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EXPLORING STUDENTS' MOTIVATION FOR ATTENDING COLLEGE: A FUNDAMENTAL NEEDS PERSPECTIVE

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Abstract

Exploring Students' Motivation for Attending College:

A Fundamental Needs Perspective

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This dissertation adopts a fundamental needs perspective to examine the associations between first-year students' reasons for attending college and their well-being. It extends Basic Psychological Needs Theory (BPNT; Ryan & Deci, 2017), by proposing that (a) meaning, safety, and status (in addition to autonomy, competence, and relatedness) are fundamental needs that students aim to satisfy in college, and (b) the salience of particular needs influences students' goal-directed behavior and well-being. The first phase of the dissertation involved the development of three novel measures which were used in the second phase to explore different profiles of salient needs and their associations with college students' experiences of need satisfaction, need conflict, and four outcome variables (GPA, intentions to persist toward graduation, psychological distress, and overall well-being).

A latent profile analysis of the first wave of data (N= 512) identified three profiles based on students' reasons for attending college: Weaker Reasons, Balanced Reasons, and Stronger Reasons. Subsequent analyses examined whether profile membership at Wave 1 predicted need satisfaction, need conflict, and the student outcomes at Wave 2 (n = 219). Results indicated that the Stronger Reasons profile was associated with higher levels of need satisfaction compared to the other two profiles, whereas the Balanced Reasons profile was associated with lower GPA and intentions to persist.

Next, structural equation models were estimated to examine the relations between need satisfaction, need conflict, and the four outcomes. Results indicated that need satisfaction was positively associated with intentions to persist and well-being, but negatively related to distress, whereas need conflict positively predicted distress. Contrary to expectations, need conflict and need satisfaction were not significantly associated.

Although additional research is needed to examine motivation profiles, findings from this dissertation study suggest that students attend college with different patterns of need-based motivations, and these profiles are related to important student outcomes. The dissertation also adds to the literature examining the association between need satisfaction and well-being, and suggests that need conflict is a construct worthy of additional inquiry.

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CHAPTER 1: INTRODUCTION

Increasing rates of stress, depression, and anxiety among undergraduate students indicate that mental health is a significant concern on many college campuses (Lipson et al., 2019; Xiao et al., 2017). Students often feel stressed or anxious about academics, peer and romantic relationships, financial issues, family dynamics, and their personal well-being, including sleeping and eating habits (Acharya et al., 2018; Jones et al., 2018; Karaman et al., 2019). There has also been an increase in reported depression, suicidality, insomnia, OCD, and panic attacks among college students (Garlow et al., 2007; Oswalt et al., 2020). In addition to undermining students' well-being, these mental health issues are known to negatively affect their class attendance, retention, academic performance, and physical health (Baez, 2005; Nordstrom et al., 2014). Although students' willingness to seek counseling has perhaps increased in recent years (due to lower levels of stigma associated with receiving mental health treatment; Lipson et al., 2019; Oswalt et al., 2020), the demand for treatment exceeds the resources available on many campuses (CCMH, 2018). While, in the near term, it is imperative for colleges to increase their mental health resources in order to meet this demand, it is also important that they identify other ways of supporting students' well-being.

Well-being refers to one's physical health, life satisfaction, and general psychological health (Deci & Ryan, 2000; Diener, 2009) and is positively associated with academic achievement (Yu et al., 2018), class engagement/participation in college (Carton & Goodboy, 2015), and physical health/vitality later in life (Ryff et al., 2015). When colleges are committed to fostering students' well-being through access to counseling resources, peer support programs, reflective retreats, effective mentorship, first-year seminars, and other programs designed to meet the needs of their students, the individual students and the college community can flourish.

Importantly, designing a campus environment that supports student flourishing goes beyond supporting students who experience mental illnesses to include opportunities for all students to experience optimal development and well-being (Pingree & Harward, 2014).

Research is needed that helps college administrators understand the ways in which they can create environments that support the well-being of the diverse students they aim to serve. One approach to developing such environments is to investigate students' fundamental psychological needs and the ways in which the college context can help students to satisfy these needs. An important goal of this dissertation research (and subsequent studies) is to inform the development and evaluation of student support programs. Using a fundamental needs perspective, this study investigates students' motivations for attending college, experiences of need satisfaction and need conflict (i.e., having to decide to satisfy one need at the expense of another need, due to limited resources), and the extent to which need satisfaction and conflict are related to several student outcomes including well-being (i.e., life satisfaction, physical well-being, and psychological well-being), psychological distress (i.e., stress and anxiety), achievement, and intentions to persist toward graduation.

Addressing Student Well-Being from a Fundamental Needs Perspective

The current mental health crisis on college campuses highlights the importance of moving away from academic achievement as the sole indicator of college success, and instead broadening the conception of student success. Currently, many colleges use students' grade point averages (GPAs) to identify students who are academically "at risk." These students are often contacted by college staff who connect them with appropriate resources, including mental health counseling (Valentine et al., 2011). Unfortunately, this model fails to identify students who might not be struggling academically but are experiencing personal challenges that are thwarting

their development (e.g., struggling to form meaningful relationships on campus can make students feel isolated and lonely). These students might benefit from counseling services or other support programs but may not be aware of the recourses available on campus.

Keeping these students in mind, it is important for universities to develop programs that are more proactive than reactive. That is, rather than waiting for students to fail a course or suffer from a serious mental health problem, there should be support systems in place to help students thrive personally and academically. One way to develop and evaluate such programs is to consider how the institution can best support students' satisfaction of their fundamental needs.

Fundamental Psychological Needs

Fundamental needs "specify innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being" (Ryan & Deci, 2017, p. 229). The present dissertation research examines students' fundamental needs for autonomy, competence, relatedness, meaning, safety, and status in the college context. When applied to the college context, a fundamental needs perspective allows us to consider the extent to which students are able to fulfill their needs, and thus experience well-being, at their university. This framework also allows us to consider the extent to which the college context supports or interferes with the satisfaction of particular needs and can help college administrators identify specific aspects of students' experiences in college that can be enhanced.

The most prominent framework for studying fundamental needs in educational psychology is the Basic Psychological Needs Theory (BPNT), which is a sub-theory of Self Determination Theory (SDT). SDT is a broad motivation theory developed by Deci and Ryan (2000) that describes the processes by which people are intrinsically motivated to explore, learn, and grow. BPNT is one of several mini-theories that contribute to the broader SDT, which arose

out of decades of research examining the nature of intrinsic and extrinsic motivation (Deci & Ryan, 2012). The central proposition of BPNT is that humans have innate needs for autonomy, competence, and relatedness, and that these needs must be satisfied for an individual to experience well-being (Deci & Ryan, 2017).

Guided by BPNT, numerous studies suggest that individuals experience relatively high levels of well-being when their fundamental needs are satisfied and suffer physical and psychological ill-effects when their needs go unfulfilled (see Deci & Ryan, 2000; Vansteenkiste et al., 2020 for a review). In the college context, there is extensive literature that focuses specifically on students' need for relatedness and its association with achievement and other positive outcomes (Walton & Brady, 2015). When students feel as though they belong to their campus community (i.e., their need for relatedness is fulfilled), they report higher levels of warmth, social acceptance, self-efficacy, and task value (Freeman et al., 2007). Additionally, the needs for autonomy and competence have been studied at the classroom level and fulfillment of these needs is associated with self-regulated learning, academic achievement, and well-being (Niemiec & Ryan, 2009).

Although there are numerous empirical studies supporting this theory, there are some potential limitations of BPNT that may be important to address when studying college students' motivation. First, it seems possible that there are additional fundamental needs that account for aspects of college students' behavior that are not predicted by their needs for autonomy, relatedness, or competence. For example, some students may be motivated to attend college, in part, because they want to be able to provide safe living conditions for themselves and their family. To fulfill this need for safety, the students may be more likely than their peers (including those who are more motivated by their needs for autonomy, relatedness, or competence) to

choose a major that will prepare them for a financially stable or lucrative career. In addition to the three needs posited by BPNT, the present dissertation research explores students' needs for meaning, safety, and status.

Second, BPNT posits that need satisfaction is the primary mechanism through which fundamental psychological needs influence well-being (Ryan & Deci, 2017), but does little to address need salience, or importance. These authors acknowledge that need satisfaction can be influenced by how subjectively salient the needs are in a person's life (p. 89): however, their theory remains focused the extent to which the context is supportive of need satisfaction, regardless of how salient the needs are to the individual. In contrast, I argue that need satisfaction depends, in part, on whether the context is supportive of the needs that the individual is trying to satisfy in that particular context. For instance, a student may experience low need satisfaction if a particular need was not important to them in the college context, and therefore they did not engage in many behaviors on campus aimed at satisfying the need (i.e., consider a student who is commuting to campus from home might have a low need for relatedness in college because they expect this need to be fulfilled by family and peers from high school). In this situation, the student may have been pursuing the need for relatedness in home and peer contexts, but those contexts were not supportive of need satisfaction for this student. Importantly, low need satisfaction in this example is not reflective of the extent to which the college context was supportive of need satisfaction, but, rather, suggests that other contexts did not support need fulfillment. On the other hand, low need satisfaction can also be experienced when a need is salient (i.e., important) to a student in the college context, but the context does not provide adequate opportunities for need satisfaction. Considering this distinction, it seems important to measure context-specific salience of students' needs to best understand whether students are

fulfilling the needs they expected to satisfy in the college context. I propose that examining students' salient needs in college may help administrators identify which needs students are struggling to satisfy on campus and encourage them to allocate resources to develop opportunities for students to satisfy those needs.

Additionally, this dissertation study seeks to extend BPNT by placing greater emphasis on the interactive nature of students' fundamental needs, including how students attempt to navigate the complexities associated with satisfying multiple needs within a college context. That is, due to factors such as time constraints, social norms, peer pressure, parental expectations, and having multiple ambitious goals, students cannot pursue *all* of the goals or activities that could help them satisfy their fundamental needs. They often must decide to engage in one activity (such as studying), while foregoing other activities (such as exercising or spending time with friends). In some situations, the decision to pursue satisfaction of one need over another may result in a sense of internal conflict. Guided by goal systems theory (Kruglanski et al., 2002) and the concept of motivation conflict (Hofer & Fries, 2016), this study explores the inherent complexity of student motivation in college.

The Current Study

The current study addresses the limitations discussed above by positing a more comprehensive model for students' motivation for attending college. First, I extend BPNT by drawing on additional research from the fundamental needs literature and positing that, in addition to autonomy, competence, and relatedness, the needs for meaning, safety, and status are fundamental human needs that can influence students' decisions to attend college. Second, I used this extended model to develop a novel questionnaire (the Motivations for Attending College Scale; MACS) to assess which needs are most salient for students in the college context. This

questionnaire was administered to a large sample of incoming first-year students from a selective, private university, as well as a smaller sample of incoming students from several community colleges.

Using data from the MACS, latent profile analysis (LPA) was then used to identify motivation profiles. The profiles each represent a common combination of the fundamental needs that students seek to fulfill by attending college (i.e., the needs that are most *salient* to them in this context). Person-centered analytic approaches (such as LPA) have been used to identify a broad range of motivation profiles, including self-efficacy profiles in teachers and goal orientation profiles in students (Perera et al., 2019; Shim & Finch, 2014; Tuominen-Soini et al., 2011); but, to my knowledge, such approaches have not been used to identify profiles representing students' need-based motivations for attending college.

Additionally, to understand the associations between motivation profiles and student outcomes, it is important to consider the extent to which students were successful at satisfying particular needs in their college environment. Previous research suggests that need satisfaction is positively associated with students' self-reported well-being (Deci & Ryan, 2000). In this study I examine the extent to which the motivation profiles are related to need satisfaction (i.e., whether particular profiles are associated with higher levels of need satisfaction compared others) and the extent to which need satisfaction is related to several important student outcomes, including well-being. Notably, this study included participants from community colleges and a selective private university because I wanted to explore whether different motivation profiles would be identified in these different contexts, and consider the extent to which the contexts were supportive of students' salient needs. However, due to the small sample of community college students, I was not able to test this research aim.

Because needs are often pursued in relation to one another (i.e., students must made decisions about which needs to pursue at a given time, often at the expense of satisfying other needs), I also consider the extent to which the motivation profiles are related to need conflict and the extent to which need conflict is related to student outcomes. It seems possible that varying levels of need conflict might explain why some profiles are associated with higher levels of need satisfaction compared to other profiles. Ultimately, this dissertation was designed to set the groundwork for future research which will examine whether, in a particular college context, certain motivation profiles are associated with higher levels of need fulfillment and well-being because the salient needs in these profiles are well-supported in that context and less likely to produce experiences of motivational conflict.

Research Aims

The specific research aims this study addresses are:

1) Using a basic psychological needs framework, develop questionnaires that assesses college students' (a) reasons for attending college, (b) experiences of need satisfaction, and (c) experiences of need conflict.

2a) Using the questionnaire that assesses students' reasons for attending college, identify "motivation profiles" that represent common combinations of students' reasons for attending college, and examine whether the same profiles exist across two contexts: a community college and a private four-year institution.

2b) Examine the extent to which these profiles are generally predictive of students' need satisfaction, need conflict, achievement, anxiety, intentions to persist toward graduation, life satisfaction, stress, and psychological well-being.

3a) Examine the extent to which students' experiences of need conflict and satisfaction generally predict their achievement, intentions to persist toward graduation, psychological distress, and well-being.

3b) Examine the extent to which need satisfaction mediates the associations between need conflict and the dependent variables.

4) Begin to explore the possibility that need satisfaction and conflict partly mediate any effects of students' reasons for attending college on their achievement, anxiety, intentions to persist toward graduation, life satisfaction, stress, and well-being.

Significance of the Study

In this study, I propose that students will experience positive outcomes if their college environment is structured in a way that provides them with opportunities to satisfy the fundamental needs that they want to fulfill by attending college. This is an important extension of BPNT because focusing exclusively on overall need satisfaction can make it difficult to identify which needs are not being properly supported in a particular context. Rather, a focus on which needs are salient for students in the college context can indicate whether the college environment is supportive of those needs in particular. I expect it might be useful for college administrators to understand which need(s) students are trying, but are unable, to satisfy on campus. This understanding can potentially inform the development or evaluation of student support programs such as academic advising, peer tutoring, living-learning communities, student-faculty mentoring programs, and other services designed to help students thrive in college. Similarly, identification of motivation profiles can help college administrators create environments that better support the fulfillment of common sets of needs students seek to fulfill in college, ultimately supporting student development, well-being, and achievement.

This study also contributes to the fundamental needs literature by examining how students' needs interact with one another, particularly, the extent to which students' efforts to satisfy one need may conflict with their efforts to satisfy their other needs. By identifying the common need conflicts that different groups of students experience, college staff can create opportunities for students to satisfy multiple needs at once, thereby helping students bring their needs into alignment. For example, if a number of students report experiencing conflict when pursuing their need for meaning (i.e., if their efforts to satisfy their need for meaning are often disrupted by their pursuit of other needs, such as their need for relatedness), the college could help students reestablish motivational alignment by offering weekend retreats or service-learning opportunities (where they can satisfy their needs for meaning, competence, and relatedness at the same time).

Ultimately this dissertation study contributes to the scholarly community by examining students' experiences of need conflict and by identifying need-based motivation profiles. The profiles and reports of need conflict might also be informative to practitioners seeking to foster students' well-being in college.

CHAPTER 2: LITERATURE REVIEW

Generally, motivation researchers study what influences people to initiate and sustain goal-directed behavior (Wigfield et al., 2015). One dominant approach in educational psychology is to examine proximal predictors of students' motivations to pursue their goals. Constructs such as self-efficacy, mindsets, expectancies, and values have been found to influence people's behavior in particular contexts (for a review see Wigfield et al., 2015). These constructs have explanatory power when predicting behavior related to specific goals (i.e., to earn a particular grade in a class), but when examining students' behavior related to a broad set of goals in a broad context (i.e., to experience well-being in college), focusing on more distal determinants of students' motivation might be more useful. One historical approach to studying motivation posits that behavior is guided by drives and needs, such that humans are motivated to act in ways that satisfy these needs. The current study adopts this paradigm and argues that these fundamental human needs help explain the *why* of students' goal-directed behavior, which ultimately can help us better understand behavior and predict outcomes, such as well-being.

More specifically, this study is guided by Self-Determination Theory (SDT), which posits that humans have inherent capacities for psychological growth and wellness and focuses on the social conditions that facilitate or thwart human flourishing (Ryan & Deci, 2017). One of the sub-theories of SDT, Basic Psychological Needs Theory (BPNT), identifies autonomy, competence, and relatedness as the three needs that humans must fulfill in order to experience well-being. In this dissertation study I extend several tenets of BPNT in order to explore students' underlying motivations for attending college. Specifically, I argue that meaning, safety, and status are also fundamental needs, and I propose that need salience and need conflict can help researchers and practitioners better understand how students' motivations for attending

college might influence important student outcomes, such as well-being, psychological distress, intentions to persist toward graduation, and achievement.

Studying Students' Reasons for Attending College

In order to best predict whether students will be successful in college (i.e., academically, socially, emotionally), it is not enough to only examine the extent to which they are motivated to attend, but we must also consider why they decided to pursue a college degree. Previous research suggests that the effects of holding a goal on important outcomes is dependent, in part, on the individual's underlying reasons for adopting that goal (Sommet & Elliot, 2017). These underlying reasons dictate the specific subgoals that students will pursue in college and will influence goal-directed behavior. The extent to which students can successfully pursue their goals in college, depends, in part, on the extent to which the college context supports or hinders goal pursuit. Thus, knowing students' reasons for attending college, and understanding which reasons are associated with lower levels of success, can help administrators create environments that best support student development and well-being.

Although research examining students' reasons for attending college is somewhat scarce, several studies have attempted to categorize these reasons and explored the extent to which these categories predict students' academic and socio-emotional outcomes. For example, Côté and Levine (1997) developed the Student Motivation for Attending University Scale, which was informed by the student development literature (i.e., Astin's [1991] Input-Environment-Output model). This measure includes twenty-two items that load onto five factors, or reasons, for attending university: (a) career or materialism, where college attendance is viewed as a means for making money or getting a good job, (b) personal-intellectual development, which represents students' desire for personal growth and learning, (c) humanitarian, where attendance

is motivated by students' desire to help others, (d) expectation-driven, which reflects the expectations and pressure imposed on students from significant others, including family and friends, and (e) default, which represents students' decision to attend college for lack of a better option. Côté and Levine found that attending college in order to foster one's personal-intellectual development was associated with the acquisition of human capital skills (i.e., self-management and self-motivation skills) and attending for humanitarian reasons was related to self-management skills and grades.

In a similar study, van Herpen and colleagues (2017) developed 40 items to measure students' pre-university reasons for attending university. Item development was based on questions such as "why do students attend university?" "why do they select a particular degree or course?" and "what motivates their learning?" Using exploratory and confirmatory factor analysis and SDT (i.e., intrinsic and extrinsic motivation) as an interpretive lens, the authors identified six reasons for attending university: career perspective, personal development, compliance with the social environment, attractiveness of the institution, recommended by others, and location. Interestingly, none of these reasons were found to significantly predict first to second-year retention. This led the authors to suggest that, perhaps, "a more profound conceptualization of the pre-university reasons by integrating, for example, orientations from the SDT, may result in an instrument with more predictive power" (van Harpen et al., 2017, p. 66). Although these authors used SDT to interpret the factors identified in their factor analysis (i.e., the career perspective reflects and extrinsic motivation for a good job or salary), the items they developed were not clearly informed by the motivation literature. It seems possible that items developed from a motivation framework would better predict students' goals and behaviors in college, and therefore, would be more predictive of student outcomes. The same critique can be

applied to the Côté and Levine's (1997) study as well; these researchers used the student development literature to identify the student typologies listed above. However, it is unclear how these typologies (i.e., the reasons for attending college) relate to motivation constructs, and thus, to student outcomes.

Guided by SDT's tenets of intrinsic and extrinsic motivation, a study by Kennett and colleagues (2013) examined students' internal and external reasons for attending college. Internal reasons (i.e., attending college because you want to discover life options, because you like learning, because it is challenging, or because college attendance can lead to other educational options) are expected to generally satisfy students' psychological needs. In this study, internal reasons were related to higher academic resourcefulness, which in turn was associated with higher grades and better college adjustment. In contrast, the external reason "attending university more for other people" was related to lower grades (Kennett et al., 2013), perhaps, because this reason is not aimed at satisfying the basic needs. Similarly, another scale that is used to measure students' motivations for attending college and is informed by SDT is the Academic Motivation Scale (AMS; Vallerand et al., 1992). This scale measures the extent to which students' motivation is autonomous, (i.e., students engage in behaviors that are self-endorsed) or controlled (i.e., students engage in behaviors because they feel pressed to do so). Using this measure researchers have found autonomous forms of motivation to be positively related to students' achievement (Turner et al., 2009), effective coping strategies (Bonneville-Roussy et al., 2017) and persistence (Ratelle et al., 2007), and negatively related to burnout (Pisarik, 2009). Research utilizing this measure indicates positive patterns exist between autonomous forms of student motivation and important outcomes, but this measure does not consider the specific needs students are seeking to satisfy in college.

One interpretation of these findings is that internal, or autonomous, reasons for attending college leads to behaviors that help satisfy students' needs for autonomy and competence, whereas external, or controlled, reasons lead to behaviors that undermine students' sense of autonomy. The measures used in the studies discussed above categorize students' reasons for attending college based on whether they generally satisfy students' needs (i.e., it is assumed that if the student reports autonomous motivation for attending college, then their needs are generally being met by attending college). An alternative approach, which is employed in this dissertation study, is to categorize reasons based on their alignment with particular needs.

Categorizing students' reasons for attending college based on the particular needs they are aimed at satisfying may be more predictive of student outcomes than the methods discussed above because fundamental needs are required for growth and well-being and motivate humans to engage in behaviors aimed at satisfying those needs (Ryan & Deci, 2017). Thus, the specific needs students are trying to fulfill in college can best predict what types of behaviors they might engage in in this context. To contrast this approach with the measures administered in the studies discussed above, consider students' motivation to attend college for "career or materialism" (Côté & Levine, 1997), "career perspective" (van Herpen et al., 2017) or "to secure a well-paying job" (Kennett et al., 2013). The extent to which career-oriented reasons for attending college are positively associated with students' well-being should depend on whether these reasons are aligned with students' fundamental needs. For example, a student might want a secure career or well-paying job because they expect the career will satisfy their needs for autonomy or safety. In this case, the reason for attending is aligned with their fundamental needs. However, a student might want a well-paying job because they want to be able to afford several materialistic goods, such as expensive cars or clothing. In this case, the reason is not aligned with

their needs, but rather, is an external reason for attending college. I expect that students' goals, or reasons for attending college, may only be predictive of outcomes to the extent that they help satisfy an underlying need.

One existing study has examined students' reasons for attending college in terms of the three needs posited by BPNT (Guiffrida et al., 2013). This study found that the extent to which students attended college to satisfy their needs for autonomy and competence was positively associated with their intentions to persist toward graduation and their grade point average (GPA). Attending college to satisfy the need for relatedness, which was measured using four subscales (i.e., relationships with college peers, faculty and staff, to maintain relationships with friends and family from home, and to give back to others from home), had more nuanced relations with the two outcomes. Specifically, GPA was negatively associated with attending college in order to fulfill the need for relatedness with college peers, but positively associated with attending to fulfill relatedness needs with faculty and staff. Attending for altruistic reasons (i.e., to give back to others from home) was negatively related to GPA and attending college to fulfill relatedness needs to maintain relations with people from home was not significantly associated with GPA. One marginal negative association was identified between relatedness to faculty and staff and intentions to persist. This study suggests that complex relations exist between the needs students are trying to fulfill in college and important outcome variables, indicating a need for additional research in this area.

With the exception of the Guiffrida and colleagues (2013) study, the studies reviewed above are limited because they do not capture the complexity of students' motivation to attend college. No study, to my knowledge, accounts for how combinations of needs or reasons for attending may lead to unique patterns of goal pursuit, some of which might be better supported

by the college context. To address this limitation, this dissertation study examines need-based motivation profiles to identify unique patterns of students' motivation for attending college, based on the needs they seek to satisfy in this context. I also examined relations between these profiles and need conflict, need satisfaction, achievement, intentions to persist, well-being, and psychological distress.

Basic Psychological Needs Theory (BPNT)

According to self-determination theory (SDT), fundamental human needs give psychological meaning and potency to the goals that individuals pursue (Deci & Ryan, 2000). To better understand how the needs that students' hope to satisfy by attending college shape their goal pursuit and quality of life, it is worth reviewing some of the central tenets of BPNT, which is the sub-theory of SDT that "detail(s) how the dynamics of basic needs affect well-being and vitality" (Ryan & Deci, 2017, p. 21).

The Universal Association Between Need Satisfaction and Well-Being

BPNT posits that satisfaction of the needs for autonomy, competence, and relatedness provides the nutrients for psychological growth and well-being. According to BPNT, if even one of these needs is thwarted, a person will experience significant negative outcomes (Deci & Ryan, 2000). Decades of research across multiple domains, including work, school, and leisure activities, has found need satisfaction to be positively associated with well-being (Ryan & Deci, 2017). For example, using an idiographic approach in which adult respondents listed life domains that were important to them and then reported their need satisfaction and well-being in each domain, need satisfaction predicted 51% of the within-participant variance in well-being between domains. More specifically, participants reported greater well-being for the domains in

which they experienced higher levels of autonomy-, competence-, and relatedness-satisfaction (Milyavskaya & Koestner, 2011).

Importantly, BPNT posits that fundamental needs are universally experienced and, thus, the association between need satisfaction and well-being is not learned or culturally dependent (Ryan & Deci, 2017). Support for this claim comes from a study of individuals from over 100 countries across 8 regions in which need satisfaction was associated with higher levels of positive feelings and need deprivation was associated with lower levels of positive feelings in all regions (i.e., in Africa, East and South Asia, Former Soviet Union, Latin America, Middle East, Northern Europe and Anglo nations, South East Asia, and Southern Europe; Tay & Diener, 2011). Additionally, in a study of college students from Belgium, China, Peru, and the U.S., satisfaction of the needs for autonomy, competence, and relatedness was associated with well-being across all four cultures (Chen, Vansteenkiste, et al., 2015).

The Role of Context in Satisfying Fundamental Needs

Another important tenet of BPNT is that social contexts vary in terms of how supportive they are of people's attempts to satisfy their basic needs; and the more supportive a context is (particularly with respect to autonomy), the more likely people are to experience high levels of well-being (Ryan & Deci, 2017). Previous studies have provided support for this claim across a range of contexts. For instance, in a home context, parents' provision of autonomy support (e.g., offering their children choices and or taking their thoughts into consideration) was associated with social and academic adjustment in elementary school children (Joussemet et al., 2005) and with well-being in adolescents (Duineveld et al., 2017). Additionally, in a health context, a meta-analysis found that practitioners' support for patients' autonomy (e.g., making patients feel

understood and comfortable sharing their feelings) was positively associated with patients' need satisfaction, as well as with their mental and physical health (Ng et al., 2012).

Importantly, programs and institutions (and not just the individuals within a context) can be characterized as supportive or unsupportive of individuals' fundamental needs. For instance, within a university context, some Science, Technology, Engineering, and Mathematics (STEM) programs have been described as "chilly" climates for female students. Because such climates are characterized by masculine norms, lack of perceived peer support, and experiences of discrimination (Simon et al., 2016), it can be assumed that women enrolled in these programs may struggle to fulfill their need for relatedness. Similarly, on many college campuses, there are numerous class-based markers (e.g., designer clothing, expensive smartphones, etc.) that may lead students from lower socioeconomic status (SES) backgrounds to feel like they do not belong and, thus, to experience low levels of relatedness satisfaction. Consistent with this possibility, Ostrove and Long (2007) found that the class background of first-year college students was positively associated with their sense of belonging on campus, which in turn predicted their social and academic adjustment.

Although college contexts can undermine students' attempts to satisfy their needs, they can also provide important opportunities for need fulfillment. For example, STEM-oriented colleges can support female students' need for relatedness by sponsoring student organizations such as Women Engineers or by providing single-sex (female) housing options (Blackburn, 2017; Szelényi et al., 2013). Additionally, in a series of intervention studies, Yeager and colleagues (2016) found that teaching low SES students about common challenges during the transition to college (highlighting that these struggles are not indicative of a permanent lack of belonging at the institution) can increase students' GPA and first-to-second year retention,

compared to low SES students who did not receive the intervention. This suggests that helping students to interpret their campus experiences in a less threatening way can buffer against fears of isolation, thereby removing perceived obstacles and allowing students to fulfill their need for relatedness. This, in turn, contributes to performance and well-being outcomes. In sum, when examining students' need fulfillment in college, it is important to consider the ways in which the context both supports and undermines students' attempts to fulfill particular needs.

Extending Basic Psychological Needs Theory

Although BPNT can explain why students' underlying reasons for attending college may predict their well-being in this context, it has relatively little to say about which combinations of reasons are most likely to be related to positive student outcomes in particular college contexts. The theory does not consider the extent to which the various needs are salient, or important, for students to satisfy in this context. BPNT also does not address students' experiences of need conflict as they seek to satisfy multiple needs in college. Therefore, in the present section I discuss how examining need salience and need conflict can help us better understand students' motivation for attending college and inform the ways in which college environments can support students' satisfaction of their salient needs.

Need Salience

Although the needs for autonomy, competence, and relatedness appear to be universal, individuals may perceive one of these needs as more salient (and thus more important to satisfy) than the others. Ryan and Deci (2017) acknowledge that the subjective salience of a particular need may influence the extent to which people end up satisfying it; however, they argue that need satisfaction is a more direct predictor of well-being than need salience and thus more central to the SDT framework. That is, even if a person does not particularly care about

satisfying one of the needs, they will experience relatively low levels of well-being if they allow it to remain unfulfilled. Thus, if the primary aim of one's research is to simply identify which individuals are likely to experience low levels of well-being in a particular context, focusing on their need satisfaction seems like a sensible approach.

On the other hand, if the goal of one's research is to determine whether a context may be preventing certain individuals from satisfying particular needs (as in the case of the present dissertation), then it may make more sense to focus on need salience (i.e., the needs that individuals care about satisfying in a particular context) in addition to need satisfaction. To understand why this is, it is useful to consider two explanations for why a college student might report experiencing low levels of relatedness. First, the need for relatedness may not be particularly salient to the student within a college context because they mistakenly believe that this need can be adequately fulfilled through their interactions with family and childhood friends. In this case, the student may not actively seek out opportunities to form close relationships with other students on campus (even though they find it difficult to maintain close relationships with their childhood friends), in which case their low level of relatedness satisfaction cannot necessarily be attributed to an unsupportive college context. On the other hand, the need for relatedness might be salient to a student in the college context because they expect to form meaningful relationships with people in college. In this case, the student would be motivated to seek out opportunities to form relationships with peers, mentors, etc.. Low satisfaction of the need for relatedness for this student might indicate that the college context did not afford the student appropriate opportunities to satisfy this need. Considering these two possible explanations for low need satisfaction, it seems important to examine which need(s) students

identify as salient in the college context so we can ensure the context is supportive of those needs or combination of needs.

In line with this example, a central purpose of my dissertation study is to identify the needs students are trying to satisfy by attending college (i.e., the needs they perceive as salient) and to examine the extent to which particular college contexts afford students opportunities to satisfy these needs. I expect that need salience will guide students' goal-directed behavior at college, which will, in turn, influence their need satisfaction. For instance, a student with a salient need for competence is expected to seek out opportunities to develop competence in college (such as participating in job shadow or internship programs to gain desired skills or knowledge). If such opportunities exist and the student is able to take advantage of them, they should experience relatively high levels of need satisfaction and well-being. Thus, college students' need satisfaction should be shaped both by the efficacy of their goal-directed behavior *and* the structure of the college environment (i.e., whether certain opportunities are made known to students and whether their attempts to act on these opportunities are supported or undermined). Importantly, I expect that each college context supports the satisfaction of certain needs more than others; but, which needs are well-supported is likely to vary from context to context. For example, at elite private universities, extensive efforts are often made to help students feel connected to each other and to the community (i.e., to satisfy their need for relatedness). But at community colleges, where students are more transitory (i.e., enrolled part-time, commuting to campus only a couple of days per week, or possibly only enrolling in classes for one semester), there might be greater emphasis on skill building and preparing students for jobs or a 4-year university (i.e., to satisfy students' needs for competence). Thus, my

investigation of students' salient needs in college can offer college administrators insight into more effective ways to support their students' need satisfaction, and, in turn, their well-being.

Motivational Conflict

Another limitation of BPNT is that is does not address what happens if or when an individual experiences a conflict between two of their needs. As mentioned in Chapter 1, due to limited resources (such as time and energy), students cannot engage in *all* of the need-supportive activities that are available to them; consequently, they may end up (either deliberately or unknowingly) engaging in behaviors that prioritize certain needs at the expense of others. For example, by deciding to stay home on a Friday night in order to study for an upcoming exam (which would help them fulfill their need for competence), a student may be forgoing the opportunity to attend a party with their friends, which would help them to fulfill their need for relatedness. Research suggests that decisions that prioritize one need at the expense of another may lead to experiences of motivation conflict and undermine students' well-being. For example, Grund and colleagues (2014) found that when college students chose to work on an academic task rather than attend a social event, they reported feelings of motivation conflict that were positively associated with the experience of study strain during the task and negatively associated with their academic adaptation.

Motivational conflict has also been found to predict broader outcomes, such as well-being. For instance, an experience sampling study by Grund, Grunschel, and colleagues (2015) examined motivation conflict related to 'want conflicts' (i.e., feeling that one *wants* to engage in a different task) and 'should conflicts' (i.e., thinking that one *should* engage in a different task). Results indicated that 'want conflicts' were related to lower affective well-being, and 'should conflicts' were related to lower affective well-being and lower life satisfaction. Additionally, a

qualitative study of first-year, first-generation Latinx college students found that many of the participants experienced motivation conflicts between their family obligations and academic achievement in college, and this conflict negatively impacted students' academic achievement and well-being (Vasquez-Salgado et al., 2015). Although the research on motivation conflict has not connected students' experiences of conflict back to their basic needs, it seems plausible that experiences of conflict (e.g., study-leisure conflicts) are likely to undermine students' well-being because they indicate an attempt to fulfill one basic need at the expense of the other.

Although Ryan and Deci's (2017) work on SDT acknowledges that people's fundamental needs are interconnected, there is little discussion of the potential conflicts that may arise as individuals strive to fulfill these needs. In fact, SDT (and BPNT in particular) actually suggests that the opposite tends to be the case; that is, "each need facilitates the satisfaction of the others under most conditions" (Ryan & Deci, 2017, p. 248). In support of this claim, Ryan and Deci (2017) point to factor analyses of need satisfaction scales that identify *overall* need satisfaction as a higher-order factor. The presence of this factor (in addition to lower-order factors representing each need) suggests that individuals tend to satisfy their basic needs to similar extents (i.e., people who experience high levels of autonomy tend to also experience high levels of competence and relatedness). Ryan and Deci argue that that his finding makes intuitive sense if you consider that (for example) "it is hard to derive competence satisfaction from a domain in which one is not autonomous or volitional, and, reciprocally, a person who feels little competence at an activity will not likely have a great deal of interest or willingness to engage in it" (pp. 248-249).

That being said, not all individuals experience similar or "balanced" levels of satisfaction across their fundamental needs. In fact, in a series of studies, Sheldon and Niemiec (2006)

demonstrated that among individuals who experienced the same amount of need satisfaction (when summing across the three needs), there was significant variability in terms of the satisfaction of each individual need (i.e., needs for autonomy, competence, and relatedness). People who experienced balanced need satisfaction (i.e., low variability across the three needs) reported higher levels of well-being, compared to participants who reported greater variability in need satisfaction, even when controlling for levels of need satisfaction. The authors suggested that an imbalance of need satisfaction "reflects inappropriate allocations of resources across the different domains of life, which may induce stresses and conflicts that ultimately detract from well-being" (Sheldon & Niemiec, 2006, p. 332). Although these findings have been replicated in diverse samples across life domains (i.e., Church et al., 2013; Milyavskaya et al., 2009), no work to my knowledge has examined need conflict as a potential source of need imbalance. To address this limitation, this dissertation study assesses students' perceptions of need conflict in order to determine whether high conflict is associated with low levels of need satisfaction and low levels of well-being (or high levels of psychological distress).

To understand why some individuals may be more effective than others at minimizing need conflicts and maintaining high levels of overall need satisfaction, I draw on an additional motivation framework – goal systems theory (Kruglanski et al., 2002). Goal systems theory posits that people's goals are organized into a hierarchical system, such that each goal is cognitively associated with a subgoal/means that the individual can carry out in order attain that goal. Within a given goal system, several means may be linked to a particular goal, which Kruglanski and colleagues (2002) term *equifinality*. On the other hand, a particular means may be linked to more than one goal, which represents *multifinality*. These system properties are useful for understanding how students strategically pursue different goals in order to satisfy their

basic needs in a college context. In some instances, students will be faced with opportunities that can help them fulfill multiple needs at one time. For example, joining the math club might fulfill students' need for relatedness while simultaneously fulfilling their need for competence (e.g., multifinality). But, equifinality is also possible, such that fulfilling a particular need (e.g., the need for relatedness) can be accomplished through several different activities, such as joining a student organization or bonding with roommates.

Importantly, goal systems theory suggests that the amount of multifinality that exists between students' needs and goals may determine the level of motivational conflict they are likely to experiences as they attempt to satisfy their needs. Further, need conflict can occur when there is low multifinality in a particular context (i.e., there are minimal means available that ultimately satisfy more than one need). Experiences of low multifinality seem especially relevant to need conflict when considering the multiple needs students are trying to satisfy in college. For instance, some students might have salient needs for relatedness and competence, and the extent to which the college environment provides opportunities to satisfy these needs will influence students' overall well-being. Some colleges might offer opportunities such as student interest groups (i.e., Finance Association, Engineers without Borders, etc.) or undergraduate research assistantships that allow students to form relationships with peers or faculty while also developing important skills (thereby satisfying needs for relatedness and competence), whereas other college may not provide such opportunities. Ideally, to decrease the likelihood of need conflict, colleges would identify which common combinations of salient needs students have in college and provide multifinal opportunities for students to satisfy those needs.

