

The Role of Psychological Factors and Institutional Channels in Predicting the Attainment of Postsecondary Goals

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Developmental systems theory and life span development describe the role of individual–context interactions in individual development but have not directly addressed how individuals pursue achievement goals in institutional contexts. We developed a theory informed by these perspectives that explains how institutional contexts affect emerging adults' success in transitioning to and progressing through college. We theorize that institutional contexts increase individuals' probability of attaining specific goals when they provide stronger channels that offer more versus fewer structural supports for these goals. Moreover, we theorize, these institutional channels influence which individual differences, including belonging certainty, growth mindset of intelligence, and grit, will be useful in goal pursuit, above and beyond individuals' academic preparation and demographic factors. We examined postsecondary goal pursuit over a 6-year period among 1,850 students who attended one of four district high schools in Pennsylvania or Massachusetts. On average, they began the study at 17.91 years of age; 48% were male, 43% belonged to a historically marginalized ethnicity, and 56% had free or reduced lunch status. We found that channel strength and psychological factors interacted in ways predicted by our theory. Higher belonging certainty and growth mindset in Grade 12, which encourage a focus on process and progress, predicted better outcomes in weaker postsecondary channels, especially college enrollment and on-track progress. Higher grit, which encourages a commitment to goal attainment, predicted better outcomes in stronger postsecondary channels, especially on-time graduation. The study locates the importance of psychological factors in predicting goal attainment in different-strength institutional channels during emerging adulthood.

Keywords: belonging certainty, growth mindset, grit, college persistence, channels

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Emerging adulthood is a critical time for the life course. It requires many decisions that are challenging yet consequential: Decisions must be made under uncertainty (Arnett, 2006b), and any negative consequences they have can be difficult to reverse subsequently (Caspi, 2002; Kaplan et al., 2014). At the same time, when emerging adulthood serves to *knife off* negative influences of

previous environments, it can produce turning points in individuals' life-course trajectories (e.g., Masten et al., 2006). During this life phase, individuals in industrialized countries seek preparation for adult roles that will facilitate financial independence or stable social commitments to others (Arnett, 2000, 2006b; Settersten et al., 2005). Postsecondary institutions can help emerging adults

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complete both developmental tasks: Emerging adults can use college to gain skills that enhance their income (Ma et al., 2016) and to find partners and communities where they belong (Arnett, 2000, 2004). How can we predict the college outcomes of diverse individuals in diverse postsecondary institutions in the years after high school — whether and when emerging adults enter postsecondary institutions, how long they persist in them, and whether they ultimately attain a degree?

Developmental Theory Regarding Individual–Context Interactions

Many disciplines prioritize individual or contextual explanations of postsecondary outcomes. A strength of developmental theory is that it views outcomes as inextricably linked to both individuals and their social and temporal context (e.g., Baltes et al., 1980; Elder & Shanahan, 2006; Ford & Lerner, 1992).

Developmental Systems Theory

Developmental systems theory (hereafter DST) in particular has focused on understanding how interactions between individuals and contexts can promote positive developmental outcomes, such as individual thriving and societal contributions (Lerner, Dowling, et al., 2003; Lerner & Galambos, 1998). From this perspective, both individuals and contexts have strengths, or developmental assets, that can help individuals meet developmental tasks (Benson et al., 2006). A key question that follows from DST is “What attributes of individuals in relation to what contextual conditions at what points in time may be integrated to promote positive instances of human development?” (p. 12, Lerner, 2006).

However, DST has not directly considered goal pursuit conducted within institutions. DST emphasizes the interconnectedness of multiple levels of contextual influences (Lerner, 2006; Lerner & Galambos, 1998). Yet, in many domains, such as education, selection into a goal-pursuit process, progress through that process, and goal attainment are regulated at a single level, by institutions (e.g., Mayer, 1986). DST also emphasizes the *embeddedness* of individuals in contexts (Lerner, 1991; Lerner & Galambos, 1998). This “embeddedness” framing obscures the distinct roles of contexts and individuals in institutionally regulated goal pursuit and the influence each can have on goal attainment. Furthermore, DST characterizes relationships between individuals and contexts as mutually accommodating (Lerner, 1991; Lerner, Wertlieb, et al., 2003). Yet, individuals who seek institutionally facilitated goals must often accommodate to goal-relevant processes set by their institution and may have limited time and resources during goal pursuit to change these.

Life Span Development

Life span theorists also consider individual–context interactions, with an emphasis on how contexts affect individuals’ goal construction and adjustment (Brandtstädter & Wentura, 1995; Nurmi, 1991; Nurmi & Salmela-Aro, 2006). Individuals construct goals to maximize fit with the constraints and opportunities of their contexts and adjust their goals when these change (Nurmi, 2004; Nurmi & Salmela-Aro, 2002). Individuals also tend to prioritize goals that facilitate progress toward meeting impending develop-

mental deadlines (Heckhausen & Tomasik, 2002; Wrosch & Heckhausen, 1999).

However, life span theory also does not fully explain goal attainment in institutional contexts. While it acknowledges that institutions provide goal options to consider, it characterizes personal goals as fundamentally “self-articulated” (e.g., Nurmi, 1993). Yet, to succeed in institutional contexts, individuals must adopt predefined goals institutions set for individuals and meet institutional criteria for their attainment. In addition, life span theory portrays individuals as active agents who direct their development and select environments to facilitate their developmental goals (Brandtstädter, 1984; Brandtstädter et al., 1999; Lerner & Busch-Rossnagel, 1981). Yet, relative to their development broadly, individuals often have a more limited role in any given institutionally regulated goal pursuit. For example, although individuals select institutions to help them reach specific achievement goals (Baltes & Baltes, 1990; Nurmi, 2004), such as a college degree, they can only pursue goals in institutions that also select them. And though individuals can devise plans to achieve institutionally regulated goals (Nurmi, 1993; Nurmi & Salmela-Aro, 2006), they can only use processes that are available and permissible within their institutional context.

