceptualizing on self-regulation by also considering the affective domain—identifying emotions that need to be adjusted in order to improve performance (Martin, Nejad et al., 2013). Moreover, whereas self-regulation is more broadly concerned with academic tasks and demands (that may involve success or adversity), adaptability is relevant to situations involving change, novelty, and uncertainty. Thus, adaptability has been positioned as a specific type of self-regulation (Martin, Nejad et al., 2013)—and this conceptual grounding provides helpful insight into how adaptability functions in students' lives.

   Individual functioning. Buss and Cantor (1989) propose a model where individuals' personal characteristics influence the strategies they apply to negotiate demands in their environment and, in turn, their outcomes in that context. In the current study, we focus on the role of strategies and their impact on outcomes. Consistent with Martin, Nejad and colleagues (2013), adaptability is proposed to act as a strategy given that it enables individuals to better negotiate (changing, new, or uncertain) demands in their environment. Indeed, on this conceptual basis, Martin, Nejad et al. (2013) proposed and tested a conceptual model where adaptability was positioned as a predictor of academic and non-academic outcomes including behavioral engagement, self-esteem, life satisfaction, and sense of meaning and purpose. With respect to engagement, Martin, Nejad and colleagues (2013) argue that adaptability plays a role in assisting engagement because of its enabling capacity. More precisely, adaptable students are more likely to be engaged in their learning because being able to adjust to effectively manage change, novelty, and uncertainty helps students to keep up with lesson

pacing and content (e.g., changes in topic, quick progression in lessons, new task demands) and means students are less likely to experience low self-efficacy and poor performance (Martin, Nejad et al., 2013). These assertions have been supported empirically.

With a longitudinal design conducted among 969 secondary school students, Martin, Nejad and colleagues (2013) showed that adaptability was associated with greater positive behavioral engagement (operationalized as class participation), greater self-esteem, life satisfaction, and sense of meaning and purpose. Thus, with conceptual support from Buss and Cantor's (1994) model, it appears that adaptability plays an important role in assisting positive outcomes and that this may occur because adaptability is a strategy that enables individuals to better manage environmental demands. In the current study, we extended prior understanding by examining adaptability alongside both engagement and achievement.

Academic Engagement

Academic engagement refers to the extent and manner in which students are actively involved in their schooling (Skinner et al., 2009) and is generally considered a multifaceted construct comprising cognitive, behavioral, and emotional engagement (Fredricks et al., 2004). In the current study, we focused on behavioral engagement, which refers to the actions that students undertake to be actively involved both academically and socially in their education (Fredricks et al., 2004). We made the decision to focus on behavioral engagement because this is a salient aspect of many definitions of engagement. For example, engagement is the "outward manifestation of a motivated student" (Skinner et al., 2009, p.494), and reflects "behaviors aligned with the energy and drive" (Liem & Martin, 2012, p.3). In addition, behavioral engagement has been shown to be highly pertinent to success in university (e.g., Credé & Kuncel, 2008; Johnson et al., 2015).

In the current examination, we consider positive and negative behavioral engagement. We operationalize *positive behavioral engagement* by way of three behaviors that stem from

self-regulatory theories of motivation (Zimmerman, 2002) and that are associated with positive academic habits and outcomes (e.g., Fredricks et al., 2004; Martin, 2007a): persistence, planning (and monitoring), and task management. Persistence refers to sustained efforts to solve questions or deal with challenges (rather than giving up; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996). Planning (and monitoring) refers to active efforts to plan schoolwork and keep track of progress on schoolwork (Miller et al., 1996). Task management refers to how self-management of study time is utilized, how a study timetable is organized, and the locations chosen for completing schoolwork (Martin, 2007a).

In contrast, *negative behavioral engagement* refers to behaviors that are associated with poor academic habits and outcomes (e.g., Fredricks et al., 2004; Martin, 2007a). We employ two constructs that stem from need achievement and self-worth motivation theories (Covington, 1992) in our operationalization of negative behavioral engagement: self-handicapping and disengagement. Self-handicapping occurs when students undertake actions to reduce their chances of academic success in order to have an excuse in case of poor outcomes (e.g., putting off studying for an exam), and disengagement occurs when students no longer care about their education or feel like giving up in their efforts (Martin, 2007a).

Various factors and processes have been identified in the literature as predictors of engagement such as interpersonal relationships, the classroom structure and climate, and teacher support (e.g., Collie, Martin, Papworth, & Ginns, 2016; Jang, Reeve, & Deci, 2010; Virtanen, Lerkkanen, Poikkeus, & Kuorelahti, 2015; Wang & Eccles, 2012). As noted above, we examine the role of adaptability. Using Buss and Cantor's (1989) model, adaptability is identified as a strategy for managing environmental demands and is examined as a predictor of engagement. Among secondary school students, evidence is emerging for the relevance of adaptability with respect to positive and negative behavioral engagement (Martin, Nejad et al., 2012, 2013, 2015). For example, adaptability has been shown to be important for positive

behavioral engagement as assessed via classroom participation (Martin, Nejad et al., 2013). In other research, adaptability has been directly linked with lower negative behavioral engagement (as assessed via self-handicapping and disengagement; Martin, Nejad et al., 2015).

It is feasible to consider that students' persistence, planning, and task management are due in part to their adaptability. With respect to persistence, students' capacity to engage in sustained efforts to solve new challenges requires adjusting the way they think about the problem, modifying the strategies they use, and perhaps even minimizing frustration. Regarding planning (and monitoring), students' ability to actively plan and keep track of schoolwork depends on their capacity to effectively modify their thoughts, behaviors, and/or emotions—such as changing priorities or actions to deal with new deadlines. Turning to task management, more adaptable students are likely to better adjust their responses in order to manage learning tasks, their study time, and the best locations for getting the work done. Conceptual links are also apparent for negative behavioral engagement. Students who are low in adaptability are more likely to experience low self-efficacy and poor performance, which may lead them to react to new circumstances defensively (self-handicapping) or give up trying (disengagement; Martin, Nejad et al., 2013). In combination, therefore, there is empirical and conceptual support for examining adaptability as a predictor of positive and negative behavioral engagement.

Academic Achievement

Academic achievement is a central aim of schooling and is associated with important long-term outcomes (Rothman & McMillan, 2003). Thus, researchers have focused substantial attention towards understanding how best to promote students' achievement. In the current study, we focus on two predictors: adaptability and behavioral engagement. Evidence of a link between adaptability and achievement is emerging (e.g., Author et al.,

2016; Martin, Nejad et al., 2012) and likely occurs because adaptable students are better at self-regulating their responses, which is central for academic performance (Johnson et al., 2015; Zimmerman, 2002). Turning to positive behavioral engagement, researchers have linked persistence, planning, and task management with greater academic achievement (e.g., Caprara et al., 2008; Collie, Martin, & Curwood, 2016; Liem & Martin, 2012; Miller et al., 1996). With respect to negative behavioral engagement, although the link between self-handicapping and academic achievement has been disputed, a recent meta-analysis of 36 field studies among (elementary, middle, and secondary) school and university students found a mean effect size between self-handicapping and academic achievement of $r = -.23$ (Schwinger, Wirthwein, Lemmer, & Steinmayr, 2014). Moreover, increasing disengagement (e.g., Appleton, Christenson, & Furlong, 2008) has been found to coincide with lower academic performance.

