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UNIVERSITY OF CALIFORNIA,
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The Role of Goal Engagement in Transitions to Post-Secondary Education

THESIS

submitted in partial satisfaction of the requirements
for the degree of

MASTER OF ARTS

in Social Ecology

by

Teh-Way David Chen

Thesis Committee:
Professor Jutta Heckhausen, Chair
Professor Susan T. Charles
Assistant Professor Amy L. Dent

2019

DEDICATION

To all the friends, family, and mentors who supported me through my many trials and tribulations and provided me with a combination of mentorship, encouragement, wisdom, and opportunity.

TABLE OF CONTENTS

	Page
LIST OF FIGURES	iv
LIST OF TABLES	v
ACKNOWLEDGMENTS	vi
ABSTRACT OF THE THESIS	viii
INTRODUCTION	1
CHAPTER 1: Motivated Goal Engagement	3
Present Study	5
CHAPTER 2: Methodology	9
CHAPTER 3: Results	16
CHAPTER 4: Discussion	20
Limitations and Future Directions	22
Conclusion	23
REFERENCES	25

LIST OF FIGURES

		Page
Figure 1	Waves of Data Per Cohort	32
Figure 2	Probability of Institutional Admittance	33
Figure 3	Probability of Institutional Admittance After Initial Failure	34

LIST OF TABLES

		Page
Table 3.1	Descriptive Statistics	29
Table 3.2	Binominal Logistic Regression (Overall Sample)	30
Table 3.3	Binominal Logistic Regression (Initial Failure Sample)	31

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ABSTRACT OF THE THESIS

The Role of Goal Engagement in Transitions to Post-Secondary Education

By

Teh-Way David Chen

Master of Arts in Social Ecology

University of California, Irvine, 2019

Professor Jutta Heckhausen, Chair

The present study examined the role of goal engagement in the transition to post-secondary education based on propositions stemming from the motivational theory of lifespan development (MTD) and motivational intensity theory (MIT). Using data from the Finnish Educational Transitions (FinEdu) Study ($n = 637$), we examined whether goal engagement facilitated goal attainment (institutional admittance) under contrasting conditions involving: (a) high challenge (admittance to highly selective universities) or (b) moderate challenge (admittance to moderately selective polytechnic universities) in the Finnish educational system. Goal engagement was associated with increased likelihood of institutional admission only under conditions of high-challenge. Results were consistent when examining a subset of students who initially failed to gain institutional admission. Overall, the findings support MTD and MIT propositions concerning adaptive goal engagement and contribute to a better understanding of the circumstances under which engagement supports achievement and adaptive development.

INTRODUCTION

In much of the developed world, a critical transition for many young adults is the shift from secondary education to higher education. This transition is especially important because it allows young adults to take control over their development and, in the process, take another step towards achieving lifelong goals (J. Heckhausen & H. Heckhausen, 2018). However, the transition from high school to college is one of the most difficult challenges encountered through the first half of the lifespan because college admissions require the investment of considerable effort and resources without any guarantee of success.

This challenging experience also varies greatly between countries. For instance, in East Asian countries (e.g., China, South Korea), admissions into higher educational institutions are determined solely by scores on the national college entrance examinations. In European countries, admissions can be determined by a single (e.g., entrance examination scores) or combinations of factors (e.g., entrance exams, high school grades, extracurricular activities, standardized test scores, letters of recommendation, and personalized essays). In some European countries such as Finland, differences also exist between post-secondary education tracks. For instance, gaining admission into Finnish post-secondary institutions that focus on more applied vocational skills (e.g., nurses, supervisors, accountants) tends to require substantially less effort than gaining admissions via challenging entrance exams for highly-ranked research universities.

Research is scarce regarding the role of motivational strategies involving persistent goal engagement for adolescents who aspire to gain admittance to institutes of higher education. We were particularly interested in whether persistent goal engagement increased the likelihood of successful admittance to more challenging and selective schools. The present study used longitudinal data from the national Finnish Educational Transitions (FinEdu) study over the

course of 13 years to examine of consequences of motivational strategies on admission rates on research universities and vocational colleges that varied in their selectivity (degree of challenge in gaining admission).

CHAPTER 1: MOTIVATED GOAL ENGAGEMENT

Motivated behavior typically reflects the enactment of individual aspirations and goals (Moskowitz & Grant, 2009). In fact, most human behavior—thinking, feeling, acting, and persisting—is impossible without being guided by goals (Adler, 1933). According to the motivational theory of life-span development (MTD), a central motivating force in human behavior is an underlying universal desire for control over one’s environment and development (Heckhausen, 2000; Heckhausen & Schulz, 1995; Heckhausen, Wrosch, & Schulz, 2010, 2019). Striving for control has been shown to have important consequences for achievement, health, and well-being during young adults’ transition into higher education (Ebner, Freund, & Baltes, 2006; Hamm, Perry, Chipperfield, Stewart, & Heckhausen, 2015; Hamm, Perry, Chipperfield, Parker, & Heckhausen, 2019).

According to MTD theory, after an individual begins pursuing a goal, challenges are assessed as to whether current control striving will lead to success or whether increased effort is required. If a goal is perceived as challenging but attainable, goal engagement—motivational and self-regulatory control strategies that maximize behavioral and motivational investment in goal pursuit—should be activated (Heckhausen et al., 2010, 2019). Goal engagement is comprised of multiple control strategies: selective primary control (SPC), compensatory primary control (CPC), and selective secondary control strategies (SSC) (Heckhausen & Schulz, 1995). SPC reflects the core goal engagement strategy and involves the investment of one’s time, effort, and abilities to achieve sought after goals (for full review, see Heckhausen, Wrosch, & Schulz, 2010).