Understanding Goal Pursuit in Emerging Adulthood: The Role of Channels

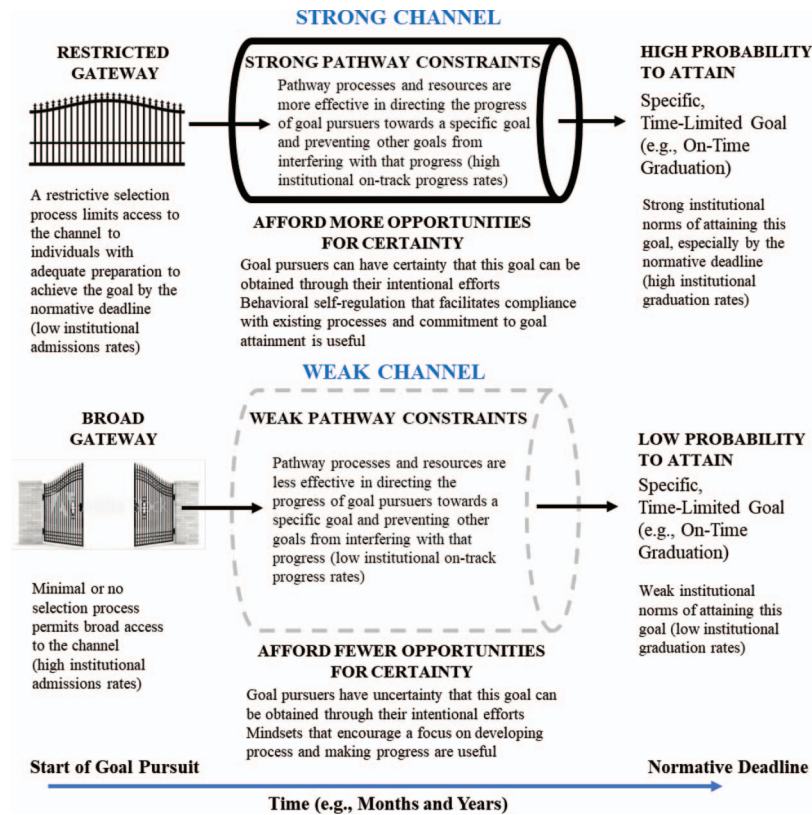
Defining Channels

To explain goal pursuit and attainment in institutional contexts, we developed a theory of *goal channels*. A channel for a specific goal exists in an institutional context when it has enough relevant structural supports to permit and direct pursuit of the goal while also affording the individual a role in influencing goal attainment. The channel facilitates goal attainment by constraining the number and kinds of actions goal pursuers must take to fulfill this role: Some actions are unnecessary or prohibited; other actions are allowable but vary in how strongly they are encouraged.

Channel Strength

Institutional contexts that permit a given goal can differ in how strongly they facilitate its attainment, which we call *channel strength*. In our model, institutional channels to a goal can be strengthened in several ways. These include (a) clarifying attainment criteria and more strongly expecting achievement of these criteria (e.g., maintaining higher on-time degree attainment rates); (b) requiring goal pursuers to meet more relevant prerequisites before goal pursuit (e.g., maintaining more selective admissions processes); (c) offering a more effective process to the goal (e.g., clearly describing and sequencing degree requirements); and (d) better insulating the goal and process from external influence during goal pursuit (e.g., allocating more resources to reduce individuals’ concurrent goal demands, such as financial obligations). Channels with more structural goal supports should have higher average rates of attainment than channels to the same goal with fewer supports. Though we conceptualize channel strength as a continuum, we also conceptualize it as bipolar. When all channel supports collectively make the probability of goal success (e.g., on-time graduation) higher than the probability of failure, the context (e.g., many 4-year colleges) provides a *strong channel* to that goal. See Figure 1. When one or more channel supports is inadequate,

Figure 1
Characteristics of Strong and Weak Institutional Channels



Note. Strong channels create and sustain strong boundaries around goal pursuit, by clearly defining the criteria for attaining a goal and strongly expecting its attainment, by requiring prospective goal pursuers to pass through a restrictive but effective selection process, by providing a clear and effective process to the goal, and by preventing other factors from interfering with goal pursuers' efforts to implement this process within expected or required deadlines. These boundaries create goal pursuit conditions in which individuals experience greater certainty that their goal-directed efforts will result in goal attainment. Channels to a goal can also be relatively stronger than other channels to that goal, even if they do not meet all the criteria for a strong channel. See the online article for the color version of this figure.

such that goal success is less likely than failure yet is possible, the context provides a *weak channel* to that goal (e.g., on-time graduation at many 2-year colleges; see Scott-Clayton, 2011).

Interactions Between Individuals and Channels

We theorize that goal progress in different-strength channels requires individuals to meet different challenges. The challenges in strong channels tend to involve implementation of well-established processes. Though often clear, these processes may require behavioral self-regulation to avoid distractions and to endure frustration, boredom, or performance pressure. As these challenges tend to be shared and recurring, strong channels afford ample opportunities to clarify their meaning and learn reliable responses to them, such as exerting more effort. Weak channels may entail more interpretational or decision-based challenges. With fewer structural supports, individuals must discover or develop processes to achieve an intended goal. Individuals may also have difficulty surmounting obstacles in weak

channels because such obstacles may be idiosyncratic to their circumstance, and their meaning cannot be easily clarified by asking or observing others. Consequently, obstacles that arise in goal pursuit must be interpreted by individuals using mindsets, implicit theories individuals have developed about how the world works, and these interpretations may or may not facilitate goal attainment. We theorize that higher levels of a psychological factor should increase the probability of goal attainment in a channel when there is a good fit between that factor and the channel's challenges, such that it serves as an asset in surmounting or enduring these challenges.

How Channels Theory Extends and Integrates Prior Theories

The channels theory we propose adapts and integrates concepts in both life span and developmental systems perspectives. In life span theory, culturally defined life-phase or role transitions "channel" development by presenting individuals with time-sensitive

challenges as well as opportunities to take action to confront these challenges (Heckhausen et al., 2010; Nurmi, 2004). We theorize that institutions serve a similar role in presenting challenges and action opportunities that channel individuals toward specific achievement goals. Consistent with DST, which holds that contexts are organized in specific ways to facilitate societally valued developmental goals (Benson et al., 2006; Lerner, Dowling, et al., 2003), institutional channels use assets such as clear rules, monitoring, and guidance (Benson et al., 2006; Scales, 1999) to promote the attainment of institutionally valued achievement goals. Just as youth experience a horizontal pile-up of assets when multiple contexts (family, neighborhood, peers) concurrently expose them to development-promoting assets (Benson et al., 2006), goal pursuers in strong channels can have more certainty that their goal-related efforts will succeed because multiple institutional assets protect them. However, in weak channels, goal pursuers may have less confidence in succeeding, as lower levels of multiple institutional assets can compound the risk of goal failure (e.g., Compas, 2004; Lerner & Galambos, 1998). Both life span development and DST emphasize that positive outcomes require a goodness of fit between individuals and contexts (Lerner, 2006; Nurmi & Salmela-Aro, 2006). Similarly, we theorize that the probability of success in both strong and weak channels increases when individuals' goals are congruent with contextual affordances (Heckhausen & Schulz, 1999) and when individuals' assets are aligned with contextual assets (Lerner, 2006). Finally, channels theory integrates goal construction with developmental assets: It frames individuals' capacities to construct, pursue, and adjust goals throughout the life span as assets that individuals can use to increase success in institutionally regulated goal pursuit experiences.

The Present Study

This study sought to answer two questions. First, as channels theory predicts, do institutional factors (contextual assets) and psychological factors (individual assets) interact in predicting college outcomes? Second, are individuals who report higher levels of a psychological factor in Grade 12 more likely to attain a college outcome than comparable individuals in the same channel, when this factor is theorized to be well-matched to the challenges in this channel?

Although many psychological factors shape how individuals pursue achievement goals, we focus on three that may be especially relevant to the challenges posed by postsecondary channels: belonging certainty, growth mindset of intelligence (hereafter growth mindset), and grit. *Belonging certainty* reflects individuals' level of certainty about their belonging in an institutional or social context (Walton & Cohen, 2007). *Growth mindset* is the belief that intelligence can grow over time (Dweck & Leggett, 1988). *Grit* is a behavioral tendency defined as "passion and perseverance for long-term goals" (Duckworth et al., 2007). Though past research has shown these factors can predict goal achievement (e.g., Duckworth et al., 2007; Yeager, Walton, et al., 2016), it has not examined whether they predict achievement more or less well in different-strength institutional channels to specific goals.

