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Autonomy and Agentic Engagement among First-Generation College Students: Exploring Resources for Psychological Need Satisfaction

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**Autonomy and Agentic Engagement among First-generation College
Students: Exploring Resources for Psychological Need Satisfaction**

by

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Dedication

I dedicate this dissertation to the participants in my study, whose stories of effort and involvement inspired me during this research when I struggled with my own sense of autonomy, competence, and belonging. As a lifelong learner, I deeply appreciate one participant's words: "I try to understand that not all paths are the same and to trust the process I am in."

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Abstract

Autonomy and Agentic Engagement among First-generation College Students: Exploring Resources for Psychological Need Satisfaction

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Abstract: Previous research has demonstrated that higher education creates distinct challenges to first-generation students' well-being and motivation in university. Amid growing interest in psychological interventions to support first-generation students' well-being in college, this study used the self-determination theory of basic needs as a framework to examine these students' resources and strategies. Previous research within this framework has emphasized teaching practices to boost student engagement through support for autonomy, competence, and relatedness. However, much remains to be explored regarding students' active role in need fulfillment and agentic efforts to reshape their learning environments. Beliefs and strategies regarding self-determination have also been linked to orientations toward autonomy satisfaction as asserted (self-reliant) or assisted (reliant on supportive environments and relationships). This study sought to extend our understanding of how inner and environmental resources intertwine in first generation students' active pursuit of psychological well-being. First-generation students

(n=212) were surveyed regarding their beliefs, perceived resources for psychological need satisfaction in college, and agentic engagement. This mixed-method study integrated findings from correlation and regression analyses, used to examine associations between student beliefs, perceived need support, and agentic engagement, with findings from the analysis of qualitative responses regarding students' salient experiences of need satisfaction or frustration in college. Results demonstrate that first-generation students' interdependent motives for college may coincide with either asserted or assisted orientations toward experiencing autonomy, but only an assisted orientation was linked to significantly greater overall satisfaction in college. However, alongside supportive teacher practices, the orientation toward asserted autonomy predicted increased agentic engagement in college classes. Participant narratives highlighted how environments and relationships in college life also were connected with first-generation students' proactive efforts to fulfill their psychological needs. This research develops an understanding of how the college environment, instructors, and learners' own agentic efforts help nurture first-generation students' inner motivational resources.

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Chapter 1: Introduction

Through my experiences with students (as a teacher, friend, or fellow learner), I became fascinated by motivation as a gatekeeper to learning and academic achievement. Consider that a degree marks the graduate as a successful participant in the academic system, which is one particular setting where we expect learning to happen, but it is certainly not the setting where people do most of their learning. In many ways, the academic environment itself may challenge learners' motivation. This is because obtaining a college degree requires participation in a system whose written procedures (like syllabi and degree plans) and announced practices (like gathering in a room for a lecture or saving questions about grades for office hours) are also attended by a host of unspoken norms and expectations. When we take the view that there are many ways people develop technical skills and problem-solving strategies to thrive in this world that do not involve the particular difficulties of developing academic literacies, it is all the more marvelous to see a classroom full of students who are enjoying learning. As an educational researcher, and as a teacher who has worked to facilitate such moments of engagement for students, it feels quite natural to focus on practices that institutions and teachers should implement to boost student motivation. However, we must also remember that students are not passive actors in academic settings. It is worthwhile to consider how students perceive these environments and find opportunities to influence the practices around them, or otherwise take measures to sustain their own motivation.

Educators and students alike often hope that motives for attending college will sustain learners' motivation, the energy that students direct toward their goals. These motives often reveal personally meaningful ways that academic credentials represent a change in resources. In one sense, this change in resources is rather easy to observe:

graduating with a college degree is associated with increased financial resources over one's lifetime, improved health outcomes, and enhanced employment prospects in a society that increasingly demands high-skilled workers. However, these benefits of the college degree are intertwined with another way it signals new resources: it represents learning, or a change in knowledge, ability, beliefs, or behaviors that might ultimately help the student to thrive. Learning is fundamentally the reason that educational achievement does not only benefit the individual student but has a transformative impact on families, communities, and the broader society across generations.

The intergenerational impact of a college degree is highlighted by decades of research into "the social class achievement gap," a term often used to describe how first-generation students, those who would be the first in their families to earn a college degree, are more likely to earn low grades and drop out of college than students who have college-educated parents (Harackiewicz, Canning, Tibbetts, Priniski, & Hyde, 2015; Sirin 2015; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012). Because first-generation students are unlikely to have received intergenerational information about the processes and practices of higher education, they face distinct challenges to their well-being, motivation, and performance during the transition to college and throughout their academic careers (Davis, 2010). As educational researchers continue to develop our understanding of the relationship between sociocultural, classroom, and student factors in predicting academic engagement and achievement, we still have very little to say about first-generation students that does not immediately (a) invoke comparison of outcomes with students whose parents attended college, or (b) assume the universality of constructs and principles drawn from research across all students. Perhaps the main exception to this observation is the research into how first-generation students often experience a cultural mismatch with higher education that is linked to performance-undermining anxiety, a

diminished sense of well-being, and increased concerns about belonging. We are only beginning to explore how first-generation students' achievement is supported through psychological processes, college experiences, and students' use of strategies to sustain motivation.

In this study, I used the psychological needs for autonomy, competence, and belonging, as identified by Deci and Ryan (1985a) as part of their self-determination theory of motivation, as a lens to examine the first-generation student experience. Respectively, satisfaction of autonomy, competence, and belonging needs involves the perception that one is free from external controls and acting in harmony with one's sense of self, that one is capable of achieving desired outcomes, and that one is connected to others in caring relationships. Educational research has linked satisfaction of these needs to greater effort, persistence, positive affect, and achievement among learners. A great deal of this research has emphasized that students' need satisfaction improves in supportive contexts, often focusing on need-supportive teacher practices (such as providing choices, offering informative feedback, and showing warm regard for students). However, there is increasing interest in the ways that students' more general beliefs about autonomy influence need satisfaction. Along similar lines, we have much to learn about how students actively contribute to their own need satisfaction. Understanding students' agentic efforts to sustain motivation may be particularly important for those learners who are least familiar with the college environment and perhaps most likely to struggle to feel free, capable, and connected.

Thus, my overarching purpose was to contribute to our understanding of how beliefs, environmental supports, and the agentic pursuit of psychological need satisfaction intertwine to impact first-generation students' well-being and engagement in college. As previous research suggested that the university context often introduces motivational

challenges for these learners, I examined whether classroom interactions might nurture their inner motivational resources. Results also expand the literature on students' agency and engagement in educational settings, which to date have emphasized students' desire to express opinions, demonstrate self-reliance, or disrupt the status quo. As first-generation students often feel less familiar with the college environment and have concerns about fitting in, I examined their experiences to describe how these students proactively contribute to their own autonomy, competence, and relatedness.

RESEARCH BACKGROUND

Although all learners face challenges to their motivation, well-being, and achievement in college, many students must navigate these challenges alongside concerns that arise from being the first in their families to attend college. Early research into first-generation students tended to highlight disparities in college students' financial resources and their academic and social integration once they arrived on campus (Horn & Bobbitt, 2000; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Tinto, 1975). Ultimately, this research underlined the importance of initiatives to make college more accessible (such as financial aid), promote students' social integration on campus (such as learning communities), or support students' development of university-specific academic skills (such as specialized courses). Yet, it is abundantly clear that the most important challenges faced by first-generation college students are not simply driven by financial challenges, and certainly must not be viewed solely from the perspective that students have a deficit in academic resources (Davis, 2010; Valencia, 2010).

Rather, first-generation students exemplify the complex interplay of students' sociocultural backgrounds and beliefs with a higher education environment that can support or thwart their drive toward achievement (Pintritch, 1994). For example, among

college students, those who are first-generation are less likely to have received information about the institutional processes of higher education from their parents (Pascarella, et al., 2004) while they are also more likely to rely on institutional actors (like teachers or counselors) for information (Horn & Bobbit, 2000). They are more likely to hold interdependent values and communal goals that can be threatened by the individualistic messages of higher education (Stephens et al., 2012), but these values and goals also serve as a powerful motivational resource when students perceive that educational achievement will allow them to give back to their community, develop meaningful collaborations with others, or improve the quality of life for their family (Allen, Muragishi, Smith, Thoman, & Brown, 2015). First-generation students tend to worry that they do not belong at university or at home due to concerns that their educational aspirations are misaligned with their social background (Covarrubias & Fryberg, 2015), yet they often hold beliefs that sustain their motivation and use sophisticated coping strategies that foster resilience (Phinney & Haas, 2003). Environmental support from caring family members, peers, faculty, and counselors is also an important protective factor in their ultimate success (Davis, 2010; Gofen, 2009; Soria & Stebleton, 2012).

At this point in time, we are only beginning to understand how psychological factors and subjective experiences contribute to first-generation students' well-being, motivation, and achievement in college. Many authors have suggested that this gap in the literature arose from the limited use of psychological theory in studies of first-generation student achievement (Aronson, 2008; Garriott, Hudyma, Keene, & Santiago, 2015; Jury, Smedling, Stephens, Nelson, & Darnon, 2017). Moreover, research on psychological factors has typically treated first-generation students as a monolithic group and compared their outcomes to those of students with college-educated parents. This has limited our understanding of how various dimensions captured by the "first-generation" label might be

relevant during educational interventions. The comparative approach has also obscured diversity within the first-generation student population. That is, first-generation students do not necessarily represent or share the concerns of students from low-income backgrounds or underrepresented racial/ethnic groups on university campuses, but there is a great deal of overlap between these social groups. Ultimately, the most reliable characteristic distinguishing first-generation and continuing-generation students is intergenerational information about college: parents who did not graduate with a degree are less likely to share stories about college experiences, and typically offer less information and feedback about practices like applying to schools, interacting with professors, or obtaining institutional resources for student success (Davis, 2010; Gardner & Holley, 2011; Pascarella et al., 2004; Pizzolato, 2003).

There is evidence that as a result of this lack of intergenerational information, first-generation students experience a greater discrepancy between university culture and the experiences, practices, and values in their home communities (Stephens, et al., 2012). Specifically, first-generation students are more likely than students from college-educated families to endorse interdependent values focused on social goals, group harmony, and interpersonal concern. These values can clash with the culture of American universities that privilege self-expression and individualistic achievement, resulting in the experience of cultural mismatch. Although studies into cultural mismatch have largely emphasized the link between students' interdependent values and experience of social identity threat in college, these values are also assumed to intertwine with broader motivational processes and strategies for achievement (Stephens, Markus, & Fryberg, 2012). Thus, educational psychologists have taken an increasing interest in nurturing first-generation students' inner motivational resources through tactics that support a sense of belonging, boost self-

efficacy, or encourage students to identify how the pursuit of academic achievement is aligned with their personal values (Jury et al., 2017).

One less studied site for intervention to support first-generation students' motivation is the classroom itself. College classrooms are critical because they are assumed to be a reliable point of contact between the university and the students, offering a space for student-faculty interactions that can drive student interest and engagement. It would seem clear that college students benefit from supportive faculty (Davis, 2010; Filkins & Doyle, 2002), and there is persistent interest in exploring faculty practices that support engagement in the classroom. Teacher practices to nurture students' psychological well-being and engagement in classrooms have been widely studied through the lens of self-determination theory, which has the advantage of describing specific practices that teachers can use to support students' internal motivation and boost their involvement in class. The hypothetical value of these practices hinges on the notion that they help fulfill innate psychological needs for autonomy, competence, and relatedness, and that the satisfaction of these needs facilitates more internal regulation of behavior.

However, studies of psychological need support have largely positioned autonomy as dependent upon supportive environments, overlooking how students actively contribute to their own psychological need satisfaction. One exciting trend in the literature has been the recognition that students often seek to influence learning environments and pursue resources for their motivation (Legault, Ray, Hudgins, Pelosi, and Shannon, 2017a; Mameli & Passini, 2018; Reeve, 2013; Reeve & Tseng, 2011). In educational settings, research into agentic engagement has emphasized that students' efforts to shape the educational environment can be both an outcome and influence of need-supportive teacher practices (Matos, Reeve, Herrera, & Claux, 2018; Reeve, 2013). Legault et al. (2017a) suggested that need satisfaction can also be increased by a general orientation toward

asserted autonomy, where individuals tend proactively to seek opportunities to express their interests and values. However, an asserted autonomy orientation was also found to be negatively associated with interdependent values. The researchers suggested that this demonstrated how self-reliance for psychological need satisfaction and efforts to influence the environment might necessarily imply greater willingness to threaten interpersonal harmony.

There has been longstanding debate over universal versus culturally-specific experiences of autonomy, but those who hold universalist views have long claimed that autonomy is centered on a sense that one's actions are authentic to the self, fully volitional, and thus can be perfectly compatible with an interdependent sense of self and personal values (e.g., Chirkov, 2009; Iyengar & Lepper, 1999; Jang, Reeve, Ryan, & Kim, 2009; Murphy-Berman & Berman, 2003). Thus, asserted autonomy has raised two concerns that my study aimed to address. First, asserted autonomy may not fully capture students' disposition toward "the quest and grit for autonomy" (Legault et al., 2017a, p. 3). This concern is particularly important as we consider how students who might be less familiar or comfortable with educational institutions are still capable of taking an active, strategic role in supporting their own psychological well-being and motivation. Second, if asserted autonomy suggests that a trait-level disposition toward individualistic self-expression predicts the active pursuit of need satisfaction, what is the relative contribution of supportive environments? These gaps in the literature presented an opportunity to improve our understanding of first-generation students' psychological need satisfaction in college, taking a particular interest in how they experience authentic self-expression in college, perceive classrooms as a resource for motivation, and proactively support their own well-being.

Using self-determination theory (Deci & Ryan, 1985a; Ryan & Deci, 2000) to organize this investigation of first-generation students, I also aimed to bring two literatures into dialogue as a means of filling gaps in both. First, this study situated the relationship between learners' proactive efforts and need satisfaction at college within a literature that has emphasized how not all students enter college with the same purpose or perspectives on the college experience. Second, as need-supportive teacher practices are increasingly used as a means of intervention into student motivation, this study sought to demonstrate the role of beliefs and motives that intertwine with students' agentic contributions to the learning environment. Focusing on first-generation students' experiences allowed this study to illuminate their strategies and resources for motivation without assuming the need for a comparative lens that often obscures their strengths and within-group diversity.

THE STUDY

In this study, I aimed to expand our view of how environmental resources and learner agency support the psychological well-being of students who would be the first in their families to graduate from university. The main research questions were the following: 1) Are orientations toward asserted or assisted autonomy satisfaction differently associated with first-generation students' endorsement of interdependent motives for attending college? 2) Do orientations toward asserted and assisted autonomy both positively predict psychological need satisfaction in college? 3) Controlling for asserted autonomy, what is the association between need-supportive teaching practices and agentic engagement among first-generation students? 4) How do first-generation students describe resources and strategies that support their autonomy, competence, and belonging in college?