Finally, when discussing how colleges can help students to fulfill multiple needs simultaneously, it is important to note that the opportunities available for need satisfaction in a

particular college environment may not be equally applicable to all students. For example, students of color enrolled in a predominantly White institution (PWI) might find it difficult to satisfy their need for relatedness, despite university efforts to facilitate peer bonding. Moreover, a student with a physical disability may struggle to satisfy their need for autonomy on a campus that is difficult to navigate in a wheelchair, even if the college aims to support autonomy satisfaction in other ways. Ultimately, the extent to which students are able to satisfy their needs and experience less conflict in college is dependent on both individual characteristics (i.e., students' salient needs and background characteristics) and the extent to which the college context provides opportunities for need satisfaction.

Additional Fundamental Humans Needs

The proposed framework for this study suggests that the needs posited by BPNT (i.e., autonomy, competence, and relatedness) do not capture all of the fundamental needs that students try to fulfill by attending college. Drawing on research from the broader needs literature, I extend BPNT and posit that meaning, safety, and status may also represent fundamental needs that motivate students' behavior in college. Historically, scholars have considered numerous needs as fundamental (e.g., Murray [1938] listed over 20 needs), but there is agreement that a concise list of needs offers more utility and conceptual clarity (White, 1959). Of course, we should not sacrifice thoroughness in an effort to be concise; it is important to strike a balance between considering a long, comprehensive list of needs and settling for a short, more manageable list. Accordingly, any potential fundamental need must be vetted to consider if it is indeed fundamental, and only after careful consideration should a need be treated as fundamental by researchers. In line with Anderson and colleagues (2015), I utilized a subset of Baumeister and Leary's (1995) criteria to justify treating meaning, safety, and status as fundamental needs in

the present study. Notably, these criteria are also used to define needs, according to BPNT (Ryan & Deci, 2017). However, I did not adopt Ryan and Deci's criteria for psychological needs because their definition of a need is restricted to growth needs (i.e., they do not consider safety a psychological need because they argue it is salient only when one's safety is threatened). The criteria discussed below are utilized by several need researchers to define psychological needs, but they are more flexible than the criteria established by BPNT, thereby allowing me to explore the needs for meaning, safely and status, in addition to autonomy, competence, and relatedness.

Criteria

In a review of the motivation literature, Anderson and colleagues (2015) identified a set of criteria that a psychological construct should satisfy to be considered a fundamental motive. First, a fundamental human need is one that is universally experienced across individuals and cultures (Baumeister & Leary, 1995; Deci & Ryan, 2000). That being said, the strength of a particular need may vary across individuals and cultures, and individuals and cultures can also differ in how they prefer to express and fulfill their needs (Deci & Ryan, 2000). Secondly, fulfillment of a fundamental need must affect both short- and long-term welfare (Baumeister & Leary, 1995; Deci & Ryan, 2000), such that if the need is not fulfilled, the individual will experience psychological distress or detriments to their physical health. The third criterion for establishing fundamental human needs is that the constructs must induce goal-directed behavior aimed at satisfying these needs (Deci & Ryan, 2000). This goal-directed behavior should be evident across contexts and involves cognitive, motor, and affective processes. For each of the human needs discussed in this paper (autonomy, competence, relatedness, meaning, safety, and status), there is at least some evidence that they satisfy these criteria. This evidence corresponding to the needs for meaning, safety, and status is discussed below, whereas the

evidence for the three original needs proposed by BPNT (autonomy, competence, and relatedness) is reviewed by Ryan and Deci (2017), as well as by Van den Broeck and colleagues (2016).

Notably, a fourth criterion that is often mentioned in fundamental needs research is irreducibility; a fundamental human motive must serve as an end goal such that it cannot be reduced to another motive (Baumeister & Leary, 1995). However, empirical testing of this criterion is challenging because claims about the irreducibility of a particular need are difficult (if not impossible) to falsify. Thus, the evidence typically provided in support of this criterion is more open to interpretation than the evidence provided for the other criteria. For this reason, I do not discuss other researchers' explanations for why the needs for meaning (Heine et al., 2006), safety (Maslow, 1970) and status (Anderson et al., 2015) cannot be reduced to other motives.

Need for Meaning

Researchers who consider meaning to be a fundamental need argue that humans are inherently motivated make sense of the world around them and to explain life in a coherent manner (King et al., 2016). This meaning helps us link people, places, and ideas in predictable ways. Notably, three separate facets of meaning have been posited: coherence (i.e., making sense of the world and one's life), purpose (i.e., having a sense of direction in life), and significance (i.e., having a sense of life's inherent value; Martela & Steger, 2016). For the purposes of this study, I focus primarily on the coherence and purpose aspects of meaning. According to BPNT, meaning is not a basic need because it is an outcome of satisfying one's needs for autonomy, competence, and relatedness (Ryan & Deci, 2017). However, these authors refer to the need for meaning exclusively as wanting to have a sense of purpose in one's life, and do not consider meaning as a need to form a coherent understanding of the world. In the current study, I propose

that a need for meaning is an overarching need to understand the world and one's place in it, and it seems possible that some students may attend college in search of this understanding, irrespective of whether they are also attending college to satisfy their needs for autonomy, competence, or relatedness.

With respect to the first criterion that needs must meet to be considered fundamental (i.e., universality), the coherence facet of the need for meaning appears to motivate members of various species to acquire knowledge that can be used to make predictions and guard against potential threats (e.g., hide from predators), thus conferring a survival advantage. In support of such arguments, Heintzelman and King (2014) reviewed neuroscience research suggesting that the brain regions responsible for meaning making (i.e., the basal ganglia and orbitofrontal cortex) are present in nonhuman animals, including primates, and thus may be evolutionarily primitive.

Support for universality also comes from developmental research showing that young children engage in meaning making behavior before they have had much time to internalize cultural preferences. For example, newborns have been found to quickly form an association between a touch on their face and the delivery of liquid, which allows them to predict when they will receive food (for a review, see Dweck, 2017). Meaning making behavior continues throughout the lifespan, as children and adults work diligently to form a coherent view of the world (Heine et al., 2006). This is evidenced by findings from autobiographical memory studies suggesting that individuals consistently think about their experiences in the world and work to develop a coherent understanding of themselves and their experiences over time (Pasupathi et al., 2007).

Previous research has also found the need for meaning to be present in individuals from different cultures. For example, in a meta-analysis, Jin and colleagues (2016) found that Chinese

participants experienced a need for meaning, and satisfaction of this need was significantly related to well-being outcomes. Similar patterns were identified in another meta-analysis that examined data from 147 studies of participants from diverse cultural backgrounds and of various ages (Li et al., 2020). Although the need for meaning may be universal, it is important to reiterate that the ways in which we make meaning of ourselves and our environments are culturally specific, and thus the meaning making process can differ across individuals, including people from similar cultures.

With respect to the second criterion, people have been shown to experience life satisfaction and positive emotions when their need for meaning is fulfilled, whereas they tend to experience negative emotions and depression when the need is not fulfilled (Heine et al., 2006; Steger et al., 2006). More specifically, in a study of active military personnel, experiences of meaning (measured by items such as "I understand my life's meaning") were associated with better functioning in the contexts of work, recreational activities, and personal relationships, as well as lower levels of emotional distress and suicidal ideation (Bryan et al., 2013). A similar pattern of findings was observed in a longitudinal study of college students (Mascaro & Rosen, 2008), which found that low levels of existential meaning were associated with increases in depressive symptoms over time. One interpretation of these findings is that when people lack a coherent understanding of the world and their place in it, they struggle to make sense of events or stimuli that appear to be threatening and thus cope less effectively with stressors (Park, 2010).

Finally, regarding the third criterion, the need for meaning has been shown to stimulate goal-directed behavior. In particular, the sense of incongruity or confusion that people experience when confronted with new experiences or ideas motivates them to make meaning of these experience in ways that re-establishes a sense of coherence (Heine et al., 2006). For

instance, the coping literature suggests that individuals often attempt to find meaning in stressful or traumatic experiences, and in some cases, such as experiences of violence or war, individuals devote their lives to a related cause. After experiencing trauma or stress, one's need for meaning will direct their attention to the threat and motivate them to develop a non-threatening understanding of that experience (see Park, 2010, for a review). Additionally, experimental studies found that exposure to nonsensical stimuli led to superior performance on a subsequent artificial grammar task that depended on pattern detection, suggesting that the stimuli increased participants' sensitivity to novel patterns (Heintzelman & King, 2014). Previous work has also found that the need for meaning might motivate individuals to pursue broad, long-term goals. For example, in the previously mentioned study by Côté and Levine (1997), college students considered the desire "to understand the complexities of the modern world" as a reason for attending college.

In line with Côté and Levine (1997), I maintain that the need for meaning is an important motivator of students' behavior in college contexts. The college context might be a particularly supportive environment for the satisfaction of the need for meaning because it affords students multiple formal (e.g., coursework, study abroad, internships) and informal (e.g., co-curricular activities, peer interactions, networking) opportunities to develop a greater understanding of the world.

Need for Safety

The need for safety, which Maslow (1970) described as a need for security, stability, and protection, has obvious evolutionary roots; individuals and species who are unable to keep themselves safe from harm are less likely to survive than those who can ensure their own safety. In the current study, the need for safety includes a desire for financial and food security, as

hunger and unstable housing can be viewed as threats to one's physical well-being. Notably, Ryan and Deci (2017) do not include safety a basic need within their BPNT framework because it represents a 'deficit' motive – that is, individuals only become aware of their need for safety only once it has been threatened. However, it is not entirely clear why these authors believe that only growth-oriented motives should be considered basic/fundamental needs. In addition, it is not necessarily the case that one's need for safety "operate(s) only when the organism has been threatened or thwarted" (p. 251). There seem to be many instances when people are motivated to maintain (rather than restore) the safety of their current environment. For example, when searching for a new home, people typically consider the safety of the neighborhood they are considering moving into, even if they happen to be moving from a neighborhood that they perceive as safe. The need for safety was included in this study because, for some students, it might represent a particularly important reason for attending college. For instance, students from low SES or multigenerational homes who want to ensure that they are able to support themselves and their families in the future might be motivated by the need for safety to attend college.

Regarding universality, the need for safety is evident throughout the lifespan and across cultures. Maslow (1970) argued that safety-motivated behavior is most obvious in infants because they express clear reactions to threatening stimuli, such as loud noises or fast movements. Adults also exhibit a desire for safety, particularly when it comes to ensuring stable living conditions and food security for themselves and their families (Bradley & Corwyn, 2004). For example, in a study of individuals from over 100 countries (Tay & Diener, 2011), satisfaction of the need for shelter and food explained more variance in the outcomes of interest (i.e., life evaluation and emotions), than the other needs (e.g., needs for social connection, respect, mastery, and autonomy) evaluated in the study.

The need for safety also meets the second criterion, as a lack of perceived safety has clear effects on people's short- and long-term welfare. For example, in a study of employees in a psychiatric hospital (Lynch et al., 2005), where threats to physical safety occur regularly, participants' perceptions of physical threat were negatively associated with their well-being at work and the intrinsic job satisfaction, even when controlling for perceived autonomy-support, competence, and relatedness. Another study (Odle-Dusseau et al., 2018) found that financial insecurity (which represents a threat to one's physical safety) was positively associated with stress and negatively related to general well-being and physical health. In addition, various studies have shown food insecurity to be associated with increased mental health problems and hypertension (for a review see Gundersen & Ziliak, 2015). Conversely, individuals' perceptions of safety (e.g., they felt safe from physical threats) were found to be positively associated with their well-being (Chen, Van Assche, et al., 2015), workplace productivity (Di Fabio, 2017), and academic performance and mental health in school-aged children (for a review, see Huebner et al., 2014; Roffey, 2017).

Finally, research has shown that the need for safety stimulates goal-directed behavior, and thus meets the third criterion. For example, people tend to avoid contexts such as school (Williams et al., 2018) and work (Mohanty & Mohanty, 2017), where they feel unsafe. In addition, it is assumed that people are motivated to engage in paid work in order to provide food and shelter for themselves and their family.

In sum, the safety appears to be a fundamental human need that is relevant for understanding college students' behavior. Some students may be motivated to attend college because they view it as a means of providing themselves with a safe and stable future. This may be particularly likely for students from low SES backgrounds who have actually experienced

food insecurity, housing instability, or neighborhood violence, and are highly motivated to avoid these conditions in the future.

Need for Status

The need for status has been defined as a fundamental desire for respect and voluntary deference from others (Anderson et al., 2015). An individual is granted status from another person if that person considers the individual as potentially helpful in their own goal pursuits. Thus, to have status, one must be perceived as having both competence and a willingness to help others (Anderson et al., 2015). Because attainment of a college degree is often considered to be an indicator of competence in the U.S., some students may be motivated to attend college in order to increase their social status. Notably, Ryan and Deci (2017) view status as an outcome (i.e., something that is attained when the needs for autonomy, competence, and relatedness are satisfied) and therefore do not consider it to be a fundamental need. However, as discussed below, status appears to meet the three criteria that I have adopted for identifying fundamental needs (Anderson et al., 2015).

Regarding the first criterion (i.e., universality), an evolutionary argument can be made that the need for status provides survival and reproductive benefits (Anderson et al., 2015; Maslow, 1970). For example, men who are perceived as having higher status (i.e., as possessing characteristics that can help others achieve their goals) are more likely than lower status men to attract a worthy mate with whom they can reproduce (Ellis, 1992). In addition, having status in a particular setting may lead to compliant behaviors from others in that setting. Thus, in the human 'environment of evolutionary adaptedness,' people with status were likely to be protected by others in physically threatening situations because protecting high status individuals likely had survival benefits for the group (i.e., a high status leader who was a strategic thinker could help

the group adapt to challenges in the environment; this person was likely protected in physically threatening situations because without this leader, the group might not be able to successfully respond to the ever-changing environment). Relatedly, research on primates points to status as a need that may have emerged prior to the point at which humans diverged from other species. Chimpanzees, for example, have status hierarchies, such that males who rank second or third in the community will challenge the alpha male in attempts to gain status (see Chapais, 2015, for a review). Chapais (2015) argues that chimps have a "context-dependent motivation to rise in rank whenever opportunities arise" (p. 169).

Despite evidence suggesting that human species may have evolved a need for status, relatively little research has examined whether this need is experienced across cultures (Anderson et al., 2015). In one of the few cross-cultural investigations, Torelli and colleagues (2014) found that participants from an individualistic culture (U.S. American) *and* those from a collectivist culture (Latin Americans) reported engaging in behaviors "to gain respect and admiration and to be highly regarded by their supervisor" (p. 38). But, importantly, the frequency with which participants engaged in particular types of status-seeking behaviors differed between the two cultures.

With respect to the second criterion, a number of studies have found that one's perception of their own status is positively associated with a number of well-being outcomes (for a review see Anderson et al., 2015). For example, status was shown to be positively related to subjective well-being, self-esteem, and positive affect (Anderson et al., 2012; Fournier, 2009; Tay & Diener, 2011). There is also evidence to suggest that satisfaction and frustration of the need for status is linked to health outcomes. Specifically, in an experimental study that manipulated participants' perceptions of their own social status, participants who experienced lower levels of

subjective social status (SSS) after an induction exhibited stronger heart rate variability reactivity compared to participants who experienced higher levels of status. According to the authors, these results "support the causal role of SSS in the development of cardiovascular disease" (Pieritz et al., 2016, p.5). Relatedly, researchers have found low social status to be a robust psychosocial risk factor for coronary heart disease (Cundiff & Smith, 2017). Although the association between status and heart disease is quite complex, a possible explanation for this finding is that individuals with low social status experience higher levels of stress and lower levels of overall well-being, which in turn leads to heart disease (when combined with the other effects of low status, such as low social support and tense interactions with higher-status others).

Finally, regarding the third criterion, the need for status has been found to induce goal-directed behavior. For example, in a study of graduate students (Flynn et al., 2006), the more that participants were aware of the status hierarchies in their social group, the more likely they were to offer help to their peers (presumably as means of attaining status). Other studies have shown that individuals are willing to expend effort and resources in order to avoid losing status (Bendersky & Pai, 2018). For instance, people make efforts to protect their status by avoiding lower status behaviors, such as asking others for help (Flynn et al., 2006) and conforming to others' opinions (for a review see Anderson et al., 2015).

To my knowledge, the current study is the first to examine the need for status in relation to students' motivations for attending college. It seems likely that some students are motivated to attend college because they believe that a college degree (or the skills, social connections, or career prospects acquired while pursuing their degree) will garner respect from others. This might be particularly true of students who gain entry into highly selective universities.

Student Outcomes of Interest

A broad aim of my dissertation study was to examine motivational variables and processes that influence students' well-being in college. As discussed below, I assessed overall well-being using three measures: psychological well-being, life satisfaction, and physical well-being, and psychological distress using two measures: stress and anxiety. In order to assess whether the motivational variables were also associated with academic achievement, I assessed students' grades and their intentions to persist toward graduation as dependent measures. Lastly, I measured students' sense of belonging on campus, but for reasons described below this measure was not included in the dissertation analyses.

Well-being

Well-being had frequently been examined as a dependent variable in SDT and BPNT research. As previously discussed, BPNT posits that if an individual's fundamental needs are fulfilled, they are likely to experience higher levels of well-being (compared to if one or more of their needs remain unsatisfied). Importantly, well-being is a general term representing a person's overall psychological and physical wellness and has been measured in many different ways in the research literature. For instance, some studies include a single well-being scale (e.g., Ryan & Khan, 2015), such as the sub-scale measuring psychological well-being from the Inventory of Depression and Anxiety Symptoms (IDAS; Watson et al., 2007). Another approach is to measure multiple constructs that are viewed as components of well-being. For example, Ryan and colleagues (2010) measured mood, subjective vitality (i.e., feelings of energy and vitality), and physical well-being, whereas Chirkov and Ryan (2001) measured self-esteem, depressive symptoms, self-actualization, and life satisfaction. In the present study, I measured psychological

well-being, life satisfaction, perceptions of physical well-being, and sense of belonging on campus.

Psychological well-being

Psychological well-being is characterized by high energy, vitality, and positive affect (Watson et al., 2007) Numerous studies have found a positive relation between need satisfaction and psychological well-being across a range of contexts and throughout the lifespan (for a review, see Deci & Ryan, 2000). Psychological well-being is an important outcome because it indicates that a person is mentally healthy and thriving. Additionally, longitudinal research has found psychological well-being to be related to physical wellness (Ryff et al., 2015).

Satisfaction with Life

Within the positive psychology literature, researchers consider individuals' self-reported satisfaction with their lives to be in important indicator of their subjective well-being (Diener et al., 2002). Life satisfaction is positively associated with social and professional advancement (Diener & Diener, 1996), performance and commitment at work (Erdogan et al., 2012), and self-esteem (Gimlan & Huebner, 2003); and it is negatively associated with stress (Weinstein & Laverghetta, 2009). Life satisfaction has been found to be influenced by both acute life events (i.e., death of a family member) and chronic experiences (i.e., ongoing stress in the home; Gimlan & Huebner, 2003). Additionally, a recent meta-analysis found life satisfaction to be positively associated with global need satisfaction (Tang et al., 2019).

Physical well-being

Physical well-being, or one's physical health, is an important component of overall well-being (CDC, 2018). Although there are numerous ways to define and measure physical well-being, such as physical functioning, energy, fatigue, and physical pain, the present study asked

students to report their *perceptions* of their overall health. Perceptions of physical health have been found to mediate the relationship between context and overall well-being (Temane & Wissing, 2006). Also, a meta-analysis found physical health to be positively associated with need satisfaction (Ng et al., 2012).

Psychological Distress

As previously mentioned, experiences of stress and anxiety are pervasive in college students (Acharya et al., 2018). Locke and colleagues (2016) reported that 51% of the over 200,000 students that were surveyed by the American College Health Association "felt overwhelming anxiety" in college, and the top two self-reported issues affecting students' academic performance were stress and anxiety. Previous research has found need satisfaction to be negatively related to stress and anxiety in adult workers (Ryan et al., 2010; Rouse et al., 2020). In this dissertation, measures of stress and anxiety were examined as separate dependent measures in some analyses (i.e., those involving LPA), and as indicators of a general latent variable, psychological distress, in others (i.e., the SEMs).

Achievement

Academic achievement, typically measured by students' course grades or overall grade point averages (GPAs), is a commonly examined outcome in motivation research. Achievement is important to college administrators because it is predictive of graduation rates and post-graduation opportunities, such as graduate school enrollment (Pascarella & Terrenzini, 2005; Wintre & Bowers, 2007). Although the current study places greater emphasis on students' overall well-being, it also examined the extent to which students' motivation profiles, need satisfaction, and need conflict predicted their academic achievement.

Intent to Persist

Persistence toward graduation is an important outcome for college administrators because it indicates that students are satisfied with their experiences at the institution (i.e., they feel engaged in the campus community and generally perceive the environment as supportive of their needs; Kuh et al., 2011). Persistence is also of interest to higher education researchers because there are persistent differences in college completion rates across institutions and student subpopulations (e.g., by race and socioeconomic status), which have long-term implications for students' career development and earning potential (NCES, 2018; OECD, 2015). Because it is beyond the scope of this dissertation to measure students' actual persistence to graduation, I employed an intent to persist item, which is often used in motivation and higher education research (e.g., Hausmann, et al., 2009) and has been found to be predictive of students' actual persistence (Cabrera, et al., 1993; Hausmann et al., 2009). Although there are numerous factors that can influence students' persistence, initial research in this area has found need satisfaction to predict students' intentions to persist (Travis & Bunde, 2020). Further, if students' needs are not satisfied, they may leave the institution in search of another environment that better meets their needs.

Sense of Belonging

Sense of belonging is the extent to which a person feels socially connected to their environment (Walton & Cohen, 2007). Studies have shown students' belonging to be associated with many positive outcomes in college students, such as self-efficacy, intrinsic motivation, and intentions to persist toward graduation (Freeman et al., 2007; Hausmann et al., 2009). Ultimately, a student's sense of belonging likely reflects the degree to which their need for relatedness is being satisfied in the college context.

Importantly, sense of belonging was originally intended to be a dependent variable in this study. However, as discussed below, some of the measures used to in the present dissertation were revised based on pilot testing. During this revision process, I did not realize that my changes to the relatedness satisfaction scale resulted in items that were similar to the items used to assess sense of belonging. Because the correlation between the two measures ended up being very high, $r(217) = .733$, $p < .001$, I decided not to include sense of belonging in any of the analyses reported in Chapter 5.

Historical Context of the Current Study

The primary dissertation study was conducted during the 2020-2021 academic year, which was drastically impacted by the COVID 19 pandemic. As discussed below, the timing of data collection should be taken into account when interpretating the findings of the current study.

In response to the pandemic, the colleges that participants attended transitioned from almost exclusively teaching fully in-person classes in previous academic years to offering most courses fully online or using a hybrid model (i.e., a combination of in-person and online). In addition to significant changes to students' academic experiences, the colleges also restricted co-curricular opportunities, and social distancing guidelines are assumed to have influenced students' informal socialization on and off campus. As discussed in Chapter 5, these novel college contexts limit the generalizability of the results of this study to more traditional contexts. Interpretations and suggestions for future research related to need satisfaction and online learning are reviewed in the Discussion section, below.

Hypotheses

R1) Using a basic psychological needs framework, develop questionnaires that assesses college students' (a) reasons for attending college, (b) experiences of need satisfaction, and (c) experiences of need conflict.

H1) It was hypothesized that students' responses to the Motivations for Attending College Survey (MACS) and Need Satisfaction and Progress Scales would reliably load onto six factors: the needs for autonomy, competence, relatedness, meaning, safety, and status. Given the interrelatedness of the need conflict items (i.e., the conflict associated with each need depends on students' perceptions of that need in relation to the other needs), and the lack of previous motivation conflict measures in the literature, the factor structure of this measure was difficult to predict.

R2a) Using the questionnaire that assesses students' reasons for attending college, identify "motivation profiles" that represent common combination of students' reasons for attending college, and examine whether the same profiles exist across two contexts: community colleges and a private four-year institution.

H2a) This research question was exploratory in nature. It was expected that motivation profiles exist, but the precise nature of these profiles (i.e., the common combinations of needs that motivate students to attend college) was difficult to predict. It was possible that different sets of profiles would be identified at each type of institution (i.e., 2-year versus 4-year institutions). However, it was also possible that the same profiles would be identified across the two samples.

R2b) Examine the extent to which these profiles are generally predictive of students' need satisfaction, need conflict, achievement, anxiety, intentions to persist toward graduation, life satisfaction, stress, physical well-being, and psychological well-being.[1]

H2b) This research question was exploratory because fundamental need-based profiles have not been used to examine students' motivation for attending college. It was difficult to predict which combinations of salient needs would be related to the outcome variables of interest, although I expected that profiles that featured a salient need for competence would be associated with high levels of achievement.

R3a) Examine the extent to which students' experiences of need conflict and satisfaction generally predict their achievement, intentions to persist toward graduation, psychological distress, and well-being.[2]

H3a) It was hypothesized that psychological distress would be positively associated with need conflict and negatively associated with need satisfaction. Conversely, academic achievement, intentions to persist to graduation, and well-being would be negatively associated with need conflict and positively associated with need satisfaction.

R3b) Examine the extent to which need satisfaction mediates the associations between need conflict and the dependent variables.

H3b) It was hypothesized that need conflict would be inversely correlated with need satisfaction, and that need conflict would be *indirectly* associated with the various academic and socio-emotional outcomes via need satisfaction.

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[1] Originally, Research Aim 2b was also going to address whether relations between motivation profiles and the outcomes of interest were moderated by school type (i.e., community college or private university). However, it ended up being beyond the scope of this dissertation study to test this research aim empirically.

[2] Originally, Research Aim 3a was also going to examine the extent to which school type (i.e., community college or private university) moderated the effects of need satisfaction and need conflict on the dependent measures. However, due to the low response rate from community college students, this moderation was not tested.

R4) Begin to explore the possibility that need satisfaction and conflict partly mediate any effects of students' reasons for attending college on their achievement, anxiety, intentions to persist toward graduation, life satisfaction, stress, physical well-being and psychological well-being.

H4) It was hypothesized that both need conflict and need satisfaction would partly mediate the observed relations between motivation profiles and the academic and socio-emotional outcome variables. Importantly, it is beyond the scope of the current study to test this hypothesis directly. As discussed in Chapter 6, I examined relations between the profiles and each outcome measure and the associations between need satisfaction and conflict with the dependent measures to begin to explore the possibility of need conflict and satisfaction mediating associations between profiles and outcomes.

CHAPTER 3: PILOT STUDIES

The development of the Motivations for Attending College Scale (MACS) was a significant component of my dissertation study. To develop this measure, I employed the best practices outlined by Boateng and colleagues (2018): item development (i.e., identification of constructs and item generation and exploration of items' content validity), scale development (i.e., pre-testing questions, sampling and survey administration, item reduction, and extraction of factors), and preliminary scale evaluation (i.e., tests of dimensionality). As described below, I conduced three pilot studies over the span of one year to develop and refine the MACS, as well as the Need Satisfaction and Progress Scale, and the Need Conflict Scale.

Pilot Studies 1 and 2: Measure Development

Pilot Studies 1a and 1b: Item Development

Pilot Study 1 included semi-structured interviews (Pilot Study 1a) and open-response survey questions (Pilot Study 1b) with a convenience sample of college students.

Pilot Study 1a: Semi-Structured Interviews

Sample. Participants were recruited via emails sent to student organization email addresses and faculty email addresses that are publicly available on colleges' websites. Participants were enrolled in community colleges, public 4-year institutions, and private 4-year institutions. Ten students participated in the interview portion of the study in return for a ten-dollar Amazon gift card. Half of the interviewees identified as female and half as male, and their racial identities were reported as follows: 3 Black, 2 Asian, 2 Latinx, 1 American Indian, and 2 White students. Three interviewees were first-year college students, four were sophomores, one was a junior, and two were seniors.

Methods. These one-on-one interviews were conducted via Skype and, with participants' permission, audio recorded. One of the ten interviewees did not agree to the audio recording, so I instead took notes throughout the interview. The script for the interviews is provided in Appendix A.

Pilot Study 1b: Open-Response Survey

Sample. An additional thirty-six undergraduate students (recruited via the same set of emails used in Pilot Study 1a) responded to a short-answer survey (the sample was 75% female; 16.7% Asian, 8.3% Black, and 75% White participants; 41.7% first-year students, 13.9% sophomores, 27.8% juniors, and 16.7% seniors).

Methods. Participants were emailed a link to the open-response survey. The survey, presented in Appendix A, asked students to report their motivations for attending college, including what they hoped to gain from attending college and how they expected college would help them achieve their life goals.

Results from Pilot Studies 1a and 1b

Along with my review of the literature, the analyses of the interviews and short-answer responses informed the generation of 78 items for the Motivations for Attending College Scale (MACS). Each item was intended to measure the extent to which students were seeking to fulfill one of the needs (i.e., autonomy, competence, relatedness, meaning, safety, or status) in college. At this phase of measure development between 10 and 16 items were generated for each need.

These items were then reviewed by a focus group comprised of two motivation researchers, two graduate students, and one undergraduate student from Dr. Miele's Motivation, Metacognition, and Learning Laboratory. Participants in the focus group were presented with a list of all 78 items as part of a Qualtrics survey and were asked to categorize each item based on

which need they thought the item was intended to measure. For example, a participant might have read the item "I decided to attend college because I wanted to feel included in a community" and then "drag and drop" this the statement onto the Relatedness categorization box in the Qualtrics survey. After participants finished categorizing the items, we discussed general issues with the items, such as the possible presence of a 'family obligation' factor (which was not represented by one of the categories in the survey), and the potential presence of two 'meaning' factors, as well as potential problems with specific items. I used this feedback to refine the item list. Of the original 78 items, 37 were eliminated, and one item was changed. An additional seven items were developed based on feedback from the focus group. Thus, 48 items (i.e., seven to nine items per need) were used for the next stage of piloting. All items are listed in Appendix A.

Pilot Studies 2a and 2b: Measure Development

Pilot Studies 2a and 2b served two purposes: (1) to obtain more feedback from undergraduate students about the latest draft of the MACS, and (2) to test the need conflict measure developed for my dissertation. Both Pilot Studies were conducted online, via a Qualtrics survey. After consenting to the terms of the study, participants were randomly assigned to one of two surveys; one third of the participants were assigned to Pilot Study 2a, which included the categorization task, as described below, and two-thirds of the participants were assigned to Pilot Study 2b, which included the Need Conflict Scale. The Need Conflict Scale, which aims to assess the extent to which students experience motivational conflict when trying to fulfill their fundamental needs in college, consists of two parts. In the first part, students reflect on each of the six needs and write about behaviors they engage in in college to fulfill each need. The purpose of this exercise is to encourage students to actively think about each need and how it

influences their behavior in college. Then, in the second part, they respond to a set of conflict items for each of the need. For example, on one screen, students are asked "how often does what you to do find meaning get in the way of…" and then provide separate frequency ratings for each of the remaining five needs. All MACS and Need Conflict items administered in Pilot Studies 2a and 2b are presented in Appendix B.

Sample

Participants for both studies were recruited through a Psychology department participant pool at a private , four-year university. Details regarding data cleaning for this pilot study are discussed in Appendix B. The final sample size for Pilot Study 2 was 220 participants, with approximately one third being randomly assigned to the online survey for Pilot Study 2a (N = 67) and the remaining two thirds being assigned to the online survey for Pilot Study 2b (N = 153). Across the two surveys, the sample was 84% female and 13% of the participants identified as first-generation college students. The racial identities of participants were as follows: 1.8% American Indian of Alaska Native, 20.0% Asian, 6.36% Black, 6.82% multiracial, 62% White, and 1.36% of the sample identified as "other" (one participant did not report their racial identity). Approximately half of the respondents (49%) were first-year students, 38% of participants were sophomores, 8% were juniors, and 5% were seniors[3].

Methods

Pilot Study 2a consisted of a categorization task, similar to the one used with the focus group in Pilot Study 1. Participants were presented with 7 or 8 MACS items at a time and were asked to categorize each item based on the need they thought the item would measure (i.e., autonomy, competence, meaning, relatedness, safety, status). Based on feedback from the focus

[3] Percentages were calculated out of 220 participants.

group, there was also a category labeled "Unsure" for items that participants did not think clearly measured one of the needs listed. Following the categorization task, participants responded to the 48 MACS items (using a 6-point Likert-type scale; 1 = strongly disagree, 6 = strongly agree) and several outcome measures were administered in a random order, including the 21-item University Stress Scale (Stallman & Hurst, 2016), the three-item Sense of Belonging Scale (which is a subscale from Bollen & Hoyle's, 1990, Group Cohesion Scale), and the five-item Satisfaction with Life Survey (Diener et al., 1985)[4].

Pilot Study 2b consisted of the 48 MACS items, as well as the items developed to measure need conflict. The study also included the following outcome measures, which were administered in a random order: stress, belonging, and life satisfaction scales used in Pilot Study 2, as well as seven items from the Self-Efficacy for Self-Regulated Learning (Usher & Pajares, 2008), and the 7-item Self-Efficacy for Learning and Performance (adapted from Motivated Strategies for Learning Questionnaire; Pintrich et al., 1991). Both surveys included demographic questionnaires.

Results

Data from Pilot Studies 2a and 2b were used to select items for the next version of the MACS.

Factor Structure. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO = .62) and Bartlett's Test of Sphericity, χ^2 (1128) = 2693.16, p <.001, supported that the data set was factorable (Mvududu & Sink, 2013). All EFAs discussed below were conducted using Principal Axis Factoring (PAF) and a Promax (oblique) rotation. Details of the EFA and process

[4] All items developed for this dissertation (i.e., the MACS, Need Conflict Scale, and Need Satisfaction and Progress Scale items) are listed in the Appendix. The scales developed by other researchers (i.e., the dependent measures) are listed with the authors' names in the main text and in the Appendix and are available in the cited articles in the reference list.

by which items were removed from the analysis is discussed in Appendix B. After several iterations of EFA, including many that forced a 6-factor solution to help identify problematic items, I removed a total of 15 items. The remaining 33 items were entered into an EFA that used an eigenvalue threshold of 1 (i.e., did not force a 6-factor solution) to extract seven factors: autonomy, competence, relatedness, meaning, status, and two safety/security factors. The internal consistency reliability of the subscales corresponding to each factor ranged from $\alpha = .65$ to .89. The items included in each subscale and Cronbach alpha for each subscale are presented in Appendix B.

Regarding the two safety factors that were identified at this stage of development, five out of the eight items loaded (factor loadings from pattern matrix > .5) on to a factor that seemed to represent participants' familial obligations. The remaining three items loaded onto a factor second that more clearly represented my intended construct (i.e., a general need for security). Because these subscales appeared to measure separate constructs, I examined them separately when computing correlations with the outcome measures of interest. Importantly, my conceptualization of this need evolved over the course of the pilot studies. At this stage, I was trying to measure a need for safety *and* security. As discussed below, data from Pilot Study 3 informed my decision to focus specifically on the need for *physical safety* (independent of one's sense of security) in the main dissertation study.

Additionally, because the focus group in Pilot Study 1 raised concerns that the meaning subscale might include two factors (one measuring participants' desire to find truth in the world and another assessing their desire for a sense of purpose in life), I conducted an EFA with an eigenvalue threshold of 1 that included only the meaning items. This analysis yielded a one-factor solution, which was in line with my argument that people seek to develop an overarching

understanding of themselves, the external world, and relations between themselves and the world.

Correlations Between MACS and Outcomes. To examine associations between the subscales and outcome variables, I computed mean scores for each of the seven subscales and correlated these scores with the mean scores on each of the dependent measures (i.e., sense of belonging on campus, stress, life satisfaction, self-efficacy for self-regulated learning, and self-efficacy for learning and performance). As a reminder, the scales measuring sense of belonging, stress, and life satisfaction were administered in both Pilot Studies 2a and 2b, and therefore the entire sample (N=220) was included in the analyses of those variables. However, the scales measuring self-regulated learning and self-efficacy for learning and performance were only administered in Pilot Study 2b, so the sample size for those correlations was 153. As shown in Table B1, presented in Appendix B, stress was significantly positively correlated with students' needs for autonomy and the familial obligation subscale, and negatively correlated with the need for relatedness. Life satisfaction was positively correlated with the needs for competence and relatedness and negatively correlated with the familial obligation subscale. Both sense of belonging and self-efficacy for self-regulated learning were positively correlated with the needs for competence, relatedness and meaning, and self-efficacy for learning and performance was positively correlated with the need for competence.

Correlations Between Need Conflict and Outcomes. I also examined students' need conflict and its relations to the dependent variables. As a reminder, in the second part of the needs conflict measure (after they had reflected on the six needs and written about things they do in college to fulfill each of them), each screen asked participants how often a particular need conflicted with each of the five other needs. Using participants' responses to the 30 items across

the six screens, I computed two different sets of needs conflict variables. First, I averaged the items from each screen to compute the mean level of *conflict* caused by the pursuit of each need (i.e., how often do the things participants do to satisfy a particular need get in the way of the things they do to fulfill the other needs). Second, to compute *need disruption*, I averaged (across screens) the ratings of how frequently each need was disrupted by the five other needs. The means, standard deviations, and internal reliability for all the need conflict and disrupted scales are reported in Table B2. The need conflict and disruption scores for all of the needs were significantly positively correlated with stress; however, they were not significantly correlated with sense of belonging, life satisfaction, self-efficacy for self-regulated learning, or self-efficacy for learning and performance.