In sum, there is support for the role of adaptability and both positive and negative behavioral engagement as predictors of academic achievement. In addition to examining this in the current study, we also investigated the extent to which behavioral engagement plays a linking role between adaptability and achievement. Although this relationship has yet to be examined, prior research suggests an indirect association is plausible (e.g., Caprara et al., 2008; Martin, Nejad et al., 2015). Of note, achievement was examined at two time points: Semester 1 and Semester 2. By examining the two time points, this enabled us to ascertain the role of adaptability and engagement as assessed at the beginning of Semester 1 on subsequent achievement at the end of Semesters 1 and 2 to understand the influence of adaptability and engagement over an academic year. Having two measures of achievement also enabled us to estimate the indirect effect of adaptability and engagement on distal achievement (Semester 2) via proximal achievement (Semester 1) as examined through bootstrapping analyses.

Other Relevant Constructs

To best understand the unique associations among the substantive constructs in the study, it is important to control for personal characteristics that may influence the substantive constructs and their associations. In the current study, we controlled for three covariates: age, gender, and prior achievement. These covariates have all been linked with adaptability, engagement, and achievement in prior research. Male students (though not necessarily "adult" male students) tend to report lower levels of positive behavioral engagement and higher negative behavioral engagement than females (e.g., Martin, Nejad et al., 2015; Wang & Eccles, 2012; Yu & Martin, 2014). Among adolescents, older students tend to report lower adaptability and positive behavioral engagement than younger students (e.g., Martin, Nejad et al., 2012), and higher negative behavioral engagement (e.g., Collie et al., 2016). Prior achievement is positively associated with both adaptability and future achievement (e.g., Author et al., 2016; Martin, Nejad et al., 2013). Thus, given the associations established between the covariates in prior research, we also controlled for them in the current study. Moreover, given that most prior research has involved secondary school students, the current study provides an opportunity to examine the role of these covariates at the university level.

Study Overview

University entry is a time of great change for students and the extent to which individuals are able to adjust to effectively navigate this change likely plays a role in their academic outcomes. In the current study, we sought to examine adaptability among university students to see whether it plays a positive role in predicting students' engagement and achievement. We also examined the extent to which significant indirect effects were evident in linking adaptability with Semester 1 and 2 achievement via behavioral engagement, and in linking behavioral engagement to Semester 2 achievement via Semester 1 achievement. Four research questions guided the study:

1. To what extent does adaptability predict (positive and negative) behavioral engagement among university students? (RQ1)

2. To what extent do adaptability and behavioral engagement predict achievement in Semester 1 and 2? (RQ2)

3. To what extent does achievement in Semester 1 predict achievement in Semester 2? (RQ3)

4. To what extent is (a) adaptability significantly associated with Semester 1 and 2 achievement via behavioral engagement, and (b) behavioral engagement associated with Semester 2 achievement via Semester 1 achievement? (RQ4)

Given that prior research has demonstrated that adaptability is associated with behavioral engagement and achievement among secondary school students, we expected similar associations in the current sample. Thus, we expected that adaptability would be associated with greater behavioral engagement and lower negative behavioral engagement (RQ1). We anticipated that adaptability and positive behavioral engagement would be associated with greater Semester 1 and 2 achievement, whereas the opposite would be true for negative behavioral engagement (RQ2). We assumed there would be a positive association between Semester 1 and 2 achievement (RQ3). Finally, regarding indirect effects, we assumed that behavioral engagement may play a significant linking role between adaptability and achievement, given supported links between engagement and these constructs in prior research (e.g., Author et al., 2016; Martin, Nejad et al., 2013; RQ4a). For similar reasons, we expected that Semester 1 achievement may play a linking role between behavioral engagement and Semester 2 achievement (RQ4b).

Method

Participants and Procedure

All participating students in this study ($N = 186$) were recruited from a single higher education institution (university) in the West Midlands, UK. Students were University Freshmen – undergraduates in their first year of study – enrolled in either a single honors psychology degree (BSc Psychology, $n = 149$) or a combined honors degree, which includes psychology (BSc Psychology and Criminology, $n = 26$; BSc Sport Psychology, $n = 11$). There were 185 full-time students and one part-time student. Three-quarters (75%) of the sample were female ($n = 139$), students were aged between 18 and 35 years ($M = 19.16$, $SD = 2.32$), and six students (3%) disclosed some form of disability (Dyslexia [$n = 3$]; Dyspraxia; long standing illness; other physical disability). The vast majority of participating students were from the UK (76%; $n = 142$) with others coming from wider Europe (16%), Asia (5%), and also Africa and the Americas (3%). The ethnic background of most students was 'White British' (33%; $n = 62$), followed by 'Black or Black British–African' (15%; $n = 27$), 'Other White Background' (11%; $n = 20$), 'Asian or Asia British–India' (9%; $n = 17$), 'Asian or Asia British–Pakistani' (7%; $n = 13$), 'Black or Black British–Caribbean' (7%; $n = 12$) or other (18%). The selection criteria were not limited to any particular demographic or ability group; all eligible students were invited to participate in this research. Participants completed a paper questionnaire shortly after the program induction. At the end of Semester 1 and 2, students' academic achievement scores were extracted from the University Records System along with background characteristics.

Measures

Students completed a questionnaire with items on adaptability and engagement. Background characteristics and achievement data were obtained from students' university records. Descriptive and psychometric statistics for all core measures in this study are presented in Table 1 and reflected upon in the Results section.

Adaptability. Students' adaptability was measured using the Adaptability Scale (Martin, Nejad et al., 2013). The scale comprises nine items assessing cognitive (e.g., "I am able to think through a number of possible options to assist me in a new situation"), behavioral (e.g., "I am able to seek out new information, helpful people, or useful resources to effectively deal with new situations"), and emotional (e.g., "I am able to reduce negative emotions [e.g., fear] to help me deal with uncertain situations") adaptability. Using a Likert scale response format, respondents rated themselves on a scale of 1 (strongly disagree) to 7 (strongly agree) for each item. Previous measurement work (e.g., Martin, Nejad et al., 2012, 2013) has shown that the scale functions well when the three types of adaptability are combined into an overarching adaptability factor given that they are highly interrelated. In addition, prior research has provided evidence of validity for the one-factor scale via confirmatory factor analysis, positive correlations with related constructs (e.g., self-regulation), invariance in measurement properties across key participant subgroups (e.g., gender, age), and adequate levels of reliability (e.g., Author et al., 2016; Martin, Nejad et al., 2012, 2013, 2015). In the current study, the Cronbach's alpha was .89.