To address these questions, I surveyed 212 first-generation college students in a convenience sample from a large public university. Participants responded to measures of

their personal values, motives for college, perceptions of psychological need satisfaction, orientations toward asserted and assisted autonomy, and experience of classroom practices and engagement. They also provided narratives of salient college experiences affording the satisfaction or frustration of autonomy, competence, and relatedness. To offer additional context for this study, I present the findings from a pilot survey to examine key measures and describe college students' classroom strategies (Appendix A). Throughout this manuscript, I note where the pilot study was relevant to my primary investigation, particularly in evaluation of the measures used and ultimate discussion of findings.

The rest of this dissertation is organized as follows: Chapter 2 presents a review of literature centered on first-generation students' well-being, motivation, and achievement in college. I highlight research that has examined psychological processes and contributed to our understanding of first-generation students' sense of alignment between their values and activities, competence, and relatedness in college. I then discuss the self-determination theory of basic psychological needs that provided a framework for my study, focusing on how need satisfaction connects to educator practices and student engagement. In Chapter 3, I describe the participants, procedures, and measures used in my investigation. The chapter separately summarizes my analyses of quantitative and qualitative data before concluding with my rationale for (and approach to) integrating methodological strands. Chapter 4 separately presents the answers to my research questions, as my first three questions were addressed by using correlation and regression to analyze students' responses to Likert-scaled survey instruments, and the fourth question was addressed through analysis of qualitative survey responses. In Chapter 5, I discuss the quantitative and qualitative findings separately, then discuss insights developed through the integration of findings across methodological strands. The chapter concludes with discussion of this study's theoretical implications, limitations, and relevance for educational practice. As an

afterword in Chapter 6, I provide a statement of reflexivity as brief reflection on how my personal background and perspectives shaped the process of conducting this research into first-generation students' experiences.

Chapter 2: Literature Review

In this chapter I aim to review research on my study's target population, first-generation students, as well as previous findings informing this investigation of their motivation. I also discuss how the self-determination theory of basic needs has connected competence, autonomy, and belongingness to educational practices and learner engagement. Together, these literatures provided the key constructs in my study: interdependent and independent values, psychological need satisfaction, need-supportive practices, agentic engagement, and autonomy orientations. I have organized this chapter into two main sections.

First, I provide an overview of research that has informed our current understanding of first-generation students and fostered an increasing interest in their motivational processes. Much of this research compared first-generation students with their peers from college-educated families or otherwise relied on demographic variables, which has posed key challenges. For one, as studies documented gaps between levels of well-being, motivation, or achievement, they rarely spoke to psychological mechanisms. Second, studies examining psychological processes within first-generation students often assume that a working-class background or membership in racial/ethnic minority groups is sufficient to predict students' motivational challenges in college. The longstanding focus on first-generation students' sociodemographic characteristics has contributed to a knowledge gap regarding the potential role of beliefs and psychological processes. As I will summarize, one line of research attempting to describe first-generation students' psychological experiences has largely linked students' beliefs to their strategies for coping. I also highlight how many current psychological interventions for first-generation students rest on a foundation of presumed conflict between interdependent values and the

individualistic culture of higher education. So far, many of these interventions have attempted to reduce identity threat, whereas others have attempted to address general concerns about belonging or competence in college.

Second, I discuss self-determination theory as a lens that has been widely used to view the interplay of psychological needs, teacher practices, and student engagement in educational settings. I discuss the evidence that all individuals are more internally driven to act when they feel a sense of autonomy (that their actions are fully self-endorsed), competence (that they can successfully perform tasks), and belonging (that they are connected to important others), with a focus on research that has linked psychological need support to student engagement. A great deal of this literature has emphasized autonomy-supportive teacher practices, although both the theoretical framework and recent evidence suggest that these practices must intertwine with competence and belonging support to promote engagement in the classroom. I also discuss relatively nascent attempts to understand the agentic role that learners take to support their own need satisfaction. Ultimately, I discuss how using self-determination theory as a lens to study first-generation students addressed shared gaps in these two literatures.

UNDERSTANDING THE FIRST-GENERATION STUDENT EXPERIENCE

In American universities, increasing college enrollment across the U.S. population and initiatives designed to improve socioeconomic diversity in universities have increased the number of first-generation students, college students whose parents do not possess a college degree (Davis, 2010). A great deal of research suggests that when students are the first in their family to attend college, the sociocultural context of higher education presents a number of challenges that threaten their motivation, well-being, and achievement. Much

of this research has emphasized comparing first-generation students to continuing-generation students, who have at least one parent with a college degree.

Some studies have defined first-generation status more loosely to encompass students with at least one parent who graduated college. However, review of the literature has suggested that students for whom neither parent graduated from college are the most likely to experience difficulties associated with first-generation status, such as unfamiliarity with the environment and processes of higher education, a clash of cultural values, or heightened identity concerns (Davis, 2010).

Studies examining how parents' educational status is associated with college outcomes have demonstrated that there is an achievement gap between first-generation and continuing-generation students. First-generation students report lower levels of engagement in their classes (Soria & Stebleton, 2012) and tend to earn lower grades in college (Chen & Carroll, 2005; Harackiewicz et al., 2014; Pascarella et al., 2004). They make slower progress toward degree completion and are more likely to drop out before they finish (National Center for Education Statistics, 2018; Sirin, 2005), even when controlling for family income, race, and high school achievement (Ishitani, 2006). Thus, a great deal of literature has linked the achievement gap to inequality of resources, with many researchers highlighting how students' experience of higher education shifts with (and often reproduces) disparities in economic and cultural capital (Bourdieu & Passeron, 1990; Jury et al. 2017; Mitchall, 2015; Stephens et al., 2012).

Characteristics of First-generation Students

Researchers often use parental education levels to indicate the socioeconomic status (SES) of individuals; that is, parental education level is often assumed to be a proxy for one's access to financial resources, power, and perceived position relative to others in an

unequal society (Sirin, 2005). Accordingly, the different educational achievement of first-generation and continuing-generation students has often been described as a “social class achievement gap,” although it is a mistake to assume that first-generation students are necessarily low-income. When comparing the reported family income of continuing-generation and first-generation students, it is true that the latter group reports less family income on average; however, when compared to the broader American society, the families of first-generation students represent all income levels (Horn & Bobbitt, 2000). Davis (2010) cautioned that members of first-generation or low-income student populations are likely to face distinct challenges, and has suggested that even when they overlap, low-income students might “address those concerns differently from the way those with a first-generation-only background address them” (p. 35).

Nonetheless, given historical exclusion of lower-income groups from higher education and the link between educational attainment and earning potential, it is perhaps no surprise that first-generation students as a whole do appear to be more likely than continuing-generation students to face economic hardship during their studies. For example, they are more likely to hold jobs during college and spend more time at work, factors that have been negatively associated with students’ time spent studying, college grades, and credit hours earned per semester (Pascarella et al., 2004). First-generation students entering university often have supportive families that have invested (emotionally and financially) in their educational aspirations (Gofen, 2009), but this does not stop students from worrying that the cost of their education is negatively impacting the financial well-being of their families or reduce perceived pressure to contribute actively to the family household (Berg, 2010; Bui, 2002). Relative to continuing-generation students, first-generation students’ increased concern about being a financial burden on their families also

makes them more averse to seeking financial help from their parents (Somers, Woodhouse, & Cofer, 2004).

Economic constraints do not only influence student decision-making surrounding the opportunity cost of study time and class attendance, they also pressure everyday interactions. In an analysis of how classism contributes to the experiences of college students, Allan, Garriott, and Keene (2016) found that first-generation status and low-income backgrounds were “interrelated but distinct features of [first-generation college students’] background characteristics” (p. 489); meaning both independently predicted that students would perceive institutional and interpersonal economic exclusion in college. For example, students with these background characteristics were more likely to report that they had skipped university social events because they could not afford the fees, or had felt that faculty members were dismissive of their financial situations. In a discussion of these findings, Allan et al. (2016) mentioned that understanding first-generation students’ perceptions of economic exclusion is further complicated due to “race and racism, which are inextricably tied to social class and classism in the United States” (p. 493).

Indeed, many low-income and first-generation students are also members of underrepresented racial or ethnic minority groups at their university. Taking an intersectional view of the first-generation student population emphasizes that individuals belong to multiple social groups that shape their experience of the world and sometimes result in compounded disadvantage (Cole, 2009). That is, although it is unwise to assume that class, race/ethnicity, or education sufficiently explain psychological outcomes, reflecting on these characteristics can help researchers thoughtfully design studies and interpret the generalizability of findings. To illustrate this point, consider how research has suggested that first-generation students experience threats to their sense of self-efficacy in the university (Garriott et al., 2015; Phinney & Haas, 2003). Although a lack of

intergenerational information about college can lead students to worry about their competence in college coursework, it is also the case that stereotypes about low ability target low-income and ethnic minority groups who overlap with the first-generation student population. These stereotypes can certainly undermine academic performance through cognitive processes such as stereotype threat (Steele, Spencer, & Aronson, 2002), through the experience of outright discrimination, and through shaping the way that learners appraise their own academic ability (Reyna, 2000). For example, in a survey of undergraduates, Ivcevic and Kaufman (2013) found that first-generation African-American and Hispanic students gave lower self-estimates of their intelligence relative to continuing generation students who shared their racial/ethnic identification. However, they also gave lower self-estimates relative to first-generation White students.

This demonstrates how studies of competence or other psychological outcomes can not presume that first-generation student status provides a full explanation of findings. Rather, the diversity of first-generation students requires that research move beyond dichotomous group comparisons toward a more “nuanced understanding” (Harackiewicz, et al., 2016; p. 761). In recent years researchers have shown increasing appreciation of the fact that although first-generation students might also be underrepresented minority or low-SES, these are intersecting but distinct identities, and there is a general call for researchers to reflect on and describe the characteristics of their participants when researching first-generation students (e.g., Davis, 2010; Harackiewicz et al., 2016; Ward, Siegel, & Devenport, 2012). However, simply describing outcomes along the lines of demographic characteristics (i.e., parental education level, ethnic group, or income level) is not sufficient to understand the actual mechanisms by which these outcomes are linked to first-generation student status. Given the distance between demographic variables and the outcomes of interest in psychological research, Awad and Cokely (2009) suggested that researchers

working with diverse populations can better explain phenomena through a focus on more proximal factors, such as beliefs: for example, ethnicity often approximates the more relevant factor of ethnic identity, just as income is often a proxy for perceived social status.

Taken together, the literature points our attention back to the characteristic that most reliably distinguished first-generation students from their continuing-generation peers: access to firsthand information about the practices and processes of higher education from their parents. To be clear, this does not mean that first-generation students lack parental involvement and investment in their education nor that their families have low educational aspirations – in fact, some studies have suggested quite the opposite (Dennis, Phinney, & Chuateco, 2005; Gofen, 2009). Rather, the type of support that students' parents can provide generally does not include assistance with such things as providing feedback about the quality of college applications, choosing a college major, or what to expect regarding the difficulty of classwork, interacting with professors, or obtaining institutional support (Davis, 2010). College-bound students might easily seek this information from other sources like the internet or academic counselors. However, a growing body of evidence suggests that disparities in intergenerational information about college mirror different levels of familiarity with the values and practices of higher education.

First-generation Students, Socialization, and the Culture of Higher Education

A review by Jury et al. (2017) described how a great deal of psychological research into the experiences of first-generation students has grown from a theory of cultural mismatch between learners and institutions (Stephens et al., 2012). Cultural mismatch refers to how the highly individualistic culture of American universities endorses values and practices that are unfamiliar to first-generation students, who often belong to families

and communities that socialize interdependent values and norms for behavior. Why has cultural mismatch theory been such an appealing framework for psychological researchers studying first-generation students?

Cultural mismatch theory is rooted in cross-cultural research that has widely used the constructs of individualism and collectivism to describe how individuals tend to view themselves within two overarching types of sociocultural contexts (e.g., Hofstede, 1980; Hui & Triandis, 1986; Markus & Kitayama, 1991; Reeve et al., 2014; Singelis, Triandis, Bhawuk, & Gelfand, 1995; Triandis, 1994). Researchers have argued that individualistic contexts have a “normative imperative... to become independent from others and to discover and express one’s unique attributes” (p. 226, Markus & Kitayama, 1991). The process of socialization in individualistic contexts is thus likely to inculcate a view of the self as separate from others, and promotes independent values such as seeking personal freedom, self-expression, and cultivating distinctive personal attributes. In contrast, collectivistic contexts promote behavior that sustains social connectedness and group harmony. These contexts promote a view of the self as embedded in interpersonal relationships, and foster interdependent values such as sustaining relationships with family, being responsive to community norms, and seeking social goals.

American first-generation students have been distinguished from continuing-generation students by their endorsement of relatively interdependent values and motives for educational achievement (Allen et al., 2015; Dennis et al., 2005; Jury et al., 2017; Harackiewicz et al., 2014; O’Neal et al., 2016; Stephens et al., 2012). This characteristic of first-generation students is conceptualized as an outcome of socialization, a process that is intertwined with the everyday experiences of their home communities. Socialization into a culture is a process of learning about ways of thinking and acting in the world, is largely driven by interpersonal interactions in close relationships, and is embedded within the

larger socioeconomic environment (Bronfenbrenner, 1979). As previously discussed, the most reliable shared characteristic of first-generation students is a lack of intergenerational information about higher education. This intergenerational information often carries implicit knowledge about college culture; that is, when a continuing-generation student's parent has graduated from college, the parent is more likely to share stories, values, and norms that reflect socialization into higher education.

The American college culture tends to be highly individualistic. Stephens et al. (2012) found that university administrators were significantly more likely to report that their universities aimed to help students develop independent skills (such as learning to express oneself, solve problems on one's own, or do independent research) than interdependent skills (such as learning to do collaborative research, ask for help, or adjust to others' expectations). Other researchers using a cross-cultural perspective have also highlighted that value for individualism and independence is reflected in the ways that American schools design instructional practices and curricula, as well as in predominant assumptions about the nature of student learning (Li, 2003; Tweed & Lehman, 2002).

Thus, when students with more interdependent values enter college, they can experience a cultural clash with individualistic messages and practices that emphasize the pursuit of personal satisfaction, self-exploration, and independent achievement. This may lead students to experience social identity threat, such as when stereotype threat increases anxiety and undermines performance (Steele et al., 2002). A lack of familiarity with college culture has also been suggested to affect first-generation students' conscious decisions regarding the value of pursuing specific paths of study. For example, Allen et al. (2015) found that first-generation students have less motivation to pursue STEM careers or graduate education when they do not perceive that these will allow them to sustain family connectedness, collaborate with others, or achieve highly prosocial goals. Others have

argued that a clash with college culture also surfaces in first-generation students' interpersonal interactions as they try to determine appropriate behavior when they interact with faculty (Collier & Morgan, 2008; Davis, 2010; Gardner & Holley, 2011; Jury et al. 2015).