Given that individuals' goals tend to be sensitive to the demands of specific stages within developmental transitions (e.g., Salmela-Aro et al., 2000), we conceptualize the transition to and through

college as a sequential series of outcomes that individuals pursue: (a) college enrollment, (b) sustained full-time ("on-track") progress in college, and (c) on-time graduation. We theorize that each outcome is facilitated by a different channel, whose strength can vary both within and across institutions (see Figure 2). Next, we describe our specific predictions by outcome.

College Enrollment

We theorized that enrollment in American colleges is typically pursued in a weak channel for several reasons (Figure 2A): Emerging adults may have diverse goals; American college applicants have many institutional choices and cannot seek guidance from a single, centralized coordinating agency; and many American colleges admit only a proportion of applicants using processes that are not fully visible to applicants.¹ As a mindset factor and a broad anticipatory belief about one's prospect of belonging in college, belonging certainty may predict ever enrolling in college, including the prescriptive American norm of immediate enrollment after high school. As a mindset factor related to the belief that academic preparation for college can improve with time, growth mindset may predict delayed enrollment. As a behavioral tendency to finish goals begun, grit may not predict enrollment.

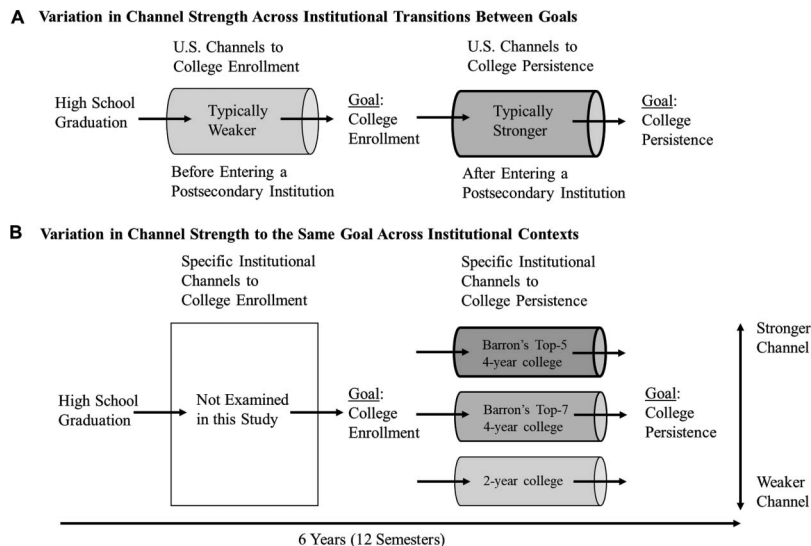
On-Track Progress

After the opportunity to enroll, students can be classified as being in stronger or weaker channels to post enrollment outcomes. See Figure 2B. We expect that individuals will persist longer in weak channels when they focus on the *process of improvement* and rely on self-defined, proximal goals, whether or not their associated progress is sufficient to meet an objectively validated, long-term goal (earning a degree on time or at all). Additionally, individuals who can tolerate the ambiguity of weak-channel obstacles without concluding that they signify a lack of belonging or ability may persist longer in weak channels. As both belonging certainty and growth mindset encourage a process focus and discourage definitive negative interpretations of setbacks (Blackwell et al., 2007; Walton & Cohen, 2007), both factors may predict on-track progress in weaker postsecondary channels.

In strong channels, individuals may persist longer when they focus on reaching an objective performance standard (e.g., earning a degree on time), when they closely adhere to institutional processes to reach this standard (e.g., degree requirement sequences), and when they consistently show increased determination after setbacks. As grit encourages sustained effort and goal commitment following setbacks ("setbacks don't discourage me") and predicts time on task in highly structured or immersive goal contexts such as spelling competitions (Duckworth et al., 2007), grit may predict on-track progress in stronger postsecondary channels. Alternatively, grit may not predict on-track progress if these channels have such extensive monitoring that a high level of grit is unnecessary for remaining continuously enrolled.

¹ Although our dataset did not permit examination of this, channels to college enrollment may also vary in strength.

Figure 2
Types of Variation in Channel Strength in Postsecondary Contexts



Note. Channels can vary in strength both across goal pursuit experiences, as the same individuals transition between institutional contexts over time (Panel A), and within the same goal pursuit timeframe (Panel B), as different individuals pursue the same goal within different institutional contexts. Panel A depicts our hypothesis that channels leading to institutional entry in the United States (here, college enrollment) are typically weaker than channels leading to institutional persistence (i.e. on-track progress and on-time graduation), as the latter involves regulatory oversight of goal pursuit by a specific institution. Panel B depicts our hypothesis that specific institutions in the same country can offer different-strength channels to the same goal. The Barron's Top 7 threshold is an intermediate threshold that we analyze in the [online supplemental material](#). It is displayed here to show the continuum of channel strength that exists in U.S. postsecondary contexts.

On-Time Graduation

To the extent that higher belonging certainty facilitates stronger identification with an institution one has entered and use of its resources and processes to meet the institution's normative deadlines, belonging certainty may predict earning a degree on time in weaker channels. But to the extent that students with a higher growth mindset focus on meeting personal learning goals and/or on academic growth broadly, they may complete specific degree requirements on time at the same or lower rates as individuals with a lower growth mindset, even in weaker channels. To the extent attainment in strong channels is associated with individuals' capacity to follow through on their goal-related intentions, individuals with higher grit should be more likely to graduate on time in strong channels — to finish an achievement goal to which they have committed — than individuals with lower grit.

Method

Participants

Participants were 2,135 seniors from four district high schools in Pennsylvania and Massachusetts, tracked for five (cohort 2) or six (cohort 1) years after high school. The primary sample for analysis (with nonmissing data for all predictors) comprised 1,850 partic-

ipants. See the [online supplemental material](#) for multiple-imputation analyses in the 2,135-person sample.

Analytic Sample

Baseline Characteristics

The sample was highly diverse: 48% of participants were male; 43% were from a historically marginalized racial-ethnic group (Black, Latino/a, or other Non-White, Non-Asian); and 56% had free and reduced lunch status during high school. Students' scores on statewide standardized tests in Grade 10 or 11 were slightly above average for their respective states (in standard deviation units, Math: $M = 0.25$, $SD = 1.00$; English/Reading: $M = 0.08$, $SD = 0.91$). The average Grade 12 GPA was 2.8 on a 4-point scale ($SD = 0.81$). College-going students in the analytic sample first enrolled in one of 238 colleges (200 4-year colleges).

Recruitment and Survey Procedure

Following approval by the Institutional Review Board at the University of Pennsylvania for the Penn Study of Young Adults (Protocol 814991), students ($N = 2,267$) were recruited during the fall semester of Grade 12 via a letter from their school principal. Students whose parents did not sign and return the opt-out consent form completed assent forms prior to data collection.

Grade-12 students at each school were surveyed once between November and April on school computers. Data collection was staggered over a few months due to staff constraints and school schedules. The survey contained various psychological scales, of which we examine three (see Baseline Measures section). Demographic and academic performance data were obtained from administrative records provided by students' high schools.

College Outcomes

Data Source

We obtained college data from the National Student Clearinghouse (NSC), a comprehensive national database, for all participants who consented to have their college outcomes tracked for up to six years post high school ($N = 2,135$).² We obtained additional institutional characteristics from Barron's Profiles of American Colleges (Barron's Guide).