Conclusions from Pilot Studies 2a and 2b

These results were presented to a group of motivation researchers and graduate students to discuss the patterns in the data and next steps for the study. The most important feedback from this focus group pertained to the autonomy and safety subscales. Although the autonomy items all loaded onto the intended factor, they were not capturing the full construct of the need for autonomy, so I revised this scale entirely for the next pilot study. We also decided that the first (unintended) safety/security factor may have been tapping into familial relations and obligations (as previously explained). The items in this subscale also included self-specific reference points (e.g., "I wanted to provide my children with *a better life than I had growing up*"). Because this type of item might be interpreted differently by participants, especially those from differing upbringings (and therefore different reference points), I changed the wording of the items in this scale to make the reference points more general and normative. For example, the previous item was changed to "I wanted to be able to provide me and my family with stable living conditions."

Several new items that were expected to better capture the need for safety were also added. Sample items include "I never wanted to worry about feeding myself or my family" and "a college education will allow me and my family to live in a safe neighborhood." Lastly, while conducting these pilot studies I was also continuing to read the SDT literature to refine my research objectives for this study. To best address my evolving research aims, I decided to develop a need satisfaction measure, to be administered in the next pilot study and the dissertation study.

Pilot Study 3: Measure Refinement

Sample

Participants for Pilot Study 3 were recruited through the CDEP Participant Pool for course credit and through a First-Year Experience (FYE) listserv, which includes faculty and staff from colleges across the country who work with first-year students (these individuals were asked to forward a recruitment email to the students at their schools). Notably, the FYE listserv yielded only 1 participant who completed the survey and 6 additional respondents with partial data. Due to this low response rate, these responses were excluded from the analyses discussed below.

In total 211 responses were collected from the participant pool. As discussed in greater detail in Appendix C, two duplicate responses and ten additional responses were removed from analyses, leaving a final sample size of 199 participants. Five of these participants were missing data from one or measures, and therefore were excluded from any analysis that included the measure(s) they were missing data on. The sample was predominantly female (86.4%) and 13.6% of participants identified as first-generation college students. The racial identities of participants were: 69.9% White, 4.0% Black, 17.1% Asian, 1.5% American Indian or Alaskan

Native, 6.0% multiracial, and three respondents (1.5%) selected “other” for their racial identity and indicated that they identify as Hispanic. Approximately two-thirds of the respondents (63.3%) were first-year students, 26.1% of participants were sophomores, 6.5% were juniors, and 4.0% were seniors.

Methods

In Pilot Study 3 the MACS (48 items) was administered first, followed in random order, by either the Need Conflict Scale (i.e., the same measure that was administered in Pilot Study 2b) or the Need Satisfaction Scale (which was developed for this Pilot Study, as discussed below), and the following outcome measures that were administered in random order: the 21-item University Stress Scale (Stallman & Hurst, 2016), the 5-item Satisfaction with Life Scale (Diener et al. 1985), four items measuring perceptions of campus climate (adapted from Reid & Radhakrishnan, 2003), an 8-item psychological well-being questionnaire (using the Well-being subscale from the Inventory for Depression and Anxiety Symptoms [IDAS], Watson et al., 2007), one item measuring perceived physical well-being (Ware & Sherbourne, 1992), and the 3-item Sense of Belonging Scale (subscale from Bollen and Hoyle's, 1990, Group Cohesion Scale). It is important to note that administration of this survey took place during the coronavirus outbreak, which caused most students to move out of their college housing and transition to online learning for the second half of the spring semester. As such, it was expected that responses to some of the items on the survey were substantially influenced by this event, particularly students’ reports of stress, anxiety, well-being, and life satisfaction.

The 12 items in this version of the need satisfaction scale assessing autonomy, relatedness, and competence fulfillment were from the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen, Vansteenkiste, et al., 2015). These items were modified

to measure need fulfillment in college. For example, the item "I feel that my choices express who I really am" was modified to "I feel that my choices in college reflect who I really am." I developed the items for the needs for meaning, safety, and status using the BPNSFS as a template. For Pilot Study 3, the needs satisfaction scale included four items assessing fulfillment of the needs for safety and status and five items assessing fulfillment of the need for meaning. At the time of administration, I planned to use the results of the pilot study to select the three items for each need that would be included in the final version of the measure for the dissertation study, however, as discussed below, the scale required significant revision. The items administered for the MACS, Need Conflict Scale, and Need Satisfaction Scale are listed in Appendix C.

Results

Data from Pilot Study 3 were used to revise the MACS.

Factor Structure. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO = 0.915) and significant Bartlett's Test of Sphericity, $\chi 2$ (1081) = 6400.02, $p<.001$, suggested excellent factorability of the MACS items (Mvududu & Sink, 2013). At this phase of measure development my goal was to identify a 6-factor solution that included four items from each intended subscale. After numerous iterations of EFA, the details of which are discussed in Appendix C, a total of 24 items were removed from the analyses. When entered into an EFA (with a promax rotation and an eigenvalue value threshold greater than 1) the remaining 24 items loaded onto 6 factors. The factor loadings for all subscales except the competence subscale were greater than .50, which is higher than the recommendation of .40, as suggested by Beavers and colleagues (2013). As discussed in Appendix C, the intended competence subscale was problematic, and ultimately included two items with cross-loadings onto other factors. This

subscale underwent significant revisions prior to the next administration of the MACS. The final pattern matrix for the MACS from Pilot Study 3 is presented in Table C1 and the means, standard deviations, and internal reliability of each subscale are listed in Table C2. The MACS items used in subsequent analyses are listed in Appendix C.

Correlations Between MACS and Outcomes. To examine associations between the MACS subscales and outcome variables, I computed mean scores for each of the six subscales and correlated these scores with the mean scores on each of the dependent measures (i.e., anxiety, intentions to persist toward graduation, life satisfaction, sense of belonging, stress, and well-being.). As displayed in Table C2, the autonomy, competence, and status subscales were each significantly positively correlated with sense of belonging, life satisfaction, perceptions of campus climate, and physical well-being, and the autonomy and competence scales were also significantly positively correlated with students' intentions to persist to graduation. The relatedness subscale was significantly positively correlated with sense of belonging, life satisfaction, anxiety, perceptions of campus climate and intentions to persist, the meaning subscale was significantly positively correlated with sense of belonging, stress, anxiety, and intent to persist; and the safety subscale was significantly positively correlated with anxiety. Notably, these patterns are slightly different from those identified in Pilot Study 2, in which the autonomy subscale was significantly positively correlated with stress and the relatedness subscale was significantly negatively correlated with stress. These changes could be due to the changing of the items for this version of the measure and/or due the effects of the Coronavirus outbreak at the time of the administration of Pilot Study 3.

Correlations Between Need Conflict and Outcomes. I also examined students' need conflict and need disruption in relation to the dependent variables. Overall, with the exceptions

of safety conflict and competence disruption, the conflict and disruption scores for each need were positively correlated with stress and anxiety. Another notable pattern is that the disruption of safety needs was significantly negatively related to life satisfaction, well-being, perceptions of campus climate, and physical well-being. Correlations between need conflict and need disruption scales and the dependent variables are presented in Table C3. The means, standard deviations, and internal reliability for all need conflict and disrupted scales are reported in Table C4.

Correlations Between Need Satisfaction and Outcomes. The first version of the Need Satisfaction and Progress Scale was pilot tested in this study. To reduce respondent burden, my goal was to select three satisfaction items for each need, if doing so did not significantly impact the internal reliability of the scale. As such, I examined Cronbach alpha values for each scale with all items and with each item deleted. The reliability of the safety subscale increased when I dropped one item. The reliability of the other subscales dropped slightly when I included only three items - the largest decrease in Cronbach alpha across all subscales was .047. Because of my concern about the length of the survey and this minimal reduction in internal reliability, I proceeded with the three-item subscales for need satisfaction. The means, standard deviations, and internal reliability for all need satisfaction scales are reported in Table C5. Note that in planning for the dissertation research, I decided to completely revise the Need Satisfaction and Progress Scale, as explained below. Although I ran EFAs on the measure for this pilot study, they are not reported here because their results were difficult to interpret and they did not inform the changes that were made to the measure for my primary dissertation study.

Next, I computed mean satisfaction scores for each subscale and examined correlations between need satisfaction and the dependent variables. Interestingly, satisfaction of the needs for competence and safety were significantly correlated with all outcome variables - negatively

correlated with stress and anxiety and positively correlated with sense of belonging, life satisfaction, well-being, perceptions of campus climate, physical well-being, and intentions to persist to graduation. This pattern of correlations was also observed for the satisfaction of the needs for autonomy, relatedness and status with one exception – these variables were not significantly related to anxiety. The satisfaction of the need for meaning was significantly positively correlated with sense of belonging, life satisfaction, well-being, perceptions of campus climate, physical well-being and intentions to persist, but was not associated with stress or anxiety. Correlations between the need satisfaction scales and the dependent variables are presented in Table C6.

The last set of correlations I examined were between the MACS subscales and the need satisfaction scores. As presented in Table C5, for all needs *except* safety, the scale score for each need on the MACS was significantly positively correlated with satisfaction of that need. For example, scores on the autonomy subscale of the MACS were correlated with satisfaction of the need for autonomy in college. Overall, the more that the students endorsed a particular need as a reason for attending college, the more that they felt that this need was being satisfied. One possible explanation for the lack of a correlation between the need for safety in college and satisfaction of the need for safety is because the items from these two subscales were not well aligned. The items in the MACS were mostly future oriented – about having a safe and stable life in the future, while the satisfaction items were about feeling safe while in college. To address this issue, I made revisions to both measures, which are described in greater detail below.

Additionally, there were several cases in which one need was significantly positively associated with satisfaction of a different need. For example, the needs for autonomy and competence were significantly associated with need satisfaction of all six needs. Similarly, the

need for relatedness was significantly associated with satisfaction of the needs for autonomy, competence, and safety, the need for meaning was significantly positively related to satisfaction of the needs for autonomy, competence, and relatedness, and the need for safety was significantly positively related to satisfaction of the need for meaning. One interpretation of these patterns is that student may often engage in multifinal activities (i.e., activities in which more than one need is satisfied).

Changes to the MACS. After discussions with my dissertation committee, I changed the instructions and the stem used on the MACS. Previous versions of the measure instructed respondents to think back to the time they decided to attend college, and the question stem was "I decided to attend college because…" The instructions now read "Please answer the following questions based on how you are currently feeling**.** These questions may seem relevant to your life in general, be we are interested in how they relate specifically to your motivation to attend college," and the stem was changed to "I am attending college because…." These changes were made because I expected the needs that students are currently trying to fulfill in college, and satisfaction of these needs, to better predict student outcomes, compared to the needs that students think they were trying to fulfill in the past. Also, in the interviews in Pilot Study 1, many students said they did not remember a specific time when they decided to attend college – it was often assumed they would attend and/or it was a decision they made with their parents over time.

One concern about this measure is that the mean scores on the MACS are high (i.e., the mean scale scores from Pilot Study 3 ranged from 4.39 to 5.31, using a 6-point Likert scale). To potentially address this issue in the dissertation study, the stem of the question (i.e., "I decided to attend college because…") was presented with each item (compared to previous versions of the

measure in which the stem appeared only once on each page of the survey, above all of the items). This change was made in an effort to address potential ceiling effects by reminding respondents that they are responding to questions related to their decision to attend college, rather than endorsing general beliefs about their live across domains or contexts. It is possible that, with the stem presented only once on each page (as was done in the pilot studies), students forgot the context of the question and responded to items based on perceived relevance to their lives more generally.

Starting with the final set of MCAS items identified in Pilot Study 3 (Appendix C), I made several changes. First, I changed all items to be in the present tense to match the tense of the new question stem. Another potential issue was that some of the items were focused on events in the future – particularly events that might occur after graduating from college (i.e., "I decided to attend college because graduating from college will give me more freedom to pursue the kind of life I want to live" – item A13). Because students' college-related need satisfaction may be based on students' perceptions of how a particular need is currently being filled, in addition to their expectations about whether they will be able to fulfill the need in the future, I revised the items to strike a balance between present and future need fulfillment. For example, item A13 was changed to "I decided to attend college because attending college will give me more freedom to pursue the kind of life I want to live."

Additionally, based on the high correlations between the autonomy and competence items in Pilot Study 3, I added three new competence items and two new autonomy items that were expected to help differentiate the two factors. I also added one new meaning item, edited one relatedness item, and one status item. Three safety items were revised and two new safety items

were added to the measure. The final list of MACS items, which were administered in Wave 1 of the dissertation study, is presented in Appendix D.

Lastly, analyses from Pilot Study 3 informed the decision to drop the "security" component of the need for "safety/security." As discussed in the literature review, although some researchers have grouped these needs together, security could be considered more of an outcome variable – if people's growth needs (i.e., needs for autonomy, competence, and relatedness, according to BPNT) are fulfilled, they should feel secure, and if their growth needs are threatened, they should feel insecure. Thus, it seems possible that students in Pilot Study 3 reported feeling secure when their other needs were satisfied. For example, the students might have endorsed the item "I feel a sense of security in my life" if they felt physically safe on campus (i.e., need for safety is satisfied), secure in their relationships (i.e., need for relatedness is satisfied), and competent at the tasks they are undertaking (i.e., need for competence is satisfied). The data from this pilot study seems to be consistent with this possibility. In a series of simultaneous multiple regression analyses in which each dependent variable was regressed onto all six need satisfaction scores, the safety/security subscale was a significant predictor of five of the outcome variables (i.e., anxiety, life satisfaction, perceptions of campus climate, sense of belonging, and stress), and for stress, anxiety, and life satisfaction the safety/security subscale was the only significant predictor. As such, the MACS and Need Satisfaction and Progress Scale for the dissertation study were revised to include items about students' need for safety (particularly their need for physical safety), with less emphasis on security.

Changes to the Need Satisfaction and Progress Scale. One limitation of the need satisfaction measure from Pilot Study 3 was that the items were not well-aligned with the MACS items. For example, consider a competence item from the original Basic Psychological Needs

Satisfaction and Frustration Scale: “I feel competent to achieve my goals.” To make the item more applicable to my research, I changed this item in Pilot Study 3 to “I feel competent to achieve my goals in college.” However, this wording is limiting because it might not lead respondents to think about the long-term satisfaction of their need for competence beyond college; and my assumption is that students’ reasons for attending college are partly based on such future concerns. With this in mind, the need satisfaction items were revised to better align with the items in the MACS (e.g., “I feel like I am acquiring expertise in new areas”). Notably, the revised items did not measure need satisfaction in college specifically, which made the items more aligned with the outcomes variables as well (i.e., the outcome measures assessed overall well-being and psychological distress). I expected that, when examining indirect effects, this alignment would better account for any effects of the MACS on the outcomes of interest. I also revised the instructions for this measure, which now read “The following questions will ask you about the extent to which you feel some of your basic needs are being met. When responding to these questions, think about if the need is currently being met and if you are on track to meet the need in the long term.” I expect these instructions will encourage respondents to reflect on their current need satisfaction and their expectations of need satisfaction in the future, which I think more accurately measure the construct I am interested in examining. The need satisfaction items that were administered in the dissertation study can be found in Appendix D.

Changes to Dependent Variables. To shorten the length of the surveys for the dissertation study, the campus climate scale was removed. This scale was selected for removal because it strongly correlated with the sense of belonging measure $r(197) = .80$, $p<.001$. Another limitation of this scale is that it included 4 items that were selected from two different measures – and these items seemed to be tapping into different constructs. This is the only

measure from Pilot Study 3 that was not included in the dissertation study. However, as discussed in greater detail below, the Sense of Belonging Scale was administered in the dissertation study, but it was not included in the analyses due to a high correlation with the satisfaction of the need for relatedness.

Notes Regarding the COVID-19 Pandemic. In March 2020, many colleges around the world sent students home to complete the spring 2020 semester remotely. This is one of many ways in which the coronavirus outbreak influenced students' day-to-day lives, and the broad impact of these changes is not well understood at this time. It is likely that the social and economic changes resulting from the virus impacted students' thinking about college – both their reasons for attending and, for some students, whether they attended at all. To acknowledge the possibility of Covid-19 influencing students' perceptions of college, a message (presented in Appendix D) was shown to participants after they consented to participating in the dissertation study, but before they began responding to the MACS items. Relevant implications for interpretations of the research findings are discussed in Chapter 6.

CHAPTER 4: DISSERTATION STUDY METHODOLOGY

Participants

Participants were recruited from four community colleges and one selective private four-year university in the Northeast. At each institution, a staff member sent the recruitment email, which included a link to the Wave 1 survey, to all incoming first-year students enrolled in the fall 2020 semester. The Wave 1 Survey asked participants to report their email addresses, which allowed me to administer the Wave 2 survey directly to students.

A total of 553 students responded to the Wave 1 survey. However, 24 respondents did not complete the survey, and thus were removed from the sample. Additionally, one participant was excluded from the sample because they provided the same response to all MACS items. Nine respondents incorrectly answered the attention check item and were also excluded from all analyses. Lastly, seven respondents were removed from the sample because they did not provide their email address, which prohibited them from participating in Wave 2 of the study. The final sample included 512 students, 86 (16.8%) of whom were enrolled in community colleges and 426 (83.2%) of whom were enrolled in the private four-year university. The demographic characteristics of these subsamples are listed in Table 1.

A total of 521 students were recruited to complete the Wave 2 survey. This included the 512 respondents from Wave 1 plus the nine respondents who were excluded from Wave 1 analyses due to incorrectly responding to the attention check item (these participants were contacted for the Wave 2 survey because incentives were offered for participation in the study, but they were not included in any analyses). Of those contacted, 253 students (48.56%) responded to the Wave 2 survey. Twenty-six respondents did not complete the survey and seven respondents incorrectly answered the attention check item and were thus excluded from all

analyses. Lastly, one respondent was excluded from Wave 1 analyses for failing the attention check, and therefore was also omitted from Wave 2 analyses. The final sample included 219 students, 29 of whom were community college students (13.2%) and 190 of whom were private university students (86.8%). The demographic characteristics of these subsamples are listed in Table 1.

Because such a high percentage of the students who completed the Wave 1 survey did not completed the Wave 2 survey, I used chi-square tests to examine the extent to which there were differences in demographic characteristics, prior academic achievement, and Wave 1 well-being and stress between students who did versus did not complete the Wave 2 survey. As indicated in Table 1, there were two significant differences between these groups of participants: participants in the Wave 2 sample reported significantly higher SAT/ACT percentiles and significantly lower rates of psychological well-being, compared to participants who completed Wave 1 but did not provide Wave 2 data. The difference in SAT/ACT percentiles may have partly been due to the slightly higher percentage of community college students in the group that did not complete the Wave 2 survey.

Table 1

Demographic Information and Covariates for Dissertation Study Analyses

	Wave 1 sample (n=512)			Wave 2 Sample (n=219)			Did not provide Wave 2 data (n=293)		
	Community colleges (n=86)	Private university (n=426)	Total (n=512)	Community colleges (n=29)	Private university (n=190)	Total (n=219)	Community colleges (n=57)	Private university (n= 236)	Total (n=293)
	Mean (SD) or N (%)			Mean (SD) or N (%)			Mean (SD) or N (%)		
Demographics									
Gender									
Male	30 (34.9%)	159 (37.3%)	189 (36.9%)	8 (27.6%)	63 (33.2%)	71 (32.4%)	22 (38.6%)	96 (40.7%)	118 (40.3%)
Female	54 (62.8%)	266 (62.4%)	320 (62.5%)	19 (65.5%)	127 (66.8%)	146 (66.7%)	35 (61.4%)	139 (58.9%)	174 (59.4%)
Race									
White	64 (74.4%)	273 (64.1%)	337 (65.8%)	22 (75.9%)	127 (66.8%)	149 (68.0%)	42 (73.7%)	146 (61.9)	188 (64.2%)
Black or African American	2 (2.3%)	22 (5.2%)	24 (4.7%)	2 (6.9%)	6 (3.3%)	8 (3.7%)	0 (0.0%)	16 (6.8%)	16 (5.5%)
American Indian or Alaska Native	0 (0.0%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.4%)	1 (0.3%)
Asian	4 (4.7%)	86 (20.2%)	90 (17.6%)	1 (3.4%)	36 (18.9%)	37 (16.9%)	3 (5.3%)	50 (21.2%)	53 (18.1%)
Native Hawaiian or Pacific Islander	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0)%	0 (0.0%)	0 (0.0%)	0 (0.0%)
Multiracial	10 (11.6%)	35 (8.2%)	45 (8.8%)	4 (13.4%)	17 (8.9%)	21 (9.6%)	6 (10.5%)	18 (7.6%)	24 (8.2%)
Other	6 (7.0%)	5 (1.2%)	11 (2.1%)	0 (0.0%)	2 (1.1%)	2 (0.9%)	6 (10.5%)	3 (1.3%)	9 (3.1%)
Hispanic	15 (17.4%)	57 (13.4%)	72 (14.1%)	6 (20.7%)	26 (13.7%)	32 (14.6%)	9 (15.8%)	31 (13.1%)	40 (13.7%)
Age (in years)	20.88 (7.18)	17.81 (.57)	18.32 (3.19)	19.90 (3.21)	17.77 (.55)	18.05 (1.45)	21.39 (8.50)	17.83 (.59)	18.53 (4.02)
Covariates									
Socioeconomic status	5.31 (1.60)	6.93 (1.80)	6.65 (1.86)	5.66 (1.29)	6.97 (1.79)	6.79 (1.79)	5.14 (1.73)	6.89 (1.80)	6.55 (1.91)
SAT or ACT percentile	65.11 (17.61)	93.80 (8.71)	90.84 (13.25)	65.80 (13.15)	94.47 (8.01)	92.36 (11.30)*	64.80 (19.48)	93.24 (9.23)	89.66 (14.50)*
Wave 1 stress	2.02 (.47)	1.85 (.41)	1.88 (.43)	1.90 (.42)	1.88 (.41)	1.88 (.41)	2.08 (.49)	1.83 (.41)	1.88 (.44)
Wave 1 PWB	3.40 (.91)	3.09 (.76)	3.14 (.80)	3.40 (.95)	3.00 (.74)	3.06 (.78)*	3.40 (.90)	3.15 (.78)	3.20 (.81)*

Note. PWB psychological well-being. Socioeconomic status was assessed using a ladder scale that ranged from 1 (indicating the lowest rung on a socioeconomic ladder) to 10 (indicating the highest rung on the ladder). Percents were calculated from the total number of participants in the respective sample or subsample. The total number of participants from each sample with missing data for a particular variable is as follows: *Wave 1* -- Race (4), Age (1), SAT/ACT percentile (46), SES (2); *Wave 2* -- Race (2), SAT/ACT percentile (15); *Did not provide Wave 2 data* -- Race (2), Age (1). SES (2), SAT/ACT percentile (31).

* Indicates a significant difference in means between the Wave 2 sample and the participants who did not provide Wave 2 data at the $p < .05$ level (2-tailed).

Procedure

This study included two waves of data collection. The first survey, administered in summer 2020, included the MACS, baseline measures of well-being and stress, and demographic questions, including gender, race, first-generation college student status, and socioeconomic status (SES). The second survey, administered in January 2021 included the Need Satisfaction and Progress Scale, the Need Conflict Scale, and the questionnaires assessing the student outcomes of interest, described below. Participants were also asked to complete an adapted version of the Centrality subscale from the Multidimensional Inventory of Black Identity (Sellers et al., 1997), a cognitive strategies measure (adapted from Hartwig & Dunlosky, 2012; Morehead et al,, 2016), as well as to report the format of their classes in the fall semester (i.e., fully in-person, fully online, or blended), their living situation (i.e., on campus, off campus, with family, or other), and the number of days per week they spent on campus, but these measures were not examined for this dissertation, and therefore are not described below.

All participants who completed both surveys were entered in a raffle to win one of several prizes (i.e., one iPad Air, two pairs of AirPods Pro, one Apple Watch (Series 5), twelve $50 Amazon gift cards). The purpose of these incentives was to recruit more students to participate in the study and to encourage them to complete the second survey.

Measures

Motivations for Attending College Scale (MACS)

As previously mentioned, a significant component of the current study included measure development. The version of the MACS, which was developed in the pilot phase of the study, includes six subscales (one for each fundamental need) and a total of 31 items. Using a 6-point Likert-type scale (1 = strongly disagree, 6 = strongly agree) participants are asked to reflect on

their motivations for attending college and respond to each item, using the prompt "I am attending college because…" Sample items for each need include: "…it will give me more control over my own life" (autonomy), "…I want to master new skills" (competence), "…I want to develop friendships that will last many years" (relatedness), "…I want to discover the truth about the world" (meaning), "…I want to have stable living conditions" (safety), and "…will earn me more social status" (status). See Appendix D for a full list of items. As discussed below, the MACS was finalized in the dissertation study; an EFA was conducted with half of the Wave 1 sample to determine which items would be used in subsequent analyses to address the research aims.

Need Conflict Scale

For the purposes of this study, I developed a measure (during the pilot phase; see above) of the conflict students experience when attempting to fulfill their needs in college. Participants indicated on a scale of 0 (never) to 4 (always) how often the things they do to fulfill each need get in the way of the things they do to fulfill the other needs. See Appendix D for a full list of items.

Need Satisfaction and Progress Scale

The need satisfaction and progress measure was developed in the pilot phase of this study, see above for details. Using a 6-point Likert-type scale (1=strongly disagree, 6= strongly agree), participants responded to three items for each need. Sample items for each need include "I feel like I am gaining more control over my life" (autonomy), "I feel like I am mastering new skills" (competence), and "I feel like I am developing close personal relationships" (relatedness), "I feel like I am exploring the meaning of my existence" (meaning), "I feel like I am taking steps

to ensure that I will always have stable living conditions" (safety), and "I feel like my social status is increasing (status). See Appendix D for a full list of items.

Psychological Well-Being

Psychological well-being was measured at both data collection time points using the 8-item well-being subscale from the Inventory for Depression and Anxiety Symptoms (IDAS; Watson et al., 2007). Using a 5-point Likert-type scale (1 = not at all, 5 = extremely), this measure asks participants to report how much they experienced particular feelings or experiences in the past two weeks. Sample items include "I was proud of myself" and "I felt that I had a lot to look forward to."

Physical Well-Being

Participants also reported their perceived physical health in one 5-point Likert item (1 = poor, 5 = excellent), "In general, would you say your physical health is poor, fair, good, very good, or excellent?" (Ware & Sherbourne, 1992).

Satisfaction with Life Scale

This scale includes five items (Diener et al., 1985), all of which were administered during Wave 2 of data collection. Sample items include "In most ways, my life is close to my ideal," and "The conditions of my life are excellent." Participants responded to these items utilizing a 6-point Likert-type scale (1 = strongly disagree, 6 = strongly agree).

Sense of Belonging

Belonging on campus was measured during Wave 2 of data collection using the 3-item Sense of Belonging subscale from Bollen and Hoyle's (1990) Group Cohesion Scale. Using a 6-point Likert-type scale (1 = strongly disagree, 6 = strongly agree), participants responded to items such as "I feel a sense of belonging at my college" and "I see myself as a member of my

college community." Notably, this scale was strongly correlated with the relatedness satisfaction subscale of the Need Satisfaction and Progress Scale, $r(217) = .733$, $p < .001$; therefore, it was not included as a dependent measure in the dissertation analyses, contrary to my original plan.

Anxiety

Anxiety was measured using the GAD-7 (Spitzer et al., 2006), a 7-item generalized anxiety survey. This measure uses a 4-point Likert-type scale (0 = not at all, 3 = nearly every day) to ask participants how often in the last two weeks they have experienced symptoms of anxiety, such as "trouble relaxing" and "worrying too much about different things." This measure was administered in Wave 2 of data collection.

Stress

Stress was measured using the University Stress Scale (Stallman & Hurst, 2016). For this measure, participants reported how often (1 = not at all to 4 = constantly) 21 categories cause them stress, including friendships, work, mental health, university environment and discrimination. This measure was administered in Waves 1 and 2 of data collection.

Academic Achievement

In the Wave 2, survey students were asked to report their GPA from the fall semester. If students did not know their GPA, they were asked to list their course grades (i.e., A-, B, B+, C, B) and their GPAs were calculated. Note that if grades were listed, they were assumed to be grades for 3 credit courses, as I did not ask students for a list of the specific courses they took; thus, there could be some error in the calculated GPAs to the extent that participants reported grades was for 1-credit labs or 4-credit course, for example. Self-report GPA is often used as a dependent variable in education research. Although there is some error in asking students to report their grades, Kuncel and colleagues (2005) found in a meta-analysis that students' self-

report grades are good reflections of actual grades, especially for students with higher GPAs. Considering the average fall semester GPA in the sample for this dissertation study was 3.53, I expected that the self-reported GPAs provided would be strongly correlated with actual GPAs in this sample. However, Kuncel and colleagues (2005) also found that low performing students tend to report inflated grades. Thus, the high mean GPA in the sample could be due, in part, to some students reporting inflated grades.

Intention to Persist Toward Graduation

Persistence intentions were measured in the Wave 2 survey with one item (i.e., How certain are you that you will graduate from your college?), using a 6-point Likert scale (1= very uncertain, 6= very certain).

Data Analysis

In addition to the analyses performed in the pilot phase of this study, factor analysis was used to address Research Aim 1 (i.e., developing the three need-related measures). To finalize the MACS for the purpose of this research I performed EFA and confirmatory factor analysis (CFA) using Wave 1 data. First, I used SPSS 25 to run an EFA on half of the sample in order to determine which items should be included in the CFAs. The details of the EFA and item selection are presented in Chapter 5. The CFAs were conducted on the other half of the sample using Stata 15. Model fit was assessed using the cut-off criteria recommended by Schreiber and colleagues (2010): comparative fit index (CFI ≥ 0.95), the root mean square error of approximation (RMSEA ≤ 0.06), and the standardized root mean square residual (SRMR ≤ 0.08).

To address Research Aim 2a, (i.e., identifying profiles of salient needs for both school types), I conducted LPA using MPlus 8 Software. All respondents who completed the Wave 1 survey were included in the LPA ($N = 512$). Six scale scores (i.e., one for each need) from the

MACS were used as indicator variables. To determine the appropriate number of profiles, I considered the substantive interpretation the profiles as well as several statistical indices. For example, I considered the Akaike information criterion (AIC), the Bayesian information criterion (BIC), and the sample-size adjusted Bayesian information criterion (ssBIC) to examine parsimony: lower values of these information criterion statistics indicate better fit (Oberski, 2016). To examine the separation of profiles I examined entropy statistics (i.e., entropy values greater than 0.80 indicate a separation of distinct characteristics in each profile). I also considered the Lo-Mendell-Rubin likelihood test, for which a significant *p*-value indicates the k-1 class model should be rejected in favor of the k-class model (Bauer & Steinley, 2020). Note that due to the small sample of community college students, I was not able to address the second half of Research Aim 2a (i.e., examine whether the same profiles exist across two contexts) by running separate LPAs on the two samples, as recommended by Collins and Lanza (2010). Rather, I included school type as a covariate in the mixture model to identify the likelihood of students from each type of school falling into each of the identified profiles.

Several mixture models were run to address Research Aim 2b (i.e., examining the extent to which the profiles predicted need satisfaction, need conflict, and the various outcome variables). All mixture models included the six scale scores from the MACS as indicator variables and each model included one of the dependent variables of interest. To evaluate relationships between the profiles and the distal outcomes I used Vermunt's 3-step approach: (a) fit the mixture model to class indicator variables (i.e., the six MACS scale scores), (b) assign cases to profiles based on posterior probabilities (profile membership is then treated as a latent variable), and (c) predict each distal outcome by latent profile using the assigned class as a latent indicator variable (i.e., the profile membership latent variable identified in step b; Bauer &

Steinley, 2020; Nylund-Gibson et al., 2019). Vermunt's approach was selected for these analyses because it is more robust than other types of analysis (i.e., compared to the 1-step approach and the Naïve 3-step approach), and it can accommodate more predictors. The results of each mixture model are reported in Chapter 5.

Structural equation modeling (SEM) was performed in Stata 15 to address Research Aims 3a (i.e., examining the associations between need conflict, need satisfaction, and the various outcome variables). Maximum likelihood estimation was used for all SEM models in this study. To examine the extent to which the models fit the empirical data, I examined χ^2 statistics and several fit indices, including standardized root mean square residual (SRMR), comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Data were considered to fit the model if the following criteria were met: nonsignificant chi-square test, SRMR value less than .08, CFI value greater than .95, and RMSEA value less than .06 (Hu & Bentler, 1999; Schreiber et al., 2010). Note that I considered model fit to be adequate if some (but not all) of the indices were within the recommended range.

The development of this dissertation study was, in part, guided by Research Aim 4, (i.e., begin to explore the indirect effects of the motivation profiles on the outcomes via need conflict and need satisfaction). Although testing these indirect paths using mixture models would be an important contribution to the literature, it was beyond the scope of my dissertation. Instead, to address this research aim, I drew on findings from Research Aims 2b and 3 in my discussion of the results (Chapter 6).

Missing Data

This dissertation study utilized listwise deletion in all analyses. This approach was selected because all survey items on both Wave 1 and Wave 2 surveys were forced response (except for

demographic questions, which were request response). This means that to proceed through the survey, participants were forced to answer all questions presented to them (except for the demographic questions). During the data cleaning process, any respondent who did not complete a particular survey was removed from the analytic sample for that survey. As such, all participants in the analytic sample for each wave have complete data on all need measures (i.e., the MACS, need satisfaction, and need conflict scales) and all dependent variables, except for fall GPA. For cases in which participants did not respond to a particular demographic question, those respondents were removed from all analyses that included the item with missing data.

CHAPTER 5: RESULTS

Descriptive and Correlational Analyses

Before delving into the analyses that provide a more sophisticated examination of my research aims, I discuss the zero-order correlations between the primary variables of interest (i.e., the need constructs from Waves 1 and 2, as well as all outcome variables from Wave 2). Note that, for these correlations, I used mean scores for all multi-item scales and subscales (in contrast to the SEM analyses, for which I estimated latent variables in some cases). Also, the mean scores associated with the MACS excluded poorly fitting items that were identified in my factor analyses (which are described in the next section).

As presented in Table 2, students' reasons for attending college (as assessed by the MACS) were generally correlated with each other, but not to a substantial degree, which suggests that different students attempted to satisfy different sets of needs by attending college. In terms of associations between Wave 1 and Wave 2 variables, students' reasons for attending college exhibited strong positive associations with overall need satisfaction but were not strongly correlated with need conflict or the various outcome measures. There was a small negative correlation between autonomy reasons and physical well-being, as well as small positive associations between competence reasons and both fall GPA and intentions to persist. There was also a small positive association between safety reasons and stress.

The other need constructs (overall need satisfaction and need conflict) were somewhat more predictive of the outcome variables. Specifically, need satisfaction exhibited moderate to strong positive correlations with life satisfaction, psychological well-being, physical well-being, and intentions to persist. It also exhibited small to moderate negative correlations with anxiety and stress. As expected, I observed an opposite pattern of associations when it came to need

conflict. Specifically, need conflict exhibited small to strong positive correlations with anxiety and stress, and small to moderate negative correlations with life satisfaction and psychological well-being. Interestingly, need conflict and need satisfaction were not significantly inversely correlated with each other, as I had expected. The means, standard deviations for all measures (as well as the α for all multi-item scales) are also present in Table 2. Note that marginally significant results are not discussed below, and, when applicable, two significance levels are reported in the tables, <.05 and <.001.

Table 2

Correlations Between MACS Subscales, Need Satisfaction, Need Conflict, and Dependent Measures

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. MACS - Autonomy	--														
2. MACS - Competence	.344**	--													
3. MACS - Relatedness	.268**	.161*	--												
4. MACS - Meaning	.353**	.264**	.453**	--											
5. MACS - Safety	.238**	.122	.096	.099	--										
6. MACS - Status	.225*	.150*	.307**	.159*	.215*	--									
7. Overall Need Satisfaction	.186*	.274**	.206*	.171*	-.023	.085	--								
8. Overall Need Conflict	-.119	-.011	.025	.090	.096	.184*	-.130	--							
9. Stress	-.007	-.029	.004	.040	.185**	.072	-.290**	.447**	--						
10. Life satisfaction	.086	.111	.167*	.084	-.072	-.086	.466**	-.190*	-.355**	--					
11. Psychological well-being	-.036	.077	.079	-.031	-.126	-.002	.546**	-.133*	-.360**	.553**	--				
12. Anxiety	.079	.054	-.047	.068	.083	.054	-.191*	.182*	.523**	-.396**	-.409**	--			
13. Fall GPA	-.030	.180*	.045	.011	-.107	.073	.115	.071	-.044	.212*	-.003	-.023	--		
14. Physical well-being	-.145*	.043	.131	-.038	-.130	-.020	.327**	-.021	-.297**	.402**	.350**	-.184*	.110	--	
15. Intentions to persist	.036	.247**	.018	-.039	.018	.039	.362**	-.065	-.212*	.335**	.215*	-.142*	.272**	.268**	--
Mean	5.24	5.28	4.82	4.48	3.52	3.88	4.52	2.16	2.07	4.04	3.06	2.00	3.53	3.52	5.46
SD	.60	.57	.99	1.00	.97	.94	.65	.66	.40	.96	.86	.74	.49	.96	.87
α	.72	.80	.86	.84	.80	.86	.83	.92	.82	.82	.91	.89	N/A	N/A	N/A

* $p < .05$. ** $p < .001$.