Despite the innate need for control, continuously investing maximum effort into every goal pursuit is not adaptive and can lead to over exertion and the depletion of physical and

cognitive resources (French, Kamil, & Leger, 2001; J. Heckhausen & H. Heckhausen, 2018). Motivational intensity theory (MIT) posits that any sustained form of action is undertaken with goal attainment and the conservation principle in mind. Specifically, MIT theory contends that plans for goal pursuit must: (1) be accompanied by opportunities for success, (2) hold a level of importance to the individual, and (3) provide information to determine the difficulty of the goal (Richter, Gendolla, & Wright, 2016). This ensures that any goal directed effort is strategically invested and not wasted. For instance, in pursuit of less challenging goals, coasting (i.e., doing enough to suffice) would be effective and efficient because the desired goal is judged to be attainable even with decreased or merely maintained effort (Carver & Scheier, 2011; Richter, Gendolla, & Wright, 2016). For more difficult challenges, there is typically a need to increase goal engagement. If difficult but attainable challenges are accurately appraised, greater goal engagement should elevate the likelihood of overcoming the challenge. However, if inaccurate appraisals of task difficulty are made, this can result in failures, setbacks, and wasted personal resources when obstacles are truly insurmountable (Cannon & Edmondson, 2001; Wrosch, Scheier, Carver, & Schulz, 2003).

Experiences of failure and setbacks can lead to negative outcomes; however, they can also serve as a signal to increase effort and/or assess the suitability of the action means employed (Bandura, 1982), a prediction consistent with MIT (Locke & Latham, 1990; Shepherd, 2003). Setbacks and failures do not necessarily mean that the goal is unattainable. Rather they suggest that a misappraisal of difficulty may have occurred or some form of deficiency (e.g., effort, time, skill, strategy, etc.) prevented the successful attainment of the goal. Therefore, if a setback or failure is encountered, investigating the causes of the failed attempt, properly adjusting one's

motivational and self-regulatory behavior (e.g., increasing goal engagement), and persisting are crucial to overcoming initial setbacks and fulfilling one's aspirations.

In sum, goal engagement should reflect the level of challenge encountered when pursuing a goal. At extremely high levels of challenge, when goal attainment is all but impossible, disengagement is adaptive (Wrosch, Scheier, Miller, Schulz, & Carver, 2003). At high but manageable levels of challenge, increasing personal goal engagement is necessary to achieve success. At more moderate levels of challenge, goal engagement can remain relatively low or stagnant since increasing engagement may waste motivational resources. Moreover, in the process of goal pursuit over time, adaptive goal engagement should be adjusted in response to the challenges experienced, so that surmountable failures or setbacks prompt increased goal engagement. Goal engagement is calibrated to the level of challenge encountered will be most effective in achieving successful outcomes.

Present study

In the present study, we tested propositions of the MTD and MIT regarding goal engagement and the pursuit of time-sensitive developmental goals that varied in degree of difficulty. To do so, we examined young adults' pursuit of higher education goals in the unique context provided by the Finnish post-secondary education system. Finland's higher education system is separated into two tiers, university and polytechnic university (now referred to as university of applied sciences). Within each tier, there are multiple universities with their own respective specialties. There is no ranking system within the higher educational tiers. However, the focus of study and the applications process for institutions in the higher tier (university) and the lower tier (polytechnic university) differ considerably.

Polytechnic universities focus on occupational education and take a more holistic approach by considering the applicants' high school grades, matriculation exam scores (high school exit exam score), and the school's entrance exam score to make their admission decisions. Polytechnics are limited in the degrees they can provide (e.g., bachelor's degrees and masters) and until recent years, the education provided did not permit students to transition to more selective research universities that offer more advanced degrees. Although the polytechnic entrance examinations may vary in their level of difficulty, the consideration of a broad spectrum of student achievement noted above and their focus on occupational education and less on research makes it a naturalistic less challenging condition.

In contrast, research universities provide higher level degrees (e.g., licentiate and Ph.D.) and their admissions decisions are solely based on difficult, high-stakes entrance exams. The exams are institution specific (e.g., psychology major in Helsinki has a different entrance exam than psychology major in Jyväskylä) and require the applicants to invest a great deal of time and effort to become proficient with new and challenging material. Noteworthy is that the opportunity to take the examination occurs once per year. Therefore, the time-limited, high stakes nature of Finnish universities admissions necessitates high and sustained or even increased levels of motivation and goal engagement. In order to increase their likelihood of success, each applicant needs to invest all their motivational resources into attaining this difficult goal if they are to be successful. If applicants choose to spread their limited resources into studying for more than one examination, they risk a greater probability of failure.

Past admission statistics indicate that universities and polytechnic colleges admit about a third of their applicants (Education Statistics Finland, 2019). However, applicants self-select according to their abilities and other pertinent academic qualities, so that insufficiently qualified

applicants do not even try to attain admission to the university system. Moreover, the polytechnic admission process is chiefly based on a broader evaluation of previous achievement and academic preparation (e.g., high school GPA, exit exams scores, etc.) which renders effortful goal engagement negligible because some key evaluation components (e.g., GPA) cannot be changed despite increased effort. In contrast, university admissions rely solely on entrance exams that occur after high school and cover very specific materials and topics; therefore, increase efforted and goal engagement should lead to increase probability of successful admission.

This backdrop creates a natural challenging versus less challenging condition.