Enrollment

We defined enrollment as enrolling in a 2- or 4-year college for at least one semester at any intensity other than absent or withdrawn. Given varying calendar systems, we defined an enrolled semester as one where students enrolled for at least 12 weeks during the fall (August to December) or spring (January to April) months. To measure ever enrollment, we assigned a value of 1 versus 0 if students met these enrollment criteria at any time during the data collection window of 12 semesters. To measure immediate enrollment, we assigned a value of 1 versus 0 if students met our enrollment criteria in semester 1, the fall semester after high school. To measure delayed enrollment, we assigned a value of 1 if students met our enrollment criteria during semester 2 or later but not in semester 1. Students who enrolled immediately were excluded from the analysis of delayed enrollment.

Progress

To measure "on-track" progress toward a degree, we examined whether students consecutively enrolled at least 12 weeks at 2- or 4-year college at full-time intensity during each of their first four semesters of college. We allowed students to start full-time college enrollment any time from semester 1 to semester 9. A value of 0 was assigned to students who never enrolled in college or who enrolled in college during the data collection window but were not full-time continuously enrolled at least 12 weeks per semester for their first four semesters.

Graduation

To assess graduation, we focused on on-time graduation, as it should be much harder to achieve, especially in weak channels; further, this outcome could be adequately assessed within the data collection window for all students. Students who graduated on time by earning an associate's degree within two years of starting a 2-year college or an associate's or bachelor's degree within four years of starting a 4-year college were assigned a value of 1 for this outcome. All others were assigned a value of 0.

Channel Strength

We defined post enrollment channel strength using the college level and Barron's Guide rating of the college in which students

first enrolled. In reporting results, we focus on two thresholds that represent liberal or restrictive criteria for a stronger channel: (a) first enrolling in a 4-year college rather than a 2-year college and (b) first enrolling in a Barron's Top 5 college (rating of very competitive or higher) rather than a college with a lower rating or no rating.³ Though ostensibly distinguishing more selective from less selective colleges, these thresholds also tend to distinguish colleges with higher versus lower levels of other indicators (e.g., higher resources, retention rates) that support progress and degree attainment. See [online supplemental material](#). The first threshold operationalizes a test of a bipolar strong versus weak channel distinction. The second threshold operationalizes a test of a relatively stronger versus weaker channel distinction. The [online supplemental material](#) provides results for additional thresholds.

Baseline Measures: Psychological Predictors

Belonging Certainty

Belonging certainty was measured with three negatively valenced items (e.g., "Sometimes I worry that I will not belong in college"; Yeager et al., 2016) and one positively valenced item (1 = *not at all true*, 5 = *completely true*). The four-item composite was positively valenced to facilitate comparisons with the other two psychological factors ($\alpha = .79$; $M = 3.77$; $SD = 0.96$).

Growth Mindset

Growth mindset was measured with three negatively valenced items (e.g., "You have a certain amount of intelligence, and you really can't do much to change it"; Dweck, 2000; 1 = *strongly agree*, 6 = *strongly disagree*). The items were reverse-scored before averaging so that higher levels would reflect the underlying positively valenced construct of growth mindset ($\alpha = .79$; $M = 4.29$; $SD = 1.20$).

Grit

Grit was measured with four items (e.g., "I finish whatever I begin"; Duckworth & Quinn, 2009; 1 = *not at all like me*, 5 = *very much like me*). Higher composite scores indicated higher levels of grit ($\alpha = .77$; $M = 3.81$; $SD = 0.73$).

Pairwise Correlations

The three psychological factors were correlated, $ps \leq .001$, but only modestly, $0.11 \leq rs \leq 0.27$.

² 132 students in the originally recruited sample ($N = 2,267$), 119 of whom were from a sixth High School \times Cohort Group, did not consent to the six-year NSC tracking of college outcomes and thus could not be analyzed.

³ Barron's Guide annually classifies the admissions competitiveness of four-year colleges using one of nine ordinal categories ranging from noncompetitive to most competitive. Four-year colleges labeled "Special" are included in Barron's Guide but not in the ordinal rating system. Non-rated colleges include all 2-year colleges and unaccredited and/or non-Bachelor's degree-granting four-year colleges. See the [online supplemental material](#) for details.

Baseline Measures: Demographic Predictors

Gender

Participant gender was defined as 1 for males and 0 for females.

Ethnicity

We defined ethnicity as 1 if a student's ethnic group has historically faced marginalization in educational institutions due to pervasive intellectual stereotypes (Black, Latino/a, and other Non-White, Non-Asian) and 0 if the student's ethnic group has not (White or Asian), following past research (Yeager et al., 2016).

Free and Reduced Lunch Status

Participants were assigned a value of 1 if they had free and reduced lunch status during high school and 0 if not.

Baseline Measures: Academic Preparation

Grade 10/11 State Standardized Test Scores

We used statewide standardized test scores (cohort 1: Grade 10; cohort 2: Grade 11) in Reading/English and Math as a measure of academic preparation because only 63% of our sample had SAT scores and analyses sought to track students' postsecondary attainment whether or not they had taken the SAT. We constructed variables in standardized units using the statewide mean and standard deviation for a given subject test, separately for each state and cohort.

Grade 12 GPA

All schools provided students' grade-12 GPA. We standardized each participant's GPA using the mean and standard deviation among all students with college data ($N = 2,135$) within each Student's High School \times Cohort Group.

Analytic Approach for Regression Analyses

We executed multiple logistic regression analyses in STATA separately for each outcome. In post enrollment analyses, we allowed each psychological factor to interact with channel strength and report both this interaction and the simple association between each psychological factor and the log-odds of outcome attainment in each channel strength type (the coefficient for a given psychological factor when the focal channel is defined as 0 rather than 1). In these analyses, students who did not enroll in college were classified as being in weaker channels to preserve the full sample across analyses and to reflect the fact that nonenrolled students also lacked access to the structural goal supports available to those in stronger channels.

All analyses controlled for dichotomous student gender, historically marginalized ethnicity, and free and reduced lunch status, as well as continuous Grade-10/11 standardized test scores and Grade-12 GPA. We clustered standard errors by High School \times Cohort Groups and standardized all predictors to permit comparison of effect size.

For each analysis, we report the relevant log-odds coefficient, the corresponding odds ratio and its 95% confidence limits, and predicted probabilities of outcome attainment for prototypical students with low (-1 SD) versus high ($+1$ SD) values of the relevant psychological factor and average values for all other predictors.

We display these results in figures (see the [online supplemental material](#) for corresponding regression tables).

Results

Outcomes Pursued Before the Opportunity to Enter a Postsecondary Institution

Ever Enrollment Within Six Years After High School

Higher belonging certainty predicted higher log-odds of ever enrolling in college, $b = 0.15$, $z = 3.00$, $p = .003$, $OR = 1.16$, 95% CI [1.05, 1.28], $P_{Low} = 81.4\%$ versus $P_{High} = 85.6\%$. Growth mindset, $z = 1.34$, $p = .18$, $OR = 1.10$, and grit, $z = -0.38$, $p = .70$, $OR = 0.97$, were nonpredictive of ever enrollment. See [Figure 3](#).