When attempting to understand how individuals' independent or interdependent values relate to other beliefs and behaviors, it is important to recognize inherent issues that arise from this approach. First, although social groups and individuals differ in the relative importance they assign to independent versus interdependent values, features of individualism and collectivism are present in all cultures, and independent/interdependent values can coexist within individuals (Kim, Triandis, Kagitcibasi, Choi, & Yoon, 1994; Singelis, 1994; Suizzo, 2007). Second, members of cultural groups can differ in the extent to which they endorse their group's dominant norms and values, contributing to the dynamic process of reconstituting and changing the cultures in which they participate. Third, a simple dichotomy between individualism and collectivism obscures the multiple ways that these cultural constructs are understood and practiced by real people, as well as other potential dimensions of their socially-shared meanings.

For example, Triandis and Gelfand (1998) argued that both constructs have horizontal and vertical dimensions that respectively center on whether one perceives an equal or hierarchical relationship between self and others in society. Schwarz (1994) also sought to address more completely the complexity of individualism and collectivism by differentiating these constructs along multiple dimensions (e.g., self-enhancement, self-transcendence) and value types (e.g., self-direction, power, conformity, benevolence). Other researchers have found greater multidimensionality of self-construals (within cultures and individuals) when studies ask participants to self-describe their attributes, group memberships, and relationships (Santamaría, de la Mata, Hansen, & Ruiz, 2010;

Wang, 2004). Observing that the individualism-collectivism dichotomy has often been conceptualized as a tension between personal autonomy and interpersonal relatedness, Kagitcibasi (2005) argued that “being connected does not imply lacking autonomy” (p. 410), just as people can have a high sense of personal agency when they prioritize sustaining group harmony and interconnectedness. Instead, cultural contexts and self-construals can be understood along dimensions of agency (i.e., value for a sense of volition regarding one’s actions) and interpersonal distance (i.e., value for separateness from others).

Such multidimensional views of interdependence raise questions about our current understanding of the cultural mismatch experienced by first-generation students. This is because endorsement of interdependent values in college has been widely assumed to introduce threats to students’ sense of belonging among other students and identification with university culture. In much of this research, first-generation students’ endorsement of interdependent values has emphasized the measurement of their interdependent motives for college achievement (Harackiewicz et al., 2014; Harackiewicz et al., 2016; Stephens et al., 2012; Tibbets, Harackiewicz, Canning, Boston, Priniski, & Hyde, 2016; Suhlmann, Sassenberg, Nagengast, & Trautwein, 2018; Tibbets, Priniski, Hecht, Borman, & Harackiewicz, 2018). However, studies of cultural mismatch to date have viewed these values and motives as falling on one side of a dichotomy. Nonetheless, a growing appreciation for the measurement of first-generation students’ beliefs rather than their simple demographics or objective measures (like hours spent at work, GPA, or family income) coincides with a heightened interest in (and ability to understand the mechanisms behind) interventions that provide psychological satisfaction in college.

Motivational Concerns and Psychological Interventions

In a recent review of research, Jury et al. (2017) identified four key psychological barriers to success for first-generation college students that have emerged from the literature. First, they discussed that among all college students, first-generation students have relatively higher levels of emotional distress: they reported lower levels of subjective well-being and were more likely to report negative emotions such as depression and guilt regarding their academic achievements (Covarrubias & Fryberg, 2015; Padgett, Johnson, & Pascarella, 2012; Stebleton, Soria, & Huesman, 2014). Second, first-generation students often struggle to develop their identity as college students. They are often concerned that their social background differs from the majority of college students, which can lead them to worry about belonging at university (Gardner & Holley, 2011; Harackiewicz et al., 2014). Furthermore, they may not perceive a great deal of family support for establishing their identities as college students, and in fact may be skeptical that attending college will change their identities in ways that make them less aligned with their origins (Davis, 2010). Third, first-generation students' perceptions of ability and belonging in college can be negatively influenced by stereotypes and discrimination targeting their social background, as well as the process of social identity threat. Fourth, these other barriers intertwine with students' beliefs and everyday experiences in college, making it difficult to sustain their motivation.

Motivation is central to college success because it drives learners to pursue their goals, changes the emotional experience of learning, influences learner's decisions and use of strategies, and ultimately shapes performance (Pintrich, 2003). This has led a growing number of psychological researchers to explore how first-generation students' beliefs and experiences are associated with their motivation and thus present opportunities for intervention. These approaches to supporting motivation include approaches centered on

resilience and coping strategies, and approaches centered on affirming students' personal integrity and belonging in college. Given the dynamic interplay between these three approaches, there is certainly a lot of overlap that I do not mean to obscure.

Because first-generation students tend to experience higher levels of emotional distress relative to the general population of college students, coping and resilience have been used as a lens for research into their transition to college. Coping describes how individuals attempt to respond to difficult situations and manage stress with cognitive or behavioral effort, whereas resilience describes how individuals overcome adversity, achieving desired outcomes despite the presence of factors that threaten their success (Lazarus & Folkman, 1984; Masten, 2001). A number of interventions focused on coping and resilience have emphasized increasing the counseling services, campus spaces, and trainings available to first-generation students to support their ability to process emotions and stressful situations (e.g., Clauss-Ehlers & Wibrowski, 2007; Jehangir, Williams, & Jeske, 2012; Tello & Lonn, 2017).

First-generation students' interpersonal relationships have been emphasized as resources for coping and resilience, typically emphasizing learners' emotional reliance on supportive family and friends (Davis, 2010; Dennis et al., 2005; Garriot et. al., 2017; Phinney & Haas, 2003). Fellow college students are in a unique position to provide assistance for coping with the problems that students face at University, and greater social support from university friends or classmates has been found to predict increased achievement, adjustment to the college environment, and commitment among first-generation students (Dennis et al., 2005). Although both family and peer support contribute to students' well-being, one study distinguished peer support as a predictor of decreased psychological distress in college (Rodriguez, Mira, Myers, Morris, & Cardoza, 2003). The study's authors suggested that peers at university may be uniquely situated to offer moral

support, advice, and assistance for college life. Peer relationships have also been emphasized by research into learning communities, or institutional programs that encourage frequent interaction and collaboration among cohorts of college students. For learners who belong to underrepresented groups in higher education, these communities can boost both social and cultural capital (Moschetti, Plunket, Efrat, & Yomtov, 2018; Rios-Ellis, Inzuna-Franco, Bellamy, & Torres, 2015; Smith, 2018).

Other studies of first-generation students have tried to identify how specific beliefs or orientations might be thwarts or supports for coping and resilience. For example, a handful of studies have identified that first-generation students might be more likely than their peers to have concerns about personal ability, and beliefs surrounding their personal ability ultimately impact their success in university. Jury, Smeding, Court, and Darnon (2015) found that among high-achieving college students, first-generation students expressed greater endorsement of performance-avoidance goals in their classes (i.e., goals that focus on avoiding the appearance of incompetence relative to others; Elliot & McGregor, 2001). First-generation students also expressed lower expectancies of success. These findings were cause for concern given that performance-avoidance goals have been linked to reduced motivation, more superficial learning strategies, less pursuit of feedback on academic work, and lower grades among college students.

Phinney and Haas (2003) analyzed freshman students' journals to explore how they were responding to stressful experiences during the transition to college. All 30 students in their sample were members of ethnic minority groups, and all but three were first-generation. They found that the students who were least successful in coping with stressors in college were characterized by lower levels of self-efficacy and less perceived social support. Students who saw themselves as effectively coping with college stress were characterized by high levels of self-efficacy, no perceived lack of social support, and

reliance on their sense of commitment (to obtaining a college degree) as a motivational resource. These qualitative findings were echoed by a quantitative study (Wang & Castaneda-Sound, 2008) that found first-generation students had lower levels of self-efficacy than continuing generation students, and that lower perceived self-efficacy and social support predicted more depressive symptoms and ineffective coping with stress. A handful of studies into first-generation students' resilience have used the construct of "grit" (Duckworth, Peterson, Matthews, & Kelly, 2007) to describe students' sense of personal commitment toward long-term goals, usually pointing to this sense of personal commitment as a factor in student success that drives the persistent and flexible use of strategies to overcome obstacles to success (Mercado, 2017; O'Neal et al., 2016; Strayhorn, 2013).

Contemporary psychological interventions into first-generation student achievement have also focused on social identity threat as critical concerns given the research findings regarding cultural mismatch. That is, many efforts to enhance first-generation students' performance in college have sought to reduce concerns that students have about their social backgrounds in the college environment and reaffirm feelings of personal integrity or belonging.

Taking an approach motivated by research into social identity threat, Stephens et al. (2012) manipulated incoming college students' perception of university culture as promoting independent values (in the identity threat condition) or interdependent cultural values through a university welcome letter. Students then worked on an anagram task. In the social identity threat condition, an achievement gap appeared between first-generation and continuing-generation students. No performance gap was observed when students read a welcome letter emphasizing interdependent values. Building on this finding, Harackiewicz et al. (2014) investigated whether writing about personal values could reduce

first-generation students' social identity threat and boost performance in introductory biology classes. They found that relative to controls, first-generation students who participated in the values affirmation intervention achieved higher grades and were more likely to persist on the biology track into the next semester. In the intervention condition, the achievement gap was cut in half. However, they were unable to see any intervention effects for ethnic minority students in their sample, in part because the sample was largely composed of first-generation White students.

In a follow-up study that attempted to differentiate better how student characteristics interacted with the intervention (Harackiewicz et al., 2016), values affirmation no longer had a significant impact on the performance of all first-generation students, but significantly reduced the achievement gap when students were both first-generation and belonged to ethnic minority groups (i.e., had identified as African American, Native American, or Latino). In their interpretation of these results, the researchers suggested that perhaps first-generation students who are also underrepresented minorities are the most likely to hold interdependent values and experience cultural mismatch, so that thinking through the value of curricular content for their personal goals was particularly powerful. They also suggested a distinction between students' feeling that coursework is not aligned with personal values and "more general sense of belonging in college" (p. 761).

Given that concerns about belonging are widespread among first-generation students, it is interesting to observe that two contemporary interventions have tried to reduce this belonging uncertainty through distinct tactics. One intervention aimed to reduce the salience of social backgrounds during the transition to college, whereas the other brought social backgrounds forward, highlighting how these shape the college experience. The intervention reducing the salience of social backgrounds focused on teaching incoming

freshman the lay theory that all individuals, regardless of their social backgrounds, have difficulty feeling they belong during the transition to college that they eventually overcome (Yeager et al., 2016). Thus the primary goal of this intervention was to reduce identity concerns and enhance a sense of social belonging. At follow-up six months later, students who received the intervention had higher levels of social and academic integration than students in the control group: for example, they were more likely to report that they had accessed campus resources or participated in student groups.

Taking quite a different tactic, a difference-education intervention aimed to draw clear lines from students' social backgrounds to particular challenges that they might face in college and discuss how different students will need different strategies to be successful (Stephens, Hamedani, & Destin, 2014). In this intervention, students listened to stories from diverse panelists who highlighted how their experiences provided strengths and weaknesses during the transition to college. The goal of this intervention was to help students recognize "how their social class backgrounds shaped what they experienced in college, in both good and bad ways" (p. 1557, Stephens, Townsend, Hamedani, Destin, & Manzo, 2015). Two years later, first-generation students who participated in the intervention were more likely than other students to discuss their social backgrounds when they talked about college life (Stephens et al., 2015).

Overall, psychological studies of first-generation students have largely focused on linking beliefs to resilience and creating interventions to reduce social identity threat. For the most part, studies of motivational outcomes have focused on students' experience of college in general rather than specific classes or interpersonal interactions. However, these studies have also suggested that first-generation students' emotional well-being and motivation are influenced by their perceptions of competence, alignment between coursework and personal values, and belonging in the college environment. As I will

attempt to illustrate in the next two sections, self-determination theory provides a parsimonious framework for examining first-generation students' perceptions of inner psychological resources that ultimately support achievement.

SELF-DETERMINATION THEORY AS A LENS ON MOTIVATION IN EDUCATION

Self-determination theory (Ryan & Deci, 2000) has been widely used in education research to explore the interrelationships between classroom experiences and student motivation. The theory posits that an individual's motivation to act is characterized along a continuum from behavior entirely coerced by external pressures (such as the threat of punishment) to behavior that is driven by purely internal factors (such as joy or interest). As the most internally-directed type of motivation, intrinsic motivation is a state characterized by freely choosing to participate in an activity regardless of external pressures. There is persistent interest in understanding how psychological processes and environmental factors contribute to students' experience of intrinsic motivation, because such satisfying learning experiences have been linked to persistence, well-being, and achievement in a variety of educational settings (Jang et al., 2009).

Psychological Need Satisfaction and Motivation

Self-determination theory posits that all humans have an innate drive to realize their potential that is optimized when they perceive satisfaction of three basic psychological needs for competence, autonomy, and relatedness (Ryan & Deci, 2000). Competence bears similarity to constructs from other theories of motivation, such as self-efficacy in social cognitive theory (Bandura, 1977) and expectancy for success in expectancy-value theory (Eccles & Wigfield, 2002), as it centers on an individual's perception that he or she has the ability to perform tasks successfully (Pintrich & De Groot, 1990). This requires a sense of

control over one's performance along with the perception that one has the knowledge, ability, or information necessary to succeed. Autonomy is the sense that one's actions are self-chosen, freely undertaken, or authentic expressions of self. An autonomous student feels that his or her behavior is aligned with personal goals, interests, and values (Reeve, Nix, & Hamm, 2003). Relatedness is a person's sense of possessing meaningful social bonds and belonging, and stems from perceiving "stability, affective concern, and continuation into the foreseeable future" of interpersonal relationships (Baumeister & Leary 1995, p. 500).

A corollary is that motivation and well-being are undermined when these basic needs are frustrated - as when an individual perceives that he or she is controlled by the social environment, isolated from others, or unable to achieve desired outcomes successfully. This can result in either a state of amotivation (where the individual has no drive to act) or extrinsic motivation (where the individual perceives that behavior is driven by external pressure). Purely extrinsic and controlled motivation lacks a sense of personal endorsement (Deci & Ryan, 1985a), and is characterized by an individual who participates in an activity to achieve some other separable outcome, such as social approval or financial gain. Rather than treating intrinsic and extrinsic motivation as a simple dichotomy, self-determination theory posits that extrinsic motivation can be experienced on a continuum ranging from highly controlled to highly autonomous.