Furthermore, Finland has one of the lowest income inequality rates with its Gini index at 27.1 (The World Bank, n.d.) and is among the top-rated K-12 education in the world with highly trained teachers. For these reasons, we will be able to test our proposition of goal engagement in a naturalistic challenge setting while holding constant some important extraneous variables such as socioeconomic status and varying levels of education. Based on the motivational theory of life-span development, previous research on goal engagement, and motivation intensity theory, we hypothesize that:

1. High-school GPA will be associated with increased odds of being admitted to both challenging and less challenging institutions, consistent with past research showing that the most selective colleges often select students with the highest grades (Carnevale & Rose, 2003; Zwick, 2017).
2. Increases in goal engagement will be associated with increased odds of being admitted when controlling for initial levels of goal engagement, GPA, and SES.
3. There will be a significant interaction between the level of degree aspiration and goal engagement as predictors of institutional admittance.

- a. In situations of high difficulty and challenge (i.e., aspirations for a university degree), increasing goal engagement will be associated with significantly higher odds of successful institutional admittance.
 - b. In situations with modest challenge (i.e., aspirations for polytechnic degree), increasing goal engagement will not be significantly associated with higher odds of successful institutional admittance.
4. For those students who initially failed to gain admittance, increases in goal engagement will be associated with higher odds of subsequent admittance; however, this will be moderated by the level of degree aspiration.
- a. In situations of high challenge, increasing goal engagement will be associated with higher odds of successful institutional admittance.
 - b. In situations of modest challenge, increasing goal engagement will not be significantly associated with higher odds of successful institutional admittance.

CHAPTER 2: METHODOLOGY

Participants

We examined our research questions using data from the Finnish Educational Transitions (FinEdu) Study (see <https://growingmind.fi/projects/finedu/> for a detailed description of FinEdu). Briefly, FinEdu is an ongoing longitudinal study of educational transitions and choices for Finnish students who were 15-16 years old at the baseline assessment for Cohort A (2003-present; $n = 1,703$) and 17-18 years old at the baseline assessment for Cohort B (2003-present; $n = 731$). Data was collected from students in a mid-sized Finnish city (population ~100,000).

For Cohort A, all willing 9th grade participants from all the lower secondary schools (U.S. equivalent to junior high) in the city were assessed in 2003-2004 ($n = 707$) and again several months later in 2004 ($n = 624$). When students transitioned to upper secondary school (U.S. equivalent to high school), the decision was made to collect data from Cohort A's initial students along with all other enrolled 10th grade students, in the same class year ($n = 1530$). Subsequent assessments were conducted in 2006 ($n = 1373$), 2008-2009 ($n = 611$), 2011 ($n = 599$), 2013-2014 ($n = 610$), and 2016-2017 ($n = 586$). For Cohort B, all willing 11th grade participants from all upper secondary schools within the same city as Cohort A were initially assessed in 2003 ($n = 614$). Subsequent assessments were also collected in 2005 ($n = 636$), 2006 ($n = 449$), 2008 ($n = 422$), 2011 ($n = 497$), 2013 ($n = 528$), and 2016 ($n = 471$).

For Cohort A, we focused on the following five study waves which contained data pertinent to our hypotheses: (T1) two years before upper secondary school graduation (age 16-17); (T2) two years after upper secondary school graduation when students were applying to or had been admitted into institutions of higher education (age 20-21); (T3) four years after upper secondary school graduation when students were again applying or had been admitted to

institutions of higher education (age 22-23); (T4) six years after upper secondary school graduation when students were applying, had been admitted, or completed their higher education degrees and were working (age 24-25); and (T5) nine years after upper secondary school graduation when students were again applying to schools, had been admitted, or had completed their higher education degrees and were working (Age 27-28) (see Figure 1).

For Cohort B, the six waves of data used for analyses were as follows: (T1) the last year of upper secondary school, but before students graduated (age 18-19); (T2) one year after graduating from upper secondary school when students were either applying to or had been admitted into institutions of higher education (age 19-20); (T3) three years after upper secondary school graduation when students were again applying to or had been admitted to institutions of higher education (age 22-23); (T4) six years after graduating from upper secondary school when students were applying to, had been admitted, or had completed their higher education degrees (age 24-25); (T5) eight years after graduating from upper secondary school when students again were applying, had been admitted, or had completed their higher education degree (age 26-27); and (T6) eleven years after graduating from upper secondary school (age 29-30) when students were again applying to, had been admitted, or had completed their higher education degree (see Figure 1).

The present study's inclusion criteria for both cohorts were as follows: (a) at T1, students had to provide their high school GPA, respond to both indicators of initial levels of goal engagement, indicate the occupation of their parent(s), and nominate university or polytechnic degree as their highest aspiration; (b) at T3 (Cohort A) and T4 (Cohort B), students had to respond to both indicators of goal engagement; and (c) students had to report their work and/or school status at any of the subsequent time points after T1. These criteria allowed us to examine

changes in goal engagement (in pursuit of higher education) that occurred from pre-to-post high school graduation. There were 637 students who met these criteria and were included ($n = 308$ from Cohort A; $n = 329$ from Cohort B). See Table 1 for more detail on the descriptive statistics for the analyzed sample.

Of the final analyzed sample, 448 students aspired to attain a university degree (Cohort A = 191, Cohort B = 257) and 189 aspired to attain a polytechnic degree (Cohort A = 117, Cohort B = 72). In total, 283 students eventually gained admission to a university and 165 students did not (63.1%). For polytechnics aspirers, 129 students gained admissions while 60 students were unable to do so (68.3%) by the most recent data collection period.