Immediate Enrollment

Belonging certainty also predicted enrolling in college immediately, $b = 0.15$, $z = 3.86$, $p < .001$, $OR = 1.16$, 95% CI [1.08, 1.26], $P_{Low} = 63.8\%$ versus $P_{High} = 70.5\%$. Growth mindset was a marginal negative predictor of immediate enrollment, $b = -0.04$, $z = -1.66$, $p = .098$, $OR = 0.96$, 95% CI [0.92, 1.01], $P_{Low} = 68.1\%$ versus $P_{High} = 66.3\%$. Grit was nonpredictive, $z = -0.63$, $p = .53$, $OR = 0.97$.

Delayed Enrollment

Among students who did not enroll in college by semester 1, growth mindset predicted delayed enrollment, $b = 0.27$, $z = 2.41$, $p = .016$, $OR = 1.31$, 95% CI [1.05, 1.63], $P_{Low} = 34.5\%$ versus $P_{High} = 47.5\%$. Neither belonging certainty, $z = 0.90$, $p = .37$, $OR = 1.06$, nor grit, $z = -0.38$, $p = .71$, $OR = 0.97$, predicted delayed enrollment.

Outcomes Pursued After the Opportunity to Enter a Postsecondary Institution

As noted, we distinguished stronger and weaker post enrollment channels using two thresholds. We first summarize results for the main effect of channel and then present interaction results separately for on-track progress (see [Figure 4](#)) and on-time graduation (see [Figure 5](#)).

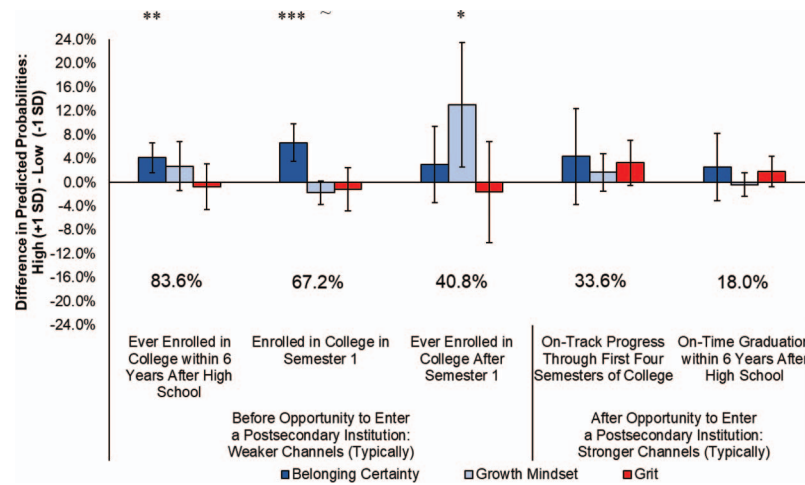
Main Effect of Channel

Controlling for academic preparation, demographic factors, and all three psychological factors, log-odds of achieving on-track progress and on-time graduation were significantly higher when students' college enrollment status met stronger-channel criteria than when it met weaker-channel criteria, $bs = 0.71$ to 2.99 , $ps \leq .001$, $ORs = 2.04$ to 19.98 .

Interaction Between Channel and Psychological Factors for On-Track Progress

Belonging Certainty. There was no interaction between channel strength and belonging certainty for on-track progress for the 4-year-college threshold, $z = -0.46$, $p = .64$, $OR = 0.98$, but there was for the Barron's Top 5 threshold, $b = -0.40$, $z = -2.37$, $p = .018$, $OR = 0.67$, 95% CI [0.49, 0.93]. Higher belonging

Figure 3
Associations Between Psychological Factors and College Outcomes Without Accounting for Specific Institutional Channels



Note. This figure depicts logistic regression results for all college outcomes assessed, controlling for individual demographic, academic, and psychological factors, excluding interactions between psychological factors and specific institutional channels. It compares the associations between psychological factors and college outcomes pursued before versus after the opportunity to enter a postsecondary institution in the United States, which reflects goal pursuit that we hypothesize typically occurs in weaker versus stronger channels, respectively. Error bars reflect 95% confidence intervals. Each analysis includes all students who agreed to college tracking and had data for all predictors ($N = 1,850$) except the third column, which reflects an analysis of only those students who did not enroll in semester 1 ($N = 638$), to assess delayed enrollment. The vertical bars represent the association between each psychological factor and the log-odds of a given college outcome as a difference in predicted probabilities of outcome attainment between students with high (+1 SD) versus low (−1 SD) values of the psychological factor and average values for all other predictors. The percentage provided above each outcome represents the predicted probability of attaining that outcome for a prototypical student with average levels of all predictors. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, ~ $p \leq .10$. See the online article for the color version of this figure.

certainty did not predict on-track progress in 4-year-college threshold weaker channels (e.g., 2-year colleges), $z = 0.20$, $p = .84$, $OR = 1.02$, but did in Barron's Top 5-threshold weaker channels (e.g., 2-year colleges and lower-rated or unrated 4-year colleges), $b = 0.18$, $z = 2.00$, $p = .045$, $OR = 1.20$, 95% CI [1.00, 1.44], $P_{Low} = 24.8\%$ versus $P_{High} = 32.2\%$. Belonging certainty did not predict on-track progress in either stronger channel, $|z|s \leq 1.28$, $ps \geq .20$.

Growth Mindset. There was a significant interaction between channel strength and growth mindset for on-track progress for both the 4-year-college, $b = -0.30$, $z = -3.64$, $p < .001$, $OR = 0.74$, 95% CI [0.63, 0.87], and Barron's Top 5-college thresholds, $b = -0.29$, $z = -3.05$, $p = .002$, $OR = 0.75$, 95% CI [0.62, 0.90]. Growth mindset positively predicted on-track progress in each weaker channel, in both 4-year-college-threshold, $b = 0.25$, $z = 8.77$, $p < .001$, $OR = 1.28$, 95% CI [1.21, 1.35], $P_{Low} = 5.6\%$ versus $P_{High} = 8.8\%$, and Barron's Top 5-threshold weaker channels, $b = 0.11$, $z = 2.04$, $p = .041$, $OR = 1.11$, 95% CI [1.00, 1.23], $P_{Low} = 26.2\%$ versus $P_{High} = 30.5\%$. Growth mindset did not predict on-track progress in 4-year-college-threshold stronger channels, $z = -0.91$, $p = .36$, $OR = 0.95$, and was negatively predictive in Barron's Top 5-threshold stronger channels,