Research Aim 1: Measure Development

Motivations for Attending College Scale (MACS)

Exploratory Factor Analysis

An EFA was conducted in SPSS 26 with data from half of the Wave 1 survey participants (n = 256) to examine the factor structure of the revised MACS. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (.815) and Bartlett's Test of Sphericity, χ^2 (465) = 3352.329, p < .001, indicated that the data set was factorable (Mvududu & Sink, 2013). An inter-item correlation matrix was computed between all MACS items. For factor analysis, inter-item correlations should be at least r = .20 but should not exceed r = .85 (Mvududu & Sink, 2013). I began by flagging potentially problematic items, based on low inter-item correlations within each intended subscale. Three items with inter-item correlations below .30 were flagged at this stage: A21, A22, and C11. EFA with principal axis factoring (PAF) and an eigenvalue threshold of 1 (Beavers et a., 2013), yielded a 7-factor solution, and a promax (oblique) rotation was applied to help with interpretability. The first six factors represented the six intended needs, and the seventh factor included only three items: A21, A22, and C15. Additionally, C11 did not load onto any of the factors with a factor loading greater than .30 and R5 loading on the relatedness factor was .302. None of the items cross-loaded onto two or more factors with a loading greater than .30.

To determine which items should be removed from the measure, I considered factor loadings, inter-item correlations, and the content of each item. First, item C11 was removed followed by C15, A21 and A22 (note these three items were added to the measure after Pilot Study 3 and seem to measure a desire for personal development). The factor structure of the measure was examined after each item was removed, and no major changes to factor loadings

were identified throughout this process. After removing the previously mentioned items, the item R5 remained a concern, due to its relatively low factor loading of .36 (none of the other remaining items had a loading of less than .48) and was removed from the measure. As such, a total of 5 items were removed from the MACS measure at this stage of the project. The final list of items that were used in subsequent analyses are listed in Appendix D, and the pattern matrix (which includes the unique loadings of the items on each factor) for the MACS is presented in Table 3. The internal consistency reliabilities of each subscale ranged from $\alpha = .72$ to .86.

Table 3

Descriptive Statistics and Pattern Matrix for the Final Set of Items from the Motivations for Attending College Scale (Wave 1 data)

	Meaning	Status	Safety	Competence	Relatedness	Autonomy
A13						.659
A14						.564
A16						.588
A19						.489
A20						.566
C3				.614		
C5				.727		
C14				.764		
C16				.729		
R1					.930	
R3					.891	
R4					.630	
M5	.707					
M6	.603					
M7	.688					
M8	.864					
M12	.737					
safe13			.789			
safe14			.584			
safe16			.622			
safe17			.626			
safe18			.719			
stat5		.783				
stat6		.679				
stat8		.727				
stat9		.876				
M	4.50	3.82	3.58	5.29	4.83	5.30
SD	.96	1.05	1.04	.59	.98	.57
α	.84	.86	.80	.80	.86	.72

Note. Factor loadings less than .30 are not displayed in the table.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted using Stata 15 to determine if the factor structure of the MACS that was derived from the EFA would be identified in a different subsample (Mvududu & Sink, 2013). As such, data from the other half of the Wave 1 sample was used for the CFA (n = 256). CFA requires a conceptual framework and a priori hypothesis about how the observed variables (i.e., the MACS items) will load on to the latent dimensions. In this case, the initial hypothesis was that the items would load onto six correlated factors representing the six fundamental needs. Model fit was assessed using the cutoff criteria recommended by Schreiber and colleagues (2010): comparative fit index (CFI ≥ .95), the root mean square error of approximation (RMSEA ≤ .06), and the standardized root mean square residual (SRMR ≤ .08). Based on these goodness of fit indices, an adequate model fit was identified: RMSEA = .050, CI [.042, .058], and SRMR = .061. The CFI = .936 was just below the desired cutoff of .95. It is possible that the lower CFI in the model tested here is due to the large model being tested; three fit indices (i.e., CFI, TLI, and RMSEA) have been found to yield estimates that suggest a worse fit when more parameters are added to a model (Shi et al., 2019). Additionally, the χ^2 test was significant, χ^2 (284) = 464.51, $p < .001$, which can indicate a poor fitting model; however, this index is often inaccurate for a variety of reasons, including its sensitivity to large sample sizes, and therefore greater emphasis is placed on the goodness of fit indices when evaluating model fit (Mvududu & Sink, 2013). Additionally, due to this test's sensitivity to sample size, Kumar and Kumar (2015) suggest that a ratio (χ^2 /degrees of freedom) less than 2.0 indicates acceptable fit for continuous data. In this model, the ratio is 1.64, thereby suggesting an adequate model fit. The standardized and unstandardized coefficients for this model are presented in Table 4.

Table 4

Standardized and Unstandardized Coefficients from CFA of MACS Items

Item number	Latent Construct	β	SE	B	SE
A13	Autonomy	.68	.04	1.00	--
A14	Autonomy	.67	.04	1.16	.13
A16	Autonomy	.52	.05	.69	.10
A19	Autonomy	.69	.04	1.04	.11
A20	Autonomy	.66	.05	1.03	.12
C3	Competence	.73	.04	1.00	--
C5	Competence	.73	.04	1.19	.12
C14	Competence	.66	.04	1.00	.17
C16	Competence	.73	.04	.99	.10
R1	Relatedness	.89	.02	1.00	--
R3	Relatedness	.86	.02	1.02	.06
R4	Relatedness	.74	.03	.83	.06
M5	Meaning	.78	.03	1.00	--
M6	Meaning	.68	.04	.82	.07
M7	Meaning	.86	.02	1.10	.07
M8	Meaning	.76	.03	1.04	.08
M12	Meaning	.81	.03	.96	.07
Safe13	Safety	.66	.05	1.00	--
Safe14	Safety	.51	.06	.78	.12
Safe16	Safety	.61	.05	.97	.13
Safe17	Safety	.75	.04	1.00	.10
Safe18	Safety	.67	.04	.99	.12
Stat5	Status	.75	.03	1.00	--
Stat6	Status	.79	.03	1.07	.09
Stat8	Status	.73	.04	1.00	.09
Stat9	Status	.78	.03	1.10	.09

Note. CFI = .936, RMSEA = .050 CI, [.042, .058], and SRMR = .061.

Need Satisfaction and Progress Scale

Confirmatory Factor Analysis

The purpose of this CFA (which was conducted on Wave 2 data from 219 participants) was to examine the structure of the Need Satisfaction and Progress Scale. Note that, due to the low response rate to the Wave 2 survey, the sample was not large enough to split in order to conduct separate EFAs and a CFAs on this measure. In the tested model, each of the six needs was measured using three items from this scale, and the six needs (i.e., factors) were correlated. Based on the previously specified cutoff criteria, the model was determined to be an adequate fit to the data, although the RMSEA and CFI did not reach the recommended cutoff: RMSEA = 0.063, CI [0.051, 0.076], and SRMR = 0.059, and CFI = 0.942. Notably, the χ^2 test was significant, χ^2 (120) = 225.87, $p < .001$, which can indicate a poor fitting model (Mvududu & Sink, 2013). As mentioned above, due to this test's sensitivity to sample size, Kumar and Kumar (2015) suggest that a ratio (χ^2 /degrees of freedom) less than 2.0 indicates acceptable fit for continuous data. In this model, the ratio is 1.88, thereby suggesting an adequate model fit. The standardized and unstandardized coefficients for this model are presented in Table 5.

To aid in the estimation and interpretability of the SEMs, discussed below, I also tested a 1-factor item-level model, a bifactor model, and a hierarchical model, in addition to the 6-factor solution. An example of the factor structure for each of these models is presented in Figure 1. The purpose of these analyses was to examine whether the six subscales could be modeled as indicators of one general factor. This is in line with previous research, which has found a bifactor model to be a good fit for other need satisfaction scales (i.e., Sánchez-Oliva et al., 2017). As indicated in Table 6, the fit for the 1-factor model (i.e., a model in which all 18 need satisfaction items loaded onto one global need satisfaction factor) was poor and the hierarchical and bifactor

models did not converge. Although the hierarchical and bifactor models did not converge, likely due, in part, to the small sample size, a 1-factor scale score model in which the scale scores for the six need satisfaction subscales loaded onto one overall need satisfaction factor was determined to be an adequate fit to the data, although the RMSEA and CFI do not reach the recommended cutoffs: RMSEA = .137, CI [0.099, 0.177], SRMR = .052, CFI = .925, and significant χ^2 test, χ^2 (9) = 45.96, $p <$ .001, suggesting that perhaps a higher order factor may exist for this scale. This final model, in which the six scale scores load on to one overall need satisfaction factor, represents how this scale was modeled in the SEMs.

Table 5

Standardized and Unstandardized Coefficients from CFA (6-Factor Model) of Need Satisfaction and Progress Scale

Item	Latent Construct	β	SE	B	SE
NSa1	Autonomy Satisfaction	.67	.05	1 [a]	--
NSa2	Autonomy Satisfaction	.67	.05	.95	.12
NSa3	Autonomy Satisfaction	.65	.05	.68	.08
NSc1	Competence Satisfaction	.75	.04	1 [a]	--
NSc2	Competence Satisfaction	.68	.04	.98	.11
NSc3	Competence Satisfaction	.77	.04	1.08	.10
NSr1	Relatedness Satisfaction	.95	.01	1 [a]	--
NSr2	Relatedness Satisfaction	.69	.04	.66	.05
NSr3	Relatedness Satisfaction	.89	.02	.95	.05
NSm1	Meaning Satisfaction	.58	.06	1 [a]	--
NSm2	Meaning Satisfaction	.79	.04	1.11	.16
NSm3	Meaning Satisfaction	.57	.06	1.05	.15
NSsafe1	Safety Satisfaction	.78	.04	1 [a]	--
NSsafe2	Safety Satisfaction	.84	.03	1.12	.10
NSsafe3	Safety Satisfaction	.69	.04	.97	.10
NSstat1	Status Satisfaction	.74	.04	1 [a]	--
NSstat2	Status Satisfaction	.78	.04	.88	.09
NSstat3	Status Satisfaction	.59	.05	.70	.09

Note. CFI = .942, RMSEA = .063 CI, [.051, .076], and SRMR = .059.

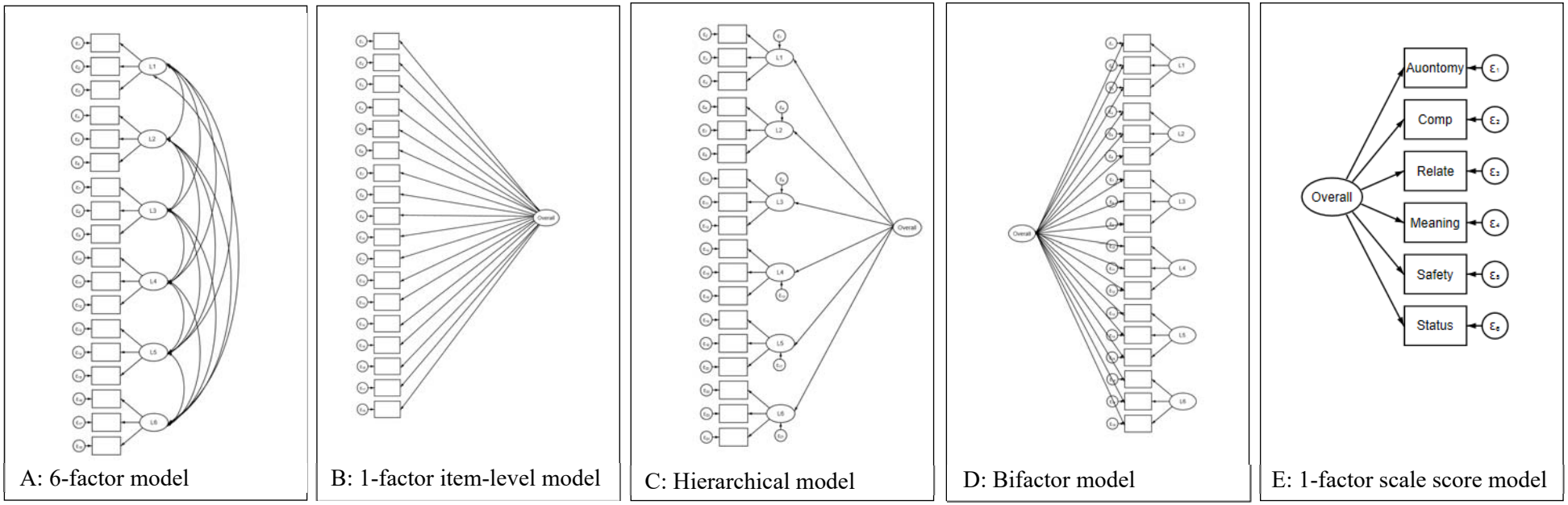
[a] indicates the parameter was set to 1.

Table 6

Fit Indices for Multiple CFAs of Need Satisfaction and Progress Scale and Need Conflict Scale

Model	χ2 (df)	CFI	SRMR	RMSEA (90% CI)
Need Satisfaction				
6-factor model	225.87 (120)	.942	.059	.063 (.051, .076)
1-factor model item-level	715.27 (135)	.681	.094	.140 (.130, .150)
Hierarchical model	*Did not converge*			
Bifactor model	*Did not converge*			
1-factor scale score	45.96 (9)	.925	.052	.137 (.099, .177)
Need Conflict				
6-factor model	1146.90 (390)	.803	.069	.094 (.088, .100)
1-factor model item-level	1623.36 (406)	.683	.126	.117 (.111, .123)
Hierarchical model	1168.10 (399)	.800	.070	.094 (.088, .100)
Bifactor model	*Did not converge*			
1-factor scale score	21.66 (9)	.985	.023	.080 (.037, .124)
Need Disruption				
6-factor model	1463.76 (390)	.721	.077	.112 (.106, .118)
1-factor model item-level	1623.36 (406)	.683	.126	.117 (.111, .123)
Hierarchical model	*Did not converge*			
Bifactor model	*Did not converge*			
1-factor scale score	16.12 (9)	.994	.015	.060 (.000, .107)

Figure 1
Graphical representation of the alternative models tested.



Note. Only the first model (A) was tested for the MACS, whereas all four models were tested for the Need Satisfaction and Progress Scale and Need Conflict Scale.

Need Conflict Scale

Confirmatory Factor Analysis

The purpose of the CFA (which was conducted on Wave 2 data from 219 participants) was to examine the fit of several potential conflict models. Note that, due to the low response rate to the Wave 2 survey, the sample was not large enough to split in order to conduct separate EFAs and a CFAs on this measure. As a reminder, the Need Conflict Scale asked participants how often a particular need conflicted with each of the five other needs. In the pilot studies, participants' responses to the 30 items across the six needs were used to compute two sets of need conflict variables. To compute the first set of variables, I averaged the five items for each need that represented the extent to which fulfillment of this need *conflicted* or interfered with fulfillment of the five other needs (this involved averaging the five items displayed on each screen of the measure). For the second set of variables, I averaged the five items for each need that represented the extent to which fulfillment of this need was *disrupted* by fulfillment of the five other needs (this involved averaging items across screens). The CFAs discussed below were used to examine the factor structure implied by each of these scoring methods.

Need Conflict Models. The first CFA tested a model in which all of the items from a particular screen loaded onto a single need conflict factor (e.g., the *autonomy_conflict 1* item*, "*How often do the things you do to feel autonomous get in the way of the things you do to feel competent," loaded onto the autonomy conflict factor), and all six factors were correlated. Based on the previously specified cutoff criteria, the model was determined to be a poor fit to the data: RMSEA = .094, CI [.088, .100], SRMR = .069, and CFI = .803 Additionally, the χ^2 test was significant, χ^2 (390) = 1146.90, $p < .001$, which can indicate a poor fitting model (Mvududu & Sink, 2013). The standardized and unstandardized coefficients for this model are presented in

Table 7. To better understand the factor structure of this measure, and possibly identify a better fitting model, I ran additional analyses. As presented in Table 6 a hierarchical need conflict model yielded a similar fit to the 6-factor model, a 1-factor item-level need conflict model yield a poor fit, and the bifactor model did not converge. In line with the analyses reported for the Need Satisfaction and Progress Scale, I also tested a 1-factor scale score model in which the six scale scores from the Need Conflict Scale loaded onto one overall need conflict factor. The model was determined to be a good fit to the data, although the RMSEA was higher than the recommended value: RMSEA = .080, CI [.037, .124], SRMR = .023, and CFI = .985, but the χ^2 test was significant, χ^2 (9) = 21.66, $p < .001$. I also tested more complex models, which are not reported here but are available upon request. Similar to the Need Satisfaction and Progress Scale, it is possible that a bifactor model would best fit the data from the Need Conflict Scale.

Table 7

Standardized and Unstandardized Coefficients for CFA (6-factor model) of the Need Conflict Scale

Item number	Latent Construct	β	SE	B	SE
Aconflict1	Autonomy Conflict	.66	.05	1 [a]	--
Aconflict2	Autonomy Conflict	.71	.04	1.16	.13
Aconflict3	Autonomy Conflict	.61	.05	1.02	.13
Aconflict4	Autonomy Conflict	.68	.04	1.08	.13
Aconflict5	Autonomy Conflict	.68	.04	1.07	.12
Cconflict1	Competence Conflict	.70	.04	1 [a]	--
Cconflict2	Competence Conflict	.72	.04	1.06	.11
Cconflict3	Competence Conflict	.71	.04	1.01	.10
Cconflict4	Competence Conflict	.68	.04	1.01	.11
Cconflict5	Competence Conflict	.69	.04	.99	.11
Rconflict1	Relatedness Conflict	.63	.05	1 [a]	--
Rconflict2	Relatedness Conflict	.69	.04	1.04	.12
Rconflict3	Relatedness Conflict	.62	.05	.95	.12
Rconflict4	Relatedness Conflict	.66	.04	1.00	.12
Rconflict5	Relatedness Conflict	.73	.04	1.08	.12
Mconflict1	Meaning Conflict	.69	.04	1 [a]	--
Mconflict2	Meaning Conflict	.76	.03	1.21	.12
Mconflict3	Meaning Conflict	.75	.04	1.31	.13
Mconflict4	Meaning Conflict	.62	.05	1.00	.12
Mconflict5	Meaning Conflict	.75	.04	1.26	.13
Safeconflict1	Safety Conflict	.07	.04	1 [a]	--
Safeconflict2	Safety Conflict	.79	.03	.98	.09
Safeconflict3	Safety Conflict	.77	.03	1.04	.10
Safeconflict4	Safety Conflict	.79	.03	1.03	.10
Safeconflict5	Safety Conflict	.78	.03	1.04	.10
Satusconflict1	Status Conflict	.74	.04	1 [a]	--
Satusconflict2	Status Conflict	.77	.03	.96	.09
Satusconflict3	Status Conflict	.64	.04	.83	.09
Satusconflict4	Status Conflict	.69	.04	.93	.09
Satusconflict5	Status Conflict	.76	.03	1.08	.10

Note. CFI = .803, RMSEA = .094, CI [.088, .100], and SRMR = .069.

[a] indicates the parameter was set to 1.

Need Disruption Models. The initial need disruption CFA tested a model in which one item from each screen loaded onto a single need disruption factor (e.g., the item *autonomy_conflict 1* item*, "*How often do the things you do to feel autonomous get in the way of the things you do to feel competent," loaded onto the *competence* disruption factor), and all six

need disruption factors were correlated. Based on the previously specified cutoff criteria, the model was determined to be a poor fit to the data: RMSEA = .112 CI [.106, .118], SRMR = .077, and CFI = .721. Additionally, the χ^2 test was significant, χ^2 (390) = 1463.76, $p < 0.001$, which can indicate a poor fitting model (Mvududu & Sink, 2013). Notably, the 1-factor item-level need disruption model was equivalent to the one factor need conflict model (as these models include the same items and factor structure), and the hierarchical and bifactor need disruption models did not converge. Considering the poor fit of the need disruption model in these initial models, I decided to exclude this construct from subsequent structural analyses, and instead focus only on need conflict. However, in line with the analyses for the need satisfaction and conflict constructs, I also tested a need disruption model in which the six disruption scale scores loaded onto one overall need disruption factor. Although this model was determined to be a good fit to the data, RMSEA = .060, CI [.000, .107], SRMR = .015, CFI = .994, χ^2 (9) = 16.12, $p = .064$, I proceeded with my plan to only include need conflict in the SEMs.

Interpretation of CFAs

The CFAs discussed above were used to inform model building decisions for the subsequent structural equation models (SEMs). Considering the poor to adequate fit of the CFAs in which the individual items loaded onto their intended factor, I explored hierarchical and bifactor models to examine whether a higher-order factor might exist for both need satisfaction and need conflict. The hierarchical model for need satisfaction did not converge, and the hierarchical model for need conflict indicated similar fit to the data as the 6-factor model. Considering this and previous work that examined the factor structure of other need satisfaction scales, it seems possible that a bifactor model might best represent the factor structure of the Need Satisfaction and Progress Scale and the Need Conflict Scale. However, the bifactor models

for both of these measures did not converge, possibly due to the sample size. As discussed below, need satisfaction and need conflict were included in the SEMs as latent variables such that the scale scores for each of the six needs loaded onto one latent variable (i.e., need satisfaction or need conflict). These constructs were modeled as latent variables, rather than scale score manifest variables, because the latent variables modeled some of the measurement error associated with the scales.

Research Aims 2a and 2b: Latent Profile Analysis

To address Research Aim 2a (which concerned the identification of motivation profiles from the Wave 1 MACS data), I conducted Latent Profile Analysis (LPA) using the Mplus8 statistical package (Muthén & Muthén, 2017). Models were estimated using the maximum likelihood estimator and 500 initial-stage start values with 20 being fully optimized. To identify the best fitting model, I compared LPA models that were estimated without variance restrictions (i.e., allowing for different variances within profiles) to models that imposed homoscedasticity (i.e., assumed equivalent variances within the profiles).

Note that, as part of Research Aim 2a, my initial plan was to treat responses from the two subsamples (community college students and private university students) as separate datasets and fit a separate set of models for each subsample to determine whether the same profiles were identified across contexts (Collins & Lanza, 2010). However, due to the small sample of community college students, this approach ended up not being feasible for the present study. Thus, to begin to address this research aim, I instead used school type (i.e., community college or private university) as a covariate in the mixture model and examined the likelihood of that students from each type of school would fall into each of the identified profiles.

Model Selection

To determine the number of patterned groups in the data, I tested several LPA models, all of which implemented a diagonal covariance matrix, consistent with the LPA approach (Bauer & Steinley, 2020). First, I ran restricted LPA models (i.e., imposing homoscedasticity) containing one to five profiles. In these models, class means were free to vary but the variances and covariances were restricted (i.e., there was no variance or covariance between the motivation indicators within a class). Next, I examined unrestricted models containing one to four profiles. In these models, class means and variances were freely estimated in all profiles, but covariances remained restricted. Note that a 4-profile solution failed to converge for the unrestricted models due to the large number of parameters and limited overall sample size.

To examine the fit of the models, I considered values for the following indices: lower Akaike information criterion (AIC), lower Bayesian information criterion (BIC), lower sample size adjusted BIC (ssBIS), higher entropy value, a significant Lo–Mendell–Rubin likelihood ratio test (LMR-LRT), and a significant bootstrap likelihood ratio test (BLRT). The fit indices for all estimated models are presented in Table 8. I also considered the substantive interpretation of each model, as well as the size of each profile within the various models. Notably, the restricted LPA models with four or more profiles included groups with less than 10% of the sample, which is not advised because small profiles can be difficult to recover, especially when the sample size is small and the class sizes are unequal (Nylund-Gibson & Choi, 2018), as was the case in this analysis. As indicated in Table 8, the fit indices point to the unrestricted 3-profile model as the best fitting model. This solution had the lowest AIC, BIC, ssBIC, significant LMR-LRT and BLRT. It also had an entropy value of 0.79, which was higher than most of the other

models (with the exception of the restricted 5-profile model). Considering these indices, I selected the unrestricted 3 profile model for subsequent analysis.

Table 8

Fit Indices for LPA Models

Number of profiles	AIC	BIC	ssBIC	Entropy	LMR-LRT	BLRT
Restricted models						
1	7,658.05	7,708.91	7,670.82	N/A	N/A	N/A
2	7,320.97	7,401.50	7,341.19	0.77	<.001	<.001
3	7,230.66	7,340.86	7,258.33	0.73	0.32	<.001
4	7,161.00	7,300.86	7,196.11	0.77	0.14	<.001
5	7,129.51	7,299.05	7,172.08	0.80	0.52	<.001
Unrestricted models						
1	7,658.05	7,708.91	7,670.82	N/A	N/A	N/A
2	7,182.38	7,288.34	7,208.99	0.70	<.001	<.001
3	**6,897.70**	**7,058.76**	**6,938.14**	**0.79**	**0.01**	**<.001**
4	Model did not converge					

Note. Selected model is in bold. LMR-LRT and BLRT, and entropy values are not available (N/A) for one profile models. *AIC* = Akaike information criterion, *BIC* = Bayesian information criterion, *ssBIC* = Sample size adjusted Bayesian information criterion, *LMR-LRT* = Lo–Mendell–Rubin likelihood ratio test, and *BLRT* = bootstrap parametric likelihood ratio test.

The profiles, presented in Figure 2, were labeled (a) Weaker Reasons (representing approximately 33% of the sample), (b) Balanced Reasons (51.5%), and (c) Stronger Reasons (15.5%). I characterized these profiles by examining the means of the MACS subscales, both between and within profiles. Between-profile differences corresponding to each need-related reason (e.g., autonomy) were assessed using Wald tests. As indicated in Table 8, all but two of these differences were significant at the $p < .05$ level (uncorrected). In general, the means in the Stronger Reasons profile were higher than the means in the other two profiles, with the exception of the safety and status means, which did not significantly differ between the Stronger Reasons and Balanced Reasons profiles. In addition, the means in the Balanced Reasons profile were higher than the means in the Weaker Reasons profile.

In terms of assessing within-profile differences, most comparisons were significant (see Table 9); thus, I assessed the relative salience of the various needs within each profile based on the magnitude of the differences between means. As illustrated in Figure 2, the range in need salience (from the two most salient needs, which were autonomy and competence in all three cases, to the two least salient needs, which were safety and status) was greater in the Stronger Reasons and Weaker Reasons profiles compared to the Balanced Reasons profile. The word "balanced" is meant to reflect the fact that there was less of a disparity in need salience within this profile. That being said, the Balanced Reasons profile still reflects a relatively large disparity between the salience of the needs for relatedness and meaning, compared to status and safety; this disparity is actually larger for the Balanced profile, compared to the Weaker Reasons profile.

Figure 2

Final Three-Profile Solution.

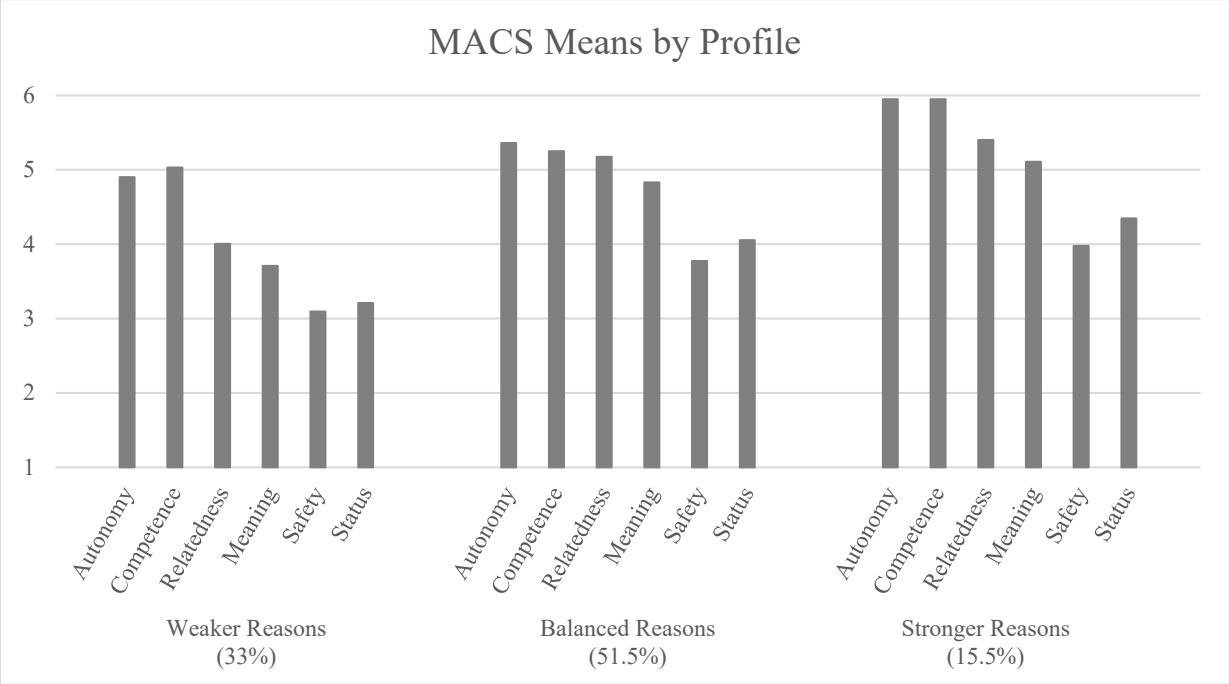


Table 9

MACS Means for Each Profile

	Weaker Reasons		Balanced Reasons		Stronger Reasons	
	Mean	SE	Mean	SE	Mean	SE
% of sample in each profile	33%		51.5%		15.5%	
Autonomy	4.90 ^{z}	.053	5.36	.031	5.95 ^{z}	.013
Competence	5.03 ^{z}	.052	5.25 ^{z}	.039	5.95 ^{z}	.016
Relatedness	4.01	.104	5.18 ^{z}	.045	5.42	.075
Meaning	3.71	.098	4.83	.046	5.11	.095
Safety	3.10 ^{y}	.087	3.78 ^{a}	.067	3.98 ^{a}	.127
Status	3.21 ^{y}	.100	4.06 ^{a}	.057	4.35 ^{a}	.136

Note. Differences *between* the profiles that are not significant at the $p < .05$ level are indicated with shared italicized letters from the beginning of the alphabet. Differences *within* the profiles that are not significant at the $p < .05$ level are indicated with shared italicized letters from the end of the alphabet.

School Type as a Predictor of Profile Membership

As mentioned above, the final sample size of the current study precluded me from examining whether the same profiles are present in the two subpopulations of interest (community college students and private university students). Instead, I used the 3-step approach to examine school type as a covariate in the mixture model (Bauer & Steinley, 2020). This approach involved (a) fitting the mixture model to class indicator variables (i.e., the six MACS scale scores), (b) estimating class membership and classification error, and (c) regressing the estimated class membership on the covariate, in this case school type (Vermunt, 2010).

To better understand how school type was related to profile membership, I examined two separate mixture models, both using the 3-step approach in which the indicator variables were the six MACS scale scores, and the covariate was school type. The two models differed in the way the school type variable was coded. First, I examined this variable with community college coded as 0, the private university coded as 1, and using the Weaker Reasons profile as the reference class (because the private university students were *least* likely to be in this profile). As presented in Table 10, students from the private university were 18.45 [95% CI 4.91, 69.29] times more likely to fall into the Balanced Reasons profile, compared to the Weaker Reasons profile, and 2.60 [95% CI 1.21, 5.63] times more likely to fall into the Stronger Reasons profile. Next, to interpret the likelihood of community college students being classified into each profile, I coded community college as 1, and examined odds ratios using the Balanced Reasons as the reference group (because community college students were least likely to be classified into this profile). Results indicated that community college students were 15.40 [95% CI 5.02, 47.20] times more likely to fall into the Weaker Reasons profile, compared to the Balanced Reasons

profile, and 5.632 [95% CI 1.725, 18.39] times more likely to fall into the Stronger Reasons profile.

Outcomes of Profile Membership

To address Research Aim 2b (i.e., examining differences in outcomes between profiles), I ran several mixture models using Mplus. All models included the six MACS scale scores as indicator variables and one of the dependent variables of interest. To evaluate relations between the profiles and each distal outcome, I used the 3-step approach: (a) fit the mixture model to class indicator variables (i.e., the six MACS scale scores), (b) assign cases to profiles based on posterior probabilities (profile membership is then treated as a latent variable), and (c) predict each distal outcome by latent profile using the assigned class as a latent indicator variable (i.e., the profile membership latent variable identified in step b; Bauer & Steinley, 2020; Nylund-Gibson et al., 2019).

As presented in Table 11, there were significant differences between profiles in overall need satisfaction, intentions to persist toward graduation, and fall GPA. Specifically, need satisfaction was significantly lower for the Weaker Reasons profile than for the Balanced Reasons and Stronger Reasons profiles. In addition, both fall GPA and intentions to persist were lower for the Balanced Reasons profile than for the other two profiles. There were no significant differences between the three profiles when it came to need conflict, stress, anxiety, life satisfaction, psychological well-being, or physical well-being.

Table 10

School Type Associations with Profile Membership

School Type	Balanced Reasons vs. Weaker Reasons		Stronger Reasons vs Weaker Reasons	
	Estimate (SE)	Odds Ratio [CI]	Estimate (SE)	Odds Ratio [CI]
Private university	2.92 (.68)	18.45 [4.91, 69.29]	.96 (.39)	2.61 [1.21, 5.63]
	Weaker Reasons vs Balanced Reasons		Stronger Reasons vs Balanced Reasons	
	Estimate (SE)	Odds Ratio [CI]	Estimate (SE)	Odds Ratio [CI]
Community college	2.73 (.57)	15.40 [5.05, 47.20]	1.73 (.60)	5.63 [1.73, 18.39]

Table 11

Means of Distal Outcomes by Profile

	Weaker Reasons		Balanced Reasons		Stronger Reasons	
	Mean	SE	Mean	SE	Mean	SE
% of sample in each profile	33%		51.5%		15.5%	
Overall need satisfaction	4.27	.104	4.60 ^{a}	.065	4.83 ^{a}	.113
Overall need conflict	2.14 ^{ab}	.090	2.14 ^{ac}	.068	2.30 ^{bc}	.124
Stress	2.03 ^{ab}	.054	2.10 ^{ac}	.041	2.04 ^{bc}	.080
Anxiety	1.98 ^{ab}	.102	1.98 ^{ac}	.077	2.14 ^{bc}	.145
Life satisfaction	3.93 ^{ab}	.133	4.07 ^{ac}	.096	4.21 ^{bc}	.191
Psychological well-being	3.03 ^{ab}	.117	3.13 ^{ac}	.084	2.84 ^{bc}	.501
Physical well-being	3.65 ^{ab}	.123	3.44 ^{ac}	.099	3.52 ^{bc}	.205
Persistence	5.73 ^{a}	.062	5.22	.103	5.70 ^{a}	.097
GPA	3.63 ^{a}	.039	3.44	.059	3.61 ^{a}	.056

Note. Differences *between* the profiles that are not significant at the $p < .05$ level are indicated with shared italicized letters.

Exploratory Analyses

To help interpret the three profiles and their relations with the distal outcomes (particularly the association between the Balanced Reasons profile and lower GPA), I examined whether the profiles differed in terms of the satisfaction and conflict that participants experienced with respect to each of the six needs (i.e., I examined six satisfaction and six conflict scores, whereas in previous analyses I examined one overall need satisfaction score and one overall conflict score). The rationale for these analyses is that I expected the profile with several competing needs (i.e., the Balanced profile) to be associated with higher need conflict, compared to the other profiles, because students might struggle to pursue several salient needs. In turn, this higher level of conflict might explain the relation between the Balanced profile and lower GPA (i.e., trying to satisfy multiple salient needs leads to higher conflict, which makes it difficult to prioritize or focus on academic tasks, leading to lower GPA). This expectation was not supported in previous analyses, perhaps, because examining overall need conflict was confounding effects of conflict of individual needs. For example, it seemed possible that the Balanced Reasons profile might be associated with higher levels of relatedness or meaning conflict because these needs were more salient in this profile relative to the two most salient needs (i.e., autonomy and competence). To explore this issue, I used the previously described 3-step approach to test whether the experiences of conflict associated with each need differed between profiles. Results indicated only one significant difference across the six needs: the Stronger Reasons profile was associated with higher levels of relatedness conflict compared to the Weaker Reasons profile. However, relatedness and meaning conflict (as well as autonomy and competence conflict) were not significantly higher for the Balanced Reasons profile compared to the other profiles,

suggesting that pursuing a greater number of salient needs did not necessarily result in these needs conflicting with other needs to a greater extent.

The rationale for testing whether the experiences of satisfaction associated with each need differed between profiles was to examine a potential response style bias (Batchelor & Miao, 2016). That is, because the distribution of the needs in the Weaker Reasons profile was similar to that of the Stronger Reasons profile, I was concerned that, perhaps, the Stronger Reasons profile simply reflected the tendency of some students to "strongly agree" with statements on the survey. Examining the need satisfaction scores across profiles allowed me to see if this pattern held up across two different scales that required participants to rate their agreement with individual items (i.e., I examined whether the Stronger Reasons profile was associated with higher levels of need satisfaction across all six needs, which might be indicative of a response style bias for this profile). To examine this issue, I used the 3-step approach to compare the six individual need satisfaction scores across the three profiles. As presented in Table12, the Stronger Reasons profile was related to higher need satisfaction compared to the Weaker Reasons profile for all of the needs except for safety satisfaction, and all of those differences (except the difference for safety satisfaction) were statistically significant, which suggests that the Stronger Reasons profile might reflect a potential response style bias, rather than a substantively distinct motivation profile. As discussed in Chapter 6, an alternative explanation to this pattern is that high scores on the MACS were associated with higher levels of need satisfying behavior.

Table 12
Means of Individual Need Satisfaction Scores by Profile

	Weaker Reasons		Balanced Reasons		Stronger Reasons	
	Mean	SE	Mean	SE	Mean	SE
% of sample in each profile	33%		51.5%		15.5%	
Autonomy satisfaction	4.54 ^{a}	.109	4.75 ^{a}	.074	5.13	.122
Competence satisfaction	4.48 ^{a}	.131	4.65 ^{a}	.081	5.07	.137
Relatedness satisfaction	3.55	.202	4.49 ^{a}	.131	4.43 ^{a}	.246
Meaning satisfaction	4.20	.126	4.77 ^{a}	.071	4.87 ^{a}	.148
Safety satisfaction	4.91 ^{ab}	.111	4.87 ^{ac}	.073	5.05 ^{bc}	.159
Status satisfaction	3.82	.136	4.15 ^{a}	.071	4.43 ^{a}	.152

Note: Differences *between* the profiles that are not significant at the $p < .05$ level are indicated with shared italicized letters.