Behavioral Engagement. Students' behavioral engagement was measured using the Motivation and Engagement Scale – University/College (MES-UC) (Martin, 2007b). Five factors assessed with 4 items each were used to assess engagement. Positive behavioral engagement was assessed using three factors: persistence (e.g., "If I can't understand my university work at first, I keep going over it until I do"), planning (e.g., "Before I start an assignment, I plan out how I am going to do it"), task management (e.g., "When I study, I usually study in places where I can concentrate"). Negative behavioral engagement was assessed with two factors (4 items each): self-handicapping (e.g., "I sometimes don't study very hard before exams so I have an excuse if I don't do as well as I hoped") and disengagement (e.g., "I've pretty much given up being involved in things at university").

Respondents rates themselves on a scale of 1 (strongly disagree) to 7 (strongly agree). Ample prior work has provided support for combining these different factors into two overarching positive and negative behavioral engagement constructs (e.g., Martin, 2007a; Yu & Martin, 2014). Moreover, the psychometric properties of this scale have been demonstrated among secondary and university students showing evidence of sound factor structure through confirmatory factor analysis, invariance across different participant subgroups, adequate reliability, and appropriate correlations with other academic outcomes (e.g., positive behavioral engagement associated with greater achievement; negative behavioral engagement associated with lower academic valuing; e.g., Martin, 2007a, 2009).

Academic Achievement (Grade Point Average). Data on students' academic achievement (coursework, examinations, and overall module marks) at the end of semesters 1 and 2 were collected via a University Records System, which contains detailed records of student profiles (personal and performance). All marks are carefully checked and verified; thus, this was a reliable way to access students' academic scores. At the participating institution, University Freshman who enroll in September (i.e., those participating in this study) complete three courses in Semester 1 (October – January) and three courses in Semester 2 (February – May). Although participating students shared two courses in Semester 1 and 2, a single course was 'degree-specific' and thus only taken by students in that particular degree program. For each, an overall mark (/100) can be accessed from the University Records System where a score of below 40 is considered a 'fail', 42-48 a 'third class' or 'D-grade', 52-58 a 'second class lower' or 'C-grade', 62-68 a 'second class higher' or 'B-grade', and 72 or above a 'first class' or 'A-grade'. Students' academic achievement was measured using their Grade Point Average – the most widely used method to assess educational performance – for courses taken in Semester 1 and Semester 2. These are referred to as GPA Semester 1 and GPA Semester 2 respectively hereafter.

Demographics and Prior Achievement. The University Records System was also consulted to gather demographic data (e.g., gender, age) and students' academic achievement prior to enrolment. To assess students' previous academic scores (prior to enrolment), the University Records System provides a Universities and Colleges Admissions Service (UCAS) tariff point score for each student, which represents a 'converted equivalent' of their A-Level, Business and Technician Educational Council (BTEC), or other qualification scores. This score thus reflects students' prior academic achievement and is used during the admissions process to make acceptance decisions on prospective students. The measure was chosen principally because it is reliable and provides an equivalent reflection of students' academic achievement prior to enrolment.

Data Analysis

Means, standard deviations, and reliabilities were all calculated using SPSS Version 22. Confirmatory factor analysis (CFA) was used to assess the factor structure of instrumentation and to ascertain correlations among the latent factors. Structural equation modeling (SEM) was used to test the hypothesized process model. Both CFA and SEM were performed with M*plus* 7.30 (Muthén & Muthén, 2014) using Maximum likelihood (ML) for estimation. Full information maximum likelihood was used to deal with missing data (see Muthén & Muthén, 2014 for details). Missing values were 1.4% of the data. In CFAs and SEMs, we posit an *a priori* structure and test the ability of a solution based on this structure to fit the data by demonstrating that (a) the solution is well defined, (b) parameter estimates are consistent with theory and *a priori* predictions, and (c) the χ^2 and subjective indices of fit are reasonable (Marsh, Balla & McDonald, 1988; McDonald & Marsh, 1990). Due to sample size, we aimed to reduce the number of parameters relative to respondents while also harnessing the statistical advantages of modeling latent factors. We therefore estimated latent engagement factors via the scale scores of planning, task

management, and persistence for positive engagement, and via the scale scores of self-handicapping and disengagement for negative engagement. This use of overarching positive and negative engagement factors also avoided multicollinearity, which was identified as an issue with the separate engagement factors in preliminary analyses. We also parceled the nine adaptability items into three scale scores as indicators for the latent adaptability factor (Little, Cunningham, Shahar, & Widaman, 2002). In the hypothesized process model, we explored a 'fully forward' process model in which adaptability predicts engagement, adaptability and engagement predict GPA Semester 1, and engagement, adaptability, and GPA Semester 1 predict GPA Semester 2. The covariates of age, gender, and prior achievement were predictors of all substantive factors in the model; hence substantive parameters are purged of any shared variance with covariates. Figure 1 shows the hypothesized model.

When assessing model fit, several fit indexes were consulted, namely, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Gamma Hat index, and the standardized root mean square residual (SRMR). Models were considered to adequately fit the data at values of ≤.08 for the RMSEA, values of ≥.90 for the CFI and Gamma Hat index, and values of ≤.08 for the SRMR. The chi-square test and normed chi-square test are also reported. The CFI contains no penalty for a lack of parsimony so that improved fit due to the introduction of additional parameters may reflect capitalization on chance, whereas the NNFI and RMSEA contain penalties for a lack of parsimony. Whereas tests of statistical significance and indices of fit aid in the evaluation of the fit, there is ultimately a degree of subjectivity and judgment in the selection of a 'best' model. A parametric bootstrapping approach (with 1000 draws) was used to test for indirect effects (Shrout & Bolger, 2002). Significant indirect effects would support the

hypothesized process of adaptability to GPA Semesters 1 and 2 via engagement and the

process of engagement to GPA Semester 2 via GPA Semester 1.

Results

Descriptive Statistics, Reliability, Factor Structure, and Correlations

Table 1 presents scale means, standard deviations, reliabilities, and mean factor

loadings from the CFA. Internal reliabilities for all substantive factors were acceptable, as

follows: $\alpha = .89$ for adaptability, $\alpha = .92$ for positive engagement, and $\alpha = .85$ for negative

engagement. Mean factor loadings were also acceptable (ranging from .73 to .75). The fit for

the CFA was good, $\chi^2 = 69.03$, $df = 42$, $p < .01$, $\chi^2/df = 1.64$, RMSEA = .059 CFI = .96,

Gamma Hat = .98, and SRMR = .045.