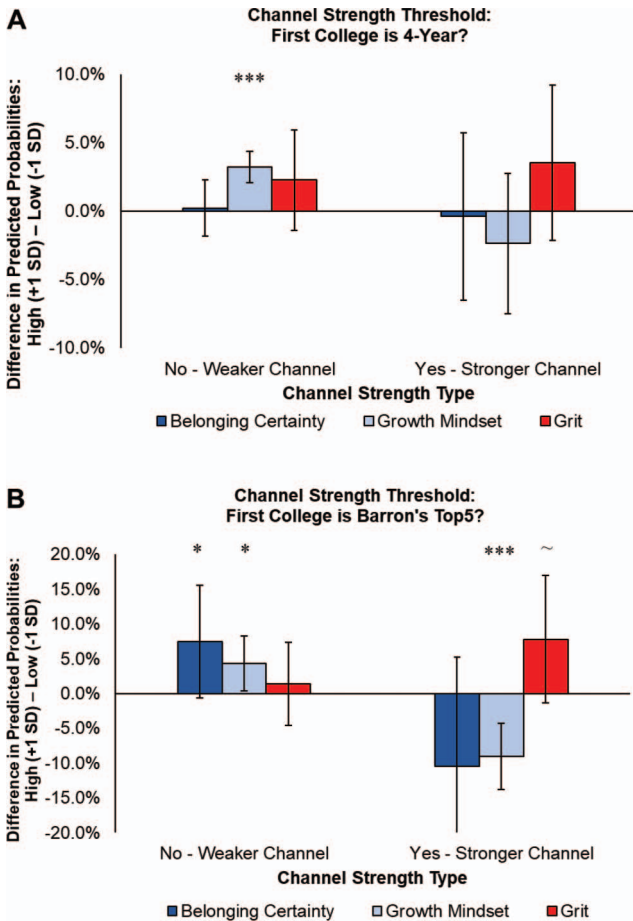
$b = -0.18$, $z = -3.72$, $p < .001$, $OR = 0.83$, 95% CI [0.76, 0.92], $P_{Low} = 57.8\%$ versus $P_{High} = 48.8\%$.

Grit. There was no interaction between channel strength and grit for either threshold, $|z|s \leq 0.87$, $ps \geq 0.39$, as the simple slope for grit was directionally positive in both channels. Grit did not predict on-track progress in either weaker channel, $|z|s \leq 1.15$, $ps \geq .25$, or in 4-year college-threshold stronger channels, $z = 1.25$, $p = .21$, $OR = 1.08$. It had a marginal positive association with on-track progress in Barron's Top 5-threshold stronger channels (e.g., higher-rated 4-year colleges), $b = 0.16$, $z = 1.70$, $p = .09$, $OR = 1.17$, 95% CI [0.98, 1.40], $P_{Low} = 49.4\%$ versus $P_{High} = 57.2\%$.

Interaction Between Channel and Psychological Factors for On-Time Graduation

Belonging Certainty. There was no interaction between channel strength and belonging certainty for on-time graduation for the 4-year-college threshold, $z = 0.11$, $p = .91$, $OR = 1.03$, but there was for the Barron's Top 5 threshold, $b = -0.35$, $z = -3.24$, $p = .001$, $OR = 0.70$, 95% CI [0.57, 0.87]. Higher belonging certainty did not predict on-time graduation in 4-year-college-threshold

Figure 4
Associations Between Psychological Factors and On-Track Progress by Channel



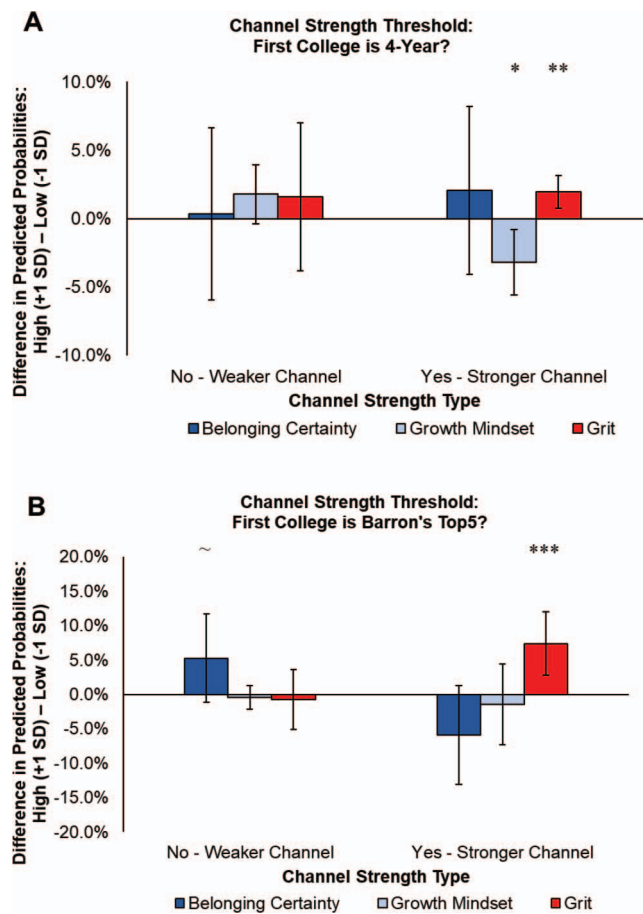
Note. Summary of logistic regression results for on-track progress (sustained full-time enrollment in college for four consecutive semesters) when accounting for the strength of the institutional channel in which students pursued this outcome and its joint interaction with each psychological factor. Each panel represents the difference in predicted probabilities of achieving on-track progress between students with high (+1 SD) versus low (-1 SD) values of a given psychological predictor when students were in a weaker channel or in a stronger channel for a given threshold, for students with average values for all other psychological, demographic, and academic factors controlled. Channel strength was tested at two thresholds: defining a stronger channel as first enrolling in any 4-year college (Panel A) or as first enrolling in a Barron's Top 5 (rating of very competitive or higher) 4-year college (Panel B). Error bars reflect 95% confidence intervals. Each analysis includes all students who agreed to college tracking and had data for all predictors ($N = 1,850$). Students who did not enroll in college were grouped with students whose first college did not meet the relevant stronger-channel criteria for a given threshold. Stars reflect the significance of corresponding log-odds regression coefficients. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, ~ $p \leq .10$. See the online article for the color version of this figure.

weaker channels, $z = 0.11$, $p = .91$, $OR = 1.02$. It was a marginal positive predictor in Barron's Top 5-threshold weaker channels, $b = 0.20$, $z = 1.87$, $p = .062$, $OR = 1.22$, 95% CI [0.99, 1.51], $P_{Low} = 13.0\%$ versus $P_{High} = 18.2\%$. Belonging certainty did not predict on-time graduation in 4-year-college-threshold stronger

channels, $z = 0.67$, $p = .50$, $OR = 1.05$, and had a directionally negative association in Barron's Top 5-threshold stronger channels, $z = -1.60$, $p = .11$, $OR = 0.86$.

Growth Mindset. For growth mindset, there was a significant interaction with channel strength for the 4-year-college threshold, $b = -0.20$, $z = -2.06$, $p = .039$, $OR = 0.82$, 95% CI [0.68, 0.99], but not for the Barron's Top 5-threshold, $z = -0.21$, $p = .84$, $OR = 0.98$. Growth mindset had a directionally positive association with on-time graduation in 4-year-college-threshold weaker channels, $z = 1.51$, $p = .13$, $OR = 1.13$, and no association in Barron's Top 5-threshold weaker channels, $z = -0.55$, $p = .59$,

Figure 5
Associations Between Psychological Factors and On-Time Graduation by Channel



Note. Summary of logistic regression results for on-time graduation (earning an associate's or bachelor's degree in 100% time) in the analytic sample ($N = 1,850$), when accounting for the strength of the institutional channel in which students pursued this outcome and its joint interaction with each psychological factor. Each panel represents the difference in predicted probabilities of achieving on-time graduation between students with high (+1 SD) versus low (-1 SD) values of a given psychological predictor when students were in a weaker channel or in a stronger channel for a given threshold, for students with average values for all other psychological, demographic, and academic factors controlled. All other specifications, including channel strength thresholds and regression models, are the same as in Figure 4. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, ~ $p \leq .10$. See the online article for the color version of this figure.