On the continuum of extrinsic motivation, behavior that is externally regulated by punishment or reward becomes increasingly internalized (and thus autonomous) in an "active, natural process" as an individual experiences psychological need satisfaction (Ryan & Deci, 2000, p. 234). In a state of introjected regulation, the individual has begun to internalize the pressure to act because of a desire to avoid feelings of guilt and shame or obtain social approval, but of course is still in a highly controlled state. Identified regulation

involves even greater internalization, as one recognizes the value of behaving in a certain way. When an individual is still acting in the presence of external pressures yet feels highly autonomous, he or she is in a state of integrated regulation. Because individuals acting in a state of integrated regulation perceive their motivation as highly autonomous (or self-chosen), they can experience increases in commitment and performance similar to those associated with intrinsic motivation (Ryan & Deci, 2000).

Students who experience more relatively autonomous (i.e., intrinsic, integrated, or identified) types of motivation are more likely to persist than students who feel relatively controlled (Vansteenkiste, Lens, & Deci, 2006; Vansteenkiste, Simons, Lens, Sheldon & Deci, 2004). Moreover, highly autonomous students experience sustained well-being regardless of their academic performance, whereas poor performance can threaten the well-being of extrinsically motivated students, even if they have identified with the value of a task (Burton, Lydon, D'Alessandro, & Koestner, 2006). Autonomous motivation also benefits learners in many other ways. College students who experience higher levels of intrinsic motivation (reporting their own levels of interest-enjoyment) while reading have also demonstrated improved understanding and recall of material (Ryan, Connell, & Plant, 1990). Autonomous motivation is associated with greater engagement, effort, and performance in learning activities among college students (Vansteenkiste et al., 2004).

The relationship between psychological need satisfaction and engagement in classroom studies exemplifies the dynamic interplay of students' beliefs and teacher practices. Engagement has been associated with greater persistence, resilience, and achievement among students across age groups (Handelsman, Briggs, Sullivan, & Towler, 2005; Skinner, Furrer, Marchand, & Kindermann, 2008; Skinner, Zimmer-Gembeck, & Connell, 1998), fostering interest in how teachers can increase engagement via practices designed to provide psychological need support. Yet engagement also has a reciprocal

relationship with teacher practices. That is, teachers who support the psychological needs of their students perceive increased student involvement, then respond with increased support for students' self-expression, provision of appropriate challenge, and warm regard (Pelletier, Levesque, & Legault, 2002; Reeve, 2013). On the other hand, teachers who perceive lower levels of engagement might respond to their students with "correspondingly more neglect, coercion, and even inconsistency" (Skinner & Belmont, 1993, p. 578). This is mirrored by findings that students who are engaged are also more likely to perceive increased psychological need support over time (Matos et al., 2018). Here, I will briefly summarize these lines of research.

Supportive Teacher Practices and Classroom Engagement

To date, the study of need-supportive classrooms has emphasized the critical role of teacher practices. Although autonomy-supportive classroom practices have received more attention in the literature than practices designed to support competence or relatedness, all three types of need support have been examined as a means to boost student engagement.

Autonomy-supportive practices include allowing learners to make choices, providing informational and noncontrolling feedback, offering rationales that identify value in otherwise uninteresting activities, and acknowledging student expressions of negative emotions during a task (Su & Reeve, 2011). Teachers' autonomy-supportive practices have been linked to greater student engagement among children, adolescents, and college students, and have similar benefits for students regardless of achievement level (Guay, Ratelle, Larose, Vallerand, & Vitaro, 2013; Reeve & Jang, 2006; Reeve et al., Jang, Carrell, Jeon, & Barch, 2004). In contrast, controlling practices during interaction have been associated with disaffection among children and adolescents through their reliance on

extrinsic motivators such as directives and punishment (Assor, Kaplan, Kanat-Maymon, & Roth, 2005). Of course, most teachers do not rely entirely on autonomy-supportive or controlling practices, but tend to use them in combination. These practices can have interactive effects on student engagement; for example, the presence of controlling practices may serve as a contrast that boosts the positive association between autonomy-supportive practices and engagement, whereas autonomy-supportive practices can dampen the negative impact of control (Patall et al., 2018).

As Niemec and Ryan (2009) observed, “students will only engage and personally value activities they can actually understand and master” (p. 139). The mutually supportive nature of psychological needs is highlighted by findings that the benefits of autonomy support hinge on an appropriate level of support for student competence (Jang, Reeve, & Deci, 2010; Oga-Baldwin & Nakata, 2015). Students feel competent when they have the information or structure that they need to carry out a task successfully (Skinner & Belmont, 1993). Teachers can facilitate competence in their students by clearly communicating instructions and expectations, providing tasks at an appropriate level of challenge, offering informational feedback about student performance, and expressing confidence in students’ ability to achieve (Niemec & Ryan, 2009; Reeve et al., 2004). Moreover, Reeve et al. (2004) found that classroom structure (such as performance standards, time limits, and informational feedback) were most effective at boosting students’ sense of competence when teachers also used non-controlling language, rationales, and other forms of autonomy support.

Finally, although relatively less research has examined teacher relatedness support (i.e., involvement), students who feel connected to their teacher and classmates are also presumed to feel more autonomous motivation and engagement (Niemec & Ryan, 2009). In their study of student-teacher interactions, Stroet et al. (2015) organized involvement

into four categories: affection, attunement, dedication of resources, and dependability. Affection centers on demonstrating positive regard for students: communicating an interest in students' lives, treating all students with fairness, and encouraging respect and empathy. Attunement involves taking the perspective of students and trying to understand what is important to them. Teachers practice dedication of resources when they demonstrate presence for their students, rather than appearing to be preoccupied or minimally invested in teaching. Dependability centers on a teacher's availability to support student learning, both through in-class attention when students struggle and clear, consistent channels for students to seek support or additional feedback. Freeman, Anderman, and Jensen (2007) found that students felt greater classroom belonging when their teachers encouraged student participation by knowing students' names, offering opportunities to share opinions, and encouraging the free discussion of ideas. Summers, Beretvas, Svinicki, and Gorin (2005) found that collaborative learning could also contribute to students' sense of belonging to a classroom community (i.e., feeling a sense of connectedness, familiarity, friendship, and fitting in with other students).

Previous research into classroom psychological need satisfaction has emphasized teachers because of their critical role in designing classroom activities and guiding the development of classroom community. As Reeve (2012) noted, self-determination theory "focuses special attention on those relationships in which people of high status or expertise attempt to motivate or socialize people of lower status or expertise" (p. 159). However, some studies of need satisfaction in educational contexts have also investigated peer relationships, typically with an emphasis on how they fulfill relatedness needs (e.g., Guay, Denault, & Renaud, 2017; Zainuddin & Perera, 2019). Much classroom research outside of the framework of self-determination theory has demonstrated the impact of peers. Peers provide emotional support and contribute to collective norms that form a constructive, safe

context for learning (Juvonen, Espinoza, & Knifsend 2012; Martin & Dowson, 2009; Wentzel, Muenks, McNiesh, & Russell, 2017). Among college students, peers' perceived enthusiasm can help sustain interest in course material (Kim & Schallert, 2014). Researchers have also documented peer's critical role in contributing to (and managing) collaborative efforts to build knowledge (Nussbaum, 2008; Reusser & Pauli, 2015; Volet, Summers, & Thurman, 2009). Thus classroom supports from peers and teachers interact, but can also make independent contributions to learners' engagement (Meyer & Turner, 2006; Wentzel, Battle, Russel, Looney, 2010). Nonetheless, teachers have great influence on peer interactions through their modeling and guidance of classroom relationships (Farmer, Lines, & Hamm, 2011; Field & Hoffman, 2012) and directly affect engagement through their relationships with each individual student. Thus a focus on teacher practices to support autonomy, competence, and relatedness has dominated studies of classroom need support.

The Role of Student Beliefs, Engagement, and Agentic Pursuit

Amid interventions to promote teachers' use of need-supportive practices (especially for facilitating autonomy), some researchers have suggested that student beliefs can shift the impact of teacher practices through the process of appraisal. First, individuals may differ in the degree to which they perceive their behavior as autonomous due to persistent, general beliefs regarding whether one's behavior has an internal or external locus of control (Deci & Ryan, 1985b; Gagné, 2003). In addition, a learner's experience of autonomy depends on his or her expectations about the nature of autonomy-supportive interaction (Vansteenkiste, Zhou, Lens, & Soenens, 2005). For example, although directives are conceptualized as a controlling practice in the individualistic culture of the United States, in Japan students may self-endorse such directives when they perceive the

“teacher as a benevolent and interdependent authority, who manages uncertainty” (Oga-Baldwin & Nakata, 2015, p. 175). However, cross-cultural studies of autonomy support have found that when teachers practice autonomy support, structure, and involvement in the classroom, students tend to respond with greater engagement (Chirkov, 2009; Jang et al., 2009; Roth, Assor, Kanat-Maymon, & Kaplan, 2006).

Within a classroom context, engagement is a state of active involvement in a task (Reeve, et al., 2004), typically conceptualized as a combination of emotional, and cognitive, and behavioral engagement (Fredricks & McColskey, 2012; Reeve & Tseng, 2011). As emotions are intertwined with the process of learning, they can also support or thwart students’ pursuit of classroom goals (Meyer & Turner, 2002). Consequently, a student who is experiencing emotional engagement is expected to feel pleasant emotions such as interest and enjoyment during learning, along with reduced levels of unpleasant emotions (associated with disaffection or amotivation) such as boredom and anxiety (Skinner et al., 2008). Cognitive engagement involves expending mental effort towards class activities (Fredricks, Blumenfeld, & Paris, 2004). For example, a cognitively engaged student will actively self-regulate, will use strategies (such as making up examples that illustrate new material) to improve comprehension, and will actively monitor his or her understanding. A student with high behavioral engagement takes actions that support his or her learning (such as paying attention or taking notes), demonstrates persistence and time on task, and participates in classroom activities.

The conceptualization of cognitive and behavioral engagement also point toward the role of students’ self-regulatory strategies as a connection between need satisfaction and achievement. Students’ metacognitive or strategic approaches to learning are key indicators in self-report and observational measures of increased involvement (Fredericks & McColskey, 2012). The view that engagement provides the will to recruit self-regulatory

skills has generally emphasized students' efforts toward learning as the outcome of satisfying classroom experiences, although the two can also be seen to operate in a virtuous cycle (Cleary & Zimmerman, 2012). As previously discussed, students' levels of cognitive, emotional, and behavioral engagement can shape classroom environments through teachers' perception that certain need-supportive practices are rewarded.

Engaged students can also influence teachers more directly. In addition to the other types of engagement, Reeve and Tseng (2011) have also argued that agentic engagement is an additional aspect of student involvement that is distinct from behavioral engagement, as learners with high agentic engagement seek actively to influence their learning environment. For example, students might offer their opinions regarding instruction or suggest ways the teacher might change a classroom activity. Attempted influence is central to the distinction between agentic and behavioral engagement: students go beyond reacting to the teacher by actively seeking to change the course of instruction. Agentic engagement has been conceptualized as both an outcome and predictor of need-supportive teaching practices. As a result, a number of classroom studies have incorporated an agentic dimension into their measures of student engagement.

Agentic engagement has been positively associated with measures of cognitive, behavioral, and emotional engagement, and all types of engagement tend to increase when teachers use need-supportive practices (Jang et al., 2016; Mameli & Passini, 2017; Matos et al., 2018; Reeve, 2013; Reeve & Lee, 2014). To date, these studies have tended to rely on students' self-report using the Agentic Engagement Scale (Reeve, 2013), which emphasizes students' willingness to interact with the teacher and learning environment by offering suggestions to improve the class, ask for assistance, or adjust what the class is learning to increase personal interest. Because agentic engagement is a relatively new construct, there may be room to expand on how it currently presents students' active pursuit

of more motivationally satisfying learning environments. For example, Mameli and Passini (2018) argued that agentic engagement does not only surface in student-teacher interactions; rather, it also involves “interactions and stance-taking among peers” (p. 9). Accordingly, the researchers extended the measure of agentic engagement to incorporate peer and class-level social interactions. In a longitudinal study, Matos et al. (2018) replicated findings that teachers’ use of practices to provide psychological need support predicted greater cognitive, emotional, behavioral, and agentic engagement among university students. The researchers also replicated previous findings (Reeve, 2013) that higher levels of agentic engagement among students early in the semester predicts teachers’ increased use of autonomy-supportive practices over time.

Agentic engagement emphasizes that the experience of need frustration does not necessarily relate to diminished psychological need satisfaction if learners are driven to mold the environment and make it more supportive of their personal well-being and motivation. Building on this rationale, Legault et al. (2017a) raised the question of whether there are persistent differences in individuals’ willingness to disrupt the status quo during the pursuit of need satisfaction. They argued that individuals who have largely experienced psychological need satisfaction through supportive relationships and environments become oriented toward a perception of assisted autonomy, or a sense that need satisfaction tends to be reliant on others. Legault et al. further theorized that long-term experiences with psychological need frustration can drive individuals to become more self-reliant in their psychological need satisfaction, developing an orientation toward asserted autonomy. That is, individuals with an orientation toward asserted autonomy

“rely less on consistent autonomy-support to feel self-determined, cope adaptively in unsupportive environments, and employ more effort and audacity in the expression of identity and interests under inhospitable conditions” (p. 18)

Self-reliance for psychological need satisfaction is the critical feature defining an orientation toward asserted autonomy. Legault et al. (2017a) presented a series of studies examining how this self-reliance is associated with related constructs. First, they found a strong positive association between asserted autonomy orientations and childhood experience of authoritarian parenting (i.e., the perception that parents had demanding expectations but little responsiveness or warmth; Baumrind, 1971) among participants drawn from the general U.S. population. Assisted autonomy orientations were associated with authoritative parenting (i.e., high expectations and high responsiveness), suggesting that different childhood experiences with caregivers might contribute to more or less reliance on others for psychological need satisfaction. In their second study, both assisted and asserted autonomy were found to predict well-being among members of the general U.S. population. However, individuals' value for curiosity/exploration mediated the relationship between asserted autonomy and well-being, whereas the relationship between assisted autonomy and well-being was mediated by satisfying personal relationships.

To examine how autonomy orientations might predict responses to supportive or frustrating interactions, Legault et al. (2017a) conducted two studies with college students. In their first study, the researchers had undergraduates write about a negative personal experience for ten minutes. Researchers then assessed whether the participants tried to distance themselves from the experience (e.g., by avoiding thinking about the experience or denying its self-relevance), or whether they had integrated the experience, viewing it as a resource that informed their sense of self. Participants' levels of asserted autonomy (but not assisted autonomy) predicted greater integration of the negative life experience. In their second study, after reading scenarios in which a manager was either supporting or undermining an employee's competence, autonomy, and belonging, participants were told to imagine how the employee should respond to the manager during a hypothetical

disagreement over a work project. Participants then rated their endorsement of different strategies for responding to the interpersonal conflict that represented negotiation (actively seeking to change the situation), rumination (e.g., mentally dwelling on their unhappiness in the situation), or accommodation (patiently accepting the situation). Asserted autonomy uniquely predicted the endorsement of negotiation strategies in the need-frustrating condition, but assisted autonomy also predicted negotiation when the boss had been described as need-supportive. In both conditions, only assisted autonomy was associated with accommodation. Assisted autonomy also negatively predicted rumination whereas asserted autonomy had no relationship. One interpretation of these findings is that those who trust in others for psychological need satisfaction may also be more willing to resolve conflicts by changing their own beliefs or behavior (rather than seeking to change others).