<<TABLE 1 ABOUT HERE>>

Correlations between all latent factors taken from the CFA are presented in Table 2. It

can be seen that adaptability is significantly correlated with positive engagement ($r = .77$, $p <$

.001) and negative engagement ($r = -.62$, $p < .001$). It can also be seen that negative

engagement but not positive engagement is significantly correlated with GPA Semester 1 ($r =$

-.30, $p = .001$) and GPA Semester 2 ($r = -.18$, $p = .05$). Significant correlations are also found

between all measures of achievement: prior achievement with GPA Semester 1 ($r = .22$, $p <$

.05) and GPA Semester 2 ($r = .20$, $p < .05$); and, GPA Semester 1 with GPA Semester 2 ($r =$

.57, $p < .001$).

<<TABLE 2 ABOUT HERE>>

Exploring the Process Model

Given the sound measurement support, structural equation modeling was then used to

explore the hypothesized model (Figure 1). This model provided a good fit to the data ($\chi^2 =$

76.03, $df = 43$, $p < .01$, RMSEA = .064, CFI = .95, Gamma Hat = .97, and SRMR = .049).

Results are presented in Table 3 and Figure 2. They reveal that adaptability is a predictor of

both positive engagement (β = .79, *p* < .001) and negative engagement (β = -.66, *p* < .001). In

turn, negative engagement predicts GPA Semester 1 (β = -.43, *p* < .001), which subsequently

predicts GPA Semester 2 (β = .53, *p* < .001). Direct effects between adaptability and GPA

Semesters 1 and 2 are not significant, nor is the direct effect of positive or negative

engagement to GPA Semester 2.

<<TABLE 3 ABOUT HERE>>

<<FIGURE 2 ABOUT HERE>>

Indirect Effects

We next tested the significance of indirect effects using bootstrapped standard errors

(with 1000 draws) (Shrout & Bolger, 2002). Findings are presented in Table 4. Three

significant indirect effects emerged: adaptability to GPA Semester 1 via negative engagement

(adaptability → negative engagement → GPA Semester 1; β = .28, *p* < .05), adaptability to

GPA Semester 2 via negative engagement and GPA Semester 1 (adaptability → negative

engagement → GPA Semester 1 → GPA Semester 2; β = .15, *p* < .05), and negative

engagement to GPA Semester 2 via GPA Semester 1 (negative engagement → GPA

Semester 1 → GPA Semester 2; β = -.23, *p* < .01). Together, these effects provide evidence

of the significant indirect influence of adaptability and negative engagement on later

achievement.

<<TABLE 4 ABOUT HERE>>

Discussion

This study examined the relations between adaptability, behavioral engagement, and

academic achievement in undergraduate students. Findings revealed that adaptability was

associated with greater positive behavioral engagement and lower negative behavioral

engagement. In addition, negative behavioral engagement predicted lower GPA Semester 1.

As expected, GPA Semester 1 positively predicted GPA Semester 2. Also important were the

indirect findings showing that adaptability was indirectly associated with GPA in Semester 1 and 2, and that negative behavioral engagement was indirectly associated with GPA Semester 2. Key findings are discussed below.

Role of Adaptability

Students' adaptability was significantly associated with greater positive and lower negative behavioral engagement. This supports the conceptual positioning of adaptability as a strategy that can help individuals to better negotiate (changing, new, or uncertain) demands in their environment (Martin, Nejad et al., 2013). As noted above, this finding likely occurred because adaptable students are better able to engage in sustained efforts to solve new challenges (persistence), actively plan and keep track of schoolwork (planning and monitoring), and adjust their responses in order to manage learning tasks (task management). In addition, adaptable students are less likely to react to new circumstances defensively (self-handicapping) or with disaffection (disengagement) given that they are able to adjust as needed to effectively manage new or changing demands (Martin, Nejad et al., 2013). This finding is significant because it extends studies involving secondary school students (e.g., Martin, Nejad et al., 2012, 2013, 2015) and suggests that a similar link between adaptability and behavioral engagement occurs among university students. Thus, it is relevant for developing conceptual knowledge of the adaptability construct.

In a finding that was contrary to our expectations, adaptability did not directly predict GPA (however, it was indirectly associated; discussed below). This finding contrasts emerging research on the link between adaptability and achievement among secondary school students (e.g., Author et al., 2016; Martin, Nejad et al., 2012) and suggests that, for university students, adaptability may influence achievement via other processes. Indeed, adaptability was indirectly associated with greater GPA via negative behavioral engagement—more adaptable students tended to report lower negative behavioral engagement and, in turn, lower

negative engagement was associated with greater GPA. Together, these findings provide preliminary information about the role of adaptability in predicting academic achievement among university students and suggest differences in how it functions compared with secondary school students.

Behavioral Engagement and GPA

As expected, negative behavioral engagement was found to predict lower GPA Semester 1 (e.g., Appleton et al., 2008; Schwinger et al., 2014). In a somewhat surprising finding, however, positive behavioral engagement did not predict greater GPA Semester 1. This finding is inconsistent with other evidence in this area (e.g., Chow & Yong, 2013), but may have occurred because prior research does not often involve both positive and negative behavioral engagement in the one model. In the current study, we accounted for shared variance between the engagement factors in the SEM. When this control was in place, findings indicated that the remaining (unique) variance was attributable only to negative behavioral engagement.

With respect to why this occurred, perhaps for university students, effective processes such as persistence, planning (and monitoring), and task management are more the norm— thereby truncating possible variance among university students. Indeed, these processes are arguably essential for successfully completing the final year of secondary school and gaining entry to university. Thus, at the university-level, perhaps it is in terms of the negative behavioral engagement processes (self-handicapping and disengagement) that more differentiation occurs. Another possible reason for why this finding occurred concerns the difference in instructional approaches and expectations that occur between secondary school and university such as the increase in autonomy for students and the reduction in instructor or parental support for completing schoolwork. These changes might exacerbate the impact of negative behavioral engagement if students feel they are lacking support. Taken together, this

finding is significant given that it highlights the unique role played by self-handicapping and disengagement in university students' GPA and highlights the importance of efforts to address these negative processes. Indeed, this finding closely aligns with other research into maladaptive engagement patterns among university students. For example, Martin, Marsh and Debus (2003) found university students higher in maladaptive strategies such as self-handicapping (e.g., not studying for tests, procrastination, reduction of effort) received significantly lower grades.