$OR = 0.98$. Higher growth mindset predicted lower on-time graduation in 4-year-college-threshold stronger channels, $b = -0.08$, $z = -2.17$, $p = .03$, $OR = 0.92$, 95% CI [0.86, 0.99], $P_{Low} = 29.3\%$ versus $P_{High} = 26.1\%$, and was nonpredictive in Barron's Top 5-threshold stronger channels, $z = -0.48$, $p = .63$, $OR = 0.96$.

Grit. There was no interaction between channel strength and grit for the 4-year-college threshold, $z = -0.31$, $p = .76$, $OR = 0.94$, and a marginally significant interaction for the Barron's Top 5 threshold, $z = 1.80$, $p = .072$, $OR = 1.24$. Grit had no association with on-time graduation in weaker channels, $|z|s \leq 0.60$, $ps \geq .55$. Grit had a small but significant positive association with on-time graduation in 4-year-college-threshold stronger channels, $b = 0.05$, $z = 2.77$, $p = .006$, $OR = 1.05$, 95% CI [1.01, 1.09], $P_{Low} = 26.7\%$ versus $P_{High} = 28.7\%$. It had a larger positive association in Barron's Top 5-threshold stronger channels, $b = 0.19$, $z = 3.83$, $p < .001$, $OR = 1.20$, 95% CI [1.10, 1.33], $P_{Low} = 23.6\%$ versus $P_{High} = 31.0\%$.

Sensitivity Analyses

We also examined results for 2- and 4-year college outcomes when excluding students who never enrolled in college (see [online supplemental material](#)). This analysis is largely consistent with the primary analysis and also finds a stronger association between belonging certainty and on-time graduation in weaker channels. The [online supplemental material](#) further examines 4-year college outcomes when excluding students who never enrolled in 4-year college. This analysis finds a stronger positive association between grit and outcome attainment in stronger channels and in some cases a stronger Grit \times Channel Strength interaction.

Discussion

Summary of Results

The present study found that specific psychological factors predicted postsecondary outcome attainment in different-strength institutional channels. In pre enrollment channels, which we theorized were typically weak in the United States, belonging certainty (immediate and ever enrollment) and growth mindset (delayed enrollment) positively predicted enrollment in college, while grit was nonpredictive. In weaker post enrollment channels, growth mindset positively predicted on-track progress. In some weaker post enrollment channels (e.g., those including lower-rated 4-year colleges), belonging certainty also predicted on-track progress, as well as on-time graduation. By contrast, in stronger channels, mindset factors were nonpredictive or negatively predictive. Post enrollment results for grit were less consistently different in the two channel types, but when grit was a significant positive predictor, it was in stronger channels, especially of on-time graduation. It was nonpredictive in weaker channels.

Implications for Research on Emerging Adulthood

Existing research on emerging adulthood has focused on differentiating it from other life stages or defining its demographic preconditions at a cultural level. Compared to adolescents and adults, emerging adults experience relative freedom from social

roles and normative expectations (Arnett, 2006a, 2006b). This comparison has encouraged a framing of emerging adulthood as an "institutionalized moratorium" (Côté, 2006) in which individuals are unconstrained by institutional demands. Additionally, emerging adulthood has been observed in developed economies with strong norms for individuals to spend their late teens and early twenties gaining further education and skills rather than entering marriage and parenthood (Arnett, 2004, 2006b). This cross-cultural focus has motivated research on the relationship between development in emerging adulthood and the timing, length, and permeability of institutional tracks in different countries (e.g., Heckhausen & Chang, 2009; Nurmi et al., 1995).

However, a complete understanding of emerging adulthood requires attention to variation in emerging adults' trajectories within countries, particularly as a function of postsecondary experiences. In the United States, where rates of college enrollment among 18-to-21-year-olds have risen over the last decades (Arnett, 2000, 2006b), individuals' developmental outcomes are increasingly shaped by institutional influences during their emerging adult years. At the same time, as this study shows, broad categorizations distinguishing college from noncollege students (e.g., Tanner, 2006) are insufficient. College students can have widely varying experiences and outcomes, because postsecondary institutions vary in how well they facilitate the attainment of college goals, and individuals vary in how well they use institutional supports when pursuing these goals. In addition, some defining features of emerging adulthood, such as exploration of roles, careers, and relationships (Arnett, 2000, 2004), may be more challenging in weak postsecondary channels where individuals experience social pressure to maintain close ties with friends and family outside the institution (Covarrubias & Fryberg, 2015), financial pressure to work during or immediately after college, and normative institutional pressure to complete degrees in shorter time periods (as for associate's versus bachelor's degrees). Thus, in order for research on emerging adulthood to be more inclusive of diverse trajectories within the same culture, it should take into account how individuals' development is affected by the institutional channels in which they pursue goals.

Implications for Goal Pursuit and Individual Differences

To date, research on emerging adulthood, developmental assets, and life span goal construction and adjustment has proceeded somewhat independently and without an explicit institutional focus. The developmental assets framework, which emerged from research on middle and high school students, has shown that adolescents with more assets, such as responsibility and sense of purpose, tend to have more well-being and academic success than adolescents with fewer assets (Benson et al., 2006; Scales, 1999). The emphasis is thus on the accumulation of developmental strengths, rather than the strategic use of them.

Our study demonstrates that psychological assets are also helpful in facilitating positive outcomes for emerging adults. Examining what promotes a specific achievement goal in a given institutional context further shows that assets are not necessarily interchangeable or additive. Different-strength institutional channels present different challenges in goal pursuit and thus necessitate different goal strategies. Thus, while high levels of a factor

that is helpful in one channel can facilitate goal attainment in that channel, high levels of the same factor may be neutral or increase risk of goal failure in a different-strength channel (see [Compas, 2004](#)).

The need for different goal strategies in response to contextual changes has been noted by life span theories, in particular action-theoretical perspectives ([Brandstätter, 2006](#); [Brandstätter & Rothermund, 2002](#)) and the life span theory of motivation ([Heckhausen et al., 2010](#); [Nurmi, 2004](#)). *Assimilative strategies*, such as goal construction and environmental selection, can be useful when resources and opportunities to achieve an intended goal are sufficient. *Accommodative strategies*, such as goal adjustment and environmental accommodation, can be useful when available time, capacity, or supports prove inadequate to achieve an original goal. Life span research has most often studied individuals' change in strategies over the life span generally or when individuals approach or pass important developmental deadlines ([Brandstätter & Rothermund, 1994](#); [Brandstätter & Wentura, 1995](#); [Salmela-Aro et al., 2007](#)). In addition, a key focus of this research has been to uncover when each strategy confers greater well-being during goal pursuit (e.g., [Nurmi & Salmela-Aro, 2002](#); [Salmela-Aro & Nurmi, 1997](#)).