Research Aims 3a and 3b: Structural Equation Models

To address Research Aims 3a and 3b (i.e., examine the direct and indirect effects of need conflict and need satisfaction on the outcome variables), I estimated a series of structural equation models (SEM) using Stata. SEM was selected for these analyses (rather than multiple regression or path analysis) because it allowed me to examine need satisfaction and need conflict as latent variables, which was expected to reduce measurement error (Russell et al., 1998). Also, SEM allowed me to examine overall well-being and psychological distress as latent variables, which is in line with the conceptual framework for this study.

To identify the best approach to address my research aims, given constraints such as sample size, I ran multiple versions of each model, which are available upon request. Notably, the significance of the parameters did not change across the different models. The final versions of all models included four endogenous outcome variables: fall GPA (manifest variable), intentions to persist to graduation (manifest variable), overall well-being (latent variable with the following indicators: psychological well-being scale score, satisfaction with life scale score, and psychical well-being item), and psychological distress (latent variable with the following

indicators: stress scale score and anxiety scale score). Scale scores were used as indicator variables (rather than item-level indicators) when modeling well-being and psychological distress in order to reduce the number of parameter estimates in the models. Note that the error terms for the two latent variables were allowed to covary with the manifest outcome variables and with each other; the covariance between the two manifest variables was also modeled.

To help decide which variables to include as covariates in the final SEMs, I examined the extent to which the primary variables in these models differed based on school type (community colleges vs. private university), gender, and race/ethnicity. Note that due to sample size, I combined several racial categories to create a dichotomous race variable. All participants who identified as Non-White, multiracial, and/or Hispanic were coded as Non-White Hispanic students, and participants who identified as White and not Hispanic were coded as White Non-Hispanic students. As shown in Table 13, need satisfaction was significantly higher for private university students (vs. community college students) and for White Non-Hispanic students (vs. Non-White Hispanic students). In addition, need conflict was higher for females (vs. males), fall GPA was higher for White Non-Hispanic students, and physical well-being was higher for private university students. Finally, psychological well-being was higher for males and White Non-Hispanic students, anxiety was higher for community college and female students, and stress was higher for Non-White Hispanic students and female students. The fact that school type, gender, and race/ethnicity were each significantly associated with at least one of the predictors (need conflict and/ need satisfaction) *and* one of the outcomes from the SEMs (i.e., GPA, intentions to persist, well-being, or psychological distress) supports the possibility that these background variables might confound the associations of interest in these models. Thus, the present analyses support my decision to include all three variables as covariates in the SEMs.

In addition to considering these dichotomous background variables, I examined the extent to which the continuous measures of socioeconomic status (SES), prior achievement (i.e., SAT/ACT percentile), Wave 1 stress, and Wave 1 psychological well-being were associated with the primary variables in the SEMs. Note that in the Wave 1 survey I collected students' high school GPA and their SAT or ACT scores. Due to high schools using different GPA scales, it was difficult to standardize this variable and I was concerned about its reliability. Therefore, I used only SAT/ACT percentile as a measure of previous achievement. As shown in Table 14, Wave 1 stress and psychological well-being were both significantly associated with at least one of the predictor variables, as well as multiple outcomes. In contrast, SES and prior achievement were significantly associated with three or more outcome variables, but neither of the predictors. Although this might indicate that only the Wave 1 variables were likely to have confounded the associations of interest in the SEMs, the significant associations involving SES and prior achievement may have resulted in less precise estimates of the effects of need conflict and need satisfaction, had they not been controlled for in the SEMs (Keith, 2015). Thus, the present analyses support my decision to include SES, prior achievement, Wave 1 stress, and Wave 1 psychological well-being as covariates in the SEMs. Note that all covariates were modeled as predictors of the outcome variables and were allowed to covary with each other. Also, due to missing data for these variables and for the fall GPA outcome, the final sample for all SEMs was 202. Given this small sample size and the numerous parameters estimated in the models, especially the mediation model used to address Research Aim 3b, it is possible that the parameter estimates presented below are unstable (Schreiber et al., 2010).

Table 13

Differences in Need Satisfaction, Need Conflict, and All Dependent Measures Between Demographic Groups

	School type		Gender		Race/Ethnicity		
	Community College (*n*=29)	Private University (*n*=190)	Male (*n*=71)	Female (*n*=146)	White, non-Hispanic (*n*=128)	Non-White, Hispanic (*n*=91)	Possible responses/ outcomes
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	Range
Need satisfaction	4.25 (.74) *	4.59 (.63) *	4.60 (.63)	4.49 (.67)	4.59 (.59) *	4.41 (.69) *	1-6
Need conflict	2.21 (.70)	2.16 (.66)	2.02 (.67) *	2.22 (.65) *	2.12 (.63)	2.23 (.70)	1-5
Fall GPA	3.30 (1.00) [a]	3.56 (.35) [a]	3.47 (.52)	3.55 (.48)	3.61 (.42) *	3.41 (.56) *	0-4
Intentions to persist	5.17 (1.28) [a]	5.50 (.78) [a]	5.38 (1.05)	5.51 (.76)	5.48 (.89)	5.43 (.85)	1-6
Psychological well-being	3.02 (1.07) [a]	3.07 (.83) [a]	3.22 (.74) *[a]	3.00 (.91) *[a]	3.19 (.84) *	2.88 (.86) *	1-5
Physical well-being	3.14 (.95) *	3.58 (.96) *	3.56 (.97)	3.51 (.96)	3.60 (.94)	3.41 (.99)	1-5
Life satisfaction	3.72 (1.15)	4.09 (.93)	4.01 (.94)	4.07 (.97)	4.20 (.98) *	3.81 (.89) *	1-6
Anxiety	2.29 (.72) *	1.96 (.73) *	1.69 (.54) **[a]	2.14 (.77) **[a]	2.03 (.73)	1.96 (.72)	1-4
Stress	2.01 (.40)	2.08 (.40)	1.95 (.39) *	2.13 (.40) *	2.02 (.38) *	2.14 (.41) *	1-4

***** indicates a significant difference between school types, genders, and races at $p < .05$ level. ****** indicates a significant difference between school types, genders, and races at $p < .001$ level. [a] indicates equal variances were not assumed based on results of Levene's Test for Equality of Variances.

Table 14

Correlations Between Covariates and Dependent Variables

	Stress (W2)	Life satisfaction (W2)	Psychological well-being (W2)	Anxiety (W2)	Fall GPA (W2)	Physical well-being (W2)	Intentions to persist (W2)	Overall need satisfaction (W2)	Overall need conflict (W2)
Prior achievement	-.034	.202*	.123	-.213*	.259**	.134	.043	.108	.062
SES	-.151*	.288**	.195*	-.188*	.151*	.171*	.135*	.127	.012
Well-being (W1)	-.273**	.336**	.503**	-.143*	-.028	.231*	.109	.371**	-.110
Stress (W1)	.574**	-.355**	-.334**	.440**	.026	-.268**	-.123	-.248**	.254**

* $p < .05$. ** $p < .001$

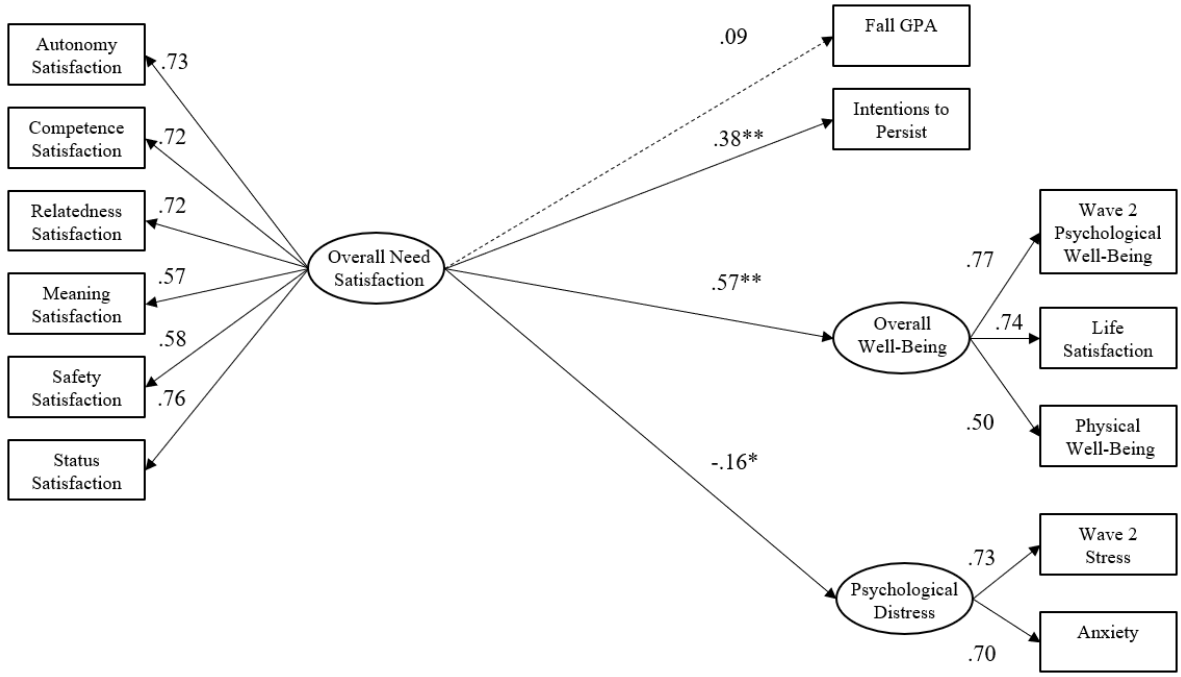
Need Satisfaction

To examine the relations between need satisfaction and the outcomes of interest, controlling for the covariates listed above, I ran an SEM in which need satisfaction was a latent variable (i.e., the indicators for need satisfaction were the six scale scores from the Need Satisfaction and Progress Scale; see Figure 3). As a reminder, I tested several CFAs to investigate the factor structure of this measure. Although the hierarchical and bifactor models did not converge, a model in which the scale score for each subscale loaded onto one general need satisfaction factor yielded adequate fit to the data, suggesting a higher-order factor might exist for this scale. The adequate fit of this model and the large number of parameters to be estimated in the SEM, given the sample size, informed the decision to model need satisfaction as a latent variable with the six scale scores as indicators.

Model fit was assessed using the previously described cut-off criteria recommended by Schreiber and colleagues (2010); that is, CFI ≥ .95, RMSEA ≤ .06, SRMR ≤ .08. Based on these criteria, the model was determined to be an adequate fit to the data, despite the CFI being below the recommended cutoff: RMSEA = .059, CI [.045, .073], SRMR = .052, and CFI = .922. Although the χ^2 test was significant, χ^2 (113) = 193.70, $p < .001$, the ratio of χ^2 to df was less than 2.0, which indicates acceptable fit for continuous data (Kumar & Kumar, 2015). As hypothesized, students' need satisfaction positively predicted their intentions to persist toward graduation, $\beta = .38$, $p < .001$ and their psychological well-being, $\beta = .57$, $p < .001$, but negatively predicted their psychological distress, $\beta = -.16$, $p = .043$. However, contrary to expectations, it was not significantly related to fall GPA.

Figure 3

SEM Examining the Effects of Overall Need Satisfaction on the Outcome Variables



Note. Standardized coefficients are presented. Dashed lines indicate non-significant paths. Solid lines indicate significant paths. All paths from indicator variables to latent variables are significant at the $p <$ .001 level. Fit indices: CFI = .922, RMSEA = .059, CI [.045, .073], and SRMR = .052. The model included the effects of the following covariates on the outcome variables: gender, prior achievement (i.e., SAT/ACT percentile), race, school type, SES, Wave 1 psychological well-being, and Wave 1 stress. The manifest variables and latent variable error terms were allowed to covary. All covariates were allowed to covary.

* $p < .05$. ** $p < .001$

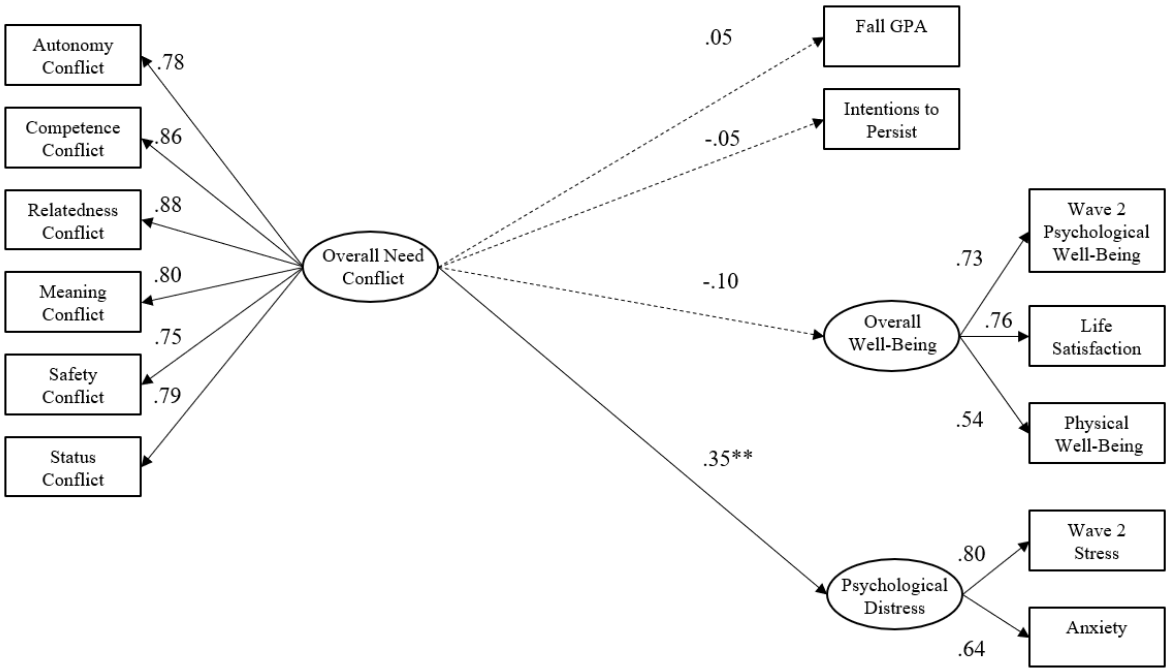
Need Conflict

The SEM examining the relations between need conflict and the outcomes of interest (see Figure 4) was identical to the previous model, except that need conflict was included as a latent independent variable (i.e., the six scale scores from the Need Conflict Scale were used as indicators) in place of need satisfaction. Based on the previously specified criteria, the model was determined to be an adequate fit to the data: RMSEA = .056, CI [.040, .070], SRMR = 0.048, and CFI = .949. Although the χ^2 test was significant, χ^2 (113) = 183.54, $p < .001$, the ratio of χ^2 to df was less than 2.0, which indicates acceptable fit for continuous data (Kumar & Kumar,

2015). Interestingly, the only significant path in the model was between need conflict and psychological distress (β = .35, $p < 0.001$).

Figure 4.

SEM Examining the Effects of Overall Need Conflict on the Outcome Variables



Note. Standardized coefficients are presented. Dashed lines indicate non-significant paths. Solid lines indicate significant paths. All paths from indicator variables to latent variables are significant at the $p <$ .001 level. Fit indices: CFI = .949, RMSEA = .056, CI [.040, .070], and SRMR = .048. The model included the effects of the following covariates on the outcome variables: gender, prior achievement (i.e., SAT/ACT percentile), race, school type, SES, Wave 1 psychological well-being, and Wave 1 stress. The manifest variables and latent variable error terms were allowed to covary. All covariates were allowed to covary.

** $p < .001$

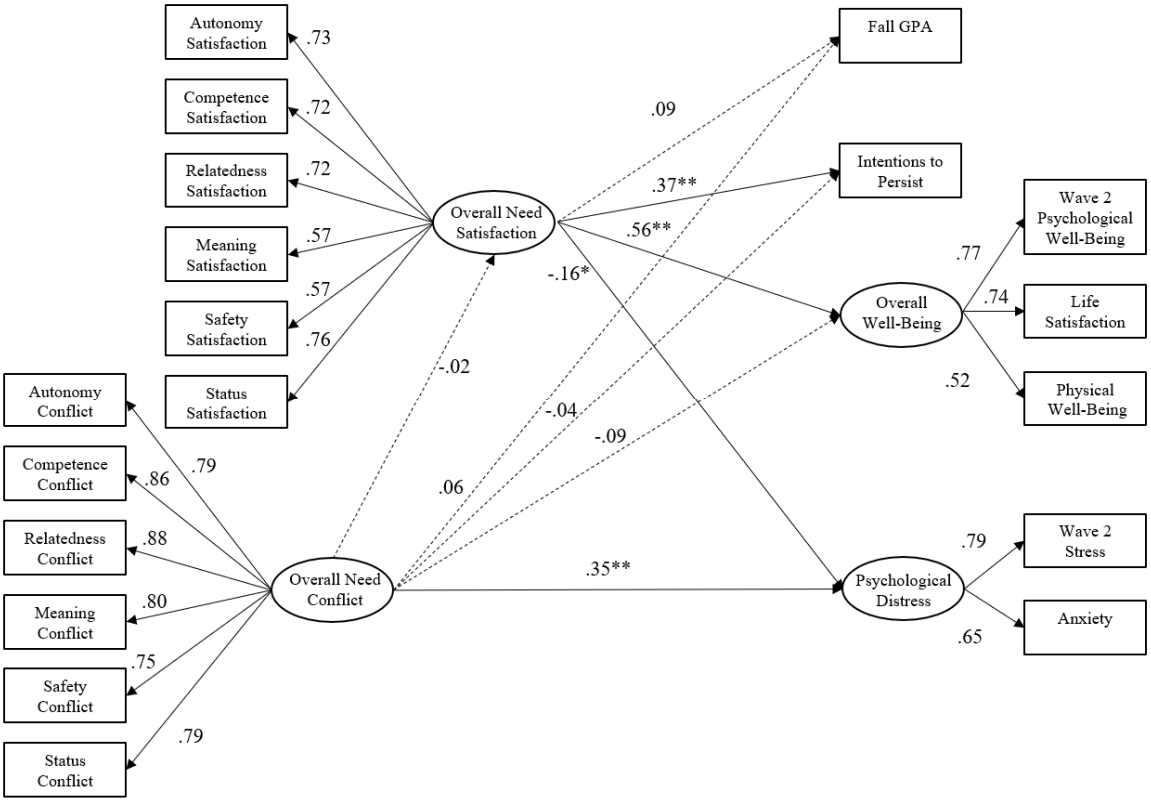
Indirect Effects of Need Conflict Through Need Satisfaction

The SEM examining the extent to which need conflict indirectly predicted the outcome variables via need satisfaction is presented in Figure 5. The model contained all variables, paths, and covariances from the previous two models, as well as a path from need conflict to need satisfaction. Based on the previously specified criteria, the model was determined to be an adequate fit to the data, although the CFI was below the recommended threshold: RMSEA =

.053, CI [.043, .064], SRMR = .055, and CFI = .932. Although the χ^2 test was significant, χ^2 (230) = 362.47, $p < .001$, the ratio of χ^2 to df was less than 2.0, which indicates acceptable fit for continuous data (Kumar & Kumar, 2015). All paths from the previous two models that were significant were also significant in the present model. However, contrary to my hypothesis, none of indirect effects were significant (see Table 15), perhaps because the association between overall need conflict and need satisfaction was almost zero.

Figure 5

SEM Examining the Indirect Effects of Need Conflict on Outcome Variables Through Need Satisfaction



Note. Standardized coefficients are presented. Dashed lines indicate non-significant paths. Solid lines indicate significant paths. All paths from indicator variables to latent variables are significant at the $p < .001$ level. Fit indices: CFI = .925, RMSEA = .055, CI [.045, .065], and SRMR = .071. The model included the effects of the following covariates on the outcome variables: gender, prior achievement (i.e., SAT/ACT percentile), race, school type, SES, Wave 1 psychological well-being, and Wave 1 stress. The manifest variables and latent variable error terms were allowed to covary. All covariates were allowed to covary.

* $p < .05$. ** $p < .001$

Table 15

Indirect Effects of Need Conflict on the Outcome Variables via Need Satisfaction

	Need Conflict	
Model	β	SE
Direct		
GPA	.06	.07
Persist	-.04	.07
Well-being	-.09	.06
Psychological distress	.35**	.07
Need satisfaction	-.02	.08
Indirect (via satisfaction)		
GPA	-.001	.01
Persist	-.01	.04
Well-being	-.01	.05
Psychological distress	.002	.01
Total		
GPA	.06	.05
Persist	-.05	.11
Well-being	-.10	.08
Psychological distress	.35**	.04

** $p < .001$

CHAPTER 6: DISCUSSION

Guided by several research aims, this dissertation study investigated students' reasons for attending college using a fundamental needs perspective. These research aims were guided by Basic Psychological Needs Theory, which I sought to extend in the following ways. First, I posited that in addition to the needs for autonomy, competence, and relatedness, the needs for meaning, safety, and status are also fundamental and motivate students to attend college. Second, I proposed that examining the needs that students identify as salient in the college context can ultimately help administrators determine whether the college context is supporting or preventing certain individuals from satisfying particular needs. This study provides an initial investigation of need salience within a college context. Third, considering the limited resources available to students (i.e., time, energy, attention, etc.), I explored the construct of need conflict and its relation with several student outcomes, including well-being and psychological distress.

The first set of research aims in this dissertation study was focused on developing three new measures: the Motivations for Attending College Scale (MACS), the Need Satisfaction and Progress Scale, and the Need Conflict Scale. Next, based on students' responses to the MACS, I identified three motivation profiles and then examined them as predictors of student's need satisfaction and need conflict, as well as the following outcomes: fall GPA, intentions to persist toward graduation, psychological well-being, physical well-being, life satisfaction, stress, and anxiety. I also used SEM to examine the extent to which need satisfaction and need conflict predicted the outcome variables, and I explored whether there were any indirect effects of need conflict on the outcomes via need satisfaction. In this chapter, I summarize my findings related to each research aim, offer interpretations of these findings, and discuss limitations of the study and suggestions for future research.

Measure Development

The first research aim for this dissertation study was to develop three measures to assess students' motivations for attending college, need satisfaction, and experiences of need conflict.

Motivations for Attending College Scale (MACS)

Findings from this study extend prior research on the topic of students' reasons for attending college by adopting a fundamental needs framework and examining the extent to which each of the needs motivate students to attend college. Although there has been some work examining the extent to which students' reasons for attending college are generally aimed at satisfying their fundamental needs (i.e., are autonomous or internal; Kennett et al., 2013; Vallerand et al., 1992), there has only been one study (to my knowledge) that examined how students' reasons for attending college are rooted in specific needs (i.e., autonomy, competence, and relatedness; Guiffrida et al., 2013). Because fundamental needs give psychological meaning to the goals that individuals pursue (Deci & Ryan, 2000), there was reason to believe that connecting students' reasons for attending college to these needs would be helpful in predicting student outcomes, particularly well-being. To investigate this possibility, I developed the MACS, which is a theoretically driven tool to assess students' underlying motivations for attending college.

Items for the MACS were developed based on a literature review and qualitative data from interviews and open-response survey questions. After conducting multiple rounds of pilot testing and identifying poorly fitting items in the dissertation study (by conducting an EFA on half of the Wave 1 sample), the final version of the measure was shown to have adequate measurement properties. This final version included three to five items loading on to each of the six intended need factors. The CFA, which was conducted on the second half of the Wave 1

sample, determined that a six-factor model in which the factors were allowed to correlate was an adequate fit to the data. Initial analyses suggest the MACS offers some utility when examining student motivation, for the purpose of this dissertation research. First, the MACS subscales are significantly correlated with several outcomes of interest, including life satisfaction, GPA, physical well-being, and intentions to persist toward graduation. This suggests there is some content validity in the measure, although greater tests of validity are suggested for future research. Second, despite the restriction of range issue discussed below, three motivation profiles were identified in the sample. This is a promising finding, as it suggests that need-based motivation profiles exist in college students, and with greater refinement, data from a revised MACS could lead to the identification of profiles that are more distinct from one another, compared to the profiles identified in this dissertation study.

Importantly, the version of the MACS used in this dissertation study requires revisions and additional pilot testing before it is administered in future research studies. Of greatest concern is the high item and subscale means (i.e., subscale means ranged from 3.58 to 5.3, using a 6-point Likert scale, and four of the six subscale means were 4.5 or higher). One problem with high means is that it suggests the items might fail to detect certain values of a construct (DeVellis, 2017). In the case of the MACS, it is likely the items were not worded strongly enough, which means it was difficult for respondents to disagree with the items. This presents an analytical problem because typically items (or subscales) with high means have low variances, and items that do not vary cannot covary with other items or scales (DeVellis, 2017). This restriction of range likely influenced my ability to identify meaningful motivation profiles in this study (i.e., because the items were limited in their ability to discriminate differences in students' motivations for attending college, the profiles are also limited in their ability to discriminate

differences in student motivation profiles). Thus, a revised MACS should include items that are more difficult to endorse, which would allow more students to disagree with the items, which, in turn, would result in lower item and subscale means and greater variability.

Need Satisfaction and Progress Scale

The second measure developed for this dissertation study, the Need Satisfaction and Progress Scale, was intended to measure students' perceptions of their current need satisfaction and their progress toward satisfying their fundamental needs in the long term. Notably, SDT scholars have already developed need satisfaction measures including the widely-utilized Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen, Vansteenkiste, et al., 2015), and the more specific Basic Needs Satisfaction at College Scale (Jenkins-Guarnieri et al., 2015). The Need Satisfaction and Progress Scale developed in this study differs from these measures in several important ways.

First, because I extended Basic Psychological Needs Theory to include needs for meaning, safety, and status, my new measure includes items to evaluate the satisfaction of these needs, whereas existing scales only assess satisfaction of the needs for autonomy, competence, and relatedness. Second, I intentionally developed the new measure to be used in conjunction with the MACS. As a result, items from the new measure closely parallel items from the MACS. For example, one MACS item reads "I am attending college because it will give me more control over my own life," while a corresponding item from the Need Satisfaction and Progress Scale reads "I feel like I am gaining more control over my life." The Need Satisfaction and Progress Scale was revised after Pilot Study 3 to better align with the MACS items because I expected that, when examining indirect effects, this alignment would better account for any effects of the MACS on the outcomes of interest.

Lastly, the Need Satisfaction and Progress Scale includes some items related to students' perceptions of their *progress* toward long-term need satisfaction. This is a unique approach to measuring need satisfaction, as most existing measures, including the BPNFS, focus exclusively on current need satisfaction. Given the future-oriented nature of some of reasons students might have for attending college (e.g., "I am attending college because I want to have stable living conditions"), it was important to assess the extent to which students perceived themselves as making progress toward these long-term aims.

In terms of the scale's factor structure, a simple model, in which three items loaded onto each of the six intended need factors (which were allowed to correlate), was determined to be an adequate fit to the data. Although previous research has found bifactor models to best fit data from other need satisfaction measures (i.e., Sánchez-Oliva et al., 2017), the bifactor model tested here did not converge, likely due to the small sample size. However, the model in which the six scale scores loaded onto one overall need satisfaction factor was determined to be an adequate fit to the data. Therefore, in the SEMs I proceeded to model this measure as one latent overall need satisfaction variable, with the six scale scores as indicator variables. Preliminary correlational analyses using the scale scores found several expected associations with the dependent measures, including significant positive correlations with life satisfaction, psychological well-being, physical well-being, and intentions to persist toward graduation, and negative correlations with stress and anxiety. Previous work utilizing other need satisfaction scales have identified similar patterns (e.g., Chen, Vansteenkiste et al., 2015; Reed-Fiske & Lucier-Greer, 2020).

Notably, the Need Satisfaction and Progress Scale also requires revisions before it is used in future research. Because the measure was developed to assess need satisfaction in relation to the MCAS, any changes to MACS items should be reflected in the need satisfaction

items. It should be noted that subscale means were also higher than desired on this version of the Need Satisfaction and Progress Scale (i.e., subscale means ranged from 4.07 to 4.90 on a 6-point Likert scale), suggesting that revised items should be more strongly worded (i.e., more difficult to endorse). Prior to a formal administration, an EFA should be run with pilot data from the revised measure.

Need Conflict Scale

The third measure developed for the dissertation study, the Need Conflict Scale, was intended to assess the extent to which students' pursuit of certain needs interferes with their pursuit of other needs. My rationale for assessing students' experiences of need conflict was to examine one way in which students' need profiles may impact their need satisfaction and well-being. In particular, it seemed possible that need satisfaction could be partly determined by the extent to which the environment supports the student's attempts to fulfill their needs. However, even when the environment provides opportunities to satisfy certain needs, engaging in these opportunities might come at the expense of satisfying other salient needs for the student. In this case, the student might experience feelings of motivational conflict that can undermine their well-being or increase their psychological distress.

It is important to note here that need conflict is conceptually similar to, but distinct from, the constructs of need frustration and need *dis*satisfaction, which have previously been examined as part of the SDT literature (e.g., Cheon et al., 2019; Ferrand & Mertinent, 2020; Reed-Fitzke & Lucier-Greer, 2020; Rouse et al., 2020). Whereas need frustration assesses students' perceptions that a particular need has been thwarted (e.g. "In this… class, I feel prevented from making choices with regard to what I can and cannot do"; Cheon et al., 2019) and need dissatisfaction assesses the perceived *lack* of need satisfaction (e.g., "In this… class, I believe I have no choice

about doing what I usually do"; Cheon et al., 2019), need conflict is more focused on the interrelated nature of students' needs (e.g., "How often do the things you do to feel autonomous get in the way of: the things you do to feel competent"?). In this regard, need conflict is more closely related to (but still distinct from) Sheldon and Niemiec's (2006) concept of "balanced" need satisfaction, which they assessed in terms of the variability in satisfaction of three different needs. Later in the chapter, I explore the connection between need balance and need conflict in more detail and make the argument that need conflict is a novel construct (cf. Gagnon, 2007) that contributes to our understanding of how need balance (as well as need satisfaction and need frustration) affect students' well-being and psychological distress.

The initial CFAs of the Need Conflict Scale discussed in this dissertation suggest that additional analyses are necessary to better understand the measurement properties of this scale. Specifically, the CFA in which five items loaded onto each of the intended six factors was determined to be a poor fit to the data. However, the model in which the six scale scores (i.e., mean conflict scores for each of the six needs) loaded onto one overall need conflict factor was determined to be a good fit to the data. Unfortunately, the bifactor model did not converge, likely due to sample size, but it seems possible that a bifactor solution might fit the data from this measure.

It also seems possible that CFA is not the most appropriate analysis to examine the structure of the Need Conflict Scale. CFA is a data reduction technique that places items or scales that correlate highly with each other on one factor, and items that correlate at low levels with the first factor on a separate factor (Keith, 2015). Essentially these models assume there is a common cause (i.e., the latent variable), which creates separate dimensions. Given the interdependence of the items in the Need Conflict Scale (i.e., to respond to one item, participants

must consider one need in relation to another need, and multiple comparisons are made across all 6 needs), it seems possible that a psychological network model might be more suitable for this type of measure. Network models can be used to explain how complex interactions among different psychological variables can occur (Epskamp, 2017). In this instance, a network model would examine the causal relationships between the conflict items and show how different items influence one another, and which ones are more central for explaining students' experiences of need conflict. This type of analysis may be more appropriate than CFA when examining the Need Conflict Scale.

Despite the unclear factor structure of the Need Conflict Scale, analyses in this study suggest the measure effectively captures students' experiences of need conflict in college. As expected, conflict scores were significantly positively related to experiences of stress and anxiety in the SEMs.

Lastly, it is worth reminding readers that before students rated the extent to which individual needs conflicted with other needs, they were asked to reflect on each need and report behaviors and activities that they engaged in while at college to satisfy each need. As explained in Chapter 3, the purpose of this writing activity was to encourage students to actively think about each need and how it influences their behavior in college, thus it was never my intention to analyze students' open-ended responses with a particular research question in mind. That being said, a careful review of these responses may provide additional insight into students' perceptions of need satisfaction and conflict in college.

Motivation Profiles

Identifying Profiles of Salient Needs

One aim of this research was to explore need-based motivation profiles in a sample of first-year college students. I expected motivation profiles would identify common combinations of students' salient needs in college, which could ultimately help administrators determine whether the college context is supporting or preventing certain groups of students from satisfying particular needs. I was interested in identifying combinations of salient needs because I assumed that students do not pursue each need in isolation, and that pursuit of one salient need might impact pursuit of other salient needs. Furthermore, with six different needs, a variable-centered approach would make it difficult to focus on the combinations of needs that are most prevalent within these student populations. Although the research aim related to motivation profiles was exploratory, I expected that the profiles would be characterized by different salient needs, and that these needs would, in turn, lead students to engage in different behaviors and activities. I also expected that different college contexts might be more supportive for some combinations of needs than for others.

Latent Profile Analysis using the MACS scale scores identified three distinct profiles (see Figure 2). The profiles were interpreted based on the mean subscale scores within each profile, and were labeled the Weaker Reasons profile, the Balanced Reasons profile, and the Stronger Reasons profile. Considering the exploratory nature of the LPA, it is important to note that my interpretation of these profiles is speculative, and that further research is needed to determine whether similar profiles are identified in other samples of college students.

The first thing to note about the three profiles is how similar they were in terms of which needs were perceived as the most vs. the least salient reasons for attending college. Specifically, autonomy and competence were perceived as the most salient needs in all three profiles and safety and status were perceived as the least salient. In line with emerging adulthood theory

(Arnett, 1998), it is possible that increasing one's autonomy and becoming more competent are particularly salient reasons for attending college because, in U.S. culture, they represent important developmental tasks that students are faced with upon graduating from high school.

Although there were certain similarities in the distribution of need salience across all three profiles, the distributions of the Weaker Reasons and Stronger Reasons profiles seemed more similar to each other, compared to the Balanced Reasons profile. Both profiles seemed to exhibit clear demarcations between three pairs of needs autonomy/competence, relatedness/meaning, and safety/status. The main difference between the profiles was that all three pairs of needs were rated as more salient in the Stronger Reasons profile than in the Weaker reasons profile. One explanation for this finding is that students in the Stronger Reasons profile were more motivated to satisfy their needs in college because the needs were not being met in other contexts. Another potential explanation is that the difference between these profiles represent a response style bias (Batchelor & Miao, 2016). That is, students in the Stronger Reasons profile may have similar perceptions of relative need salience as students in the Weaker Reasons profile but exhibit a more extreme response style when responding to agreement items (i.e., they tend to "strongly agree" with survey items more often).

Distinguishing between these explanations is important when it comes to interpreting differences in outcomes between these two profiles. For example, the Stronger Reasons profile was associated with significantly higher levels of overall need satisfaction compared to the Weaker Reasons profile. On the one hand, this finding could indicate that students who fit the Stronger Reasons profile engaged in more goal-directed behavior aimed at satisfying their needs. However, considering that the Need Satisfaction and Progress Scale used the same six-point

agreement scale as the MACS, it also possible that the finding reflects a response style bias in the Stronger Reasons profile.

In contrast to the Stronger Reasons and Weaker Reasons profiles, the Balanced Reasons profile was characterized by a flatter distribution of needs. That is, there was less of a difference between the two most salient needs and the two least salient needs in this profile. In addition, there were relatively small differences between the four most salient needs (i.e., autonomy, competence, relatedness, and meaning). Although, in general, the six needs were perceived as less salient for attending college in the Balanced Reasons profile than in the Stronger Reasons profile (though the differences were not significant for the safety and status needs), the needs for relatedness and meaning seemed to have greater *relative* importance in the Balance Reasons profile compared to in the other two profiles.

Differences in Outcomes Between Motivation Profiles

Other than the previously mentioned difference in overall need satisfaction (which may have been due to response bias), there were no significant differences in any of the Wave 2 measures between the Stronger Reasons and Weaker Reasons profiles. However, both of these profiles were associated with higher levels of academic performance (i.e., fall GPA) and intentions to persist toward graduation compared to the Balanced Reasons profile.

These results were not hypothesized and are difficult to interpret. After the profiles were identified, but before examining their associations with the outcome variables, I hypothesized that students in the Balanced Reasons profile would have higher levels of need conflict. I expected that when pursuing a relatively high number of salient needs, students may struggle to identify multifinal activities (i.e., those that satisfy multiple needs at once), and therefore might experience greater levels of need conflict. Surprisingly, the Balanced Need profile was not

associated with higher need conflict, it but was associated with lower GPA and intentions to persist. Although high levels of need conflict (and stress) could also lead to poor academic performance, no differences in need conflict or stress were observed between the profiles. Thus, it is unclear what mechanisms might explain the differences in academic performance across profiles.

Considering that a primary difference between the Balanced Reasons profile and the other two profiles seems to be the relatively high salience of the needs for relatedness and meaning, it seems possible that students' attempts to satisfy these needs somehow contributed to the observed differences in academic performance and persistence. Therefore, my tentative interpretation of this finding is that students in this profile were more focused on their needs for relatedness and meaning (compared to students in the other profiles), which took attention and resources away from their academic work, resulting in lower GPAs. It is more difficult to offer an interpretation of the finding regarding persistence intentions. One possibility is that, given that fall GPA was correlated with intentions to persist, the struggle that students experienced with their academic work could have undermined their desire to continue their studies at their current institution.