For our supplemental analysis that examined the role of goal engagement for the subsample of students who initially failed to gain admittance to their first-choice degree program, the inclusion criteria for both cohorts were as follows: (a) at T1, students had to provide their GPA, respond to both indicators of initial levels of goal engagement, indicate the occupation of their parent(s), and nominate university or polytechnic degree as their highest educational aspiration; (b) respond to both indicators measuring their goal engagement at T3 (Cohort A) and T4 (Cohort B); (c) indicate that they were not enrolled in the institution that granted their degree of choice anytime during T2 to T4 (Cohort A) and T2 to T5 (Cohort B); and (d) report their education or work status at least one more time after reporting that they were not enrolled in the institution that granted their highest aspired degree (Cohort A & Cohort B). The aforementioned time points were used to better align the two cohorts in accordance to the number of years passed between data collection points.

These criteria allowed us to examine the role of goal engagement changes in pursuit of higher education institutional admittance for students who initially failed to gain admittance to a

higher education institution that granted their desired degree. For these supplemental analyses, 318 students who met the criteria were included from Cohort A ($n = 160$) and Cohort B ($n = 158$). When separated by aspiration group, 227 students aspired to attain a university degree and 91 students aspired to attain a polytechnic degree.

Along with differences in age, there were some significant differences found between the cohorts in some of the key variables such as GPA ($M = 5.41$ vs. $M = 4.96$) and initial goal engagement ($M = 10.29$ vs. $M = 9.52$). We thus included cohort as a covariate in all analyses.

Procedures

Data collection first began when the students were in 9th grade for Cohort A and 11th grade for Cohort B. During the next 13 years, data was collected four more times (Cohort A) and five more times (Cohort B) with the most recent data collection occurring in 2016-2017. Initially, designated school representatives distributed and collected student questionnaires. In subsequent waves of data collection, responses were collected through a combination of questionnaires packets, online surveys, and telephone interviews. For each stage of the data collection process, willing participants were compensated with movie tickets or small gift cards through a raffle system (see Lechner, Pavlova, Sortheix, Silbereisen, & Salmela-Aro, 2018 for more details).

Measures

Degree aspirations. Students were asked to indicate the highest degree they hoped to attain in their lifetime: university degree, polytechnic degree, matriculation, vocational gratification, both matriculation and vocational degree, nothing past secondary education, or other. In total, 448 students' highest aspiration was a university degree (Cohort A = 191, Cohort

B = 257) and 189 students' highest aspiration was a polytechnic degree (Cohort A = 117, Cohort B = 72)¹.

Successful admittance. Using degree aspiration from T1 for both cohorts and the work/school status from the subsequent waves, a binary outcome was created that indicated whether students were successful in gaining admittance to the institution that granted their degree of choice. At T1 in both cohorts, participants indicated their education degree aspiration. In the subsequent time points, the participants indicated their education and work status (e.g., “I am currently attending a university.”, “I am currently attending a polytechnic”, “I am currently working”, “I am currently unemployed”). If participants indicated at any time point that they were attending the higher education institution that granted their degree of choice or higher, they were classified as being successfully admitted. For instance, if a participant aspired to attain a university degree, and subsequently reported attending a university, s/he was classified as being successfully admitted. Additionally, students that aspired to earn a polytechnic degree, but reported attending a university, were also classified as being successfully admitted. These students overachieved, but due to the small number of overachievers ($n = 51$), they were collapsed into the successful admittance group.

Participants who reported aspirations of university or polytechnic degree and did not, at any of the subsequent waves, report that they were attending an educational institution that granted their degree of choice, were classified as being unsuccessful. For example, if students aspired to attain a university degree at T1, but reported that they attended a polytechnic, were working, or were unemployed during the subsequent time points, they were categorized as being unsuccessful. Participants who did not indicate their status at any of the subsequent time points

¹ In Cohort A, 456 students nominated high school equivalency as their highest degree aspiration while 26 people nominated the same goal in Cohort B.

were automatically excluded due to the inclusion criteria. In total, 225 (coded 0) participants were classified as unsuccessful and 412 (coded 1) were classified as successful.

Goal engagement. Goal engagement was measured using two theory-based items assessing the effort and persistence students invested into attaining their specific higher education degree: “Even if the fulfillment of this educational goal would require a lot of work, I am going to do everything I can to attain it.”; “Whatever happens I am not going to give up on this educational goal.” Both were measured using a seven-point scale (1 = *not at all true*, 7 = *very much true*). To be eligible for the final analyses, participants had to complete both items at T1 and T3 (Cohort A) or at T1 and T4 (Cohort B).

Academic performance (grade point average). Student high school grade point averages (GPA) were collected at T1 when the students were age 17 (Cohort A) and age 19 (Cohort B). In Cohort A, students were asked to self-report their GPA. The overall GPA scores for Cohort A ranged from a min of 6.4 and max of 9.8 on a 4 to 10 scale. In Cohort B, students were asked to indicate their GPA within a given range (1 = < 6.5, 2 = 6.5-6.9, 3 = 7.0-7.4, 4 = 7.5-7.9, 5 = 8.0-8.4, 6 = 8.5-8.9, 7=9.0-9.4, & 8 = 9.5-10.0). To maintain consistency, student GPAs from Cohort A were recoded to match the corresponding GPA scale values used in Cohort B (e.g., GPA of 8.5 in Cohort A was recoded to 6 based on the scale used in Cohort B). For our analyses, the mean reported high school GPA was 5.18 ($SD = 1.46$) which is equivalent to a “B” in the U.S. grading scale.