The notion that individuals may differ in their general reliance on others for psychological need satisfaction raises both new questions and familiar concerns. First, given that asserted autonomy predicts greater willingness to negotiate actively for psychological need satisfaction in difficult environments, how is it associated with agentic engagement? Agentic engagement has largely been studied as an outcome of teacher practices, but perhaps it is also related to students' general disposition toward actively seeking autonomy. Asserted autonomy theoretically affords less reliance on the environment for psychological need satisfaction than assisted autonomy - but how much less, and is the benefit consistent across environments? Finally, important questions about asserted autonomy arise from the fundamental tension that it assumes between reliance on interpersonal relationships and agentic pursuit of psychological need satisfaction.

Indeed, during the validation of their measure for autonomy orientations, Legault et al. (2017a) found that asserted autonomy uniquely had a strong negative association with interdependent self-construal, and cited this finding as evidence of construct validity.

Specifically, they argued that asserted autonomy is an individualistic mode of need satisfaction that “may actually come at a cost to interpersonal relationships because personal interests are prioritized” (p.19). Unlike assisted autonomy, asserted autonomy was also positively associated with individuals’ need for uniqueness. If asserted autonomy enables a certain degree of resilience to need frustration, its link to individualism raises a troubling corollary: that individuals who value personal interdependence are less likely to overcome environmental thwarts to their psychological well-being. Amid mounting interest in students’ agentic pursuit of need satisfaction, is it necessary to presume that this pursuit is in tension with students’ value for interpersonal harmony?

In the previous section, I have attempted to describe how interest in supporting student motivation through psychological need satisfaction has developed. Recently, this literature has turned toward greater interest in understanding how students agentially contribute to their own need satisfaction. Agentic engagement and asserted autonomy are both constructs attempting to capture students’ active role in psychological need satisfaction, although one emphasizes classroom-level interactions whereas the other focuses on trait-like self-reliance for autonomy satisfaction. Given the nascent nature of these constructs, this study aimed to describe how they relate to student beliefs and classroom interactions.

FIRST-GENERATION STUDENTS AND PSYCHOLOGICAL NEED SATISFACTION

Using self-determination theory as a lens for examining first-generation students’ resources for psychological need satisfaction in my study created a fruitful dialogue between two literatures that have so far rarely been brought into conversation with each other.

As previously discussed, studies of first-generation students have generally emphasized comparison with continuing-generation students, and there has so far been only limited exploration of psychological factors that support first-generation students' motivation and well-being. As Garriott et al. (2015) observed, "while research points to how first-generation students are characteristically different from their peers, few studies have examined predictors of these students' academic and life satisfaction" (p. 253). A major gap in the literature regards the strategies that the students themselves use to sustain their motivation and well-being. The basic needs identified in self-determination theory offered a parsimonious framework for investigating these strategies. To date, only a few studies have viewed first-generation student motivation with an eye toward competence, belonging, and autonomy. In a qualitative study that followed low-income first-generation students through the process of applying and getting accepted to college, Mitchall (2015) found that first-generation students described interactions with both family members and teachers as contributors to their sense of belonging, competence, and autonomy. Students' narratives also suggested that a lack of quality information about college and lack of belonging to a college-going community might undermine a sense of autonomy regarding college pursuits. A survey study among first-generation college students found that autonomy satisfaction predicted students motivation to attend classes, spend time studying, and persist toward their graduation (Kollar, 2016).

Researchers have demonstrated that first-generation students often struggle with perceptions of self-efficacy, doubt their belonging in college, and feel that their personal values are not aligned with their tasks and experiences in the college environment. These findings mirror threats to competence, belonging, and autonomy, and, from the perspective of self-determination theory, the satisfaction or frustration of these needs is likely to be mutually interactive. Studies have implicated self-efficacy, emotional distress, and identity

concerns as critical issues for first-generation students. By contributing to positive experiences and social interactions on campus and promoting internalization of coursework value, psychological need support in classroom settings may complement contemporary interventions that aim to reduce social identity threat, enhance students' perceptions that their personal goals align with college coursework, or foster a greater sense of social and academic integration on campus. For example, autonomy satisfaction positively predicts individuals' satisfaction with their social identity and willingness to acknowledge positive and negative aspects of their group membership, even if the environment makes threatening group characteristics salient (Legault, Weinstein, Mitchell, Inzlicht, Pyke, & Upal, 2017b).

Studies of psychological need support in educational settings have only recently turned toward examining students' contributions to learning environments. Agentic engagement and asserted autonomy represent two approaches to understanding how students take an active role in need satisfaction. However, these constructs are relatively nascent, so this study examined their relevance among students who may be less familiar with the culture of higher education or value interpersonal connectedness and harmony above individualistic self-expression. As well, my qualitative exploration of students' attempts to satisfy their own psychological needs sought expand our view of how students are often self-reliant for psychological need satisfaction, especially the need for autonomy. This was rooted in a view of autonomy as the experience of agency or personal volition, even in the pursuit of highly interdependent or relational goals. I aimed to situate my findings regarding learner agency and satisfaction within a population that research has suggested is less familiar with the environment they are seeking to manage. Thus, this study sought to improve our understanding of first-generation students' beliefs and environmental resources that intertwine with effort to manage or improve the context for learning.

Chapter 3: Method

This study surveyed 212 first-generation college students regarding their perceptions of psychological need satisfaction in college, beliefs, and experiences of need support and engagement in a college classroom. Students partially fulfilled course requirements through their participation and received no other compensation. After describing the characteristics of this sample, I discuss the procedures used to collect data through an online survey and prepare responses for analysis. I then describe the measures used in this study. Next, I provide an overview of the quantitative analysis procedure that I used to address my first three research questions. This is followed by a discussion of how qualitative survey responses were analyzed to address my fourth research question, as well as a section on my efforts to ensure the trustworthiness of qualitative findings. Finally, I address my rationale for the mixed-method design of this study and my approach to integration across methodological strands.

PARTICIPANT CHARACTERISTICS

Table 1 presents sample descriptive statistics for age, grade level (ranging from 1, Freshman, to 4, Senior), and GPA on the university's four-point scale for achievement.

Table 1. Sample descriptive statistics: age, grade level, and GPA.

	Range	Mean	Standard Deviation
Age (in years)	17 - 68	21.13	4.16
Grade level (college year)	1 - 4	3.23	0.95
GPA (on 4-point scale)	2.2 - 4.0	3.23	0.44

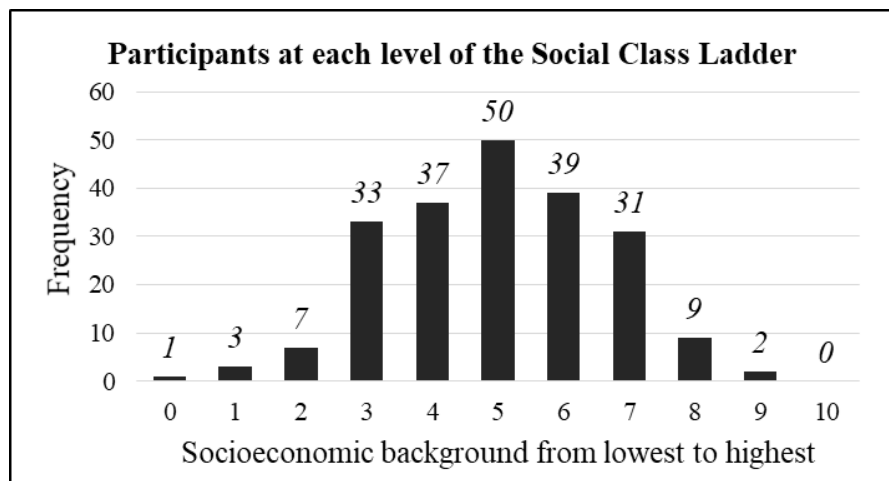
Participants in this study tended to be older undergraduates (mean age=21 years) who were further along in their studies (on average, early in the third year). A total of 7 participants were over age 24, in an age group often associated with characteristics of non-traditional students such as financial independence and delayed college enrollment after high school (National Center for Education Statistics, 2015). Each increasing grade level constituted a larger percentage of the sample: freshman (6.6%), sophomore (16.0%), junior (25.5%), and senior (51.9%). This overrepresentation of upperclassmen mirrored the larger subject pool, which drew potential participants from five elective courses. Participants reported a broad range of academic achievement, with an average GPA (3.23) in the “B” range of the University’s plus/minus letter grade scale.

Table 2 (on the following page) provides the number and percentage of participants who reported each category of sex, race/ethnicity, and parent educational attainment. For comparison, the third column of the table lists overall percentages at the university where data was available (The University of Texas at Austin, 2018). Relative to the broader university population, a greater percentage of the participants in this study identified their sex as female (72%) and a smaller percentage identified their race/ethnicity as Caucasian or European-American (17.5%). In this sample of first-generation students, a high school diploma or GED was the most commonly reported level of parental educational attainment. The sample included 5 international students who reported their countries of origin as Mexico (2), China (2), and Singapore (1). Only 20 participants (9.4%) reported that they had participated in a university program designed for first-generation students. Participants’ perceived positions on the Social Class Ladder were distributed around the middle of the scale (see Figure 1). On a scale where 0 and 10 respectively represented the lowest and highest levels of socioeconomic status, the sample average was 4.98 (median=5.00) with a standard deviation of 1.66.

Table 2. Sample descriptive statistics: sex, race/ethnicity, parent education level.

Demographic characteristics		Number within sample	Percentage of sample (n=212)	Percentage at larger University
Sex	<i>Female</i>	153	72.2%	52.7%
	<i>Male</i>	58	27.4%	47.3%
	<i>Non-binary</i>	1	0.5%	--
Race/Ethnicity	<i>African-American/Black</i>	11	5.2%	4.0%
	<i>Hispanic /Latino/Chicano</i>	84	39.6%	20.9%
	<i>Asian/Asian-American</i>	59	27.8%	19.0%
	<i>Caucasian/European-American</i>	37	17.5%	41.1%
	<i>Middle Eastern/Arab-American</i>	1	0.5%	--
	<i>Biracial/Multiracial</i>	20	9.4%	2.6%
	<i>Did not complete high school</i>	58	27.2%	--
Mother's highest level of education	<i>High school diploma or GED</i>	80	37.6%	--
	<i>Some college</i>	52	24.4%	--
	<i>Associate's or 2-year degree</i>	22	10.3%	--
	<i>Did not complete high school</i>	57	26.8%	--
Father's highest level of education	<i>High school diploma or GED</i>	77	36.2%	--
	<i>Some college</i>	57	26.8%	--
	<i>Associate's or 2-year degree</i>	16	7.5%	--
	<i>Unknown</i>	5	2.3%	--

Figure 1. Histogram of responses to the measure of social class.



DATA COLLECTION PROCEDURE

All participants in this study were recruited during the Fall 2018 semester through the subject pool of the Department of Educational Psychology at the University of Texas at Austin. Based on the subject pool's initial screening survey, 404 individuals (29.6% of the 1,361 undergraduates in the subject pool) had self-identified as first-generation undergraduate students and thus were eligible to participate in the study. Through the subject pool's online system, eligible students received a written description of the study and a link to the online survey. Upon opening the survey link, participants were presented with a written consent form. The consent form stated that the study would involve an online survey and require participants to spend roughly 45 minutes responding to questions about their beliefs, classroom experiences, and motivation as college students. The consent form also informed participants of the confidentiality of responses, their ability to cease participation at any time, and the research team's email and telephone contact information in case the study raised questions or concerns.

The survey immediately began when participants clicked to indicate their understanding of the consent form and agreement to participate. Instructions and measures were presented in nine survey sections designed to proceed from general questions (about student demographics and trait-level variables) to college experiences, and ultimately to experiences within a specific class. The survey flow is presented on the following page in Table 3, which shows sections, key instructions, and associated measures at a glance. Each section represented a webpage, and participants were required to respond to all questions in one section before proceeding to the next. Please see Appendix B for the complete survey as it was presented to participants. After completing the survey, participants sent an email to request subject pool credit for participation, which was granted within 24 hours.

Table 3. Survey flow with key instructions and associated measures.

Section	Key instructions	Associated Measures
1. Consent form	By clicking to proceed, participants indicate that they have read the information and wish to participate.	N/A
2. Demographic items	Participants must complete all questions regarding background characteristics.	<i>11 items:</i> Age, gender, race/ethnicity, SES, parent educational attainment, grade level, international status, major, participation in programs, GPA <i>1 item:</i> MacArthur Scale of Subjective Social Status (Adler, Epel, Castellazo, & Ickovics, 2000)
3. Autonomy orientations and self-construal	Participants are instructed to think about their experiences in general and rate agreement using a 7-point scale.	<i>8 items:</i> Asserted and Assisted Autonomy Orientation (Legault et al., 2017a) <i>10 items:</i> Independent and Interdependent Self-Construal (D'Amico & Scrima, 2016)
4. Pre-college messages about college and motives for college	Participants are instructed to reflect on messages received about college before attending university. Participants rate endorsement of motives for college using a 7-point scale.	<i>3 items:</i> After a researcher-created prompt, open-response items require participants to briefly describe the content of and source of each message about college. <i>12 items:</i> Interdependent and Independent Motives for Attending College (Stephens et al., 2012)
5. Open-response questions regarding college experiences	Participants are instructed to take their time to carefully read and answer each open-response question.	<i>6 items:</i> Researcher-created questions regarding three experiences of psychological need satisfaction and participants' response to three experiences of need frustration
6. Overall need satisfaction in college	Participants are instructed to reflect on their overall college experience and rate agreement on a 7-point scale.	<i>13 items:</i> Basic Psychological Need Satisfaction at College Scale (Jenkins-Guarnieri, Vaughan, & Wright, 2015)
7. Identification of a specific course	Participants are asked to identify a specific class to focus on for the next section.	<i>5 items:</i> class name, course number, whether class is within students' major, personal importance on scale of 1-7, estimated class size
8. Classroom supportive practices and engagement	Participants focus on experiences in a specific class, and rate agreement using a 7-point scale.	<i>18 items:</i> Perceived teacher behaviors <i>19 items:</i> Academic Engagement Scale (Reeve, 2013) and additional items for agentic engagement (Mameli & Passini, 2018)
9. Survey conclusion	Participants must email to confirm participation	N/A

SURVEY RESPONSES: DATA PREPARATION AND RESPONSE QUALITY

Barge and Gehlbach (2012) discussed how survey responses often have observable indicators of participants' satisficing, or minimizing the investment of their effort and attention. These indicators include non-response to survey items (through skipping items or attrition), time elapsed from start to finish, and non-differentiation (where the same level of endorsement is selected across items).