As a reminder, the development of this dissertation study was, in part, guided by Research Aim 4, (i.e., begin to explore the indirect effects of the motivation profiles on the outcomes via need conflict and need satisfaction). Although it was beyond the scope of this study to test this aim directly, I offer a couple of initial expectations, based on the results presented above. First, because there were no significant differences in need conflict across the three profiles, conflict is likely not a mediator of relations between motivation profiles and the outcome variables. Second, the direction of the associations between the profiles and need

satisfaction are not necessarily consistent with the direction of the relations between the profiles and the outcomes (e.g., the Weaker Reasons profile is associated with the *lowest* level of need satisfaction, but it is not related to significantly lower levels of well-being or higher levels of psychological distress, compared to the other two profiles). Considering these associations, I do not expect need satisfaction to mediate associations between motivation profiles and the outcomes of interest.

The findings presented here should be considered tentative for several reasons. First, the LPA was exploratory, as this was the first study to examine need-based motivation profiles. Second, when examining mean differences in MACS scale scores within and between profiles I did not correct for multiple comparisons, which could attribute to the significant differences identified within and between profiles. Additionally, I did not control for background characteristics that could explain why the students in the Balanced Reasons profile may have had lower academic achievement and persistence intentions compared to the other two profiles, separate from any differences explained by their need-based motivation. Lastly, as discussed above, the LPA in this research was limited by the poor psychometric properties of the MACS, specifically the restriction of range in the scale scores.

Despite these limitations, findings from this dissertation suggest that it might be worthwhile for subsequent research to utilize a revised MACS and revisit the person-centered analyses employed in this study. It is possible that without a restriction of range issue, the MACS has the potential to help researchers identify more interpretable motivation profiles. It remains an open question whether, even with more discriminating items, autonomy and competence will still be the salient needs of each profile (given the developmental needs of this population), or if other

needs would be identified as more salient. Nevertheless, the findings presented here offer promising directions for need-based motivation research.

Need Conflict and Satisfaction as Predictors of Students' Well-Being, Psychological Distress, and Academic Achievement

One aim of this research was to explore the relations between need conflict, need satisfaction, and several student outcomes of interest. I hypothesized that both need satisfaction and need conflict would be associated with the outcomes, and that any effects of need conflict could potentially be mediated by need satisfaction. To address these aims, I examined SEMs that specified the direct effects of need conflict and need satisfaction on fall GPA, intentions to persist toward graduation, well-being, and psychological distress, as well as indirect effects of need conflict on the outcomes via need satisfaction.

Consistent with prior research, I found that need satisfaction predicted well-being and psychological distress (for a review, see Ryan and Deci, 2017) as well as intentions to persist toward graduation (Travis & Bunde, 2020). However, need satisfaction did not predict academic performance, as hypothesized. The correlation between these two variables was in the expected direction but it was weak and non-significant. Although it seems feasible that higher levels of need satisfaction would be related to academic achievement, it also seems possible that several other variables such as academic self-efficacy and self-regulation are more proximal to student achievement, and therefore would be better predictors of GPA than need satisfaction. Another explanation is that the mean GPA in this sample was quite high with little variability, which limits the extent to which the variable can correlate with other variables (DeVellis, 2017), including need satisfaction.

In contrast, need conflict did not predict well-being, intentions to persist toward graduation, or GPA, but was positively associated with psychological distress. This finding is consistent with prior research demonstrating that experiencing motivational conflict is related to unpleasant experiences (i.e., poorer self-regulation, less positive affect, and study strain) during the execution of a chosen task or activity (Fries et al., 2008; Grund et al., 2014; Grund, Schmid et. al., 2015). Although previous research does not operationalize conflict in terms of interference between fundamental needs, it suggests that experiences of motivational conflict can ultimately detract from well-being or increase distress.

Lastly, contrary to expectations, the effect of need conflict on psychological distress was not mediated by need satisfaction (as conflict and satisfaction were unrelated). In fact, the effect of conflict on psychological distress was substantially stronger than the effect of satisfaction on this outcome. One interpretation of these results is that need conflict increased the levels of stress and anxiety that students experienced as they strove to satisfy their fundamental needs. Although aversive, this increased stress and anxiety may not actually prevent students from successfully fulfilling their needs, which would explain why need conflict and need satisfaction were not correlated. This interpretation is consistent with Sheldon and Niemiec's (2006) findings, which suggest that imbalance among the satisfaction of individual needs may induce stress and an internal conflict, which have a negative impact on well-being that is separate from any effects of students' overall level of need satisfaction. Although need balance was not examined in the current study, it is possible that need conflict is a source of imbalance (i.e., higher need conflict makes it difficult for students to satisfy all of their needs to an equal extent), and that imbalance is positively associated with psychological distress (though note that Sheldon and Niemiec found

an effect of imbalance on subjective well-being, rather than distress, and the association between conflict and well-being was non-significant in the present SEM analyses).

Although the finding that need conflict uniquely predicted psychological distress, independent of need satisfaction, may have important implications for theory and practice, additional work is needed to demonstrate a causal relation between conflict and distress in more diverse samples of students, and to identify the means by which conflict induces stress and anxiety**.** One potential mechanism underlying the effect of conflict on psychological distress is that students' experiences of need conflict reflect a struggle to identify multifinal opportunities to satisfy their needs (i.e., activities that can satisfy more than one need at the same time). Students who struggle to identify such opportunities may be forced to engage in behaviors that satisfy their needs in a sequential rather than a simultaneous manner. In situations where time is limited, pursuing one's needs in a sequential manner may lead to experiences of stress and anxiety as one struggles to jump from one activity to another in pursuit of satisfying several needs. Ultimately, satisfying needs in a sequential matter may be a less effective use of time, compared to strategically selecting activities that serve more than one need, thereby satisfying multiple needs simultaneously.

If this explanation for the effect of need conflict on psychological distress is supported by subsequent research, college administrators might be able to reduce students' stress and anxiety by offering (or improving the marketing of) campus programs and activities that are aimed at fulfilling multiple fundamental needs. For example, weekend retreats could provide students opportunities to meet new peers *and* reflect on their personal development (i.e., simultaneously help satisfy their needs for relatedness and meaning). Similarly, leadership development programs could help students build leadership skills and establish themselves as leaders in the

community (i.e., simultaneously help satisfy their needs for competence and status). It is likely that many such programs already exist on most college campuses, but students may not be aware of these opportunities, or realize the extent to which they could help satisfy their needs. In such cases, program administrators might decide to increase the visibility of their programs on campus, especially at times when students are a captive audience, such as at new student orientation, high-profile athletic events, or parents and family weekend. In other cases, university staff might be able to identify unique opportunities to help particular students navigate experiences of need conflict. For example, if a student has salient needs for safety and competence, a staff member might help the student secure a work-study job at the college-run food pantry. This type of job could help students to satisfy their need for safety (i.e., by earning income and gaining access to free food, if the student is facing food insecurity), as well as their need for competence (i.e., by learning transferable skills such as employee and customer relations, budgeting, and inventory). Ultimately, understanding students' experiences of need conflict might help both students and support staff identify effective ways for students to satisfy multiple needs simultaneously.

Limitations and Future Directions

Historical Context: COVID-19

Although the results of this dissertation study provide insight into college students' motivation, well-being, and psychological distress, several limitations should be noted. Perhaps most importantly, the data for this study were collecting during the 2020-2021 academic year, during the COVID-19 pandemic. During this time college students reported increases in stress, anxiety (Son et al., 2020), and attention problems, and the pandemic was found to have negative effects on students' mood and daily wellness behaviors (Copeland et al., 2021). Thus, students'

reports of well-being, stress, and anxiety in this study were likely affected by the pandemic. Although I attempted to control for baseline levels of well-being and stress by measuring these constructs before the start of the semester (but during the pandemic), it is possible that throughout the course of the semester students experienced heightened levels of pandemic related stress, which may have influenced their responses to the stress, anxiety, and well-being items administered in the Wave 2 survey.

Additionally, for some students, the pandemic likely influenced their need-based motivation for attending college. For example, some students decided against attending their preferred colleges in favor of local colleges closer to home (Nitro, 2020). This might reflect a change from a focus on the need for status (i.e., attending an elite college) to a focus on the need for safety (i.e., attending a local college allows students to save money while also, possibly, working and contributing to their families' income). Meanwhile, other students decided not to attend college at all in the 2020-2021 academic year due to concerns about the predominantly online learning environment and uncertainty surrounding employment and financial support (Nadworny, 2020). Therefore, the reasons for attending college that were assessed during summer 2020 may not be representative of students' reasons for attending college during a non-pandemic year, thus potentially limiting the generalizability of the findings.

In addition, there are numerous ways in which the pandemic is likely to have impacted students' efforts to satisfy their basic needs during their first semester. For example, in the online and hybrid learning environments students may have to rely on technology (i.e., video conferencing, texting, and social media) to connect with faulty and peers. Similarly, the campus and community restrictions on social gatherings and activities also likely influenced students' ability to satisfy their need for relatedness in college. Interpretations of this dissertation study

must consider the unique landscape of higher education in the 2020-2021 academic year, and subsequent research would do well to replicate aspects of the current study once colleges shift back to primarily on-campus teaching and learning.

Methodological Limitations

There are several noteworthy methodological limitations to the current study. First, as discussed above, the means of some of the MACS subscales were quite high, which may indicate a restriction of range. This restriction of range may have influenced my ability to characterize meaningful profiles in the data. The next step in this line of research is to revise the MACS and identify need-based motivation profiles in a larger, more diverse sample. Although it remains an open question whether LPA using a revised measure would identify similar profiles as those discussed in this study, or if entirely new profiles would be identified, I believe there is a good chance that more variability in the MACS subscales would yield a different profile solution than the one presented in this dissertation study.

Second, the study used self-reported GPA, rather than official college records, which presents potential issues with bias. However, previous research has found college students' self-reported GPA to be strongly correlated with actual grades (r_{obs} = .90), especially for higher-achieving students (Kuncel et al., 2005). Another limitation related to GPA is that the mean GPA for the sample was quite high with low variability. One possible explanation for this is that, as Kuncel and colleagues (2005) report, low achieving students tend to over-report their GPA. It is also possible that the sample included in my analyses is not representative of the broader college population, but rather includes, on average, high achieving students. This could impact both the motivation profiles identified in the study as well as the (non-significant) relations between GPA and the motivation profiles, need satisfaction, and need conflict. Therefore, future research

would improve upon this dissertation study by recruiting a more diverse sample and by collecting students' official grades from their college or university.

Sample Size

A significant limitation of the present study was its small sample size, which was partly due to low response rates to initial recruitment emails, particularly for the community college students. Despite rigorous recruitment efforts, the sample of community college students ended up being significantly smaller than the sample of students from the private university. There are a number of factors that could have contributed to this apparent difference in response rate, including the timing of the initial survey (e.g., due to rolling admission policies at community colleges, it is possible that students registered for classes close to the start of the semester, at which time they may have had other priorities and were not particularly interest in participating in a research study), and the possibility that community college students and their families were more severely impacted by the Covid-19 pandemic than private school students and families.

Missing Data and Selection Bias

Another limitation of the present study is that less than half of the participants who completed the Wave 1 survey completed the Wave 2 survey. It is possible that this low response rate was due to the timing of the second survey (i.e., before the start of the semester), or because students who decided to participate in the two-part study over the summer overestimated how interested they would be in completing the second survey after completing their first semester in college. As mentioned above, the sample of participants who completed the Wave 2 survey were not significantly different from those who did not go on to complete Wave 2 in most respects (i.e., school type, gender, race, or SES). However, the sample of participants who completed the Wave 2 survey reported a higher average SAT or ACT percentile, compared to those who did not

participate in the Wave 2 survey. This suggests a potential selection effect, such that students who are more conscientious might score in the upper percentiles on standardized tests and be more likely to follow through with completion of the second survey. This potential selection effect could also explain the high college GPA that participants reported in Wave 2; this high-achieving sample offered limited variability in the GPA variable and might not be representative of the college student population.

The low response rate to the Wave 2 survey presented both statistical and interpretive issues. Due to the small sample, several CFAs I attempted to run (i.e., the bifactor and hierarchical need satisfaction and need conflict models) were not able to converge. Although there is a range of recommendations regarding sample sizes in factor analysis, Mvududu and Sink (2013) suggest an adequate sample size includes 10 cases per variable. Some of the CFAs tested in this research study included over 30 variables; thus, the sample of 219 participants likely resulted in underpowered analyses. Additionally, the small sample of community college students made it difficult to adequately address the second part of Research Aim 2a (i.e., which involved comparing motivation profiles across samples). Due to the small sample of community college students, I was not able to run separate LPAs on the two samples, as recommended by Collins and Lanza (2010). Instead, I employed school type as a covariate, which only indicates the likelihood of students from each type of school falling into each profile. Thus, another aim of future research could be to recruit a larger and more representative sample of college students in order to better examine motivation profiles across different types of institutions

Constraints on Survey Length and Number of Time Points

Several decisions related to data collection were made in response to time constraints associated with this study. First, I was limited in terms of the number of questionnaire items I

could include, particularly in the Wave 2 survey, because I wanted to avoid participant burnout or fatigue. Thus, I was not able to include a second administration of the MACS in the current study. MACS data from two time points would have allowed me to examine the extent to which students' motivation profiles change over time. Although some studies have found motivation profiles to be consistent in structure and size across time points (Gillet et al., 2017; Huyghebaert-Zouaghi et al., 2020), other studies have found that first-year college students endorse different reasons for attending college compared to fourth-year students (Henderson-King & Smith, 2006). Given that participants in the current study completed the MACS before they entered college, it is possible that their reasons for attending college might have changed once they had actually experienced what college life was like. Thus, a future direction for this research is to examine the extent to which students' fundamental motivations for attending college change as they progress through their university experience.

In addition, this study was limited in terms of the number of time points that could be assessed, as well as the amount of time that transpired between time points. Stronger causal claims could have been made had the outcome measures from the Wave 2 survey been assessed at a third time point (e.g., the end of the school year). For example, this would have allowed me to examine the effects of need satisfaction at Time 2 on well-being at Time 3, while controlling for initial levels of well-being at Time 1. Overall, future research might build on this dissertation by examining students' motivations for attending college across several time points that are distributed across multiple semesters.

Statistical Limitations

The study was also limited by my current statistical knowledge. An initial goal for this research was to explore the extent to which need satisfaction and need conflict mediated the

relations between the motivation profiles and outcome measures. However, due to my developing knowledge of LPA, the sophisticated mixture models required for testing such mediational paths were beyond the scope of the current study. Thus, the next step in this line of this research is to empirically test the full mediation model that I began to explore for my dissertation. Similarly, in the early phases of planning for the present study, I had wanted to examine the extent to which students' racial identity moderated the relations between particular motivation profiles and need satisfaction. Due to the small sample size and my limited knowledge of LPA, I was not able to explore this set of research questions.

Conclusion

This dissertation research contributes several noteworthy findings to the motivation literature. First, the finding that need conflict explained unique variance in students' reports of psychological distress, beyond the effects of need satisfaction, offers a promising new line of research. Considering students' experiences of need conflict in conjunction with need satisfaction and frustration could help SDT researchers better understand the ways in which the fundamental needs interact to influence behavior and important outcomes. Second, the study extends BPNT by positing that the needs for meaning, safety, and status are also fundamental and motivate students to attend college. Although additional research is needed to examine the extent to which each of the needs contributes to well-being and other outcomes, this dissertation raises the possibility that, in addition to autonomy, competence, and relatedness, other needs might also contribute to students' motivation for attending college. Lastly, LPA suggested that motivation profiles based on the needs students seek to satisfy in college might exist in a sample of first-year students, which would indicate that students attend college with different patterns of salient needs. This presents an additional potential extension of BPNT, which places greater

emphasis on need salience, and future research should examine the extent to which different contexts support the satisfaction of different combinations of salient needs.

Finally, this dissertation suggests that adopting a fundamental needs perspective might be useful to college administrators and staff as they work to develop and evaluate student support programs. Of course, given the preliminary and exploratory nature of this research, no firm suggestions can be made regarding the implementation of specific activities for helping students to satisfy their basic needs. However, the present findings suggest that students may experience need conflict, and that this conflict may contribute to feelings of stress and anxiety. In addition, experiences of need satisfaction may contribute to students' well-being, as well as their intentions to persist toward graduation. Therefore, when developing support programs, college personnel may want to consider the extent to which the program will help satisfy students' needs or bring these needs into alignment; though further research is needed to validate this approach.

REFERENCES

Acharya, L., Jin, L., & Collins, W. (2018). College life is stressful today–Emerging stressors and depressive symptoms in college students. *Journal of American College Health*, *66*(7), 655-664.

Anderson, C., Kraus, M. W., Galinsky, A. D., & Keltner, D. (2012). The local-ladder effect: Social status and subjective well-being. *Psychological Science*, *23*, 764–771. http://dx.doi.org/10.1177/0956797611434537

Anderson, C., Hildreth, J. A. D., & Howland, L. (2015). Is the desire for status a fundamental human motive? A review of the empirical literature. *Psychological Bulletin*, *141*(3), 574.

Arnett, J.J. (1998) Learning to stand alone: The contemporary American transition to adulthood in cultural and historical context. *Human Development,* 41, 295-315.

Baez, T. (2005). Chapter 4. evidenced-based practice for anxiety disorders in college mental health. *Journal of College Student Psychotherapy*, *20*(1), 33-48. https://doi.org/10.1300/J035v20n01_04

Batchelor, J. H., & Miao, C. (2016). Extreme response style: A meta-analysis. *Journal of Organizational Psychology*, *16*(2), 51.

Bauer, D. J., & Steinley, D. (2020). Latent class, cluster analysis, and mixture modeling. Curran-Bauer analytics. Course notes. Chapel Hill, NC. June 2020.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497-529.

Bendersky, C., & Pai, J. (2018). Status dynamics. *Annual Review of Organizational Psychology*

and Organizational Behavior, *5*, 183-199. https://doi.org/10.1146.annurev-orgpsy-032117-104602

Blackburn, H. (2017). The status of women in STEM in higher education: A review of the literature 2007–2017. *Science & Technology Libraries*, *36*(3), 235-273. https://doi.org/10.1080/0194262X.2017.1371658

Bonneville-Roussy, A., Evans, P., Verner-Filion, J., Vallerand, R. J., & Bouffard, T. (2017). Motivation and coping with the stress of assessment: Gender differences in outcomes for university students. *Contemporary Educational Psychology*, *48*, 28-42. https://doi.org/10.1016/j.cedpsych.2016.08.003

Bradley, R. H. & Corwyn, R. F. (2004). Family process investments that matter for child well-being. In A. Kalil & T. DeLeire (Eds.), *Family investments in children's potential: Resources and parenting behaviors that promote success* (pp. 1-32). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Bryan, C. J., Elder, W. B., McNaughton-Cassill, M., Osman, A., Hernandez, A. M., & Allison, S. (2013). Meaning in life, emotional distress, suicidal ideation, and life functioning in an active duty military sample. *The Journal of Positive Psychology*, *8*(5), 444-452. https://doi.org/10.1080/17439760.2013.823557

Cabrera, A., Nora, A., & Castañeda, M. (1993). College Persistence: Structural Equations Modeling Test of an Integrated Model of Student Retention. *The Journal of Higher Education*, *64*(2), 123–139. https://doi.org/10.2307/2960026

Carton, S. T., & Goodboy, A. K. (2015). College students' psychological well-being and interaction involvement in class. *Communication Research Reports*, *32*(2), 180-184.

CCMH (2018). *Center for Collegiate Mental Health Annual Report*. Retrieved from:

https://ccmh.psu.edu/files/2019/04/2018-Annual-Report-4.15.19-FINAL-1s1dzvo.pdf

Center for Disease Control and Prevention (2018). *Health related quality of life: Well-being concepts*. https://www.cdc.gov/hrqol/wellbeing.htm

Chapais, B. (2015). Competence and the evolutionary origins of status and power in humans. *Human Nature: An Interdisciplinary Biosocial Perspective, 26*(2), 161-183. http://dx.doi.org/10.1007/s12110-015-9227-6

Chen, B., Van Assche, J., Vansteenkiste, M., Soenens, B., & Beyers, W. (2015). Does psychological need satisfaction matter when environmental or financial safety are at risk?. *Journal of Happiness Studies*, *16*(3), 745-766.

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., ... & Ryan, R. M. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216-236.

Cheon, S. H., Reeve, J., Lee, Y., Ntoumanis, N., Gillet, N., Kim, B. R., & Song, Y.-G. (2019). Expanding autonomy psychological need states from two (satisfaction, frustration) to three (dissatisfaction): A classroom-based intervention study. *Journal of Educational Psychology, 111*(4), 685–702. https://doi.org/10.1037/edu0000306

Chirkov, V., & Ryan, R. (2001). Parent and teacher autonomy-support in Russian and US adolescents - Common effects on well-being and academic motivation. *Journal of Cross-Cultural Psychology, 32*(5), 618-635. https://doiorg.proxy.bc.edu/10.1177/0022022101032005006

Church, A. T., Katigbak, M. S., Locke, K. D., Zhang, H., Shen, J., de Jesús Vargas-Flores, J., ...

& Mastor, K. A. (2013). Need satisfaction and well-being: Testing self-determination theory in eight cultures. *Journal of Cross-Cultural Psychology*, *44*(4), 507-534. https://doi.org/10.1177/0022022112466590

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge.

Collins, L. M., & Lanza, S. T. (2010). *Latent class and transition analysis with applications in the social, behavioral, and health sciences*. Wiley Publications.

Copeland, W. E., McGinnis, E., Bai, Y., Adams, Z., Nardone, H., Devadanam, V., ... & Hudziak, J. J. (2021). Impact of COVID-19 pandemic on college student mental health and wellness. *Journal of the American Academy of Child & Adolescent Psychiatry*, *60*(1), 134-141. https://doi.org/10.1016/j.jaac.2020.08.466

Côté, J. E., & Levine, C. (1997). Student motivations, learning environments, and human capital acquisition: Toward an integrated paradigm of student development. *Journal of College Student Development, 38*(3), 229-243.

Cundiff, J. M., & Smith, T. W. (2017). Social status, everyday interpersonal processes, and coronary heart disease: A social psychophysiological view. *Social and Personality Psychology Compass*, *11*(4), e12310. https://doi.org/10.1111/spc3.12310

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268.

Deci, E. & Ryan, R. (2012). Self-determination theory. In P. A. Van LangeA. W. Kruglanski & E. T. Higgins *Handbook of theories of social psychology: volume 1* (pp. 416-437). SAGE Publications.

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001).

Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin*, *27*(8), 930-942. https://doi.org/10.1177/0146167201278002

DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). SAGE Publications.

Di Fabio, A. (2017). Positive Healthy Organizations: Promoting well-being, meaningfulness, and sustainability in organizations. *Frontiers in Psychology*, *8*, 1938. https://doi.org/10.3389/fpsyg.2017.01938

Diener, E. (2009). Subjective well-being. In *The Science of Well-being* (pp. 11-58). Springer, Dordrecht.

Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science*, *7*(3), 181-185. https://doi.org/10.1111/j.1467-9280.1996.tb00354.x

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 71-75.

Diener, E., Lucas, R. E., & Oishi, S. (2002). Subjective well-being: The science of happiness and life satisfaction. In S.J. Lopez & C. R. Snyder (eds.) *Handbook of Positive Psychology*, *2*, 63-73. Oxford University Press.

Duineveld, J. J., Parker, P. D., Ryan, R. M., Ciarrochi, J., & Salmela-Aro, K. (2017). The link between perceived maternal and paternal autonomy support and adolescent well-being across three major educational transitions. *Developmental Psychology, 53*(10), 1978–1994. https://doi.org/10.1037/dev0000364

Dweck, C. S. (2017). From needs to goals and representations: Foundations for a unified theory

of motivation, personality, and development. *Psychological Review*, *124*(6), 689. https://doi.org/10.1037/rev0000082

Ellis, B. J. (1992). The evolution of sexual attraction: Evaluative mechanisms in women. In Barkow J., Cosmides, L., & Tooby, J. (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture*, 267-288. New York, NY: Oxford University Press.

Epskamp, S. (2017). *Network Psychometrics* [Unpublished doctoral dissertation]. University of Amsterdam.

Erdogan, B., Bauer, T. N., Truxillo, D. M., & Mansfield, L. R. (2012). Whistle while you work: A review of the life satisfaction literature. *Journal of management*, *38*(4), 1038-1083. https://doi.org/10.1177/0149206311429379

Ferrand, C., & Martinent, G. (2020). Need frustration and depressive symptoms in french older people: Using a self-determination approach. *Aging & Mental Health,* 1-7. http://dx.doi.org/10.1080/13607863.2020.1758912

Flynn, F. J., Reagans, R. E., Amanatullah, E. T., & Ames, D. R. (2006). Helping one's way to the top: Self-monitors achieve status by helping others and knowing who helps whom. *Journal of Personality and Social Psychology*, 91, 1123–1137. http://dx.doi.org/10.1037/0022-3514.91.6 .1123

Fournier, M. A. (2009). Adolescent hierarchy formation and the social competition theory of depression. *Journal of Social and Clinical Psychology*, 28, 1144 –1172. http://dx.doi.org/10.1521/jscp.2009.28.9.1144

Freeman, T. M., Anderman, L. H., & Jensen, J. M. (2007). Sense of belonging in college

freshmen at the classroom and campus levels. *The Journal of Experimental Education*, *75*(3), 203-220.

Gagnon, H. (2007). Need satisfaction, conflict and academic disengagement: An extension of self-determination theory (Doctoral dissertation, McGill University).

Garlow, S. J., Rosenberg, J., Moore, J. D., Haas, A. P., Koestner, B., Hendin, H., & Nemeroff, C. B. (2008). Depression, desperation, and suicidal ideation in college students: results from the American Foundation for Suicide Prevention College Screening Project at Emory University. *Depression and anxiety*, *25*(6), 482-488. https://doi.org/10.1002/da.20321

Gillet, N., Morin, A. J., & Reeve, J. (2017). Stability, change, and implications of students' motivation profiles: A latent transition analysis. *Contemporary Educational Psychology*, *51*, 222-239. https://doi.org/10.1016/j.cedpsych.2017.08.006

Gundersen, C., & Ziliak, J. P. (2015). Food insecurity and health outcomes. *Health Affairs*, *34*(11), 1830-1839. https://doi.org/10.1377/hlthaff.2015.0645

Grund, A., Brassler, N. K., & Fries, S. (2014). Torn between study and leisure: How motivational conflicts relate to students' academic and social adaptation. *Journal of Educational Psychology, 106*(1), 242–257. https://doi.org/10.1037/a0034400

Grund, A., Grunschel, C., Bruhn, D., & Fries, S. (2015). Torn between want and should: An experience-sampling study on motivational conflict, well-being, self-control, and mindfulness. *Motivation and Emotion*, *39*(4), 506-520. https://doi.org/10.1007/s11031-015-9476-z

Grund, A., Schmid, S., & Fries, S. (2015). Studying against your will: Motivational interference in action. *Contemporary Educational Psychology*, *41*, 209-217.

Guiffrida, D. A., Lynch, M. F., Wall, A. F., & Abel, D. S. (2013). Do reasons for attending

college affect academic outcomes?: A test of a motivational model from a self-determination theory perspective. *Journal of College Student Development*, *54*(2), 121-139.

Hartwig, M. K., & Dunlosky, J. (2012). Study strategies of college students: Are self-testing and scheduling related to achievement?. *Psychonomic Bulletin & Review*, *19*(1), 126-134. https://doi.org/10.3758/s13423-011-0181-y

Hausmann, L. R., Ye, F., Schofield, J. W., & Woods, R. L. (2009). Sense of belonging and persistence in White and African American first-year students. *Research in Higher Education*, *50*(7), 649-669.

Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review*, *10*(2), 88-110.

Heintzelman, S. J., & King, L. A. (2014). (The feeling of) meaning-as-information. *Personality and Social Psychology Review*, *18*(2), 153-167. https://doi.org/10.1177/1088868313518487

Henderson-King, D., & Smith, M. N. (2006). Meanings of education for university students: Academic motivation and personal values as predictors. *Social Psychology of Education*, *9*(2), 195-221. https://doi.org/10.1007/s11218-006-0006-4

Huebner, E. S., Hills, K. J., Jiang, X., Long, R. F., Kelly, R., & Lyons, M. D. (2014). Schooling and children's subjective well-being. In Ben-Arieh, A., Casas, F., Frones, I., & Korbin, J. E. (Eds). *Handbook of Child Well-being*, *2*, 797-819.

Hofer, M., & Fries, S. (2016). A multiple goals perspective on academic motivation. In K. R. Wentzel & D. B. Miele (Eds.), *Handbook of Motivation at School* (2nd ed., pp. 440-458).

New York: Routledge.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: Multidisciplinary Journal*, *6*(1), 1-55.

Huyghebaert-Zouaghi, T., Morin, A. J., Forest, J., Fouquereau, E., & Gillet, N. (2020). A longitudinal examination of nurses' need satisfaction profiles: A latent transition analysis. *Current Psychology*, 1-23. https://doi.org/10.1007/s12144-020-00972-1

Jenkins-Guarnieri, M. A., Vaughan, A. L., & Wright, S. L. (2015). Development of a self-determination measure for college students: Validity evidence for the basic needs satisfaction at college scale. *Measurement and Evaluation in Counseling and Development*, *48*(4), 266-284. https://doi.org/10.1177/0748175615578737

Jin, Y., He, M., & Li, J. (2016). The relationship between meaning in life and subjective well-being in China: A meta-analysis. *Advances in Psychological Science*, *24*(12), 1854-1863. https://doi.org/10.3724/SP.J.1042.2016.01854

Jones, P. J., Park, S. Y., & Lefevor, G. T. (2018). Contemporary college student anxiety: The role of academic distress, financial stress, and support. *Journal of College Counseling*, *21*(3), 252-264.

Joussemet, M., Koestner, R., Lekes, N., & Landry, R. (2005). A longitudinal study of the relationship of maternal autonomy support to children's adjustment and achievement in school. *Journal of Personality*, *73*(5), 1215-1236. https://doi.org/10.1111/j.1467-6494.2005.00347.x

Karaman, M. A., Lerma, E., Vela, J. C., & Watson, J. C. (2019). Predictors of academic stress among college students. *Journal of College Counseling*, *22*(1), 41-55.

Keith, T. Z. (2015). *Multiple regression and beyond: An introduction to multiple regression and structural equation modeling* (2nd ed.). Routledge.

Kennett, D. J., Reed, M. J., & Stuart, A. S. (2013). The impact of reasons for attending university on academic resourcefulness and adjustment. *Active Learning in Higher Education*, 14(2), 123-133. https://doi.org/10.1177/1469787413481130

King, L. A., Heintzelman, S. J., & Ward, S. J. (2016). Beyond the search for meaning: A contemporary science of the experience of meaning in life. *Current Directions in Psychological Science*, *25*(4), 211-216. https://doi.org/10.1177/0963721416656354

Kumar, S., & Kumar, S. (2015). Structure equation modeling basic assumptions and concepts: A novices guide. *Asian Journal of Management Sciences*, *3*(07), 25-28.

Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research*, *75*(1), 63-82. https://doi.org/10.3102/00346543075001063

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. In M. P. Zanna (Ed.) *Advances in Experimental Social Psychology, vol. 34* (p. 331-378) Academic Press, San Diego, CA. http://dx.doi.org.proxy.bc.edu/10.1016/S0065-2601(02)80008-9

Kuh, G. D., Kinzie, J., Schuh, J. H., & Whitt, E. J. (2011). *Student success in college: Creating conditions that matter*. John Wiley & Sons.

Li, J. B., Dou, K., & Liang, Y. (2020). The relationship between presence of meaning, search for

meaning, and subjective well-being: A three-level meta-analysis based on the meaning in life questionnaire. *Journal of Happiness Studies*, 1-23. https://doi.org/10.1007/s10902-020-00230-y

Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased rates of mental health service utilization by US college students: 10-year population-level trends (2007–2017). *Psychiatric Services*, *70*(1), 60-63.

Locke, B., Wallace, D., & Brunner, J. (2016). Emerging issues and models in college mental health services. *New Directions for Student Services*, *2016*(156), 19-30. https://doi.org/10.1002/ss.20188

Lynch, M. F., Jr., Plant, R. W., & Ryan, R. M. (2005). Psychological needs and threat to safety: Implications for staff and patients in a psychiatric hospital for youth. *Professional Psychology: Research and Practice, 36*(4), 415–425. https://doi.org/10.1037/0735-7028.36.4.415

Martela, F., & Steger, M. F. (2016). The three meanings of meaning in life: Distinguishing coherence, purpose, and significance. *The Journal of Positive Psychology*, *11*(5), 531-545. https://doi.org/10.1080/17439760.2015.1137623

Mascaro, N., & Rosen, D. H. (2008). Assessment of existential meaning and its longitudinal relations with depressive symptoms. *Journal of Social and Clinical Psychology*, *27*(6), 576-599. https://doi.org/10.1521/jscp.2008.27.6.576

Maslow, A. (1970). *Motivation and Personality* (2d ed.). New York: Harper & Row.

Milyavskaya, M., Gingras, I., Mageau, G. A., Koestner, R., Gagnon, H., Fang, J., & Boiché, J.

(2009). Balance across contexts: Importance of balanced need satisfaction across various life domains. *Personality and Social Psychology Bulletin*, *35*(8), 1031-1045. https://doi.org/10.1177/0146167209337036

Milyavskaya, M., & Koestner, R. (2011). Psychological needs, motivation, and well-being: A test of self-determination theory across multiple domains. *Personality and Individual Differences*, *50*(3), 387–391. https://doi.org/10.1016/j.paid.2010.10.029

Mohanty, P., & Mohanty, S. (2017). Impact of workplace bullying on performance, psychological distress and absenteeism: An original review of healthcare sector. *International Journal of Economic Perspectives*, *11*(3).

Morehead, K., Rhodes, M. G., & DeLozier, S. (2016). Instructor and student knowledge of study strategies. *Memory*, *24*(2), 257-271. https://doi.org/10.1080/09658211.2014.1001992

Murray, H.A. (1938). Explorations in Personality. Oxford University Press.

Muthén, L. K., & Muthén, B. O. (2017). *M*plus *user's guide* (8th ed.). Los Angeles, CA: Muthén f& Muthén.

Mvududu, N. H., & Sink, C. A. (2013). Factor analysis in counseling research and practice. *Counseling Outcome Research and Evaluation*, *4*(2), 75-98. https://doi.org/10.1177/2150137813494766

Nadworny, E. (2020). 'Losing a Generation': Fall college enrollment plummets for 1st-year students. National Public Radio. Retrieved from: https://www.npr.org/2020/12/17/925831720/losing-a-generation-fall-college-enrollment-plummets-for-first-year-students

National Center for Education Statistics (NCES) (2018). *The Condition of Education*. Retrieved from: https://nces.ed.gov/programs/coe/indicator_cpa.asp

Ng, J. Y. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., & Williams, G. C. (2012). Self-Determination Theory Applied to Health Contexts: A Meta-Analysis. *Perspectives on Psychological Science*, *7*(4), 325-340. https://doi.org/10.1177/1745691612447309

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *School Field*, *7*(2), 133-144.

Nitro (2020). How the pandemic is impacting college decisions. Retrieved from: https://www.nitrocollege.com/research/covid19

Nordstrom, A. H., Goguen, L. M. S., & Hiester, M. (2014). The effect of social anxiety and self-esteem on college adjustment, academics, and retention. *Journal of College Counseling*, *17*(1), 48-63. https://doi.org/10.1002/j.2161-1882.2014.00047.x

Nylund-Gibson, K., & Choi, A. Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science, 4*(4), 440- 461. https://doi.org/10.1037/tps0000176

Nylund-Gibson, K., Grimm, R. P., & Masyn, K. E. (2019). Prediction from latent classes: A demonstration of different approaches to include distal outcomes in mixture models. *Structural Equation Modeling: A Multidisciplinary Journal*, *26*(6), 967-985. https://doi.org/10.1080/10705511.2019.1590146

Oberski, D. (2016). Mixture models: Latent profile and latent class analysis. In *Modern Statistical Methods for HCI* (pp. 275-287). Springer, Cham.

Odle-Dusseau, H. N., Matthews, R. A., & Wayne, J. H. (2018). Employees' financial insecurity

and health: The underlying role of stress and work–family conflict appraisals. *Journal of Occupational and Organizational Psychology*, *91*(3), 546-568. https://doi.org/10.1111/joop.12216

OECD. (2015). OECD Better Life Index: Education Retrieved from: http://www.oecdbetterlifeindex.org/topics/education/

Ostrove, J. M., & Long, S. M. (2007). Social class and belonging: Implications for college adjustment. *The Review of Higher Education*, *30*(4), 363-389.

Oswalt, S. B., Lederer, A. M., Chestnut-Steich, K., Day, C., Halbritter, A., & Ortiz, D. (2020). Trends in college students' mental health diagnoses and utilization of services, 2009–2015. *Journal of American College Health*, *68*(1), 41-51.

Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin, 136*(2), 257–301. https://doi.org/10.1037/a0018301

Pascarella, E. T., & Terenzini, p. T. (2005). *How college affects students: A third decade of research*. San Francisco, CA: Jossey-Bass.

Pasupathi, M., Mansour, E., & Brubaker, J. R. (2007). Developing a life story: Constructing relations between self and experience in autobiographical narratives. *Human Development, 50*(2-3), 85-110.

Perera, H. N., Calkins, C., & Part, R. (2019). Teacher self-efficacy profiles: Determinants, outcomes, and generalizability across teaching level. *Contemporary Educational Psychology*, *58*, 186-203. https://doi.org/10.1016/j.cedpsych.2019.02.006

Pieritz, K., Süssenbach, P., Rief, W., & Euteneuer, F. (2016). Subjective social status and

cardiovascular reactivity: An experimental examination. *Frontiers in Psychology*, *7*, 1091. https://doi.org/10.3389/fpsyg.2016.01091

Pingree S. E., & Harward, D.W. (2014). The well-being and flourishing of students: Considering well-being, and its connection to learning and civic engagement, as central to the mission of higher education. *Bringing Theory to Practice.* Retrieved from: https://www.naspa.org/images/uploads/kcs/WHPL_Canon_WB_BTtoPWellbeingInitiative.pdf

Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie. (1991). A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ).