Socioeconomic status (SES). To measure household SES, students were asked to indicate their parents’ occupation through an open-end question. The responses were then coded into categories that followed the standard classification (Official Statistics of Finland, 1989). These responses were then further categorized into three categories—blue collar workers (e.g.,

construction workers, bakers), lower white-collar workers (e.g., secretaries, nurses, salespeople), and upper white-collar workers (e.g., physicians, teachers, engineers). A single SES measure was then created from the highest response from either parent ($n = 637$). Subjects whose parents' occupation both fall outside these categories and were unable to be classified by any additional information (e.g., self-employed, unemployed, retired, housewife) were excluded from the analyses.

CHAPTER 3: RESULTS

To test the first hypothesis concerning high school GPA's association with increased odds of successful admittance, we conducted a logistic regression with self-reported GPA as the predictor and institutional admittance as the binary outcome variable (0 = *not admitted*, 1 = *admitted*). As seen in Table 2, while controlling for cohort effects and SES, Model 1 results showed that high school GPA was associated with increased odds of institutional admittance (OR=1.91, CIs = 1.660 – 2.204, $p < .001$). When initial levels and subsequent levels of goal engagement were included (Model 2), initial level of goal engagement was not associated with increased likelihood of admittance (OR=0.97, CIs = 0.902 – 1.050, $p = .485$), whereas subsequent increases in goal engagement were significantly associated with higher odds of institutional admittance (OR=1.15, CIs = 1.085 – 1.229, $p < .001$). While holding GPA, cohort, SES, and initial levels of goal engagement constant, each unit increase in subsequent goal engagement predicted a 15% increase in odds of institutional admittance.

However, we reasoned that the positive consequences of increased goal engagement should depend on the level of challenge. This led us to test our third hypothesis that predicted a significant interaction between the students' aspiration level and their subsequent changes in goal engagement.

We ran a logistic regression model predicting successful institutional admittance using subsequent goal engagement as the predictor, aspiration level as the moderator, and high school GPA, initial goal engagement, SES, and cohort as covariates. Model 3 (Table 2) revealed a significant interaction (OR=1.23, CIs = 1.066 – 1.424, $p = .005$), and our a priori simple-slope analyses showed that subsequent increases in goal engagement predicted institutional admittance for only those aspiring to university (OR=1.27, CIs = 1.170 – 1.374, $p < .001$). As seen in Figure

2, university aspirers who increased their subsequent goal engagement had a 74% probability of admission. In contrast, their peers who reduced their subsequent goal engagement had a 41% probability to be admitted to university. Furthermore, looking at the simple slope for polytechnic degree aspirers, increases in goal engagement were not associated with admittance (OR=1.03, CIs = 0.911 – 1.161, $p = .649$). This lends support to our hypothesis that goal engagement effects would not be observed in less challenging situations, wherein a large majority of students were admitted to polytechnic regardless of their level of engagement (84%-86% admitted).

However, not all students are admitted to post-secondary education on their first attempt. In the face of initial failure to gain admittance to higher education, some students may struggle to sustain motivation and to adjust their goal striving appropriately, especially during a critical window of time. Most students have only several years after high school graduation where they are likely to gain admittance into higher education. After which, the constraints to achieve the goal are increased and the opportunities to achieve the academic goals decreased (Heckhausen, 1999). Success in these circumstances is likely to depend on increased goal engagement in the face of initial setbacks and failures. Increases in subsequent goal engagement should thus be associated with increased odds of success in this population. Therefore, to test our next set of hypotheses, logistic regression models were conducted using the population of students who initially failed to gain admittance. Only students who were assessed at T1, indicated that they were not attending an institution that granted their degree of choice at least once after high school graduation, and reported their status at least one subsequent time after their second status report were included in the analyses.

Of those who initially failed to gain admittance ($n = 318$), a total of 110 subjects were subsequently successful and 208 subjects were unsuccessful. The results from Table 3, Models

1-2 show that when controlling for initial and subsequent goal engagement, SES, and cohort effects, high school GPA was significantly associated with increase odds of successful institutional admittance (OR=1.51, CIs = 1.235 - 1.839, $p < .001$). While controlling for reported high school GPA, cohort, SES, and initial goal engagement, subsequent goal engagement was again significantly associated with increased odds of admittance (OR=1.16, CIs = 1.063 - 1.264, $p = .001$).

We also conducted a Subsequent Goal Engagement x Degree Aspiration model for students who initially failed to gain admittance. We expected a significant interaction between subsequent goal engagement and degree aspiration. It was predicted that students who initially failed and faced a more difficult challenge should still derive greater benefit from increased subsequent goal engagement. A logistic regression was conducted with subsequent goal engagement as the predictor, degree aspiration as the moderator, and successful or unsuccessful admission as the outcome while controlling for initial goal engagement, GPA, SES, and cohort effects.

The results in Table 3, Model 3, show that the interaction was marginally significant (OR=1.20, CIs = 0.991 – 1.464, $p = .061$). We subsequently conducted a priori simple-regression slopes that tested the conditional effects of subsequent goal engagement at the two levels of degree aspiration. These simple-slope regressions allowed us to directly test our a priori hypothesis using the full sample and the entire variance in the model (Aiken, West, & Reno, 1991; Cohen, Cohen, West, & Aiken, 2003; Hayes, 2013). As expected, simple slope analyses revealed a significant effect of subsequent goal engagement for the students aspiring to attain a university degree (OR=1.25, CIs = 1.113 – 1.398, $p < .001$). Figure 3 shows the successful institutional admittance rates. University aspirers who initially failed and reduced their

subsequent goal engagement had a 13% probability of being admitted into the university. In contrast, their peers who increased their subsequent goal engagement had a substantially higher probability of gaining admittance (38%). As expected, subsequent goal engagement had no effect for those students who aspired to attain a polytechnic degree (OR=1.04, CIs = 0.882 – 1.2015, $p = .670$).