Participants were not allowed to skip items in this study's survey, but they were free to quit taking the survey at any time. Accordingly, responses showed some evidence of attrition. The initial page of the survey was a consent form that was submitted 267 times. In 7 of these instances, no other information was recorded beyond the consent form, in 6 cases, participants only responded through the demographic items, in 8 cases participants only responded until the fourth section (stopping short of the open-response questions), and in 2 cases participants completed qualitative items but stopped during the next section which presented measures pertaining to a specific class. Only the final question of the survey asked participants to provide unique identification (their university ID) in order to receive credit for participation. Thus a total of 23 cases of attrition were excluded from analysis because I could not identify whether they represented duplicate responses from participants who later completed the survey.

Of the remaining 244 complete responses, two participants had fully responded to all survey questions twice. Only their first response was retained, leaving 242 survey responses. I chose to do this rather than averaging/combining responses for three reasons. First, in both cases the participants had chosen to focus on different classes/instructors in their second survey attempt. Second, their qualitative responses were similar or identical between attempts. Third, ideally these participants would not have been able to access the

survey a second time, because previously viewing items may have influenced their responses during the second administration of the survey.

Although only participants identified as first-generation from the subject pool's screening procedure were invited to participate in this study, 29 participants who took the survey indicated that their mother or father earned a college degree. One additional participant was a graduate student. These participants were excluded from the sample for failing to meet eligibility criteria. Among the remaining 212 responses, 16 (7.5%) included a failed attention check, introducing concern about participants' potential non-differentiation among response options. For those participants who failed the attention check, their open-ended responses were retained for the qualitative analysis. Their quantitative responses were also retained for every analysis that relied on correlation and regression, although their impact on each analysis was investigated with a sensitivity study.

MEASURES

The survey began with a demographic questionnaire to capture information about student characteristics including age, gender, racial or ethnic identification(s), mother's highest level of education completed, father's highest level of education completed, socioeconomic status, current grade level classification in university, and international student status. Students were asked to identify their academic majors, report cumulative GPA, and indicate yes/no to whether they participated in specific programs designed for first generation students at the University.

Perceived Socioeconomic Status

As part of the demographic questionnaire, participants responded to the MacArthur Scale of Subjective Social Status, an item designed to assess an individual's perceived

position relative to others in society (Adler, Epel, Castellazo, & Ickovics, 2000). The measure has been widely used by researchers in studies of various social groups in and out of the U.S. (Wolff, Acevedo-Garcia, Subramanian, Weber, & Kawachi, 2010). The original instrument presents an image of a ladder with 10 rungs with the instructions to “think of this ladder as representing where people stand in our society. At the top of the ladder are the people who are the best off, those who have the most money, most education, and best jobs. At the bottom are the people who are the worst off, those who have the least money, least education, and worst jobs or no job.” Participants indicate where they believe they stand on the ladder using a number ranging from 1 (for the bottom rung) to 10 (for the very top rung). For the present study, the instructions were modified so that an image of the ladder was not included, but the scale retained its original range. Participants were asked to indicate the number that best reflected their situation.

Assisted and Asserted Autonomy

Asserted and assisted autonomy were measured with 8 items (four items to represent each one of the asserted and assisted subscales) developed by Legault et al. (2017a). In a sample of adults from the U.S. population (n=248, 81% White, 6.5 % Black, 6.9% Asian, 3.3% Latino, 2.4% Other), the subscales demonstrated acceptable internal consistency (Cronbach’s alpha was .84 for assisted autonomy, .81 for asserted autonomy). As previously discussed in my literature review, Legault et al.’s scale validation relied on a sample drawn from the general population and ultimately supported the assumption of two latent factors. When the authors examined the associations between these subscales and theoretically related constructs, they found that the autonomy orientations were weakly associated with each other, and that asserted autonomy was significantly associated with

independence while assisted autonomy was associated with interdependence on a measure of self-construal (Singelis, 1994).

Using data collected during a pilot survey, I investigated the properties of the autonomy orientations scale. Although a confirmatory factor analysis did not support a two-factor model for the data obtained, an exploratory factor analysis did show an expected pattern of item loadings on two factors. (A detailed account of measures investigated with pilot study data is available in Appendix A.) In the sample recruited for my primary investigation, Cronbach's alphas for the asserted (.80) and assisted (.79) orientation scales indicated acceptable reliability. Although the scale's original authors did not find a significant association between the two orientations in their sample from the general population, in my sample of first-generation students participants' scores on the two factors were significantly and positively correlated ($r = 0.52, p < .001$). To further examine the orientations as constructs, I attempted to replicate the autonomy orientations' patterns of association with independent and interdependent self-construal that was reported by Legault et al. (2017a). In contrast to their findings, in my sample of first-generation students independent self-construal was significantly and positively associated with the asserted ($r = 0.53, p < .001$) and assisted ($r = .48, p < .001$) autonomy orientations, while interdependent self-construal was only associated with the assisted autonomy orientation ($r = .18, p < .001$). Chapter four presents these results in the context of my first research question, and chapter five contains a discussion of this unexpected pattern of association between orientations and self-construals in my sample of first-generation students.

Interdependent or Independent Self-construal

Alongside the motives for attending college, participants were presented with a shortened measure of independent and interdependent values (D'Amico & Scrima, 2016)

that was based on the Singelis Self-Construal Scale (Singelis, 1994). I measured self-construal in order to examine whether students' motives for attending college are positively associated with the theoretical self-construal that underlies these motives, especially given my modifications to the measure of motives. The original form of the Self-Construal Scale contains 30 items designed to assess independent versus interdependent self-construal. However, I reduced the length of the scale help mitigate participants' survey fatigue. D'Amico and Scrima (2016) developed a shortened, 10-item version of the Self-Construal Scale relying on samples of European university students. Observing that the original version presented a wide range of personal characteristics, the researchers attempted to reduce the scale to items that emphasized independence or interdependence in decisions and behaviors. For example, independent items include "I do my own thing, regardless of what others think" and "I act the same way no matter who I am with," while interdependent items include "I often have the feeling that my relationships with others are more important than my own accomplishments" and "I will sacrifice my self-interest for the benefit of the group I am in."

Although shortening scales tends to reduce the internal consistency of measures, each 5-item subscale still demonstrated acceptable reliability (Cronbach's alpha was .74 for the independent subscale; .72 for the interdependent subscale). Scores on the 10-item scales for independence and interdependence were strongly associated with scores on the expanded scales (correlations were .85, with a 99% confidence interval of .80-.89 for the independent scale; and .92, with a 99% confidence interval of .89-.94 for the interdependent scale). Additional evidence that reducing scale length did not reduce concurrent validity included that the scales were not significantly associated with each other, and responses collected via the shortened scale showed similar or improved fit to the theoretical model when both the shortened and full-length scales were subjected to

confirmatory factor analysis. Despite the shortcomings of assuming a dichotomy between independent and interdependent values, the self-construal scales were an important means to evaluate my measure for student motives and situate results in the existing literature. In my sample, Cronbach's alpha was acceptable for the independent subscale (.72) but questionable for the interdependent subscale (.62).

Independent or Interdependent Motives for Attending College

In line with previous research with first-generation student populations, I used a 12-item measure of students' independent versus interdependent motives for attending college (Stephens et al., 2012). This measure was central to literature on first-generation students that informed much of the rationale for my study. In previous studies using this scale, students were asked to select which motives they have for attending college from a list of 12 items. Half of these items represent interdependent motives for attending college such as "to help my family out after I'm done with college" and "to give back to my community." The other half were designed to represent independent motives for attending college such as "to learn more about my interests" and "to become an independent thinker." Summing the number of items endorsed on each scale provided an overall score ranging from 0-6. I altered the measure for my study so that participants rated their personal endorsement of each motive for attending college on a scale ranging from 1 (not at all important) to 7 (extremely important). My rationale for this change was that variability in the degree to which a student endorses any particular motive is obscured when the motives are presented in a checklist format. Cronbach's alpha indicated acceptable internal consistency reliability for the scales measuring Independent (.89) and Interdependent (.84) Motives for College.

Perceived Supports and Strategies for Need Satisfaction

Participants were presented with 6 open-ended questions developed for the current study. These items were designed to elicit salient experiences of need satisfaction in college as well as instances of need frustration where participants took action to change the situation. For example, the item to assess a salient experience of autonomy in college asked participants to “Think of the moment or situation when, as a college student, you felt autonomy – like you were doing something because of your personal goals, interests, or values. Autonomy is a sense of personal freedom, that one’s actions are fully self-chosen.” After this definition, students were asked to describe a specific college experience that gave them a sense of autonomy, including where and when the experience occurred, what they were doing, and who else was involved. For each of the three psychological needs, items eliciting a memory of need satisfaction were immediately followed by an item asking about an experience with the frustration of that need. For example, the second item read, “Now think of a time when, as a college student, you felt the opposite of autonomy – like you were only doing something because of outside pressure (e.g., the need to earn a reward or a positive evaluation) or a desire to avoid negative consequences (e.g., social disapproval or feeling guilty).” For experiences of need frustration, participants were asked to describe the situation and their response, with strategies that were used to overcome the feeling of need frustration or change the situation. (Please see Appendix B, Section 5, to view each complete prompt.)

Baseline Psychological Need Satisfaction at College

The Basic Needs Satisfaction at College Scale (Jenkins-Guarnieri, Vaughan, & Wright, 2015) was designed to focus specifically on college students’ overall psychological need satisfaction. This scale was validated among 541 first-year college students at a large

American research university, with first-generation students constituting 44% of the sample. Jenkins et al. conducted a confirmatory factor analysis and found that items correspond to latent constructs (the three psychological needs) as expected.. The measure contains three subscales for need satisfaction: 4 items on the autonomy subscale (sample item: “I feel like I can pretty much be myself at school”), 5 items on the competence subscale (sample item: “At school, I do not get much chance to show how capable I am”), and 4 items on the relatedness subscale (sample item: “I consider the people I attend [university] with to be my friends”). The autonomy, competence, and relatedness subscales also demonstrated adequate internal consistency (respectively, Cronbach’ alphas were .79, .72, and .80).

An investigation of the BPNSC using pilot study data did not support the assumption of three factors associated with items on each subscale (see Appendix A). My findings in an exploratory factor analysis suggested that the BPNSC appears to capture information about general satisfaction related to experiences with other people in college, satisfaction related to classes, and willingness to endorse dissatisfaction. Given the unexpected performance of the measure, I decided that I would only use it as an overall measure of college satisfaction, cautiously interpreting those findings where I had intended to use the BPNSC to describe satisfaction of three psychological needs. For the overall Basic Psychological Need Satisfaction in College scale, internal consistency was good (Cronbach’s alpha = .83).

Perception of Need-supportive Teacher Practices

Perceptions of teachers’ practices was measured with a list of teacher behaviors created for this specific study and adapted from previous research that has identified practices that support autonomy, competence, and belonging in secondary and

postsecondary classrooms (Patall et al., 2018; Reeve, 2009; Reeve & Jang, 2006, Stroet et al., 2015). Participants used a Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”) to rate their agreement with statements regarding their instructor’s perceived use of autonomy-supportive and controlling practices. For example, “my instructor explains how course assignments are useful for students’ lives” targeted the perception of an autonomy-supportive practice, “My instructor provides activities that are well-matched to my skills” targets competence support, and “My instructor demonstrates that that he or she cares about students in this class” targeted belonging support. Overall, the need support items developed for the current study demonstrated excellent internal consistency (Cronbach’s alpha = .95). Cronbach’s alphas indicated acceptable to good reliability for each subscale designed to measure classroom support for autonomy (.81), competence (.86), and relatedness (.90).

Classroom Agentic Engagement

Studies of agentic engagement have widely used the Agentic Engagement Scale (developed by Reeve & Tseng, 2011; refined in Reeve, 2013), a 5-item measure with 7-point Likert scales to measure students’ level of agreement with statements such as “During class, I ask questions to help me learn” and “I let my teacher know what I need and want.” In samples of high school and undergraduate students, the Agentic Engagement Scale has demonstrated good internal consistency (i.e., Cronbach’s alpha of .85 or greater) and is positively associated with teacher-reported and observer-coded measures of student engagement (Jang et al., 2016; Mameli & Passini, 2017; Matos et al., 2018; Reeve, 2013; Reeve & Lee, 2014).

This study used Mameli and Passini’s (2018) enlarged version of the student agentic engagement scale, comprising the original 5-items as well as 5 additional items

regarding peer interactions such as “During class, it can happen that I introduce new issues or discussion topics” and “I defend my opinions even if they are not in line with those of my classmates.” This enlarged measure was specifically designed to expand agentic engagement from student-teacher interactions to student-peer interactions and class discussions. In their development of the enlarged scale among university students, Mameli and Passini (2018) found that a confirmatory factor analysis suggested a single factor for all items. They also identified similar pattern of associations with achievement and other forms of engagement, and found slightly improved internal consistency for their lengthened scale relative to the original measure. In my primary investigation, Cronbach’s alpha indicated good reliability for the original agentic engagement scale (.90) that slightly increased for the enlarged version of the scale (.93).

Classroom Emotional, Behavioral, and Cognitive Engagement

Although I was primarily interested in agentic engagement as an outcome of teacher practices, agentic engagement has typically been measured as a subscale of the larger Academic Engagement Scale alongside 9 additional items to measure behavioral, emotional, and cognitive engagement (Reeve & Tseng, 2011). I included these subscales in case the other dimensions of engagement might become relevant for supplementary analyses. Thus, participants responded to the full Academic Engagement Scale using a 7-point Likert scale to rate statements such as “When I study for this class, I try to connect what I’m learning with my own experiences” (cognitive engagement), “I pay attention in class” (behavioral engagement), and “I enjoy learning things in this class” (emotional engagement). I investigated the Academic Engagement Scale as part of an exploration of measures using pilot survey data and found evidence for its measurement of four factors in engagement (see Appendix A). In the sample I collected for my primary investigation, each

of the Academic Engagement subscales showed acceptable to good internal consistency; Cronbach's alphas were good for the behavioral (.84), cognitive (.81), and emotional (.93) subscales. Reliability for the overall engagement scale was excellent for both the original version (.93) and the version with additional agentic engagement items (.94).

Attention Check

The survey included a single item designed to serve as an attention check that asked participants to "Please select 1 for this item to show that you are paying attention to the survey." A potential drawback of including this item is that it may have altered participants' approach to the following questions. Schwarz (1999) suggested that survey respondents respond to survey questions as though they are in conversation with the researcher and attempt to infer intentions, so that an attention check may make participants focus more on demonstrating attention than responding naturally to questions; however, other studies have suggested that the incorporation of attention checks does not necessarily reduce data quality (Fung, Kwok, & Brown, 2018). Because I was recruiting my sample from the subject pool, I decided to include an attention check as a useful indicator of participants' conscious effort to provide meaningful responses.