Pisarik, C. T. (2009). Motivational orientation and burnout among undergraduate college students. *College Student Journal*, *43*(4), 1238-1252.

Ratelle, C. F., Larose, S., Guay, F., & Senécal, C. (2005). Perceptions of parental involvement and support as predictors of college students' persistence in a science curriculum. *Journal of Family Psychology, 19*(2), 286–293. https://doi.org/10.1037/0893-3200.19.2.286

Reed-Fitzke, K., & Lucier-Greer, M. (2020). Basic psychological need satisfaction and frustration: Profiles among emerging adult college students and links to well-being. *Contemporary Family Therapy*, 1-15.https://doi.org/10.1007/s10591-020-09550-w

Reid, L. D., & Radhakrishnan, P. (2003a). General Campus and Academic Climate Subscales for Undergraduate Students. Retrieved from PsycTESTS. https://dx.doi.org/10.1037/t08190-000

Reid, L. D., & Radhakrishnan, P. (2003b). General Campus and Academic Climate Subscales for Graduate Students. Retrieved from PsycTESTS. https://dx.doi.org/10.1037/t08191-000

Roffey, S. (2017). The ASPIRE principles and pedagogy for the implementation of social and

emotional learning and the development of whole school well-being. *The International Journal of Emotional Education, 9*(2), 59-71.

Rouse, P. C., Turner, P. J., Siddall, A. G., Schmid, J., Standage, M., & Bilzon, J. L. (2020). The interplay between psychological need satisfaction and psychological need frustration within a work context: A variable and person-oriented approach. *Motivation and emotion*, *44*(2), 175-189. https://doi.org/10.1007/s11031-019-09816-3

Russell, D. W., Kahn, J. H., Spoth, R., & Altmaier, E. M. (1998). Analyzing data from experimental studies: A latent variable structural equation modeling approach. *Journal of Counseling Psychology, 45*(1), 18–29. https://doi.org/10.1037/0022-0167.45.1.18

Ryan, M. B., & Kahn, J. H. (2015). Talking about daily emotional events: Psychological well-being moderates the intensity–disclosure link. *Personality and Individual Differences*, *83*, 223-227. https://doi.org/10.1016/j.paid.2015.04.027

Ryan, R.M., Bernstein, J.H. and Brown, K.W. (2010) Weekends, work, and well-being: Psychological need satisfactions and day of the week effects on mood, vitality, and physical symptoms. *Journal of Social and Clinical Psychology*, 29, 95–122. http://dx.doi.org/10.1521/jscp.2010.29.1.95

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. http://dx.doi.org.proxy.bc.edu/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Ryff, Carol D, Radler, Barry T, & Friedman, Elliot M. (2015). Persistent psychological well-

being predicts improved self-rated health over 9–10 years: Longitudinal evidence from MIDUS. *Health Psychology Open*, *2*(2). https://doi.org/10.1177/2055102915601582

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2010). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, *99*(6), 323-338.

Sheldon, K. M., & Niemiec, C. P. (2006). It's not just the amount that counts: Balanced need satisfaction also affects well-being. *Journal of personality and social psychology*, *91*(2), 331. https://doi.org/10.1037/0022-3514.91.2.331

Shi, D., Lee, T., & Maydeu-Olivares, A. (2019). Understanding the model size effect on SEM fit indices. *Educational and Psychological Measurement*, *79*(2), 310-334. https://doi.org/10.1177/0013164418783530

Shim, S. S., & Finch, W. H. (2014). Academic and social achievement goals and early adolescents' adjustment: A latent class approach. *Learning and Individual Differences*, *30*, 98-105. https://doi.org/10.1016/j.lindif.2013.10.015

Simon, R. M., Wagner, A., & Killion, B. (2016). Gender and choosing a STEM major in college: Femininity, masculinity, chilly climate, and occupational values. *Journal of Research in Science Teaching*, *54*(3), 299-323. https://doi.org/10.1002/tea.21345

Sommet, N., & Elliot, A. J. (2017). Achievement goals, reasons for goal pursuit, and achievement goal complexes as predictors of beneficial outcomes: Is the influence of goals reducible to reasons?. *Journal of Educational Psychology*, *109*(8), 1141.

Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of Medical Internet Research*, *22*(9), e21279. https://doi.org/10.2196/21279

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, *53*(1), 80.

Szelényi, K., Denson, N., & Inkelas, K. K. (2013). Women in STEM majors and professional outcome expectations: The role of living-learning programs and other college environments. *Research in Higher Education*, *54*(8), 851-873. https://doi.org/10.1007/s11162-013-9299-2.

Tang, M., Wang, D., & Guerrien, A. (2019). A systematic review and meta-analysis on basic psychological need satisfaction, motivation, and well-being in later life: Contributions of self-determination theory. *PsyCh Journal, 5-33.* http://dx.doi.org.proxy.bc.edu/10.1002/pchj.293

Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. Journal of Personality and Social Psychology, 101, 354–365. http://dx.doi.org/10.1037/a0023779

Temane, Q. M., & Wissing, M. P. (2006). The role of subjective perception of health in the dynamics of context and psychological well-being. *South African Journal of Psychology, 36*(3), 564-581. http://dx.doi.org/10.1177/008124630603600308

Travis, J., & Bunde, J. (2020). Self-regulation in college: The influence of self-efficacy, need satisfaction, and stress on GPA, persistence, and satisfaction. *Current Psychology*, 1-11. https://doi.org/10.1007/s12144-020-01091-7

Torelli, C. J., Leslie, L. M., Stoner, J. L., & Puente, R. (2014). Cultural determinants of status: Implications for workplace evaluations and behaviors. *Organizational Behavior and Human Decision Processes,* 123, 34–48. http://dx.doi.org/10.1016/j.obhdp.2013.11.001

Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2011). Stability and change in

achievement goal orientations: A person-centered approach. *Contemporary Educational Psychology*, *36*(2), 82-100. https://doi.org/10.1016/j.cedpsych.2010.08.002

Turner, E. A., Chandler, M., & Heffer, R. W. (2009). The influence of parenting styles, achievement motivation, and self-efficacy on academic performance in college students. *Journal of College Student Development*, *50*(3), 337-346. https://doi.org/10.1353/csd.0.0073.

Valentine, J. C., Hirschy, A. S., Bremer, C. D., Novillo, W., Castellano, M., & Banister, A. (2011). Keeping at-risk students in school: A systematic review of college retention programs. *Educational Evaluation and Policy Analysis*, *33*(2), 214-234. https://doi.org/10.3102/0162373711398126

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and psychological measurement*, *52*(4), 1003-1017. https://doi.org/10.1177/0013164492052004025

Van den Broeck, A., Ferris, D. L., Chang, C. H., & Rosen, C. C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management*, *42*(5), 1195-1229. https://doi.org/10.1177/0149206316632058

van Herpen, S. G., Meeuwisse, M., Hofman, W. A., Severiens, S. E., & Arends, L. R. (2017). Early predictors of first-year academic success at university: pre-university effort, pre-university self-efficacy, and pre-university reasons for attending university. *Educational Research and Evaluation*, 23(1-2), 52-72.

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory:

Advancements, critical themes, and future directions. *Motivation and Emotion*, 44, 1-33 https://doi.org/10.1007/s11031-019-09818-1

Vasquez-Salgado, Y., Greenfield, P. M., & Burgos-Cienfuegos, R. (2015). Exploring home-school value conflicts: Implications for academic achievement and well-being among Latino first-generation college students. *Journal of Adolescent Research*, *30*(3), 271-305. https://doi.org/10.1177/0743558414561297

Vermunt, J. K. (2010). Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis*, 450-469.

Yeager, D. S., Walton, G. M., Brady, S. T., Akcinar, E. N., Paunesku, D., Keane, L., ... & Gomez, E. M. (2016). Teaching a lay theory before college narrows achievement gaps at scale. *Proceedings of the National Academy of Sciences*, *113*(24), E3341-E3348

Yu, L., Shek, D. T., & Zhu, X. (2018). The influence of personal well-being on learning achievement in university students over time: Mediating or moderating effects of internal and external university engagement. *Frontiers in Psychology*, *8*, 2287. https://doi.org/10.3389/fpsyg.2017.02287

Walton, G. M., & Brady, S. T. (2017). The many questions of belonging. In Elliot, A.J., Dweck, C.S. & Yeager, D.S. (Eds.). *Handbook of Competence and Motivation: Theory and Application*, 272-293. Guilford Publications.

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: race, social fit, and achievement. *Journal of Personality and Social Psychology*, *92*(1), 82.

Ware Jr, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical Care*, 473-483.

Watson, D., O'Hara, M. W., Simms, L. J., Kotov, R., Chmielewski, M., McDade-Montez, E., . . .

Stuart, S. (2007). *Inventory of depression and anxiety symptoms.* http://dx.doi.org.proxy.bc.edu/10.1037/t00312-000

Weinstein, L., & Laverghetta, A. (2009). College student stress and satisfaction with life. *College Student Journal*, *43*(4), 1161-1162.

White, R. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*(5), 297-333.

Wigfield, A., Eccles, J. S., Fredricks, J., Simpkins, S., Roeser, R., & Schiefele, U. (2015). Development of achievement motivation and engagement. In R. M. Lerner & M. E. Lab (Eds.), *Handbook of Child Psychology and Developmental Science: Social and Emotional Development,* 7(3), 657-700. New York, NY: Wiley.

Williams, S., Schneider, M., Wornell, C., & Langhinrichsen-Rohling, J. (2018). Student's perceptions of school safety: It is not just about being bullied. *The Journal of School Nursing*, *34*(4), 319-330. https://doi.org/10.1177/1059840518761792

Wintre, M. G., & Bowers, C. D. (2007). Predictors of persistence to graduation: Extending a model and data on the transition to university model. *Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement, 39*(3), 220–234. https://doi.org/10.1037/cjbs2007017

Xiao, H., Carney, D. M., Youn, S. J., Janis, R. A., Castonguay, L. G., Hayes, J. A., & Locke, B. D. (2017). Are we in crisis? National mental health and treatment trends in college counseling centers. *Psychological Services*, *14*(4), 407. https://doi.org/10.1037/ser0000130

Appendix A

Pilot Study 1: Materials

Pilot Study 1a: Interview Protocol

My name is Lindsey and I am a Doctoral Candidate in the Lynch School. I am starting research for my dissertation, which it about the reasons students decide to attend college. Thank you for taking the time to meet with me for this project.

(Participants will sign consent form before the Skype meeting begins. Interviewer will acknowledge whether or not the participant is willing to have the interview audio recorded):
(If the participant decides the interview can be audio recorded): I see that you are willing to let me audio record our conversation today. I am starting the recording now. I will use the recording later to help me remember what we talked about today.

(If the participant does not want the interview audio recorded): I see that you prefer that I do not audio record our conversation today. That is fine with me. Instead, I will take notes about what you say.

(To all participants): Now we can get started with the interview. I will ask you a few questions about why you decided to attend college. When answering my questions, think back to the time when you decided to pursue a college degree. Please share any information that you feel comfortable sharing. Also, please feel free to ask questions if you do not understand something that I ask you.

Interview questions:

1. Why did you decide to attend college?
2. What made you decide to attend this college/university in particular?
3. (If the student mentions they did not want to attend this college/ university): Why did you NOT want to attend this school?
    a. a. What college did you want to attend?
    b. b. Why did you prefer that college to this one?
4. Why was your reason for attending college important to you? *
5. What did you hope to gain from attending college?
6. What were you afraid of missing out on by not attending college?
7. How did your parents/guardians/family influence your decision to attend college?
8. How did you think attending college would help you achieve your life goals?
9. What does it personally mean to you to achieve (a goal mentioned in question 8)?

* Question number 4 will be asked several times, using students' response(s) from question 1.

At the end of the interview: Thank you, again, for taking the time to talk to me about your decision to attend college.

Pilot Study 1b: Open-response survey

Thank you for taking the time to complete this survey. I am interested in the reasons you decided to attend college. When answering the following questions, think back to the time when you decided to pursue a college degree. Please take your time answering each question and provide as much detail as you feel comfortable sharing.

1. Why did you decide to attend college?

2. Why was each reason for attending college important to you? For example, if you said that you chose to attend college so that you would be able to get a good job, please explain why getting a good job was important to you.

3. What did you hope to gain from attending college? What were you afraid of missing out on by not attending college?

4. How, if at all, did your parents/guardians/family influence your decision to attend college?

5. How did you think attending college would help you achieve your life goals?

6. Please select 1 or 2 of the goals you mentioned in the previous question. At the time, why was it important to you to achieve these goals?

Appendix B

Pilot Study 2: Materials

Items and scales administered in Pilot study 2.

<u>Pilot Study 2a</u> – Categorization task

Psychologists believe that, as humans, we share a number of fundamental needs that motivate what we do on a day-to-day basis. Some of these needs are listed below, with a brief description:

People have a need for autonomy. This means that they want to freely choose what to do with their lives and how to spend their time.

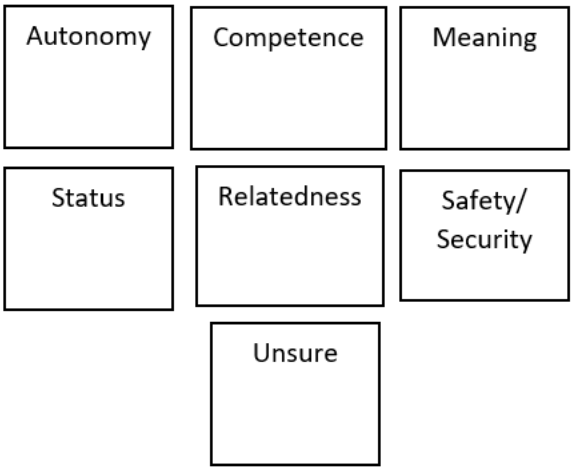
People have a need for competence. This means that they want to become skillful and good at things in different areas of their life – that is, they want to master new skills, activities, and tasks.

People have a need for belonging. This means people want to form meaningful relationships with other people in their environment and feel accepted by them.

People have a need for safety and security. This means that people want to feel safe from threats, such as things that can hurt them physically, emotionally, or financially.

People have a need for status. This means people want others to respect and admire them based on their ability or willingness to help others achieve their goals, or based on their perceived position in society.

People have a need for meaning. This can mean that people want to have coherent understanding of the world around them. It can also mean that people want to feel that their lives are meaningful and purposeful.



We are interested in how each of these needs relate to students' reasons for attending college. On the next few pages you will read statements that pertain to the needs listed above. Please categorize each statement in terms of the need that you think it *most* relates to. For example, the statement "I decided to attend college because I wanted to feel more competent" should be moved to the Competence box below. Please complete this following practice item and then proceed to the next screen. If you are unsure about which need a statement is about, please move it to the Unsure box. On each screen you will categorize 7 or 8 statements like this; and you will do this for 6 screens.

Note: You can put more than one statement in a category. Do not worry about the order of statements in the category boxes.

*Notes: The following italicized text was presented on each page of the survey. The first page in this document included a visual of the categorization boxes, which appeared on all pages of the survey. The order of the pages was randomized. Lastly, the items were numbered and there was a text box at the bottom of each screen. Participants were asked to make notes of any items that were confusing to them in that text box.

Please categorize each statement in terms of the need that you think it most relates to. To do so, please drag the statement to the appropriate box on the right side of the screen. As a reminder, the descriptions of the needs are listed below:

- *People have a need for autonomy. This means that they want to freely choose what to do with their lives and how to spend their time.*
- *People have a need for competence. This means that they want to become skillful and good at things in different areas of their life – that is, they want to master new skills, activities, and tasks.*
- *People have a need for belonging. This means people want to form meaningful relationships with other people in their environment and feel accepted by them.*
- *People have a need for safety and security. This means that people want to feel safe from threats, such as things that can hurt them physically, emotionally, or financially.*
- *People have a need for status. This means people want others to respect and admire them based on their ability or willingness to help others achieve their goals, or based on their perceived position in society.*
- *People have a need for meaning. This can mean that people want to have coherent understanding of the world around them. It can also mean that people want to feel that their lives are meaningful and purposeful.*

I decided to attend college because:

- I wanted an opportunity to live away from home
- I wanted to show myself that I can be successful
- I wanted to develop friendships that would last many years
- I wanted to learn more about the world
- I wanted to be able to have a comfortable life
- a college degree is a valuable credential in today's society
- it was important to me to be perceived as having high status

Did you find any of the statements listed above to be confusing? If so, please list the number of the statement and explain what was unclear.

--page break--

- I wanted to have time for self-exploration
- I wanted to seek out opportunities to develop new skills
- I wanted to form close relationships with people in a new community or organization
- I hoped it would help me identify a career path that is meaningful to me
- I wanted to pursue a career that has job security
- I was focused on being able to provide for my family, including parents and/or siblings
- a college degree can allow me to achieve a position of higher status in society
- I wanted others to think of me as successful

Did you find any of the statements listed above to be confusing? If so, please list the number of the statement and explain what was unclear.
--page break--

- I wanted to be more independent
- I wanted to master difficult skills/content/material
- I was seeking to develop meaningful friendships
- I wanted to feel connected to a college community
- I wanted to study topics in greater depth than I did in high school
- I wanted to have more stable living conditions than I had growing up
- I wanted to be a respected influencer in my community or career
- I wanted a career that other people respect and admire me for

Did you find any of the statements listed above to be confusing? If so, please list the number of the statement and explain what was unclear.

--page break--

- I wanted to see who I am without the influence of my parents and family
- I thought attending college would be liberating for me
- I wanted to feel included in a community
- I was looking for an opportunity to develop mastery in my field of study
- I wanted to search for my purpose in life
- I wanted to discover the truth about the world
- a college education will allow me to provide more opportunities to my children than my parents were able to provide to me
- I wanted people to know I am capable and worthy of attending college

Did you find any of the statements listed above to be confusing? If so, please list the number of the statement and explain what was unclear.
--page break--

- attending college is congruent with how I view myself
- I wanted to become an expert in my field
- I was excited about the opportunity to learn new, challenging material
- I wanted to relate to other students
- I was seeking an opportunity to explore many complex questions about life
- I do not want to struggle through life the way my parents did
- a college degree will earn me more social status

Did you find any of the statements listed above to be confusing? If so, please list the number of the statement and explain what was unclear.

--page break--

- I value education
- I will feel proud when I graduate
- I wanted to feel accepted by others
- I wanted an opportunity to think more deeply about issues that are important to me
- I wanted to search for the meaning of my existence

- I wanted to be able to provide my children with a better life than I had growing up
- a college education will help me and my family stay healthy and safe
- I will earn others' respect by attending college

Did you find any of the statements listed above to be confusing? If so, please list the number of the statement and explain what was unclear.

Added to survey 1 from survey 2 (items listed below)
MACS
University Stress Scale
Sense of Belonging Scale
Satisfaction with Life Survey

Pilot Study 2b

Motivations for Attending College Scale (MACS) (Surveys 2a and 2b)

The following items will have the following 6-point Likert response scale. The items will appear in random order on each page, and the order of the pages will be randomized.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Disagree

When responding to the following questions, please think back to the time you decided to attend college.

I decided to attend college because:
AUTONOMY
A1 I wanted an opportunity to live away from home
A2 I wanted to have time for self-exploration
A3 I wanted to be more independent
A4 I wanted to separate myself from family
A5 I wanted to be away from parents/guardians so I can make my own life decisions
A6 I wanted to see who I am without the influence of my parents and family
A7 I thought attending college would be liberating for me
A8 attending college is congruent with how I view myself
A9 I value education
COMPETENCE
C1 I wanted to show myself that I can be successful
C2 I wanted to seek out opportunities to develop new skills
C3 I wanted to master difficult skills/content/material
C4 I was looking for an opportunity to develop mastery in my field of study
C5 I wanted to become an expert in my field
C6 I was excited about the opportunity to learn new, challenging material
C7 I will feel proud when I graduate

RELATEDNESS

R1 I wanted to develop friendships that would last many years
R2 I wanted to form close relationships with people in a new community or organization
R3 I was seeking to develop meaningful friendships
R4 I wanted to feel connected to a college community
R5 I wanted to feel included in a community
R6 I wanted to relate to other students
R7 I wanted to feel accepted by others

MEANING

M1 I wanted to learn more about the world
M2 I hoped it would help me identify a career path that is meaningful to me
M3 I wanted to study topics in greater depth than I did in high school
M4 I wanted an opportunity to think more deeply about issues that are important to me
M5 I was seeking an opportunity to explore many complex questions about life
M6 I wanted to search for my purpose in life
M7 I wanted to discover the truth about the world
M8 I wanted to search for the meaning of my existence

SAFETY/SECURITY

SS1 I wanted to be able to have a comfortable life
SS2 I wanted to pursue a career that has job security
SS3 I was focused on being able to provide for my family, including parents and/or siblings
SS4 I wanted to have more stable living conditions than I had growing up
SS5 I wanted to be able to provide my children with a better life than I had growing up
SS6 a college education will allow me to provide more opportunities to my children than my parents were able to provide to me
SS7 a college education will help me and my family stay healthy and safe
SS8 I do not want to struggle through life the way my parents did

STATUS

STAT 1 a college degree is a valuable credential in today's society
STAT 2 a college degree can allow me to achieve a position of higher status in society
STAT 3 I wanted to be a respected influencer in my community or career
STAT 4 I wanted a career that other people respect and admire me for
STAT 5 a college degree will earn me more social status
STAT 6 I will earn others' respect by attending college
STAT 7 I wanted people to know I am capable and worthy of attending college
STAT 8 I wanted others to think of me as successful
STAT 9 it was important to me to be perceived as having high status

Alignment Items

Instructions: Psychologists believe that, as humans, we share a number of fundamental needs or desires that motivate what we do on a day-to-day basis. On the next several screens, you will read the description of a particular need and will then have to write down some of the things you do while at college in order to fulfill this need.

You will have at least one minute to read and reflect on each need. After one minute, the continue arrow will appear on your screen and you can continue to the next page of the survey. You can stay on each page for a maximum of two minutes, at which time the website will automatically advance you to the next screen.
To begin, click to the next screen.

Prompts:
"People may have a fundamental need or desire for autonomy. Such a need would involve wanting to freely choose what to do with one's life and how to spend one's time. What are some things you do while at college in order to feel autonomous?

People may have a fundamental need or desire for competence. Such a need would involve wanting to become skillful and good at things in different areas of one's life – that is, people may want to master new skills, activities, and tasks. What are some things you do while at college in order to feel competent?

People may have a fundamental need or desire for belonging. Such a need would involve wanting to form meaningful relationships with other people in one's environment and feel accepted by them. What are some things you do while at college in order to feel like you belong?
People may have a fundamental need or desire for safety and security. Such a need would involve wanting to feel safe from threats, such as things that can hurt someone physically, emotionally, or financially. What are some things you do while at college in order to feel safe and secure?

People may have a fundamental need or desire for status. Such a need would involve wanting others' respect and admiration based on one's ability or willingness to help others achieve their goals, or based on one's perceived position in society. What are some things you do while at college in order to gain status?

People may have a fundamental need or desire for meaning. Such a need would involve wanting to have coherent understanding of the world. It can also mean that people want to feel that their lives are meaningful and purposeful. What are some things you do while at college in order to find meaning?

--page break—

Instructions: Now that you are done reflecting on what you do while at college in order to fulfill your basic needs, we want you to think about whether the things you to do to full one need ever interfere with what you do to fulfill another need. In other words, do you ever experience a conflict between your various needs.

Keep this in mind as you respond to the questionnaire that begins on the next screen.
Response options:
Never Rarely Sometime Often Always

How often do the things you do to feel **autonomous** get in the way of:
The things you do to feel competent
The things you do to feel connected
The things you do to feel safe and secure
The things you do for status
The things you do to find meaning

How often do the things you do to feel **competent** get in the way of:
The things you do to feel in control
The things you do to feel connected
The things you do to feel safe and secure
The things you do for status
The things you do to find meaning

How often do the things you do to feel **connected** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel safe and secure
The things you do for status
The things you do to find meaning

How often do the things you do to feel **safe and secure** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel connected
The things you do for status
The things you do to find meaning

How often do the things you do **for status** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel connected
The things you do to feel safe and secure
The things you do to find meaning

How often do the things you do **to find meaning** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel connected
The things you do to feel safe and secure
The things you do for status

Dependent Measures

Sense of Belonging subscale from Bollen and Hoyle's (1990) Group Cohesion Scale (Surveys 1 and 2)

University Stress Scale (Stallman & Hurst, 2016) (Surveys 1 and 2)

Satisfaction with Life Scale (SWLS) (Diener et al. 1985) (Surveys 1 ad 2)

Self-Efficacy for Learning and Performance (Pintrich et al., 1991) (Survey 2)
Adapted from Motivated Strategies for Learning Questionnaire

Self-Efficacy for Self-Regulated Learning Scale (Usher & Pajares, 2008) (Survey 2)

Demographic items (Surveys 1 and 2)

What is your age?
[drop down list]
What is your class year?
a. 2020
b. 2021
c. 2022
d. 2023
e. other: _____

Think of this ladder as representing where people stand in the United States. At the top of the ladder (marked "10") are the people who are the best off—those who have or who come from families that have the most money, the most education, and the most respected jobs. At the bottom of the ladder (marked "1") are the people who are the worst off—those who have or who come from families that have the least money, the least education, and the least respected jobs or no job.

Where do you think you currently stand on this ladder?

Are you the first person in your family to attend college?
a. Yes
b. No

Gender:

- ❍ Male
- ❍ Female
- ❍ Other _____

Are you Hispanic or Latinx? (i.e., a person of Cuban, Mexican, Puerto Rican, South or Central American descent, or other Spanish culture or origin, regardless of race)? [Yes/No]

Please indicate your race (select all that apply):

- ❑ White: A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- ❑ Black or African-American: A person having origins in any of the black racial groups of Africa.
- ❑ American Indian or Alaska Native: A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
- ❑ Asian: A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- ❑ Native Hawaiian or Other Pacific Islander: A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- ❑ Other (please specify in the box below): _____

Appendix B Continued

Pilot Study 2: Supplementary Information about Methods and Analyses

Pilot Study 2 – Sample: Data cleaning

This participant pool includes undergraduate students who are enrolled in introductory courses in the applied psychology and human development major and complete studies as part of a research requirement. Students who completed this study earned one research credit toward their four-credit requirement, which was awarded automatically through the Sona System's participation management software.

In total, I collected 262 responses for Pilot Studies 2a and 2b combined. Of these participants 8 completed the survey in less than 10 minutes and were removed from analyses. Also, there were 32 lines of data that had a shared Sona ID number with at least once other line of data (i.e., the same student attempted to participate in the study more than once). Often, these participants started a survey but did not complete it (i.e., the online survey session timed out due to inactivity or they tried to access the survey on a mobile device), so they had to start the survey over from the beginning. These participants were removed from the analysis because I could not be sure that their first experience with the survey influenced their responses to items on the completed survey. Lastly, to check for straight-lining (i.e., students who selected the same response to a set of items, presumably without reading the item), I examined the standard deviations of responses across all shared items on the two surveys. The SDs ranged from 0.45-2.48, and the mean was 1.6. I reviewed responses patterns from all participants with SDs equal to or below 1.0. Many of the participants with low standard deviations were already removed from the analysis because they completed the survey in under 10 minutes. Thus, two participants were removed for straight-lining responses.

Pilot Study 2: Methods - EFA

First, I conducted an exploratory factor analysis (EFA) with principal axis factoring (PAF) and an eigenvalue threshold of 1 (Beavers et a., 2013), which yielded a 9-factor solution. Without rotation, the 9-factor solution was not interpretable, which was not surprising because I expected the factors to be correlated. As such, for all subsequent analyses I used an oblique rotation, which is most appropriate in the social sciences, due to inherent relations between factors (Beavers et al., 2013). The same analyses with a promax rotation was still not interpretable, although it did suggest two possible security factors and two possible autonomy factors. Because this solution was not in line with my theoretical model, I then requested a 6-factor solution. With a promax rotation, the 6 factor solution identified 6 meaningful factors, such that each factor aligned with the need for autonomy, competence, relatedness, meaning, safety, or status.

To determine which items should be removed from the measure, I considered factor loadings, inter-item correlations, and the content of each item. An inter-item correlation matrix was computed between all MACS items. For factor analysis, inter-item correlations should be at least r=.20 but should not exceed r=0.85 (Mvududu & Sink, 2013). Following guidelines from Beavers and colleagues (2013) and Mvududu and Sink (2013) an item was considered to load onto a factor if the factor loading was greater than 0.40. I began by flagging potentially problematic items, based on low inter-item correlations within each intended subscale. Ten items with inter-item correlations below 0.30 were flagged at this stage. These items, listed under their respective subscale in Appendix C, included three autonomy items (items A3, A8, and A9), one competence item (C1), one meaning item (M2), one relatedness item (R7), three safety items (SS1, SS2, and SS7), and one status item (STAT1). These items were flagged as potentially

problematic items. Keeping these items in mind, I ran several iterations of the EFA that requested 6 factors with a promax rotation. Beginning with all 48 items, I examined the factor loadings of each, then I removed an item (e.g. an item with a low factor loading that might include confusing language for some respondents), and then I re-ran the EFA. After several iterations, I removed a total of 15 items from the analyses. Notably, I did not remove items from the safety/security subscale because this scale presented a conceptual issue. Two of the items (Security 1 and Security 2) were loading onto the status factor in the EFAs with a forced 6-factor solution. Importantly, these two items more accurately represented my intended safety construct, compared to the other safety/security items. Therefore, all items from this subscale remained in the analyses, and when the EFA was run using an Eigenvalue threshold of 1 (i.e., not forcing a 6-factor solution), these two items and a third safety/security item (Security7) loaded onto a separate factor. Although the factor loadings onto this intended safety factor were relatively low (ranged from .33-.55), the identification of this factor indicated that these items were conceptually distinct from the other safety/security items in the analyses.

Pilot Study 2: MACS Subscales

*__Items that are crossed out were removed from the analyses.__

I decided to attend college because:

AUTONOMY

Alpha for revised scale = .770 (5 items)

A1 I wanted an opportunity to live away from home
~~A2 I wanted to have time for self-exploration~~
~~A3 I wanted to be more independent~~
A4 I wanted to separate myself from family
A5 I wanted to be away from parents/guardians so I can make my own life decisions
A6 I wanted to see who I am without the influence of my parents and family
A7 I thought attending college would be liberating for me
~~A8 attending college is congruent with how I view myself~~
~~A9 I value education~~

COMPETENCE

Alpha for revised scale = .787 (4 items)

~~C1 I wanted to show myself that I can be successful~~
~~C2 I wanted to seek out opportunities to develop new skills~~
C3 I wanted to master difficult skills/content/material
C4 I was looking for an opportunity to develop mastery in my field of study
C5 I wanted to become an expert in my field
~~C6 I was excited about the opportunity to learn new, challenging material~~
C7 I will feel proud when I graduate

RELATEDNESS

R1 I wanted to develop friendships that would last many years
R2 I wanted to form close relationships with people in a new community or organization
R3 I was seeking to develop meaningful friendships
R4 I wanted to feel connected to a college community
R5 I wanted to feel included in a community
~~R6 I wanted to relate to other students~~
~~R7 I wanted to feel accepted by others~~

Alpha for revised scale = .887 (5 items)

MEANING

M1 I wanted to learn more about the world
~~M2 I hoped it would help me identify a career path that is meaningful to me~~
~~M3 I wanted to study topics in greater depth than I did in high school~~
~~M4 I wanted an opportunity to think more deeply about issues that are important to me~~
M5 I was seeking an opportunity to explore many complex questions about life
M6 I wanted to search for my purpose in life
M7 I wanted to discover the truth about the world
M8 I wanted to search for the meaning of my existence

Alpha for revised scale = .858 (5 items)

STATUS

~~STAT 1 a college degree is a valuable credential in today's society~~
STAT 2 a college degree can allow me to achieve a position of higher status in society
~~STAT 3 I wanted to be a respected influencer in my community or career~~
STAT 4 I wanted a career that other people respect and admire me for
STAT 5 a college degree will earn me more social status
STAT 6 I will earn others' respect by attending college
~~STAT 7 I wanted people to know I am capable and worthy of attending college~~
STAT 8 I wanted others to think of me as successful
STAT 9 it was important to me to be perceived as having high status

Alpha for revised scale = .855
(6 items)

SAFETY/SECURITY

SS1 I wanted to be able to have a comfortable life
SS2 I wanted to pursue a career that has job security
SS3 I was focused on being able to provide for my family, including parents and/or siblings
SS4 I wanted to have more stable living conditions than I had growing up
SS5 I wanted to be able to provide my children with a better life than I had growing up
SS6 a college education will allow me to provide more opportunities to my children than my parents were able to provide to me
SS7 a college education will help me and my family stay healthy and safe
SS8 I do not want to struggle through life the way my parents did

(Intended) Security scale Alpha = .652
(items 1, 2, 7)

Familial obligation factor Alpha= .861
(Items 3, 4, 5, 6, and 8)

Pilot Study 2: Tables

Table B1

Correlations Between MACS Subscales and Dependent Measures (Pilot Study 2)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Autonomy	--											
2. Competence	.177**	--										
3. Relatedness	.286**	.413**	--									
4. Meaning	.383**	.430**	.470**	--								
5. Status	.138*	.345**	.139*	.119	--							
6. Familial obligation	.101	.395**	.339**	.203**	.500**	--						
7. Security	.193**	.049	-.08	.112	.216**	.279**	--					
8. Sense of Belonging	.033	.195**	.307**	.242**	.046	.100	-.099	--				
9. Stress	.195**	-.102	-.154*	.016	-.029	.036	.291**	-.169*	--			
10. Life Satisfaction	-.026	.159*	.316**	.115	.017	.096	-.154*	.302**	-.308**	--		
11. Self-Efficacy for Self-Regulated Learning	-.015	.270**	.288**	.174*	.034	.096	-.157	.216**	-.288**	.339**	--	
12. Self-Efficacy for Learning & Performance	.057	.250**	.031	.093	.146	.107	-.068	.100	-.135	.278**	.587**	--
n	235	235	235	235	235	235	235	232	232	232	157	157
M	4.121	5.110	5.089	4.757	4.529	3.779	5.088	4.889	2.303	4.895	4.065	4.726
SD	.964	.682	.749	.827	.812	1.271	.743	1.796	.432	1.204	.907	1.105
Cronbach alpha	.770	.787	.887	.858	.855	.861	.652	.952	.820	.876	.845	.933

* $p < .05$. ** $p < .01$.

Table B2

Means, Standard Deviations, and Cronbach Alpha for the Need Conflict and Disruption Scales (Pilot Study 2)

	Mean	SD	Reliability
Autonomy Conflict	2.56	0.75	0.82
Competence Conflict	2.56	0.84	0.85
Relatedness Conflict	2.60	0.83	0.84
Meaning Conflict	2.39	0.78	0.85
Safety/Security Conflict	2.47	0.82	0.84
Status Conflict	2.66	0.90	0.87
Autonomy Disrupted	2.55	0.73	0.74
Competence Disrupted	2.54	0.77	0.79
Relatedness Disrupted	2.69	0.68	0.71
Meaning Disrupted	2.52	0.81	0.83
Safety/Security Disrupted	2.48	0.82	0.83
Status Disrupted	2.48	0.81	0.82

Appendix C

Pilot Study 3: Materials

Items and scales administered in Pilot study 3.

Motivations for Attending College Scale (MACS)

*Indicates an item that was added to the MACS since administering the measure in Study 2
When responding to the following questions, please think back to the time you decided to attend college.

Response options:

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

I decided to attend college because…

AUTONOMY

- A2 …I wanted to have time for self-exploration
- *A11 …getting a college education is personally important to me
- *A12 …I will have the freedom to explore my interests while I am in college
- *A13 …graduating from college will give me more freedom to pursue the kind of life I want to live
- *A14 …a college education will give me more control over my own life
- *A15 …it will provide me with more control over my future
- *A16 …a college education will give me choices later in life
- *A17 …attending college will allow me to pursue my passion(s)
- *A18 …attending college will help me be my authentic self
- *A19 …attending college will allow me to follow my own path in life
- *A20 …I wanted an opportunity to make my own life decisions

COMPETENCE

- C2 …I wanted to seek out opportunities to develop new skills
- C3 …I wanted to master difficult skills/content/material
- C4 …I was looking for an opportunity to develop mastery in my field of study
- C5 …I wanted to become an expert in my field of study
- *C8 …attending college will help me develop important skills
- *C9 …attending college will help me perform well in my career
- *C10 …attending college will help me grow as a person
- *C11 …attending college will help me become a competent adult
- *C12 …attending college will help me achieve my life goals
- *C13 …I wanted to challenge myself

RELATEDNESS

R1 …I wanted to develop friendships that would last many years
R2 …I wanted to form close relationships with people in a new community or organization
R3 …I was seeking to develop meaningful friendships
R4 …I wanted to feel connected to a college community
R5 …I wanted to feel included in a community

MEANING

M1 …I wanted to learn more about the world
M5 …I was seeking an opportunity to explore many complex questions about life
M6 …I wanted to search for my purpose in life
M7 …I wanted to discover the truth about the world
M8 …I wanted to search for the meaning of my existence
*M9 …I wanted to learn about how things work in the world around me
*M10 …I wanted an opportunity to think deeply about the things that interest me
*M11 …I wanted to satisfy my curiosity about the world around me

STATUS

STAT 2 …a college degree can allow me to achieve a position of higher status in society
STAT 4 …I wanted a career that other people respect and admire me for
STAT 5 …a college degree will earn me more social status
STAT 6 …I will earn others' respect by attending college
STAT 8 …I wanted others to think of me as successful
STAT 9 …it was important to me to be perceived as having high status

SAFETY/SECURITY

*SS9 …I wanted to be able to have a stable life for me and my family
*SS10 …I wanted to pursue a career that provides me and my family with financial security
*SS11 …I wanted to be able to provide me and my family with stable living conditions
*SS12 …a college education will give me knowledge and resources to help me and my family stay healthy and safe
*SS13 …a college education will allow me and my family to live in a safe neighborhood
*SS14 …I never wanted to worry about feeding myself or my family
*SS15 …a college education will help me to keep me and my family safe

Need Conflict Scale

Instructions: Psychologists believe that, as humans, we share a number of fundamental needs or desires that motivate what we do on a day-to-day basis. On the next several screens, you will read the description of a particular need and will then have to write down some of the things you do while at college in order to fulfill this need.