CHAPTER 4: DISCUSSION

Our 13-year study examined individual differences in the efficacy of specific motivational self-regulation strategies in pursuit of higher education goals, as well as the conditions under which these strategies are most effective. According to motivational intensity theory (Richter, Gendolla, & Wright, 2016) and (in a developmental context) the motivational theory of lifespan development (Heckhausen et al., 2010, 2019), effort expenditure should reflect task difficulty or controllability of developmental outcomes. If the challenge level is high and goal attainment is controllable, increases in goal engagement should result in increased likelihood of success, in this case admittance to post-secondary education (see also Haase, Heckhausen, & Koller, 2008; J. Heckhausen & H. Heckhausen, 2018). However, when the challenge level is low or modest and the likelihood of success is high, there should be diminishing returns on increased effort (Richter, Gendolla, & Wright, 2016).

The present findings were largely consistent with our hypotheses that were based on theoretical propositions from the MTD and MIT. Past studies have shown that high school GPA is one of the strongest predictors of college success (e.g., college GPA, credits completed, and college graduation rates) (Richardson, Abraham, & Bond, 2012; Schneider & Preckel, 2017). Therefore, it was unsurprising that high school GPA was associated with increased odds of institutional admittance in all the models of analysis conducted.

Baseline goal engagement were used as a measure of existing efforts to attain a long term goal (college admittance). However, baseline engagement may not be sufficient to achieve long-term goals considering that admittance depends on strong goal engagement that is increased during the critical window of opportunity provided after completing high school (Heckhausen, 1999; J. Heckhausen & Farruggia, 2003). Therefore, given these circumstances, increased

engagement during the school-to-college transition is vital in achieving this developmental goal (Haase, Heckhausen, & Koller, 2008). Coasting or decreases in subsequent engagement is likely to be insufficient under these conditions (Carver & Scheier, 2011; Richter, Gendolla, & Wright, 2016). Consistent with this logic, results showed increased levels of goal engagement were associated with increased rates of successful college admissions, especially when participants aspired to attend selective schools with more challenging admission criteria. Students with a one unit increase in goal engagement had a 15% higher likelihood of successful institutional admittance. However, in the less challenging situation, students with one unit increases in goal engagement only boosted their success rate by about 1%. These results show that those students who adapt properly to challenges by increasing their goal engagement are more likely to succeed which is consistent with the propositions of the MTD (Heckhausen, Wrosch, & Schulz, 2010).

Finally, not everyone overcomes challenges that are initially experienced during this transition and may encounter failure. However, those who recalibrate and adjust their goal engaging behaviors accordingly after encountering this initial setback may also reap the benefits of goal engagement. Our findings support this logic and were consistent with prior literature showing the benefit of increase goal engagement in failure prone students were associated with positive outcomes (e.g., GPA) (Hamm, Perry, Chipperfield, Parker, & Heckhausen, 2019). These results extend the existing literature on MTD and goal engagement by integrating propositions from MIT. This provides a more thorough understanding of when goal engagement can lead to goal attainment especially while facing varying levels of challenge. Those who adjusted goal engagement appropriately were more likely to be admitted into the institution of their choice. The benefits, though marginal, seem to be more pronounced in the more challenging condition which is consistent with findings with the overall sample.

In sum, our findings show that during a major life course transition for young adults, active motivational adaptation to new and increasingly challenging situations is a vital component to successful goal attainment. Though prior behaviors may impact the likelihood of success, increasing goal engagement when encountering difficult future challenges result in a greater likelihood of realizing these aspirations. Even when setbacks are experienced, modifying behaviors adaptively will result in similar benefits.

Limitations and Future Directions

Several caveats limit the generalizability of our findings. First, this study was conducted in a single city within a relatively affluent European nation. Although the country, with its two-tier university system and relatively equitable society, provided a backdrop to an ideal naturalistic experiment to study adaptation to challenge, it was situated in one country. Systems of higher education vary widely across countries and may affect how students adapt during the important developmental transition to college. Therefore, future studies should conduct a more systematic examination of the role of goal engagement across multiple countries. However, we would argue in accordance to the propositions brought forth by the Motivational Theory of Life-Span Development that selective primary control striving is universal and adaptive as long as there is a reasonable opportunity for successful goal attainment (Heckhausen, Wrosch, & Schulz, 2010).

Another limitation concerns our sample. Although the study initially collected data from 9th grade subjects and 11th grade subjects from multiple schools, as time passed, some participants continued to participate while others did not. Therefore, selective attrition is a possibility. There could be some systematic differences between those subjects who decided to continue participating in the study, those who participated in specific waves of data collection,

and those who chose to drop out altogether. Due to the number of participants that either dropped out or were dropped from our analyses, some portions of our analyses are underpowered.

Attrition is a common challenge in longitudinal field studies with multiple waves of data, and the present study was no exception given that it spanned 13 years with 7-8 waves of data collection.

Our binary outcome is also a limitation. While looking at the descriptives of our data, we were able to formulate four different outcomes: accomplished goal (matriculated into the school with their degree of choice), exceeded goal (matriculated into a school that is a higher tier than originally planned), re-adjusted goal (downshift of lofty goals to something more realistic), and abandoned goal (gave up on educational goals). However, due to the group size, we were forced to collapse the four groups into two groups, thus creating a binary outcome. Therefore, it is important for future studies to examine these other more specific outcomes.