Links Across Achievement Outcomes

As expected, academic achievement in Semester 1 positively predicted academic achievement in Semester 2. This suggests that early achievement seems to lay the foundations for later achievement (see Martin, Wilson, Liem, & Ginns, 2013) and is consistent with prior theoretical perspectives on university course progression. Academic momentum, for example, is one such perspective that seeks to explain academic outcomes later in one's university course (e.g., degree completion; Attewell, Heil, & Reisel, 2012; Martin, Wilson et al., 2013). The theory emphasizes that initial academic course progress strongly influences subsequent progress, that early momentum effects occur beyond effects of socio-demographic background and secondary school attainment, and that there are some value-adding activities or orientations that enhance momentum through one's university course. The present findings suggest that value-adding activities or orientations such as adaptability and engagement may play a part in academic momentum. At the same time, it is important to recognize that although prior achievement was positively associated with both Semester 1 and 2 achievement in the bivariate correlations, it was only related to Semester 1 achievement in the SEM. Thus, after controlling for shared variance, background characteristics, and the inclusion of the adaptability and behavioral engagement factors, prior achievement did not explain unique variance in Semester 2 achievement. This provides further support for the

value-adding nature of adaptability and engagement for academic momentum, in line with the

theory (Attewall et al., 2012).

Implications for Practice

Taken together, these findings have educational applications. There is scope for

higher education institutions to consider students' negative behavioral engagement patterns

and to intervene (where necessary) in order to reduce the likelihood of maladaptive processes

which, in turn, might enhance students' academic achievement. Researchers (e.g., Schwinger

et al., 2014) have argued that educational interventions should focus on preventing negative

behavioral engagement as a way to enhance students' academic achievement. Educators

might consider creating learning environments (and associated activities) that demonstrate the

important association between effort and achievement. Activities that promote students'

understanding of the relation between their actions and outcomes are useful to illustrate how

consequences are contingent upon what students do (see Martin, 2013). This will promote

control and therefore ought to reduce levels of self-handicapping and disengagement (Martin,

2007a). Moreover, if educators can emphasize that mistakes are a useful way to identify areas

of improvement and further development, this may reduce the threat to self-worth that

mistakes can bring, students may become more 'success-oriented' (Covington, 1992), and

they may have a more positive outlook on mistakes/failures as 'challenges' (Martin, 2010).

Thus, if fear can be reduced, then this will likely reduce self-handicapping and

disengagement. Indeed, intervention research supports the feasibility of efforts aimed to

reduce maladaptive engagement. For example, in studies where students participated in a

self-complete workbook program (Martin, 2008) and a group workshop program (Martin,

2005) focusing on motivation and engagement, reductions in self-handicapping were found.

Moreover, small learning communities where teachers show an active interest in students and

provide extra help to close learning gaps have been shown to lead to reductions in disengagement (Balfanz, Herzog, & Mac Iver, 2007).

Given that adaptability was associated in beneficial ways with behavioral engagement and that it indirectly predicted greater GPA, there may be merit in promoting this among students. An adaptability intervention might take a similar form to those designed to address resilience—a cognate construct that is more concerned with adjustment to 'setbacks' rather than novelty and uncertainty (Martin, Nejad et al., 2013). Martin, Nejad, Colmar, Liem, and Collie (2015), drawing upon Morales' (2000) cycles of resilience, put forward an adaptability intervention that involves showing students how to: 1) recognize uncertainty and novelty that might demand an appropriate regulatory response; 2) appropriately adjust their cognition, behavior, and affect (emotion)—the most critical part of the process (Martin & Burns, 2014); and 3) recognize the importance of these regulatory responses and to improve/adjust them if necessary. This adjustment might enable the student to respond more constructively to circumstances and conditions of uncertainty and novelty leading to a heightened sense of control and a reduction of failure dynamics (e.g., disengagement and self-handicapping) which, in turn, might enhance their academic achievement. Indeed, this process was supported in Martin, Nejad et al.'s (2015) research.

Limitations and Future Directions

In the present study, there are several limitations that require discussion. First, the sample size was relatively modest. Although this did not prevent significant effects from being revealed, examinations with larger sample sizes and from multiple universities is important. Second, the sample was relatively homogeneous in terms of gender. Although not surprising given the typical make-up of psychology courses, this does limit the generalizability of our findings given that males and females can exhibit different engagement profiles (e.g., Yu & Martin, 2014). Third, we examined domain-general

engagement. Future research examining how the current study's findings play out in different domains of study is important given research highlighting that engagement can vary across different subjects (e.g., Green, Martin, & Marsh, 2007). Fourth, the current study did not examine the role of motivation alongside engagement. This is important in future research given that motivation is considered to underpin engagement and will enable alignment with well-established motivational frameworks (e.g., self-regulatory theories, Zimmerman, 2002; need achievement and self-worth theories, Covington, 1992). Fifth, although our data were collected at multiple time points and this added strength to the study's findings, we cannot make casual inferences. In the present study, ordering decisions were based on the research literature and our conceptual model. The results supported this ordering; however, we cannot rule out the potential of reciprocal effects. Intervention research, which is also needed in this area, would better inform us about the pattern of cause-effect relations between adaptability, behavioral engagement, and academic achievement.

Conclusion

The aim of the current study was to examine the extent to which adaptability and behavioral engagement are associated with academic achievement among university students. Findings supported prior research among secondary school students by showing strong links between adaptability and behavioral engagement. Several findings differed from the secondary school research. Adaptability and positive behavioral engagement were not directly associated with GPA, whereas negative behavioral engagement was. Of note, however, adaptability was indirectly associated with greater GPA (via lower negative behavioral engagement). Together, these findings provide important preliminary understanding about the role of adaptability among university students and extend knowledge of behavioral engagement in several ways. Thus, they have relevance to efforts endeavoring

to understand how students can successfully navigate the often tumultuous first year of

university and the promotion of effective adjustment at this educational stage.

References

Author et al. (2016) [details removed for peer review]

Appleton, J.J., Christenson, S.L. & Furlong, M.J. (2008) Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools, 45,* 369-386. http://dx.doi.org/10.1002/pits.20303

Attewell, P., Heil, S., & Reisel, L. (2012). What is academic momentum? And does it matter? *Educational Evaluation and Policy Analysis, 34*, 27–44.

Balfanz, R., Herzog, L., & Mac Iver, D.J. (2007). Preventing student disengagement and keeping students on the graduation path in urban middle-grades schools: Early identification and effective interventions. *Educational Psychologist, 42,* 223-235. http://dx.doi.org/10.1080/00461520701621079

Buss, D.M., & Cantor, N. (Eds.). (1989). Introduction. *Personality psychology: Recent trends and emerging directions.* http://dx.doi.org/10.1007/978-1-4684-0634-4

Caprara, G.V., Fida, R., Vecchione, M., Del Bove, G., Vecchio, G.M., Barbaranelli, C., & Bandura, A. (2008). Longitudinal analysis of the role of perceived self-efficacy for self-regulated learning in academic continuance and achievement. *Journal of Educational Psychology, 100,* 525-534. http://dx.doi.org/10.1037/0022-0663.100.3.525

Chow, S.J., & Yong, B.C.S. (2013) Secondary school students' motivation and achievement in combined science. *US-China Education Review B, 3.* 213-228.