You will have at least one minute to read and reflect on each need. After one minute, the continue arrow will appear on your screen and you can continue to the next page of the survey. You can stay on each page for a maximum of two minutes, at which time the website will automatically advance you to the next screen.
To begin, click to the next screen.

Prompts:
"People may have a fundamental need or desire for autonomy. Such a need would involve wanting to freely choose what to do with one's life and how to spend one's time. What are some things you do while at college in order to feel autonomous?

People may have a fundamental need or desire for competence. Such a need would involve wanting to become skillful and good at things in different areas of one's life – that is, people may want to master new skills, activities, and tasks. What are some things you do while at college in order to feel competent?

People may have a fundamental need or desire for belonging. Such a need would involve wanting to form meaningful relationships with other people in one's environment and feel accepted by them. What are some things you do while at college in order to feel like you belong?

People may have a fundamental need or desire for safety and security. Such a need would involve wanting to feel safe from threats, such as things that can hurt someone physically, emotionally, or financially. What are some things you do while at college in order to feel safe and secure?

People may have a fundamental need or desire for status. Such a need would involve wanting others' respect and admiration based on one's ability or willingness to help others achieve their goals, or based on one's perceived position in society. What are some things you do while at college in order to gain status?

People may have a fundamental need or desire for meaning. Such a need would involve wanting to have coherent understanding of the world. It can also mean that people want to feel that their lives are meaningful and purposeful. What are some things you do while at college in order to find meaning?

--page break—

Instructions: Now that you are done reflecting on what you do while at college in order to fulfill your basic needs, we want you to think about whether the things you to do to full one need ever interfere with what you do to fulfill another need. In other words, do you ever experience a conflict between your various needs.

Keep this in mind as you respond to the questionnaire that begins on the next screen.

Response options:
Never Rarely Sometime Often Always

How often do the things you do to feel **autonomous** get in the way of:
The things you do to feel competent
The things you do to feel connected
The things you do to feel safe and secure
The things you do for status
The things you do to find meaning

How often do the things you do to feel **competent** get in the way of:
The things you do to feel in control
The things you do to feel connected
The things you do to feel safe and secure
The things you do for status
The things you do to find meaning

How often do the things you do to feel **connected** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel safe and secure
The things you do for status
The things you do to find meaning

How often do the things you do to feel **safe and secure** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel connected
The things you do for status
The things you do to find meaning

How often do the things you do **for status** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel connected
The things you do to feel safe and secure
The things you do to find meaning

How often do the things you do **to find meaning** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel connected
The things you do to feel safe and secure
The things you do for status

Need Satisfaction Scale

Please indicate the extent to which you agree or disagree with the following statements.

Response Options

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

Autonomy:
I feel a sense of choice and freedom in the things I undertake in college.
I feel that my decisions in college reflect what I really want.
I feel my choices in college express who I really am.
I feel I have been doing what really interests me.

Competence:
I feel confident that I can do things well in college.
I feel competent to achieve my goals in college.
I feel I can successfully complete difficult tasks in college.
I feel capable at what I do in college.

Relatedness:
I feel close and connected with other people in college who are important to me.
I feel that the people I care about at college also care about me.
I experience a warm feeling with the people I spend time with at college.
I feel connected with people at college who care for me, and for whom I care.

Meaning:
I have a clear understanding of the world around me.
I understand the world around me.
I understand my place in the world.
I understand the complexities of the world.
I know what my purpose in life is.

Safety/Security:
My life at college is stable.
My life at college is predictable.
I feel safe in my day-to-day interactions at college.
I have a sense of security in my life.

Status:
I feel respected by other people at college.
People at my college view me as someone with status.
People at my college think I am competent and helpful.
I have status in some social contexts in college.

Dependent Measures

Sense of Belonging subscale from Bollen and Hoyle's (1990) Group Cohesion Scale

University Stress Scale (Stallman & Hurst, 2016)

Satisfaction with Life Scale (SWLS) (Diener et al. 1985)

Perceived Physical well-being (Ware & Sherbourne, 1992)

Well-being items (from Inventory of Depression and Anxiety Symptoms (IDAS; Watson et al., 2007

GAD-7 (7-item anxiety scale) (Spitzer, Kroenke, Williams & Lowe, 2006)

Intention to persist

How certain are you that you will graduate from your college?

Very Uncertain	Uncertain	Somewhat Uncertain	Somewhat Certain	Certain	Very Certain

Campus Climate (adapted from Reid, L. D., & Radhakrishnan, P. (2003). General Campus and Academic Climate Subscales for Undergraduate Students and General Campus and Academic Climate Subscales for Graduate Students)

Demographic items

For non-Sona participants:
What college or university are you enrolled in?
Please select the option that best describes your college or university.

- 2-year community college
- 4-year public institution
- 4-year private institution

For all respondents:
What is your age?
What is your class year?

a. 2020
b. 2021
c. 2022
d. 2023
e. other: _____

Think of this ladder as representing where people stand in the United States. At the top of the ladder (marked "10") are the people who are the best off—those who have or who come from families that have the most money, the most education, and the most respected jobs. At the bottom of the ladder (marked "1") are the people who are the worst off—those who have or who come from families that have the least money, the least education, and the least respected jobs or no job.

Where do you think you currently stand on this ladder?

Are you the first person in your family to attend college?

a. Yes
b. No

Gender:

❍ Male
❍ Female
❍ Other _____

Are you Hispanic or Latinx? (i.e., a person of Cuban, Mexican, Puerto Rican, South or Central American descent, or other Spanish culture or origin, regardless of race)? [Yes/No]

Please indicate your race (select all that apply):

❑ White: A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
❑ Black or African-American: A person having origins in any of the black racial groups of Africa.

- ❑ American Indian or Alaska Native: A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
- ❑ Asian: A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- ❑ Native Hawaiian or Other Pacific Islander: A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

Other (please specify in the box below):

Appendix C Continued

Pilot Study 3: Supplementary Information about Methods and Analyses

Pilot Study 3: Sample – Data cleaning

Of the 211 responses to Pilot Study 3, five stopped the survey in under two minutes and therefore were removed from analyses. Also, there were two Sona ID numbers that had two lines of data, indicating the participant participated in the study twice. In both of these cases, the participant completed a small fraction of the survey and then completed the entire survey during another session (i.e., the first session likely timed out, so the participant had to start over). The first (incomplete) line of data for each of the duplicates were removed from analysis, and the completed lines of data remained in the sample. Next, I removed four participants who responded incorrectly to the attention check (note, one of these participants was also one of the duplicate responses that was not removed in the previous step). To check for straight-lining (i.e., students who selected the same response to a set of items, presumably without reading the item), I examined the standard deviations of responses across all items. The SDs ranged from 0.95-2.42, and the mean was 1.58. I reviewed responses patterns from the two participants with standard deviations below 1.0. One of these participants was already removed for the analyses and the other participant provided thoughtful responses to the open-response questions, and therefore remained in the sample. Lastly, I examined responses to the open-response questions and removed one participant for providing random keyboard strokes as responses. Ultimately the total sample size for Pilot Study 3 was 199. Five respondents had some missing data (i.e., three were missing 5 or fewer responses, one was missing 10 responses, and one was missing 25 responses), but they remained in the analyses.

Pilot Study 3: Methods – EFA

First, I conducted an exploratory factor analysis (EFA) with principal axis factoring (PAF), a promax (oblique) rotation and an eigenvalue threshold of 1 (Beavers et al., 2013), which yielded an eight-factor solution. I also conducted an EFA with a forced six-factor solution, but this did not help with interpretability, so I worked from the eight-factor solution. Notably, in both solutions, many of the autonomy and competence items loaded onto the same factor.

To determine which items should be removed from the measure, I considered factor loadings, communalities, inter-item correlations, and the content of each item. Following guidelines from Beavers and colleagues (2013) and Mvududu and Sink (2013) an item was considered to load onto a factor if the factor loading was greater than 0.40, the cross-loadings onto other factors was less than 0.40, and the communality was greater than 0.30. For factor analysis, inter-item correlations should be at least r=.20 but should not exceed r=0.85 (Mvududu & Sink, 2013). I began by flagging potentially problematic items, based on low inter-item correlations within each intended subscale. Most inter-item correlations were above .30, with a few exceptions in the intended competence subscale – items C2, C5, and C13 had inter-item correlations below .3 and thus were flagged as potentially problematic. This was troubling because I expected item C5 ("I wanted to become an expert in my field of study") to be one of the items that best represents the competence construct.

Early in the factor analysis process it became clear that many of the autonomy and competence items were loading onto one factor, and some of these items also cross-loaded onto the meaning factor. In reviewing the content of the items, I could understand why some items were cross loading. For example, competence item C10 reads "I decided to attend college because attending college will help me grow as a person." I can see how this idea of personal growth could be related to some of the meaning and autonomy items. After several iterations of

PAF, it became clear that the items C3, C4, C5, and C9 seem to load onto a separate competence factor. Items C4 and C5 consistently had high loadings on this factor (greater than .6), though the loadings of C3 and C9 depended on which other items were in the analysis. Because the competence subscale was the most problematic of the subscales, my analyses focused on a factor solution that included all four of the items C3, C4, C5, and C9 loading onto a single factor with a loading of .3 or greater.

As such, my next step was to run several iterations of PAF, starting with these four competence items and all items from the other intended subscales. It became clear that some items were consistently cross-loading, and therefore were often removed from the factor analysis early in the process. For example, item A17, "I decided to attend college because attending college will allow me to pursue my passion(s)" often loaded onto the autonomy, meaning, and competence subscales, and item A12, "I decided to attend college because I will have the freedom to explore my interests in college" often loaded on to the autonomy, meaning, and, sometimes, the relatedness factors. As such, I was able to identify several items that do not clearly measure their intended subscale. All the items flagged as problematic at this point were intended to be autonomy, competence, or meaning items – the relatedness, safety, and status items consistently loaded onto their intended factor with loadings greater than .6. Once these problematic items were removed from the analyses, an EFA with a promax rotation and an eigenvalue threshold of greater than 1 yielded a 6 factor solution.

At this phase of measure development my goal was to identify 4 items that reliably measured each need (for a total of 24 items on the MACS). To decide which of these items to include in the revised version of the measure, my next step was to select the relatedness, safety, and status items to include, and examine if and how the factor loadings for the autonomy and

meaning items change based on the other items in the analysis. The process of removing relatedness, safety, and status items was mostly driven by the content of the items, because most items had strong factor loadings for their intended factor.

Toward the end of the factor analysis process I identified the items that consistently loaded onto the intended subscale (without cross-loadings or with low cross-loadings) and without making significant changes to the overall factor structure of the factor solution (i.e., some items were highly correlated with items from other subscales, so when included in the analysis, such items would change the structure of the overall factor solution. These items were removed from the analyses). The items that remained in the analyses at this time were R1, R2, R3, R4, R5, A13, A14, A16, A19, A20, C4, C5, M5, M6, M7, M8, SS11, SS12, SS13, SS14, SS15, Stat2, Stat4, Stat6, Stat8, and Stat9. Note that two items, C3 and C9, cross-loaded on to two factors, but these items remained in the analysis because their content best represented the intended construct. My goal was to have a 6-factor solution that included four items from each intended subscale. Keeping in mind response burden, and because the reliability for each subscale was not significantly reduced by including four items, compared to five items, I decided four items per factor was ideal. Therefore, to select the "final" subscales (i.e., the subscales with 4 items each), I ran several iterations of the EFA, each time removing one item (Beavers et a., 2013). I narrowed down the factor solutions to five options, each differing by one or two items. Each of these solutions included 2-3 competence items that cross-loaded onto a second factor with a loading greater than .3. I ultimately selected the factor solution that included subscales with the highest reliabilities and that included only two competence items with cross-loadings.

Pilot Study 3: MACS items included in analyses

I decided to attend college because…

AUTONOMY
- A13 …graduating from college will give me more freedom to pursue the kind of life I want to live
- A14 …a college education will give me more control over my own life
- A16 …a college education will give me choices later in life
- A19 …attending college will allow me to follow my own path in life

COMPETENCE
- C3 …I wanted to master difficult skills/content/material
- C4 …I was looking for an opportunity to develop mastery in my field of study
- C5 …I wanted to become an expert in my field of study
- C9 …attending college will help me perform well in my career

RELATEDNESS
- R1 …I wanted to develop friendships that would last many years
- R3 …I was seeking to develop meaningful friendships
- R4 …I wanted to feel connected to a college community
- R5 …I wanted to feel included in a community

MEANING
- M5 …I was seeking an opportunity to explore many complex questions about life
- M6 …I wanted to search for my purpose in life
- M7 …I wanted to discover the truth about the world
- M8 …I wanted to search for the meaning of my existence

STATUS
- STAT 5 …a college degree will earn me more social status
- STAT 6 …I will earn others' respect by attending college
- STAT 8 …I wanted others to think of me as successful
- STAT 9 …it was important to me to be perceived as having high status

SAFETY/SECURITY
- SS11 …I wanted to be able to provide me and my family with stable living conditions
- SS12 …a college education will give me knowledge and resources to help me and my family stay healthy and safe
- SS13 …a college education will allow me and my family to live in a safe neighborhood
- SS14 …I never wanted to worry about feeding myself or my family

Pilot Study 3: Tables

Table C1

Pattern Matrix for Motivations for Attending College Scale (Pilot Study 3)

	Relatedness	Safety	Autonomy	Meaning	Status	Competence
R1	0.817					
R3	0.733					
R4	0.688					
R5	0.645					
A13			0.714			
A14			0.655			
A16			0.655			
A19			0.55			
C3	0.393					0.303
C4						0.797
C5						0.628
C9			0.531			0.364
M5				0.755		
M6				0.623		
M7				0.627		
M8				0.771		
SS11		0.797				
SS12		0.815				
SS13		0.726				
SS14		0.668				
Stat5					0.71	
Stat6					0.587	
Stat8					0.621	
Stat9					0.789	

Note. Factor loadings less than .30 are not displayed in the table.

Table C2

Descriptive Statistics and Correlations Between MACS Subscales and Dependent Measures (Pilot Study 3)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Autonomy	--													
2. Competence	.574**	--												
3. Relatedness	.413**	.496**	--											
4. Meaning	.320**	.463**	.532**	--										
5. Safety	.305**	.320**	.303**	.214**	--									
6. Status	.246**	.299**	.249**	.283**	.264**	--								
7. Sense of belonging	.249**	.187**	.364**	.176*	.089	.195**	--							
8. Stress	-.065	.003	.092	.175*	.106	.128	-.262**	--						
9. Life satisfaction	.253**	.167*	.234**	.114	.047	.158*	.501**	-.383**	--					
10. Well-being	.135	.122	-.029	-.008	.027	-.045	.271**	-.398**	.444**	--				
11. Anxiety	.071	.120	.155*	.271**	.157*	.082	-.165*	.448**	-.248**	-.406**	--			
12. Campus climate	.209**	.163*	.286**	.066	.047	.187**	.803**	-.327**	.493**	.279**	-.273**	--		
13. Physical well-being	.191**	.211**	.054	.066	.099	.159*	.212**	-.275**	.412**	.359**	-.176*	.317**	--	
14. Intent to persist	.274**	.385**	.369**	.191**	.080	.134	.385**	-.158*	.279**	.125	-.010	.402**	.099	--
M	5.41	5.18	5.22	4.69	4.96	4.39	4.82	2.16	4.31	2.89	2.25	4.81	5.53	3.75
SD	.49	.64	.75	.86	.94	.88	.95	.44	.96	.82	.78	.84	.74	.68
Cronbach alpha	.777	.786	.872	.835	.851	.787	.948	.853	.877	.909	.913	.844	n/a	n/a

* $p < .05$. ** $p < .01$.

Table C3

Correlations Between Need Conflict and Need Disruption and Dependent Measures (Pilot Study 3)

	Sense of Belonging	Stress	Life satisfaction	Well-being	Anxiety	Campus climate	Physical well-being	Intent to persist
Autonomy conflict	-.181*	.300**	-.142*	-.103	.202**	-.248**	-.179*	-.068
Competence conflict	-.153*	.293**	-.146*	-.115	.202**	-.192**	-.116	-.012
Relatedness conflict	-.126	.310**	-.094	-.089	.141*	-.136	-.117	-.006
Meaning conflict	-.077	.335**	-.129	-.137	.150*	-.099	-.123	-.019
Safety conflict	-.058	.291**	-.099	-.120	.079	-.096	-.119	-.055
Status conflict	.004	.289**	-.139	-.175*	.190**	-.059	-.159*	-.023
Autonomy disrupted	-.077	.298**	-.115	-.119	.166*	-.120	-.111	-.016
Competence disrupted	-.099	.304**	-.134	-.162*	.119	-.132	-.149*	.002
Relatedness disrupted	-.141*	.283**	-.151*	-.124	.182**	-.150*	-.085	-.064
Meaning disrupted	-.075	.306**	-.094	-.105	.183**	-.137	-.163*	-.019
Safety disrupted	-.127	.417**	-.184**	-.189**	.206**	-.188**	-.236**	-.090
Status disrupted	-.102	.328**	-.128	-.092	.166*	-.153*	-.126	-.006

Note. The correlations between the need conflict and need disrupted scores for each need ranged from .75 to .83. The correlations between the need conflict subscales ranged from .61 to .81. The correlations between the need disrupted subscales ranged from .74 to .84. the correlations between the need conflict subscales and need disrupted subscales ranged from .72 to .84.

* $p < .05$. ** $p < .01$.

Table C4

Means, Standard Deviations, and Cronbach Alpha for the Need Conflict and Disrupted Needs Subscales (Pilot Study 3)

	Mean	SD	Reliability
Autonomy conflict	2.3472	0.82143	.86
Competence conflict	2.3799	0.84781	.88
Relatedness conflict	2.3929	0.79475	.86
Meaning conflict	2.3293	0.89434	.90
Safety conflict	2.3655	0.82439	.87
Status conflict	2.4384	0.86026	.90
Autonomy disrupted	2.4382	0.77704	.80
Competence disrupted	2.3205	0.78265	.85
Relatedness disrupted	2.4975	0.78112	.79
Meaning disrupted	2.3211	0.79049	.85
Safety disrupted	2.3342	0.80424	.83
Status disrupted	2.3319	0.80779	.86

Table C5

Descriptive Statistics and Correlations for MACS, Need Satisfaction, and Need Conflict Measures (Pilot Study 3)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Auto MACS	--																	
2. Comp MACS	.574**	--																
3. Relate MACS	.413**	.496**	--															
4. Mean MACS	.320**	.463**	.532**	--														
5. Safety MACS	.305**	.320**	.303**	.214**	--													
6. Status MACS	.246**	.299**	.249**	.283**	.264**	--												
7. Auto NS	.365**	.442**	.291**	.272**	.138	.047	--											
8. Comp NS	.365**	.330**	.242**	.233**	.089	-.013	.584**	--										
9. Relate NS	.454**	.327**	.350**	.216**	.112	.026	.587**	.512**	--									
10. Mean NS	.226**	.321**	0.117	.196**	.084	.218**	.574**	.472**	.286**	--								
11. Safety NS	.347**	.247**	.183**	.028	.031	.093	.589**	.642**	.572**	.456**	--							
12. Status NS	.238**	.166*	.084	.120	.135	.394**	.317**	.389**	.379**	.456**	.420**	--						
13. Auto NC	-.113	.081	.032	.096	.052	.118	-.147*	-.200**	-.237**	.021	-.288**	-.007	--					
14. Comp NC	-.146*	.087	.01	.067	.091	.090	-.155*	-.184**	-.233**	.034	-.294**	-.023	.812**	--				
15. Relate NC	-.064	.047	.006	.083	.07	.153*	-.119	-.139	-.210**	.066	-.252**	.068	.761**	.767**	--			
16. Mean NC	-.086	.076	.073	.179*	.043	.201**	-.120	-.207**	-.186**	.082	-.238**	.016	.691**	.693**	.715**	--		
17. Safety NC	-.131	-.009	.057	.091	.087	.109	-.098	-.122	-.130	.054	-.171*	-.013	.694**	.706**	.727**	.677**	--	
18. Status NC	-.020	-.034	.101	.120	.048	.125	-.139	-.153*	-.076	-.079	-.150*	-.051	.608**	.633**	.655**	.637**	.654**	--
Mean	5.41	5.18	5.22	4.69	4.96	4.39	4.70	4.78	5.10	3.91	4.83	4.30	2.35	2.40	2.41	2.34	2.39	2.46
SD	.49	.64	.75	.86	.94	.88	.73	.63	.75	.81	.58	.70	.82	.87	.81	.89	.84	0.87
Reliability	.777	.786	.872	.835	.851	.787	.824	.835	.889	.756	.720	.619	.863	.882	.856	.896	.873	.895

Note. Auto = autonomy, Comp = competence, Relate = relatedness, Mean = meaning, NS = need satisfaction, NC = need conflict. * * $p < .05$. ** $p < .01$.

Table C6

Correlations Between Need Satisfaction Subscales and Dependent Measures (Pilot Study 3)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Autonomy satisfaction	--													
2. Competence satisfaction	.584**	--												
3. Relatedness satisfaction	.587**	.512**	--											
4. Meaning satisfaction	.574**	.472**	.286**	--										
5. Safety satisfaction	.589**	.642**	.572**	.456**	--									
6. Status satisfaction	.317**	.389**	.379**	.456**	.420**	--								
7. Sense of belonging	.441**	.341**	.582**	.227**	.462**	.340**	--							
8. Stress	-.275**	-.283**	-.264**	-.138	-.430**	-.178*	-.262**	--						
9. Life satisfaction	.448**	.456**	.370**	.407**	.580**	.340**	.501**	-.383**	--					
10. Well-being	.287**	.345**	.237**	.258**	.348**	.300**	.271**	-.398**	.444**	--				
11. Anxiety	-.068	-.167*	-.085	-.113	-.316**	-.100	-.165*	.448**	-.248**	-.406**	--			
12. Campus climate	.393**	.255**	.445**	.152*	.519**	.283**	.803**	-.327**	.493**	.279**	-.273**	--		
13. Physical well-being	.169*	.285**	.203**	.214**	.375**	.304**	.212**	-.275**	.412**	.359**	-.176*	.317**	--	
14. Intent to persist	.380**	.328**	.297**	.215**	.295**	.148*	.385**	-.158*	.279**	.125	-.010	.402**	.099	--

* $p < .05$. ** $p < .01$.

Appendix D

Dissertation Study: Materials

All items administered in Wave 1 of dissertation study

Taking part in this task involves completing an online questionnaire. It should take you no more than 10 minutes to complete.

Before you begin, make sure that you have 10 minutes available so that you can complete the entire task in one sitting. It is very important that you complete the questionnaire in one sitting, without taking any breaks and without talking to anyone else. If possible, please complete the study in a room on your own in order to minimize distractions.

Please also use a computer (NOT a mobile device) to complete the survey. Right now, please take a moment to turn off all cell phones, televisions, music or other media devices, and shut down all other applications open on your computer. The questionnaire program may run slowly with other applications open. Next, close all other browser tabs and windows, with the exception of this survey.

Please refrain from using the Back button in your web browser for the duration of this questionnaire. Using the back button will invalidate your responses and may cause errors in recording your participation.

You can navigate through the questionnaire by clicking on the button in the bottom right corner. Click the button to begin now.

--page break--

In this survey you will be asked some questions about your reasons for attending college. We realize that the recent Coronavirus outbreak and subsequent changes in day-to-day living may influence how you think about your college experience. Please respond to the questions based on how you are currently feeling. There are no wrong answers, so please respond as openly as possible.

Motivations for Attending College Scale (MACS)

Please answer the following questions based on how you are currently feeling**.** These questions may seem relevant to your life in general, be we are interested in how they relate specifically to your motivation to attend college.

Response options:

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

AUTONOMY
A13 I am attending college because it will give me more freedom to pursue the kind of life I want to live.
A14 I am attending college because it will give me more control over my own life.
A16 I am attending college because it will give me more choices in my life.
A19 I am attending college because it will allow me to follow my own path in life.
A20 I am attending college because I want an opportunity to make my own life decisions.
A21 I am attending college because a college education is something in life that is important to me.
A22 I am attending college because it is consistent with the kind of person I want to be.

COMPETENCE
C3 I am attending college because I want to master new skills.
C5 I am attending college because I want to become an expert in something.
C11 I am attending college because it will help me become a more competent person.
C14 I am attending college because I want to become really good at something.
C15 I am attending college because I want to develop my abilities.
C16 I am attending college because I want to acquire expertise.

RELATEDNESS
R1 I am attending college because I want to develop friendships that will last many years.
R3 I am attending college because I am seeking to develop close personal relationships.
R4 I am attending college because I want to feel connected to a community.
R5 I am attending college because I want to feel like I belong somewhere.

MEANING
M5 I am attending college because I am seeking an opportunity to explore complex questions about life.
M6 I am attending college because I want to search for my purpose in life.
M7 I am attending college because I want to discover the truth about the world.
M8 I am attending college because I want to explore the meaning of my existence.
M12 I am attending college because I want to make sense of the world around me.

SAFETY
SS13 I am attending college because it will allow me to live in a safe neighborhood.
SS14 I am attending college because I never want to worry about being able to feed myself.
SS16 I am attending college because I want to have stable living conditions.
SS17 I am attending college because it will help me stay physically safe.
SS18 I am attending college because it will help me to avoid threats to my survival.

STATUS
Stat5 I am attending college because it will earn me social status.
Stat6 I am attending college because it will help me gain others' respect.
Stat8 I am attending college because I want others to view me as successful.
Stat9 I am attending college because it is important to me to be perceived as having high status.

Attention check item (will be administered to participants one time, in random order, within the MACS items)

This item is here to screen out random responding; do not give a response to this item.

Well-being items (from Inventory of Depression and Anxiety Symptoms (IDAS; Watson et al., 2007

University Stress Scale (Stallman & Hurst, 2016)

Multidimensional Inventory of Black Identity – Centrality Subscale (Sellers et al., 1997)

Demographic items

What college or university are you enrolled in (please type out the full name)?

What is your age?

How many credits are you enrolled in (or do you plan to enroll in) for the fall 2020 semester?

What was your high school GPA?

Your GPA:
Highest possible GPA:

What was your total SAT score?
Raw score:
Percentile:

What was your composite ACT score?

Raw score:
Percentile:

Think of this ladder as representing where people stand in the United States. At the top of the ladder (marked "10") are the people who are the best off—those who have or who come from families that have the most money, the most education, and the most respected jobs. At the bottom of the ladder (marked "1") are the people who are the worst off—those who have or who come from families that have the least money, the least education, and the least respected jobs or no job.

Where do you think you currently stand on this ladder?

Are you the first person in your family to attend college?

a. Yes
b. No

Gender:

- ❍ Male
- ❍ Female
- ❍ Other _____

Are you Hispanic or Latinx? (i.e., a person of Cuban, Mexican, Puerto Rican, South or Central American descent, or other Spanish culture or origin, regardless of race)? [Yes/No]
Please indicate your race (select all that apply):

- ❑ White: A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- ❑ Black or African-American: A person having origins in any of the black racial groups of Africa.
- ❑ American Indian or Alaska Native: A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
- ❑ Asian: A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- ❑ Native Hawaiian or Other Pacific Islander: A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

Other (please specify in the box below):

What is your name?

What is your email address? (forced response)

All Items administered in Wave 2 of Dissertation Study

Taking part in this task involves completing an online questionnaire. It should take you no more than 15 minutes to complete.

Before you begin, make sure that you have 15 minutes available so that you can complete the entire task in one sitting. It is very important that you complete the questionnaire in one sitting, without taking any breaks and without talking to anyone else. If possible, please complete the study in a room on your own in order to minimize distractions.

Please also use a computer (NOT a mobile device) to complete the survey. Right now, please take a moment to turn off all cell phones, televisions, music or other media devices, and shut down all other applications open on your computer. The questionnaire program may run slowly with other applications open. Next, close all other browser tabs and windows, with the exception of this survey.

Please refrain from using the Back button in your web browser for the duration of this questionnaire. Using the back button will invalidate your responses and may cause errors in recording your participation.

You can navigate through the questionnaire by clicking on the button in the bottom right corner. Click the button to begin now.

--page break--

In this survey you will be asked several questions about your experiences in college. We realize that the Coronavirus outbreak and subsequent changes in day-to-day living may influence how you think about your college experience, and this is fine. Please respond to the questions based on how you are currently feeling. There are no wrong answers so please respond as openly as possible.

Need Satisfaction and Progress Scale

The following questions ask about the extent to which you feel that your basic needs are being met. When responding to these questions, think about if the need is currently being met and if you are on track to meet the need in the long term.

Response Options

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

Autonomy:
I feel increasingly free to pursue the kind of life I want to live.
I feel like I am gaining more control over my life.
I feel like I have increasingly more opportunities to make my own life decisions.

Competence:
I feel like I am mastering new skills.
I feel like I am making progress toward becoming an expert in something.
I feel like I am acquiring expertise in new areas.

Relatedness:
I feel like I am developing close personal relationships.
I feel connected to a community.
I feel like I am making friendships that will last many years.

Meaning:
I feel like I am in the process of answering complex questions about life.
I feel like I am developing a better understanding of the world around me.
I feel like I am exploring the meaning of my existence.

Safety:
I feel like I am taking steps toward having a safe and secure life.
I feel like I am taking steps to ensure that I will always have stable living conditions.
I feel like I am taking steps to ensure that I will always have access to food.

Status:
I feel like my social status is increasing.
I feel like I am gaining other people’s respect.
I feel like I am increasingly viewed by others as successful.

Need Conflict Scale

Instructions: Psychologists believe that, as humans, we share a number of fundamental needs or desires that motivate what we do on a day-to-day basis. On the next several screens, you will read the description of a particular need and will then have to write down some of the things you do while at college in order to fulfill this need.

Please note that you will need to type 130 characters to be able to submit your response. You can stay on each page for a maximum of 90 seconds, at which time the website will automatically advance you to the next screen.

To begin, click to the next screen.

Prompts:

"People may have a fundamental need or desire for autonomy. Such a need would involve wanting to freely choose what to do with one's life and how to spend one's time. What are some things you do while at college in order to feel autonomous?

People may have a fundamental need or desire for competence. Such a need would involve wanting to become skillful and good at things in different areas of one's life – that is, people may want to master new skills, activities, and tasks. What are some things you do while at college in order to feel competent?

People may have a fundamental need or desire for belonging. Such a need would involve wanting to form meaningful relationships with other people in one's environment and feel accepted by them. What are some things you do while at college in order to feel like you belong?

People may have a fundamental need or desire for safety and security. Such a need would involve wanting to feel safe from threats, such as things that can hurt someone physically, emotionally, or financially. What are some things you do while at college in order to feel safe and secure?

People may have a fundamental need or desire for status. Such a need would involve wanting others' respect and admiration based on one's ability or willingness to help others achieve their goals, or based on one's perceived position in society. What are some things you do while at college in order to gain status?

People may have a fundamental need or desire for meaning. Such a need would involve wanting to have coherent understanding of the world. It can also mean that people want to feel that their lives are meaningful and purposeful. What are some things you do while at college in order to find meaning?

Instructions: Now that you are done reflecting on what you do while at college in order to fulfill your basic needs, we want you to think about whether the things you to do to full one need ever interfere with what you do to fulfill another need. In other words, do you ever experience a conflict between your various needs.

Keep this in mind as you respond to the questionnaire that begins on the next screen.

Response options:
Never Rarely Sometimes Often Always

How often do the things you do to feel **autonomous** get in the way of:
The things you do to feel competent
The things you do to feel like you belong
The things you do to feel safe
The things you do for status
The things you do to find meaning

How often do the things you do to feel **competent** get in the way of:
The things you do to feel in control
The things you do to feel like you belong
The things you do to feel
The things you do for status
The things you do to find meaning

How often do the things you do to feel **like you belong** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel safe
The things you do for status
The things you do to find meaning

How often do the things you do to feel **safe** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel like you belong
The things you do for status
The things you do to find meaning

How often do the things you do **for status** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel like you belong
The things you do to feel safe
The things you do to find meaning

How often do the things you do **to find meaning** get in the way of:
The things you do to feel in control
The things you do to feel competent
The things you do to feel like you belong
The things you do to feel safe
The things you do for status

Dependent Measures

Attention check item (was administered to participants one time, in random order, within the Sense of Belonging scale)
This item is here to screen out random responding; do not give a response to this item.

Sense of Belonging subscale from Bollen and Hoyle's (1990) Group Cohesion Scale

Satisfaction with Life Scale (SWLS) (Diener et al. 1985)

University Stress Scale (Stallman & Hurst, 2016)

Perceived Physical well-being (Ware & Sherbourne, 1992)

Intention to persist

How certain are you that you will graduate from your college?

Very Uncertain	Uncertain	Somewhat Uncertain	Somewhat Certain	Certain	Very Certain

Well-being items (from Inventory of Depression and Anxiety Symptoms (IDAS; Watson et al., 2007

GAD-7 (7-item anxiety scale) (Spitzer, Kroenke, Williams & Lowe, 2006)

Demographic Items

Please select the option the best explains your living situation during the Fall 2020 semester:

a. I lived on campus
b. I lived in an off-campus apartment
c. I lived at home with my family
d. other: _____

On average, how many days per week did you spend on campus?

0 1 2 3 4 5 6 7

Please indicate how many of your courses were taught fully in-person, fully remote (all course interactions were online), and using a blended format (some course interactions were in-person and some were online).

Number of fully in-person courses _____
Number of fully remote courses _____
Number of blended courses _____

What was your fall 2020 semester GPA? If you do not know your GPA, please list your course grades from the fall 2020 semester (for example, B-, C, C, B, C+).

How satisfied are you with how your college handled the Covid-19 pandemic in the Fall 2020 semester?

Extremely dissatisfied	Dissatisfied	Somewhat dissatisfied	Somewhat satisfied	Satisfied	Extremely satisfied

How successful was your college at supporting your overall well-being (i.e., your mental and physical health) in the fall 2020 semester?

Extremely unsuccessful	Unsuccessful	Somewhat unsuccessful	Somewhat successful	Successful	Extremely successful

Debriefing message:
Please be sure to click the button at the bottom of this screen after you read the following message.

Thank you for participating in the research study "Exploring College Students' Reasons for Attending College."

We have three goals for this study.

The first goal is to measure college students' underlying motivations for attending college. The survey you completed over the summer included questions about why you decided to attend college. Your responses to those questions will help us understand what basic psychological needs students are trying to satisfy by attending college. The second survey, which you just

completed, included a questionnaire that assessed the amount of progress you made towards satisfying these needs.

Secondly, we want to understand if the things you do to fulfill one need get in the way of things you do to fulfill another need (i.e., your experience of need conflict). Your responses to the open-ended questions in the most recent survey (e.g., What are some things you do while at college in order to feel autonomous?) will help us understand what students do to fulfill their needs in college; and, your responses to the comparison questions (e.g., do the activities you do to feel autonomous conflict with the activities you do to feel connected?) will help us assess the conflicts between students' needs.

Lastly, we are interested in investigating the extent to which students' need satisfaction and need conflict are related to important student outcomes, such as well-being and stress. We will also examine which combinations of needs are associated with the highest levels of need satisfaction and well-being and the lowest levels of need conflict and stress. We will consider how these relations might vary based on the type of school students attend as well as students' demographic characteristics.

Your participation is greatly appreciated by the researchers. We will contact winners of the raffle prizes in March. If you have any questions, concerns, or comments about the survey, please email Lindsey at weberlb@bc.edu. Thank you!

MACS items included in all dissertation analyses

AUTONOMY

A13 I am attending college because it will give me more freedom to pursue the kind of life I want to live.
A14 I am attending college because it will give me more control over my own life.
A16 I am attending college because it will give me more choices in my life.
A19 I am attending college because it will allow me to follow my own path in life.
A20 I am attending college because I want an opportunity to make my own life decisions.

COMPETENCE

C3 I am attending college because I want to master new skills.
C5 I am attending college because I want to become an expert in something.
C14 I am attending college because I want to become really good at something.
C16 I am attending college because I want to acquire expertise.

RELATEDNESS

R1 I am attending college because I want to develop friendships that will last many years.
R3 I am attending college because I am seeking to develop close personal relationships.
R4 I am attending college because I want to feel connected to a community.

MEANING

M5 I am attending college because I am seeking an opportunity to explore complex questions about life.
M6 I am attending college because I want to search for my purpose in life.
M7 I am attending college because I want to discover the truth about the world.
M8 I am attending college because I want to explore the meaning of my existence.
M12 I am attending college because I want to make sense of the world around me.

SAFETY

SS13 I am attending college because it will allow me to live in a safe neighborhood.
SS14 I am attending college because I never want to worry about being able to feed myself.
SS16 I am attending college because I want to have stable living conditions.
SS17 I am attending college because it will help me stay physically safe.
SS18 I am attending college because it will help me to avoid threats to my survival.

STATUS

Stat5 I am attending college because it will earn me social status.
Stat6 I am attending college because it will help me gain others' respect.
Stat8 I am attending college because I want others to view me as successful.
Stat9 I am attending college because it is important to me to be perceived as having high status.