Finally, our study does not provide information on how goal engagement and successful goal attainment relates to psychological well-being. Failed attempts at goal attainment despite increasing one's goal engagement and encountering multiple failures might result in poorer psychological well-being, especially when increases in effort ultimately results in less than desirable results. At that point, it might be more adaptive to disengage from and/or adjust their goals (e.g., downgrade from university to polytechnic). Future studies can explore and further expand this area.

Conclusion

In summary, the findings support the benefits of calibrated goal engagement and provide a more nuanced understanding of its benefits in the context of achievement and adaptive development. During times of challenge, such as the school-to-college transition, increasing goal engagement can result in greater likelihood of success. In situations where success requires little to no

additional effort and one can simply “coast”, increasing goal engagement did not improve the odds of successfully goal attainment. Only in situations when there was opportunity and high challenge did increases in goal engagement raise the likelihood of success.

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Table 1

Descriptive Statistics and Correlations. (n = 637)

Variables	Correlations							
	M (SD) or %	Range	1	2	3	4	5	6
1. GPA	5.18 (1.46)	1-8	-					
2. Degree Aspiration	70%	0-1	.28**	-				
3. Initial Goal Engagement	9.91 (2.47)	3-14	.04	.08*	-			
4. Subsequent Goal Engagement	10.75 (2.94)	2-14	.08*	.15**	.15**	-		
5. Successful Admission	59%	0-1	.38**	-.07	.04	.20**	-	
6. SES	1.78 (.71)	1-3	.26**	.26**	.03	0.07	0.15**	-

*Note: * p < .05, ** p < .001*

Table 2

Binominal Logistic Regression: GPA & Mean Level Goal Engagement Predicting Successful Institutional Admittance. (n = 637)

Variables	95% CI for Exp(B)			
	Exp(B) OR	P-value	Lower	Upper
Model 1				
GPA	1.91	0.000	0.000	1.660
SES	1.36	0.029	0.029	1.031
Cohort	0.50	0.000	0.000	0.348
Model 2				
GPA	1.91	0.000	1.652	2.207
SES	1.40	0.019	1.056	1.842
Cohort	0.51	0.001	0.347	0.747
Initial Goal Engagement	0.97	0.485	0.902	1.050
Subsequent Goal Engagement	1.15	0.000	1.085	1.229
Model 3				
GPA	2.29	0.000	1.940	2.704
SES	1.63	0.011	1.216	2.183
Cohort	0.36	0.000	0.238	0.551
Initial Goal Engagement	0.98	0.559	0.902	1.057
Subsequent Goal Engagement	1.19	0.000	1.114	1.274
Degree Aspiration	0.25	0.000	0.152	0.401
Sub. Goal Engage x Degree Aspiration	1.23	0.005	1.066	1.424

Table 3

Binominal Logistic Regression: GPA, Initial Level of Goal Engagement, and Subsequent Level of Goal Engagement Predicting Successful Institutional Admittance After Encountering Failure at least once). (n = 318)

Variables	95% CI for Exp(B)			
	Exp(B) OR	P-value	Lower	Upper
Model 1				
GPA	1.48	0.000	1.218	1.794
SES	1.28	0.184	0.891	1.826
Cohort	0.68	0.124	0.413	1.112
Model 2				
GPA	1.51	0.000	1.235	1.839
SES	1.33	0.124	0.925	1.921
Cohort	0.65	0.098	0.386	1.084
Initial Goal Engagement	0.96	0.395	0.865	1.059
Subsequent Goal Engagement	1.16	0.001	1.063	1.264
Model 3				
GPA	1.79	0.000	1.426	2.250
SES	1.44	0.060	0.985	2.103
Cohort	0.44	0.005	0.250	0.779
Initial Goal Engagement	0.96	0.459	0.867	1.067
Subsequent Goal Engagement	1.18	0.000	1.077	1.300
Degree Aspiration	0.26	0.000	0.135	0.486
Sub. Goal Engage x Degree Aspiration	1.20	0.061	0.991	1.464

Cohort A				
T1* (2005)	T2 (2008)	T3 (2011)	T4 (2014)	T5 (2017)
<u>Age 16-17</u> 9th Grade	<u>Age 20-21</u>	<u>Age 22-23</u>	<u>Age 24-25</u>	<u>Age 27-28</u>
Initial Levels of Goal Engagement	Reported School/Work Status	Subsequent Levels of Goal Engagement	Reported School/Work Status	Reported School/Work Status
Degree Aspiration		Reported School/Work Status		
GPA				

Cohort B					
T1* (2005)	T2 (2006)	T3 (2008)	T4 (2011)	T5 (2014)	T6 (2017)
<u>Age 18-19</u> 11th Grade	<u>Age 19-20</u>	<u>Age 22-23</u>	<u>Age 24-25</u>	<u>Age 26-27</u>	<u>Age 29-39</u>
Initial Levels of Goal Engagement	Reported School/Work Status	Reported School/Work Status	Subsequent Levels of Goal Engagement	Reported School/Work Status	Reported School/Work Status
Degree Aspiration			Reported School/Work Status		
GPA					

**Prior to upper secondary school graduation*

Figure 1. Waves of data used per cohort.