ANALYSIS

In this section I summarize the procedures I used to prepare and analyze the quantitative data to address my first three research questions. I will then discuss how the analysis of qualitative data (to address my fourth research question) involved the development of a coding scheme that was ultimately used to associate participants' responses with various resources and strategies for need satisfaction in college. I further describe steps taken to ensure the trustworthiness of results from the qualitative

investigation. Finally, I outline my approach to integrating findings from the quantitative and qualitative investigations.

Analysis of Quantitative Data

My primary quantitative analyses relied on correlation and multiple regression to test multiple associations among variables with students from the same sample. To be conservative in my willingness to commit a Type 1 error, I set alpha to .01 for all of the statistical tests used in this study. Prior to recruiting participants, I had conducted a power analysis using GPOWER software (Erdfelder, Faul, & Buchner, 1996), focusing on my third research question. Previous studies linking teacher practices to student achievement have reported that teacher practices account for 10% to 20% of the variance in agentic engagement among students (Reeve, 2013). In my power analysis, I assumed that teacher practices would explain 5% of the variance in agentic engagement, and that the full model with covariates for class size, class value, asserted autonomy orientation, and overall need satisfaction would explain 30% of the variance. I set .8 as the acceptable level of power to detect an effect. I obtained an estimated sample size of 200 participants as the minimum necessary to power my third research question. Exceeding this target, all analyses were conducted using data obtained from a final sample of 211 participants.

I used IBM's SPSS software for almost all preliminary and primary analyses of the quantitative data in this study. This included the preparation of data, calculation of descriptive statistics, evaluation of statistical assumptions, and use of correlation or multiple regression to address my first three research questions. I also used MPlus software to compare the fit of two models during the investigation of my first research question.

To prepare the data, I began by screening the responses for eligibility, which (as previously discussed) resulted in the removal of 30 survey responses from participants who

were not first-generation undergraduate students. With a final sample of 212 first-generation students, I reverse coded negatively-worded survey items so that all responses were on a positive scale. I then averaged the responses to all items on each subscale to obtain each participant's overall scores. I also applied numeric codes to categorize responses to certain items (e.g., creating a dummy variable to impose a binary pass/fail of the attention check).

Next, I obtained the range, mean, and standard deviation for all variables to be used in the analysis for my first three research questions. To prepare for the use of correlation and regression, I conducted preliminary analyses of each measure. This included viewing the distributions of scores using histograms and boxplots, which were also used alongside standardized scores to evaluate the presence of outliers for each measure. I further investigated potentially irregular cases by computing diagnostic statistics to examine distance, influence, and leverage (described by Darlington & Hayes, 2017) and conducted sensitivity studies to identify cases' impact on the regression solutions.

I used scatterplots to check for evidence of nonlinearity or nonconstant error variance, obtaining scatterplots of residuals against the levels of each predictor in my regression equations as well as scatterplots of standardized residuals against standardized predicted values. To evaluate potential multicollinearity, I obtained bivariate correlations between predictor variables as well as the Variance Inflation Factors for predictors in each regression model. As a result of this analysis, the three sets of items to evaluate teacher practices for supporting autonomy, competence, and belonging in the classroom were averaged (given their high correlations), creating one overall measure of supportive teacher practices. To assess the independence of observations, I reviewed survey responses to see the course codes that participants provided when asked to focus on a specific class during the latter part of the survey.

My first research question centered on whether interdependent motives for college were similarly associated with first-generation students' asserted or assisted autonomy orientations. To address this question, I obtained correlations between motives, autonomy orientations, and self-construals. I then used a χ^2 test of the difference in associations between interdependent motives and each orientation. To address my second research question, I specified a regression model with three covariates (perceived social class, year of college, and participation in programs for first-generation students) and the two autonomy orientations as predictors of need satisfaction. My third research question asked whether teacher practices predicted increased agentic engagement in the classroom when controlling for students' orientation toward asserted autonomy. For this model, the covariates of overall need satisfaction, class value, and class size were entered alongside asserted autonomy orientation and supportive practices. I also repeated each analysis excluding 16 participants who failed the attention check (although one of these participants was excluded from all analyses based on clear evidence of straight-line response). Because I did not observe major changes to estimates or significance levels during sensitivity studies, I report findings for a full sample of 211 participants in all quantitative analyses.

Analysis of Qualitative Data

My fourth research question about first-generation students' resources and strategies for need satisfaction in college was addressed using all 212 survey participants' responses to open-ended questions. To analyze these data, I borrowed techniques from qualitative methodologies, particularly grounded theory techniques for a systematic approach to identify meaningful concepts or codes in data (Corbin & Strauss, 2008; Glaser & Strauss, 1967) and qualitative approaches to content analysis that support summarizing large datasets after the application of codes (Krippendorff, 2013). In the context of this

study's overarching purpose to understand better first-generation student experiences, the merging of techniques from methodological frameworks complemented my pragmatic stance within an integrative mixed-methods study (a point I discuss later in this chapter). Moreover, although survey data may resist the rich descriptions afforded by interviews or case studies in qualitative research, survey designs can certainly afford the opportunity to "balance lack of depth with a much wider breadth of responses" (Yoo, Schallert, & Svinicki, 2015, pg. 196). Throughout this investigation, I also relied on strategies widely used in qualitative research to enhance the credibility and transferability of my findings as a representation of first-generation students' lived experiences (i.e., trustworthiness, as described by Guba & Lincoln, 1982).

During data collection, I reviewed each participant's responses as they were received and recorded my notes and impressions. I typically focused this effort around three common ways that Richards (2009) described using grounded theory to interrogate narratives: considering the conditional meanings of a phrase or statement, evaluating the consequences of a particular idea or attitude, and identifying the connection between a subjective experience and the strategies a person might employ. Viewing each participant's full responses to the survey, I applied words or short phrases to capture the ideas in each response. As more responses became available, I also separated responses by prompt to generate potential codes (for example, reading all responses to the prompt eliciting salient experiences of relatedness frustration). Throughout the study, I shared responses with members of the coding team and trusted colleagues to discuss my impressions of the data and receive their feedback.

Once all responses were collected, I began to meet regularly with two other researchers who assisted me throughout the development of the coding scheme. After reviewing samples of the responses, we discussed our impressions and refined the coding

scheme by adding and defining codes as needed. Through iterative application of these codes to a sample of the data and constant comparison of the coded responses, we ultimately organized a coding scheme into hierarchical categories based on my research question: how do first generation students describe their resources and strategies for need satisfaction in college? After applying the initial coding scheme to a sample of 50 participants' responses, our team met to discuss and refine the coding scheme and identify common sources of disagreement.

The final coding scheme centered on four categories: features of college life that provided the situation or setting for an experience (e.g., classroom experiences), descriptions of need satisfaction or frustration (e.g., autonomy satisfaction as “freedom to choose”), other people or relationships that were explicitly mentioned as having an impact on motivation or well-being, and strategies or actions taken by students to manage their motivation or well-being. The final codes for each of these categories are presented (along with their definitions and examples from the data) in Appendix C. In qualitative research, “splitting” the data so that a single narrative can be represented with multiple codes has the advantage of capturing nuance within each narrative. I chose this approach because I wanted these codes ultimately to provide a summary of common resources and strategies among first-generation students.

To analyze the data, I applied the coding scheme to all 212 first-generation students' responses to the survey. Another member of the coding team coded 20% of the responses to allow me to examine our agreement. On this subsample of the data, I applied a total of 793 codes and the second coder applied 782 codes. Across all of the codes that I applied, the second coder applied the same code to the data in 87% of all codes. Overall, there were 687 instances of agreement (where we both applied the same code), and 201 instances of disagreement (where one coder applied a code that the other did not). Thus,

across all instances of agreement or disagreement, 77.4% represented an instance of agreement between coders. Throughout the process of coding data, the second coder and I reviewed disagreements and discussed them until reaching a consensus for the final codes applied.

Once final codes were applied, I sorted responses by code to compare categories. I first examined all responses by prompt. I was interested in how experiences of need satisfaction or frustration would correspond to features of college life, relationships, and strategies. I counted responses assigned a given code, reviewed them together, and noted where codes tended to coincide. Next, I turned to viewing relationships across all of the data – who was explicitly described as supporting or thwarting students' sense of well-being in college? I wanted to examine how these relationships intertwined with common situations that first-generation students described as part of their college experience and to describe how students claimed that other people had impacted their motivation. I further compared themes and responses to look for contradictions and commonalities.

My primary goal with the qualitative investigation was to highlight how students were agentic or proactively seeking to support their own psychological need satisfaction. As a result, I examined strategies in the context of different prompts and features of college life and examined how they tended to intertwine with relationships. To analyze how strategies intertwined with relationships, I relied on findings from a process of axial coding. To manage axial coding with this large dataset, I sorted responses to view those that had received each strategy code, then examined those responses where relationships had been explicitly mentioned. Reviewing each response allowed me to create combinations of codes where applicable, such as "reaching out for help to peers" versus "reaching out for help to professors" or "expressing thoughts to resist perceived peer pressure or hostility" versus "expressing thoughts to resist family pressure."

Trustworthiness of Qualitative Findings

Trustworthiness in qualitative research is analogous to validity in quantitative research, as it centers on the credibility of inferences drawn from a systematic investigation. Trustworthiness stems from how accurately qualitative findings represent the reality of a situation from the point of view of participants (Creswell & Miller, 2000; Shenton, 2004). Although the brief and impersonal nature of an online survey represented a major limitation of using qualitative methodology in this study, there were still multiple steps taken to bolster the trustworthiness of my findings.

In qualitative research, reflecting on one's social position relative to the group being studied supports the critical examination of how the researcher's social location influences every aspect of an investigation and carries the risk of misrepresenting participants' lived experiences. As both of my parents are college graduates, I was acutely aware of the need to reflect on my positionality throughout this research. (In Chapter 6, I present a statement of reflexivity that describes my positionality, intentions, and experiences during this project.) Because I considered myself an outsider to the first-generation student experience, it was critical to engage in constant dialogue surrounding my choices in the study and my interpretations of participants' narratives. Thus, throughout the process of analyzing the qualitative data, I engaged in peer debriefing (of the study and my impressions) with first-generation students whom I met through my studies, teaching, and personal relationships. I also frequently debriefed my impressions of the data with research associates, experts in the field, and providers of services for first-generation students at the university.

Collaborating with colleagues in the coding process also provided an opportunity to find instances of agreement or disagreement in our perspectives on the data. Although the coding scheme that we eventually applied to the data necessarily obscured many aspects of the first-generation student experience, the complexity of the scheme (with over 60

unique codes) reflected my efforts to capture context and nuance in the data. After all responses were coded and analyzed, I sought specifically to review the responses for counterexamples or unusual cases that could better represent the range and richness of participants' responses. Ultimately, peer scrutiny of the results obtained will be critical to evaluating this investigation and its findings as one small contribution to understanding the intricacy and diversity of first-generation students' experiences.

Integration of Quantitative and Qualitative Findings

Multimethod or mixed-method studies that incorporate both qualitative and quantitative data originate from diverse paradigms that entail different assumptions about the nature of knowledge, appropriate techniques for inquiry, and the position of research within a wider world of social practices and power relations (Greene, 2006). The justification for a mixed-method approach to research primarily originates in the overarching purpose of a study. However, the mixed-method approach also arises as an answer to “an epistemological problem” (Harrits, 2011, pg. 152): how do methods of inquiry make claims to knowledge? Thus, it is important for mixed-method researchers to state their assumptions about knowledge, the relation between qualitative and quantitative techniques used within an investigation, and how the isolation or integration of methods is reflected throughout the course of conducting research.

In the design of this mixed-methods study, I intended for the quantitative and qualitative results to provide mutual context that might ultimately enhance the value of my study for researchers and educators seeking to support first-generation students' well-being and motivation. Accordingly, my view of the two methods was one of complementarity – in which the research design and interpretation of findings extend equal status to both approaches (Franz, Worrll, & Vögele, 2013). This was rooted in my overarching purpose

to understand better how students' dispositions, college experiences, and agentic effort may serve as resources that ultimately intertwine to influence autonomy, competence, and relatedness. My embrace of mixing and merging philosophical assumptions and their techniques to serve this purpose represented a pragmatic stance that is common in mixed-method research (Onwuegbuzie & Johnson, 2006). Alongside theory, I allowed the strengths of different methodological approaches to guide my choices throughout the study.

A mixed-method approach was also well-suited to my population of interest. Combining methodological approaches can be particularly useful for researchers seeking to understand the experiences of individuals that have historically been underrepresented in psychological research or compared to dominant social groups. For these individuals, questions about psychological processes in the context of larger cultural models or social institutions often raise concerns about the application of theories, measures, or techniques that were originally designed for another population (Karasz & Singelis, 2009). In a discussion of how complementarity can add value beyond quantitative or qualitative studies alone, Harrits (2011) discussed mixed-method designs as a way to generate praxeological knowledge (Bourdieu, 1973). That is, investigation of social phenomena can be approached with a focus on intersubjective meanings, with such focus tending to generate complex and rich descriptions of knowledge. These ways of knowing resist self-questioning as they are grounded in lived experiences. An alternative way to explore phenomena relies on structured and systematic processes designed to promote objectivity and generalizability. Through bringing the findings from objective study into dialogue with subjective experiences or meanings, praxeological knowledge offers a window into how individual experiences are often structured by larger forces, and how social practices ultimately constitute or contradict the patterns observed in quantitative data.

The integration of methods can occur at various stages throughout the research process. Choices about when and how to integrate methods are critical to creating added value in an investigation and promoting the legitimization of its findings (Franz et al., 2013; Greene, 2007; Schoonenboom, 2018). In this study, my research questions led me to integrate methods beginning from the design of my investigation. First, my overarching purpose for this study was intended to draw from both quantitative and qualitative findings, and I drew on both kinds of evidence when reviewing previous research. I also determined that a concurrent design was desirable because the simultaneous collection of quantitative and qualitative data aligned with my goal of using methods to provide mutual context. I analyzed the data separately, although I often viewed participants' quantitative and qualitative responses to the survey together when I wanted to better understand seemingly extreme observations in the quantitative data or find context for the meaning of a passage of text (e.g., "other people who share my ethnic background").

Ultimately, I considered findings from both investigations together in order to provide theoretical and contextual integration during the interpretation and dissemination of results. Integration of these data was guided by three questions: 1) How do the data from both investigations present points of consistency or contradiction? 2) For the quantitative investigation, do the qualitative findings suggest potential shortcomings in the constructs, measures, or methods employed to study first-generation students? 3) Taken as a whole, what practical suggestions and directions for future research emerge from the findings? Thus, in this study the integration of mixed methods focused on finding points of consistency, contradiction, and complementarity between quantitative and qualitative investigations of first-generation students' psychological need satisfaction in college.