Our study shows that these life span strategies can also be more or less useful when individuals in the same life stage pursue the same goals but experience different levels of institutional structuring of these goals. In addition, it shows that psychological factors that have previously been examined as individual characteristics can also be framed as strategies for facilitating goal attainment in specific contexts. Grit, found here to predict on-time graduation in stronger postsecondary channels, has been conceptualized as the characteristic capacity to sustain high effort toward goals and remain committed to these goals no matter what obstacles arise ([Duckworth et al., 2007](#)). These capacities are in fact assimilative strategies that facilitate tenacious pursuit of an intended goal in institutional contexts where relevant resources and information for this goal are adequate, and competing goals can be safely inhibited ([Shah et al., 2002](#)) as in pursuing a bachelor's degree at a higher-rated 4-year college. By contrast, mindset factors, found here to predict outcomes in weaker postsecondary channels, are consistent with the use of accommodative strategies. A growth mindset of intelligence has been theorized as facilitating resilience ([Yeager & Dweck, 2012](#)) and has been empirically associated with a willingness to start or continue striving toward goals that may be unattainable due to inadequate competence, resources, or time ([Claro et al., 2016](#); [Dweck & Leggett, 1988](#)). Similarly, belonging certainty has been conceptualized as an underlying belief in belonging as a process, in which initial worries about belonging are normal but decrease with time ([Walton & Cohen, 2011](#)). In our study, individuals with higher belonging certainty or growth mindset were more likely to achieve enrollment and on-track progress when they pursued these outcomes in weaker channels, where willingness to persist may be greater when individuals can focus on process and progress rather than on the attainment of an uncertain outcome. Additionally, when in weaker channels, higher growth-mindset individuals had higher rates of attaining outcomes that likely involved adjustment of original goals — delayed enrollment in college and on-track progress at 2- or 4-year college. Flexible goal adjustment allows individuals to be resilient in institutional contexts with fewer supports for goals where the probability of failure

for a given intended goal is high, yet multiple alternative goals are possible ([Wrosch et al., 2003](#)). Thus a less-acknowledged advantage of growth mindset in constrained goal contexts may be its promotion of goal adjustment, especially when disengagement from an insufficiently supported goal frees individuals to allocate scarce time and resources toward other, more optimal goals ([Brandstätter & Herrmann, 2016](#); [Tomasik & Salmela-Aro, 2012](#)).

Channels may also be a hidden moderator in past research. Though grit has been characterized as helpful in all contexts, it has predicted success in contexts where structural supports for goal pursuit are adequately strong, such as among local spelling bee champions preparing for a national competition or prospective military officers seeking to complete mandatory summer training ([Duckworth et al., 2007](#)). The degree to which grit's predictiveness depends on the presence of strong goal channels has previously gone unexamined. In other cases where study designs have not explicitly accounted for channels, researchers have found seemingly opposite strategies to predict goal attainment or well-being. These include performance versus learning goals (e.g., [Senko et al., 2011](#)) and optimistic versus defensive pessimist strategies ([Cantor, 1990](#)), among others. Consistent with the motivational theory of life span development ([Heckhausen et al., 1999](#)), our study suggests each strategy is not inherently useful but only conditionally useful — when that strategy helps individuals effectively confront goal-relevant challenges encountered in a specific context. Consistent with DST ([Lerner, 2006](#)), this context-dependent use of strategies can facilitate a strength-based framing of individual differences. If viewed as capacities to be deployed in all goal pursuit, individual-difference factors may be used to classify some individuals — those with lower levels of a given factor — as having deficits and others — those with higher levels — as having strengths. By contrast, a channels perspective suggests that a deficit in one goal context may be a strength in another. Relatedly, adaptive goal pursuit may not be characteristic of certain individuals but rather may emerge when an individual enacts psychological capacities that match the goal demands of their context.

Limitations and Future Directions

Further Diversify the Sample

Our sample was policy-relevant, including racially diverse, middle-to-lower SES students. However, students came from four district high schools in two states. It is important to replicate these results in other samples. Additionally, a larger and more diverse sample of high schools and age cohorts could permit a comparison of different-strength enrollment channels.

Refine Psychological Measures

Though the measures we assessed are longstanding, our study suggests adaptations of them might better predict postsecondary goal attainment in different institutional contexts than found here. In line with some recent research suggesting the *passion* facet of grit may be disaggregated from the *perseverance of effort* facet (e.g., [Guo et al., 2019](#); [Muenks et al., 2017](#)), it may be helpful to test whether consistency of interests without explicit commitment to finishing all goals begun may predict success in weaker channels. Grit scores may also be more predictive if they can reflect the

personal importance of a given goal or institution to an individual. Additionally, neither mindset scale directly measured a process mindset about goal pursuit — such as a person's belief in their ability to develop a process toward a goal — that we theorize is advantageous in weak channels. We also did not measure students' perceptions of channel strength. Potentially, students who are more aware of the existence of channels and who can correctly assess when they are in strong versus weak channels may attain postsecondary goals at higher rates than students with less channel awareness.

Assess Change in Psychological Factors Over Time

We measured psychological factors in students' 12th grade year. Future studies should examine how these factors change over time and how they may reflect a process of interactions between individuals and their goal contexts (see Dweck, 2017). As is suggested by the covariation hypothesis in positive youth development (Benson et al., 2006) and accentuation dynamics (e.g., Caspi & Herbener, 1990), individuals may frequently use assets when they are required by institutional contexts in goal pursuit and reinforced through social interactions in these contexts. Given this, can progressing through a strong postsecondary channel strengthen grit and related capacities for implementing goal processes and meeting objective standards? Can progressing through a weak postsecondary channel strengthen growth mindset and related capacities for tolerating uncertainty and valuing progress? Similarly, the horizontal pile-up hypothesis (Benson et al., 2006) suggests that assets may become stronger when individuals have multiple opportunities to build them. Consistent with this, are individuals with higher levels of a psychological asset in Grade 12 those who have had repeated goal experience during adolescence in channels that require that asset?

Account for Channels When Designing Interventions

Although analyses controlled for baseline demographic and academic factors, accounting for channels when developing interventions could help provide more direct causal evidence. Existing belonging and growth mindset interventions are primarily designed to close achievement gaps between advantaged and disadvantaged groups in the same academic contexts (e.g., Blackwell et al., 2007; Walton & Cohen, 2011; Yeager et al., 2016). The opportunity to use psychological intervention to reduce achievement gaps tends to be greatest in strong channels, where all students have similar goals and access to adequate structural resources, such as opportunities for mentor relationships, but some students contend with additional psychological barriers due to historic group marginalization or an individual history of academic difficulty. Given the social problem and contexts they target, mindset interventions tend to convey messages consistent with effective goal pursuit in strong channels: They advise students to work hard, to follow good processes, and to view setbacks as temporary or surmountable. Can mindset interventions be developed that directly address the nature of goal pursuit in weak channels, where obstacles may not have clear interpretations and resources are scarce? If so, can they help all individuals apply process mindsets, and when necessary, goal adjustment, in these channels? In addition, given that individuals cannot always control the institutions they can enter or the goal supports available to

them, it may be useful to develop interventions that teach students about channels. Could such interventions help students recognize when they are in different-strength channels and use relevant capacities that facilitate success in those channels?

Conclusion

Development is a broad process shaped by life stages and changing social contexts at multiple levels. Yet it often occurs through sequences of experiences in institutional contexts that have specific ways of structuring goal pursuit. Our study suggests optimal development requires that individuals learn to navigate both strong and weak institutional channels and adopt a tenacious or flexible approach according to a channel's goal-relevant demands.

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