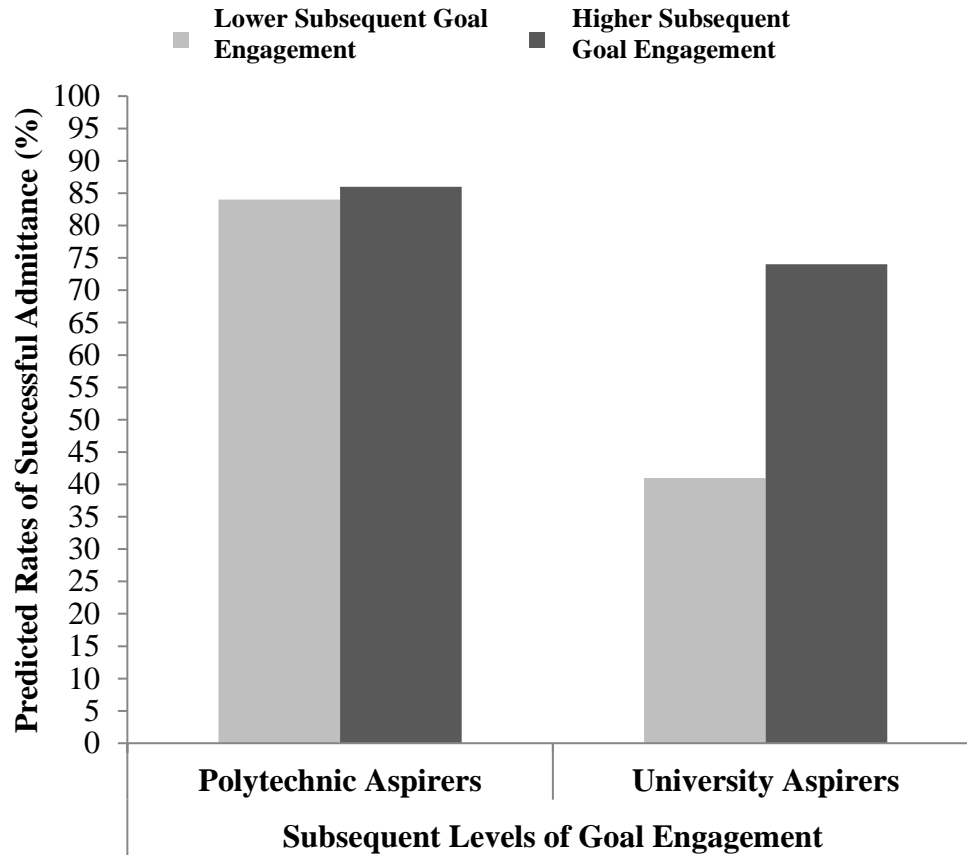


Figure 2. Probability of institutional admittance for those with lower level of subsequent goal engagement and those with higher level of subsequent goal engagement. Polytechnic aspirers are on the left and the university aspirers are on the right.

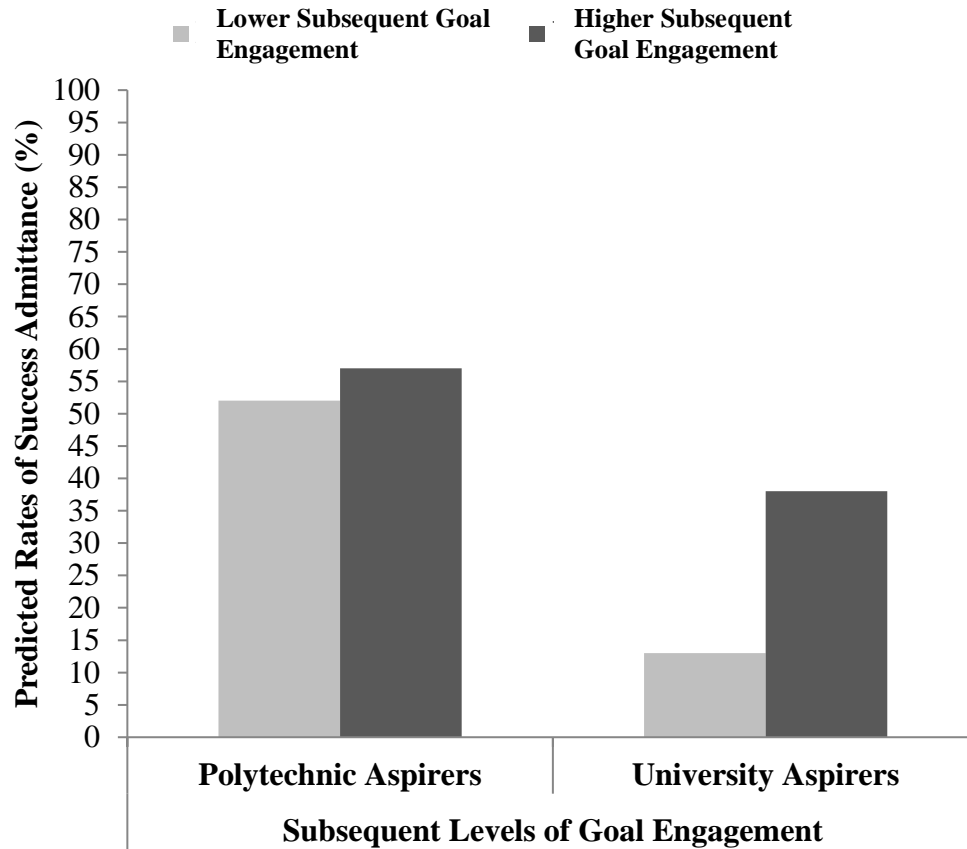


Figure 3. Probability of institutional admittance for individuals who initially failed with lower level of subsequent goal engagement and those with higher level of subsequent goal engagement. Polytechnic aspirers are on the left and the university aspirers are on the right.