Collie, R.J., Martin, A.J., & Curwood, J.S. (2016). Multidimensional motivation and engagement for writing: Construct validation with a sample of boys. *Educational Psychology, 36,* 771-791. http://dx.doi.org/10.1080/01443410.2015.1093607

Collie, R.J., Martin, A.J., Papworth, B., & Ginns, P. (2016). Students' interpersonal

relationships, personal best (PB) goals, and academic engagement. *Learning and*

Individual Differences, 45, 65-76. http://dx.doi.org/10.1016/j.lindif.2015.12.002

Covington, M.V. (1992). *Making the grade: A self-worth perspective on motivation and*

school reform. Cambridge, YK: Cambridge University Press.

http://dx.doi.org/10.1017/CBO9781139173582

Credé, M., & Kuncel, N.R. (2008). Study habits, skills, and attitudes: The third pillar

supporting collegiate academic performance. *Perspectives on Psychological Science,*

3, 425-453. http://dx.doi.org/10.1111/j.1745-6924.2008.00089.x

Fredricks, J.A., Blumenfeld, P.C., & Paris, A.H. (2004). School engagement: Potential of the

concept, state of the evidence. *Review of Educational Research, 74,* 59–109.

http://dx.doi.org/10.3102/00346543074001059

Gall, T.L., Evans, D.R., & Bellerose, S. (2000). Transition to first-year university: Patterns of

change in adjustment across life domains and time. *Journal of Social and Clinical*

Psychology, 19, 544-567. http://dx.doi.org/10.1521/jscp.2000.19.4.544

Grebennikov, L., & Shah, M. (2012). Investigating attrition trends in order to improve

student retention. *Quality Assurance in Education, 20*(3), 223-236.

http://dx.doi.org/10.1108/09684881211240295

Green, J., Martin, A.J., & Marsh, H.W. (2007). Motivation and engagement in English,

mathematics and science high school subjects: Towards an understanding of

multidimensional domain specificity. *Learning and Individual Differences, 17,* 269-

279. http://dx.doi.org/10.1016/j.lindif.2006.12.003

Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological*

Review, 102, 284-304. http://dx.doi.org/10.1037/0033-295X.102.2.284

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review, 117*, 32-60. http://dx.doi.org/10.1037/a0017668

Howard, S., & Johnson, B. (2000). Resilient and non-resilient behavior in adolescents. In A. Graycar (Ed.), *Trends and issues in crime and criminal justice series* (pp. 1–6). Canberra, Australian Capital Territory, Australia: Australian Institute of Criminology.

Jang, H., Reeve, J., & Deci, E.L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*, 588-600. http://dx.doi.org/10.1037/a0019682

Johnson, M.L., Taasoobshirazi, G., Kestler, J.L., & Cordova, J.R. (2015). Models and messengers of resilience: A theoretical model of college students' resilience, regulatory strategy use, and academic achievement. *Educational Psychology, 35,* 869-885. http://dx.doi.org/10.1080/01443410.2014.893560

Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York, NY: Springer.

Liem, G.A.D., & Martin, A.J. (2012). The motivation and engagement scale: Theoretical framework, psychometric properties, and applied yields. *Australian Psychologist, 47*, 3-13. http://dx.doi.org/10.1111/j.1742-9544.2011.00049.x

Little, T.D., Cunningham, W.A., Shahar, G., & Widaman, K.F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9*, 151–173. http://dx.doi.org/10.1207/S15328007SEM0902_1

Marsh, H.W., Balla, J.R., & McDonald, R.P. (1988). Goodness-of-fit indices in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin, 102,* 391-410.

Martin, A.J. (2005). Exploring the effects of a youth enrichment program on academic motivation and engagement. *Social Psychology of Education, 8,* 179-206.

Martin, A.J. (2007a) Examining a multidimensional model of student motivation and

engagement using a construct validation approach. *British Journal of*

Educational Psychology, 77, 413-440. http://dx.doi.org/10.1348/000709906X118036

Martin, A.J. (2007b) *The Motivation and Engagement Scale*. Sydney, Australia: Lifelong

Achievement Group (www.lifelongachievement.com).

Martin, A.J. (2008). Enhancing student motivation and engagement: The effects of a

multidimensional intervention. *Contemporary Educational Psychology, 33,* 239-269.

Martin, A.J. (2009) Motivation and engagement across the academic life span: A

developmental construct validity study of elementary school, high school, and

university/college students. *Educational and Psychological Measurement, 69,* 794-

824. http://dx.doi.org/10.1177/0013164409332214

Martin, A.J. (2010) Should students have a gap year? Motivation and performancefactors

relevant to time out after completing school. *Journal of Educational*

Psychology, 102, 561-576. http://dx.doi.org/10.1037/a0019321

Martin, A.J. (2013) Motivation to learn. In A.J. Holliman (ed.) *The Routledge international*

companion to educational psychology. Abingdon, Oxon: Routledge.

Martin, A.J., & Burns, E.C. (2014). Academic buoyancy, resilience, and adaptability in

students with ADHD. *The ADHD Report, 22,* 1-9.

http://dx.doi.org/10.1521/adhd.2014.22.6.1

Martin, A.J., & Marsh, H.W. (2009). Academic resilience and academic buoyancy:

Multidimensional and hierarchical conceptual framing of causes, correlates and

cognate constructs. *Oxford Review of Education, 35*, 353-370.

http://dx.doi.org/10.1080/03054980902934639

Martin, A.J., Marsh, H.W., & Debus, R.L. (2003). Self-handicapping and defensive

pessimism: A model of self-protection from a longitudinal perspective. *Contemporary*

Educational Psychology, 28, 1-36.

Martin, A.J., Nejad, H., Colmar, S. & Liem, G.A.D. (2012) Adaptability: Conceptual and

empirical perspectives on responses to change, novelty and uncertainty. *Australian*

Journal of Guidance and Counselling, 22, 58-81. http://dx.doi.org/10.1017/jgc.2012.8

Martin, A.J., Nejad, H.G., Colmar, S. & Liem, G.A.D. (2013) Adaptability: How students'

responses to uncertainty and novelty predict their academic and non-academic

outcomes. *Journal of Educational Psychology, 105,* 728-746.

http://dx.doi.org/10.1037/a0032794

Martin, A.J., Nejad, H.G., Colmar, S., Liem, G.A.D. & Collie, R.J. (2015). The role of

adaptability in promoting control and reducing failure dynamics: A mediation model.

Learning and Individual Differences, 38, 36-43.

http://dx.doi.org/10.1016/j.lindif.2015.02.004

Martin, A.J., Wilson, R., Liem, G.A. & Ginns, P. (2013) Academic momentum at

university/college: Exploring the roles of prior learning, life experience, and

ongoing performance in academic achievement across time. *Journal of Higher*

Education, 84, 640-674. http://dx.doi.org/10.1353/jhe.2013.0029

McDonald, R.P., & Marsh, H.W. (1990). Choosing a multivariate model: Noncentrality and

goodness-of-fit. *Psychological Bulletin, 107,* 247-255.

Miller, R.B., Greene, B.A., Montalvo, G.P., Ravindran, B., & Nichols, J.D. (1996).

Engagement in academic work: The role of learning goals, future consequences,

pleasing others, and perceived ability. *Contemporary Educational Psychology, 21*,

388-422. http://dx.doi.org/10.1006/ceps.1996.0028

Morales, E.E. (2000). A contextual understanding of the process of educational resilience:

    High achieving Dominican American students and the "resilience cycle". *Innovative*

    Higher Education, 25, 7-22. http://dx.doi.org/10.1023/A:1007580217973

Muthén, L.K., & Muthén, B.O. (2014). *Mplus user's guide*. Los Angeles: Muthén & Muthén.

Pittman, L.D., & Richmond, A. (2008). University belonging, friendship quality, and

    psychological adjustment during the transition to college. *The Journal of*

    Experimental Education, 76, 343-362. http://dx.doi.org/10.3200/JEXE.76.4.343-362

Putwain, D.W., Connors, L., Symes, W., & Douglas-Osborn, E. (2012). Is academic

    buoyancy anything more than adaptive coping? *Anxiety, Stress, & Coping, 25*, 349-

    358. http://dx.doi.org/10.1080/10615806.2011.582459

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university

    students' academic performance: A systematic review and meta-analysis.

    Psychological Bulletin, 138, 353–387. http://dx.doi.org/10.1037/a0026838

Rothman, S., & McMillan, J. (2003). Influences on achievement in literacy and numeracy.

    LSAY Research Reports, 36. http://research.acer.edu.au/lsay_research/40/

Schwinger, M., Wirthwein, L., Lemmer, G. & Steinmayr, R. (2014) Academic self-

    handicapping and achievement: A meta-analysis. *Journal of Educational Psychology,*

    106, 744-761. http://dx.doi.org/10.1037/a0035832

Shrout, P.E., & Bolger, N. (2002). Mediation in experimental and non-experimental

    studies: New procedures and recommendations. *Psychological Methods, 7*, 422-445.

    http://dx.doi.org/10.1037/1082-989X.7.4.422

Skinner, E.A., Kindermann, T.A., & Furrer, C.J. (2009). A motivational perspective on

    engagement and disaffection: Conceptualization and assessment of children's

    behavioral and emotional participation in academic activities in the

classroom. *Educational and Psychological Measurement, 69*, 493-525.

http://dx.doi.org/10.1177/0013164408323233

Stoeber, J., Childs, J.H., Hayward, J.A., & Feast, A.R. (2011). Passion and motivation for

studying: Predicting academic engagement and burnout in university students.

Educational Psychology, 31, 513-528.

http://dx.doi.org/10.1080/01443410.2011.570251

Tomasik, M., Silbereisen, R., & Heckhausen, J. (2010). Is it adaptive to disengage from

demands of social change? adjustment to developmental barriers in opportunity-

deprived regions. *Motivation and Emotion, 34*, 384-398.

http://dx.doi.org/10.1007/s11031-010-9177-6

Virtanen, T.E., Lerkkanen, M., Poikkeus, A., & Kuorelahti, M. (2015). The relationship

between classroom quality and students' engagement in secondary school.

Educational Psychology, 35, 963-983.

http://dx.doi.org/10.1080/01443410.2013.822961

Wang, M., & Eccles, J.S. (2012). Social support matters: Longitudinal effects of social

support on three dimensions of school engagement from middle to high school. *Child

Development, 83*, 877-895. http://dx.doi.org/10.1111/j.1467-8624.2012.01745.x

Winne, P.H., & Hadwin, A.F. (2008). The weave of motivation and self-regulated learning.

In D.H. Schunk & B.J. Zimmerman (Eds.), *Motivation and self-regulated learning:

Theory, research, and application* (pp. 297–314). New York, NY: Routledge.

Yu, K., & Martin, A.J. (2014). Personal best (PB) and 'classic' achievement goals in the

chinese context: Their role in predicting academic motivation, engagement and

buoyancy. *Educational Psychology, 34,* 635-658.

http://dx.doi.org/10.1080/01443410.2014.895297

Zimmerman, B.J. (2002). Achieving self-regulation: The trial and triumph of adolescence. In

    F. Pajares & T. Urdan (Eds.), *Academic motivation of adolescents* (pp. 1–27).

    Greenwich, CT: Information Age Publishing.

Table 1

Summary Statistics for Modeled Variables

	Mean	Std. Dev.	α	Mean CFA loading
Age	19.16	2.32	-	1.00
Gender (M)	1.25	1.15	-	1.00
Prior Achievement	298.26	81.82	-	1.00
Adaptability	5.12	.93	.89	0.74
Positive Engagement	5.26	.89	.92	0.73
Negative Engagement	2.39	1.00	.85	0.75
GPA Semester 1	61.10	9.72	-	1.00
GPA Semester 2	56.49	7.66	-	1.00

Note: Age was measured in years; adaptability, positive engagement and negative engagement were scored from 1-7 with higher scores corresponding to higher levels of each construct; GPA Semesters 1 and 2 were scored from 0-100 with higher scores corresponding to higher levels of academic achievement. Covariates (age, gender, prior achievement) and GPAs are single-item indicators and so reliability is not computed and the factor loadings are set at 1.00.

Table 2

Bivariate Latent Correlations Between Modeled Variables

	1	2	3	4	5	6	7
1. Age							
2. Gender (M)	.08						
3. Prior Achievement	.16	.07					
4. Adaptability	.14	.07	.09				
5. Positive Engagement	.12	-.09	.05	.77***			
6. Negative Engagement	-.13	.10	-.13	-.62***	-.67***		
7. GPA Semester 1	-.06	-.09	.22*	.05	.11	-.30***	
8. GPA Semester 2	-.05	-.11	.20*	-.03	.04	-.18*	.57***

*p < .05; **p < .01; ***p < .001

Table 3

Standardized Beta Coefficients in SEM

	Endogenous Variables				
	Adaptability	Positive Engagement	Negative Engagement	GPA Semester 1	GPA Semester 2
Age	.12	.02	-.04	-.12	-.02
Gender (M)	.05	-.14*	.15*	-.03	-.05
Prior Achievement	.07	-.01	-.07	.20*	.09
Adaptability		.79***	-.65***	-.26	-.15
Positive Engagement				.05	.05
Negative Engagement				-.42***	-.08
GPA Semester 1					.52***

$*p < .05; **p < .01; ***p < .001$

Table 4

Indirect Effects from Bootstrapping in SEM

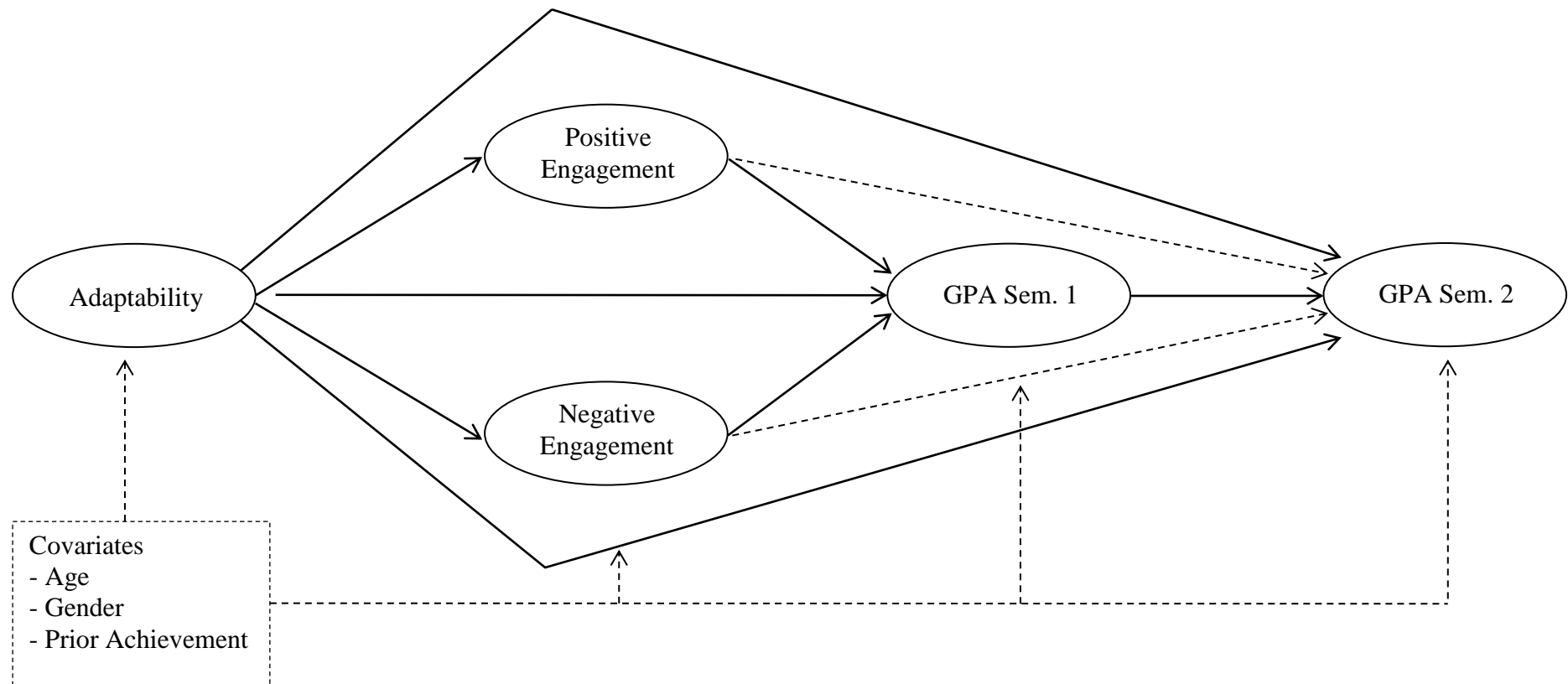| Indirect Pathway	β	*p*
Adaptability → Pos. Engagement → GPA Sem. 1	.04	.78
Adaptability → Neg. Engagement → GPA Sem. 1	.28	.02*
Adaptability → Pos. Engagement → GPA Sem. 1 → GPA Sem. 2	.02	.78
Adaptability → Neg. Engagement → GPA Sem. 1 → GPA Sem. 2	.15	.03*
Pos. Engagement → GPA Sem. 1 → GPA Sem. 2	.03	.77
Neg. Engagement → GPA Sem. 1 → GPA Sem. 2	-.23	.01**

*$p < .05$; **$p < .01$; ***$p < .001$

Figure 1. Hypothesized model. Solid paths represent hypothesized links and dashed paths represent additional links tested for completeness. Sem. = Semester.
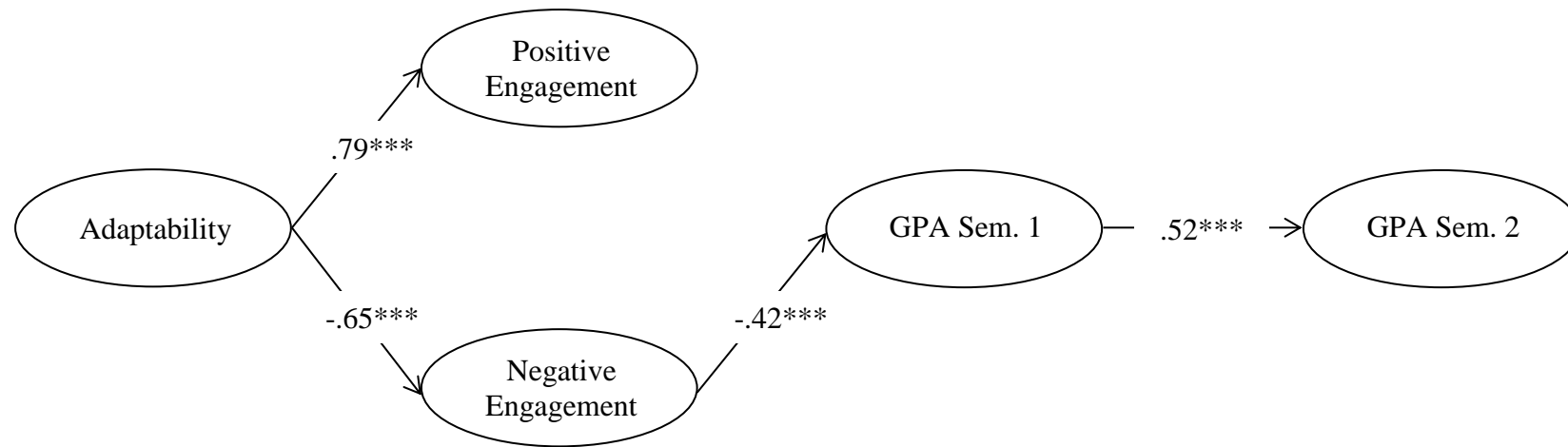
Figure 2. Significant substantive parameters from SEM. Results involving covariates and remaining non-significant effects are shown in Table 3. All indirect effects are shown in Table 4. Sem. = Semester.

***$p < .001$.