Chapter 4: Results

I have organized this chapter to present the findings for each of my research questions. My first three research questions used correlation and regression to examine the associations between autonomy orientations and motives for college, predict overall need satisfaction in college from autonomy orientations, and predict agentic engagement from asserted autonomy and supportive teaching practices. After discussing this quantitative investigation, I present results of the analysis of qualitative data to address my fourth research question about first-generation students' resources and strategies for need satisfaction in college.

THE QUANTITATIVE INVESTIGATION

This section presents my results for quantitative analyses conducted to address my first three research questions. I begin with preliminary analyses to examine descriptive statistics for key variables and check statistical assumptions for the use of correlation and regression. Next, I present results for each of the first three research questions.

Preliminary Analyses

For all measures that used Likert scales, I reverse-coded any negatively-worded item, then computed each participant's overall score for the measure by averaging responses across scale items. I then obtained the range, mean, and standard deviation for all variables used in the quantitative investigation, as displayed in Table 4. The table also presents the original range for Likert scales when a measure comprised multiple items; for these variables, the observed range of scores represents the minimum and maximum scores that I observed after averaging each participants' responses across the items of a particular measure.

Table 4. Descriptive statistics for all variables in the quantitative investigation.

	Range for multi-item scales	Observed Range	Mean	Standard Deviation
Asserted Autonomy Orientation	1 - 7	1.3 - 7	4.76	1.02
Assisted Autonomy Orientation	1 - 7	1.5 - 7	5.26	0.99
Independent Motives for College	1 - 7	1.5 - 7	5.96	0.85
Interdependent Motives for College	1 - 7	1.7 - 7	5.91	1.08
Basic Need Satisfaction in College	1 - 7	2.5 - 6.9	5.01	0.79
Need Supportive Teacher Practices	1 - 7	1.5 - 7	5.43	1.15
Agentic Engagement	1 - 7	1 - 7	4.18	1.43
Class Importance	--	1 - 7	5.39	1.52
Class Size	--	1 - 5	2.41	1.33
Grade Level	--	1 - 4	3.23	0.95
Social Class	--	0 - 9	4.98	1.66

For the measures of assisted autonomy, motives for college, need satisfaction, and supportive teacher practices, means fell above their respective scale midpoints. Means were closer to scale midpoints for both agentic engagement and asserted autonomy. In the survey, when asked to respond to classroom-focused questions, participants were able to select any class in which they were currently enrolled. The average class importance was above the scale midpoint, whereas the average class size was just below the scale midpoint (2.41 on a 5-point scale). As previously discussed, the average year of college for

participants in this sample was 3.23 (equivalent to the first semester of the junior year), and social class was relatively evenly distributed around a mean just above the scale midpoint.

For each variable, I evaluated how scores were distributed on its measure. First, I obtained histograms to view the frequency of responses at each level of a given scale. I also reviewed boxplots for autonomy orientations, college motives, self-construal, overall need satisfaction in college, and agentic engagement. Histograms and boxplots did not reveal any severe non-normality for the measures of asserted autonomy orientation, overall need satisfaction in college, or agentic engagement. However, histograms and boxplots showed that responses tended to fall at the higher end of the scales for assisted autonomy, independent motives, interdependent motives, and need-supportive teacher practices. Given the observed negative skew of distributions for these variables, I needed to evaluate whether responses at the low end of each scale included outliers that could disproportionately impact my estimates of association between variables. Among the variables with negatively skewed distributions, none had more than 7 cases with scores that differed from their mean by more than 2.5 standard deviations when I examined standardized scores. Boxplots revealed a multivariate outlier where a participant used straight-line response across all items. This participant (#141) was excluded from further analyses, reducing total sample size to 211 participants.

Inspection of Irregular Cases

I then followed a series of steps to inspect my data for possibly irregular or overly influential cases. I followed guidelines described by Darlington and Hayes (2017) to evaluate cases' distance, leverage, and influence within each of my two regression models. Distance, or how much an observed valued deviated from the regression line, was evaluated by examining studentized residuals and identifying outliers (i.e., cases where the quotient

of a deleted residual divided by its standard deviation exceeded 2.5). Leverage on regression lines, or the overall extremity of each cases' combination of values on predictors, was evaluated by computing and comparing hat values for each case used in the regression model. These values (the difference in deleted and observed residuals for a case, taken as a proportion of the observed residual) indicate how cases pull the regression line to lower their own residuals. My evaluation of influence (or how much a given case alters the predicted values or coefficient estimates in a regression) focused on identifying large or irregular values on two types of statistics for each case. Cook's Distance, which quantifies total influence, summarized the overall change in predicted values if a case were deleted from the regression model. To examine partial influence, I also examined dfbeta statistics, or how much the inclusion of a given case altered each regression coefficient in the model. Within each regression model, I used these regression diagnostic statistics in combination to identify irregular cases.

For my model predicting overall need satisfaction in college, there were two cases that had extreme studentized deleted residuals. One of these cases had a studentized deleted residual of 2.86, but low leverage or influence. The second case (number 76) had a studentized deleted residual of 4.68. This case also had a Cook's Distance of 0.334, far exceeding other cases (across all cases the mean Cook's Distance was 0.006, with a standard deviation was 0.02), as well as a hat value of 0.09 (the average hat value for cases in the model was 0.03). Compared to case 76, only one case had a more extreme hat value (of 0.12) – overall, individual cases had low leverage in my second model. When I examined dfbeta statistics, they indicated that case 76 was also having relatively high partial influence on the intercept, as well as the regressors for year of college, participation in first-generation student programs, and both autonomy orientations. I noticed that case 76 was among the 20 cases where students had reported participation in programs geared

toward first-generation students' academic integration. Because of their small proportion of the sample (9.4%), most of these cases were in the most extreme (negative and positive) *dfbeta* statistics for the program participation regressor. This highlighted a loss of precision in my estimate of that covariate's effects. Ultimately, my use of regression diagnostics led me to identify three irregular cases that I would examine in a sensitivity study.

Using the same procedure, I evaluated all cases in my model predicting agentic engagement in the classroom. Five cases had studentized deleted residuals with extreme absolute values. One of these cases also had a relatively high Cook's Distance of 0.10 (in this model, the mean Cook's Distance for all cases was 0.006 with a standard deviation of 0.01). One other case was more extreme in its overall influence (Cook's Distance of 0.11) – case number 76, which also had a relatively high hat value (0.10) and relatively high partial influence on the regressors for overall need satisfaction and asserted autonomy. Thus in my model predicting need satisfaction, this case again appeared to be irregular. Overall, I identified six irregular cases.

To examine the impact of irregular cases I had identified for each regression model, I conducted sensitivity studies (re-running each regression model after individual and simultaneous case deletion). All sensitivity studies resulted in only minor changes to coefficients and the same patterns of statistical significance. I also found that removing cases would slightly increase the variance explained by each model. Based on these findings, I retained all cases for the reported results of my regression models.

Evaluation of Statistical Assumptions

For both regression models, I inspected histograms and Normal Q-Q plots of the standardized residuals (see Figures 2 – 5). For the model predicting overall need satisfaction, the histogram demonstrated an identified outlier (case 76) but did not reveal

severe non-normality in the overall distribution of residuals. This was also the case for the Q-Q plot, where I observed an approximately linear relationship between the observed and theoretical normal distributions of residuals. I also did not find any evidence of nonnormality for residuals from the model predicting agentic engagement.

Figure 2. Histogram of standardized residuals for overall need satisfaction in college scores.

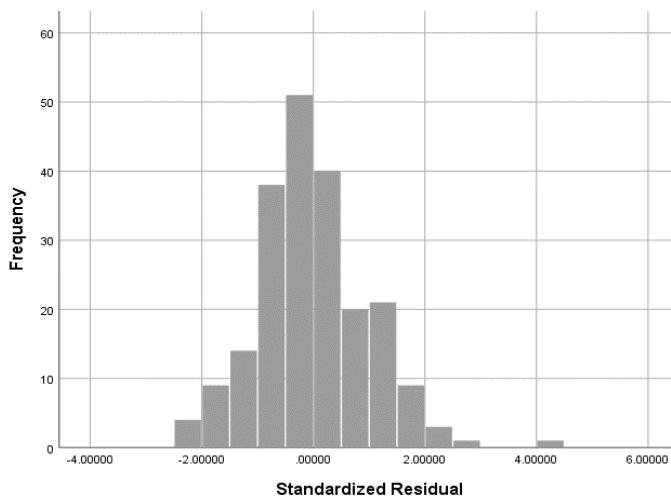


Figure 3. Normal Q-Q plot of overall need satisfaction in college scores.

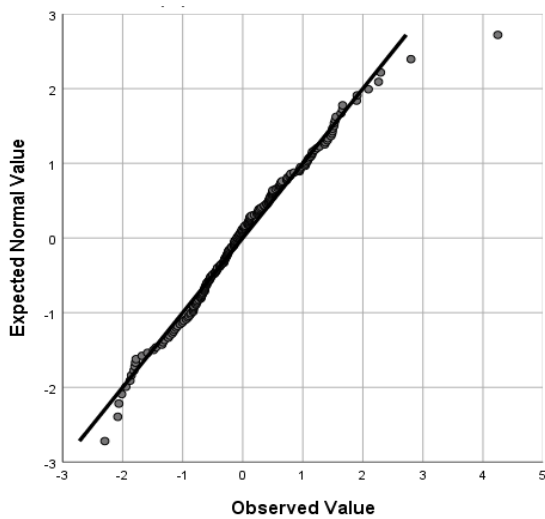


Figure 4. Histogram of standardized residuals for agentic engagement scores.

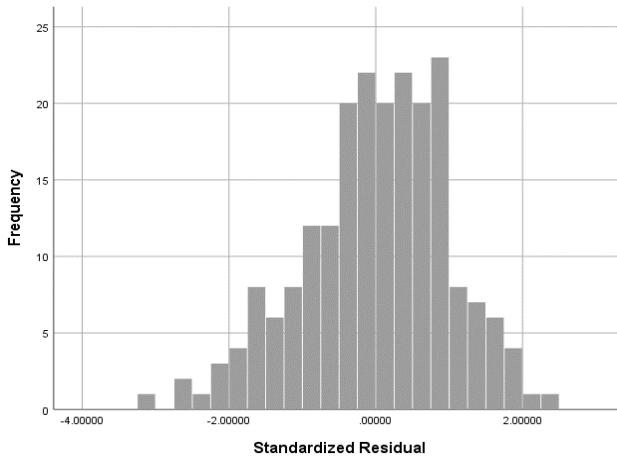
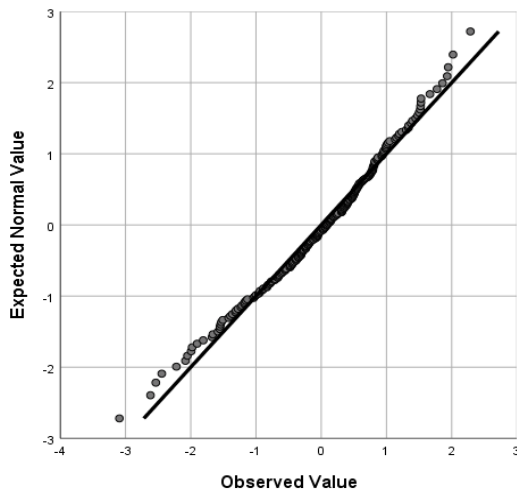


Figure 5. Normal Q-Q plot of standardized residuals for agentic engagement scores.



I also obtained scatterplots to investigate my assumption of linear relationships between predictors and outcomes and homoscedasticity. For each regression model, I obtained scatterplots of residuals against each continuous predictor, adding a line fitted to the mean of residuals across the range of predictor values. When I examined these plots, I did not see evidence of nonlinearity: residuals were distributed around a mean of zero at all predictor levels. When I visually inspected scatterplots of standardized residuals across

the levels of standardized predicted values, I did not see any evidence of severe nonconstant error variance. In other words, across standardized predicted values for overall need satisfaction in college (in the first multiple regression model) and agentic engagement (in the second multiple regression model), residuals showed a similar vertical spread around a mean of zero that was roughly symmetrical.

To address the statistical assumption that there was no multicollinearity among predictors, I calculated bivariate correlations between all independent variables. Tables 5 and 6 present the correlations between independent variables in each regression model.

Table 5. Correlations between predictors of need satisfaction.

	1	2	3	4
1. Asserted Orientation	1			
2. Assisted Orientation	0.52	1		
3. Social Class	0.03	0.21	1	
4. Year of College	0.12	0.09	-0.03	1

Table 6. Correlations between predictors of agentic engagement.

	1	2	3	4	5
1. Overall Satisfaction	1				
2. Class Importance	0.22	1			
3. Class Size	-0.20	-0.20	1		
4. Asserted Orientation	0.30	0.04	-0.09	1	
5. Supportive Practices	0.32	0.36	-0.27	0.14	1

Correlations between independent variables ranged from weak (0.00) to moderate (0.52), but none were stronger than 0.80, a commonly used cutoff value. To assess multicollinearity further, I also examined the Variance Inflation Factor (VIF) for each predictor in each model. The VIF incorporates the squared multiple correlation for

predicting one independent variable from other predictors in the model, with values greater than 10 typically raising concern about violation of the statistical assumption that predictors are not overly correlated. Because none of my predictors exhibited a VIF greater than 1.3, I retained the statistical assumption that predictors were not highly correlated.

Finally, to examine my assumption that observations were independent, I reviewed participants' survey responses to check which class they had selected as the focus of the survey. The majority of course codes listed were unique (120 total cases). In 76 cases, a participant had selected the same course as one or two other participants. Despite survey instructions to focus on a class that was not imposing the subject pool requirement, 16 participants did list the same course number for an educational psychology class. According to the subject pool prescreen results, 766 participants in the subject pool were enrolled in this course across seven sections taught by three different instructors in Fall 2018. In retrospect, requesting that participants provide a unique number for the course (rather than the general course code) would have allowed better diagnosis of whether these 16 observations were from students in the same class. However, because these cases were a relatively small percentage of the overall sample (7.5%), I decided to retain their data. When I conducted a sensitivity study, retaining or excluding these cases did not appear to influence the standard errors or significance levels in the model predicting classroom agentic engagement.

PRIMARY ANALYSES

The primary analyses in this study included a test of equal fit for dependent correlations to address my first research question, as well as two multiple regression models to address my second and third research questions (that focused respectively on predicting the outcomes of overall satisfaction in college and agentic engagement). To

improve the interpretability of findings from multiple regression, I also standardized all variables used in these analyses except the dichotomous variable for participation in programs for first-generation students. As previously discussed, I used an adjusted significance level ($\alpha = .01$) for all statistical tests to address my research questions.

Research Question 1

I used a test of equal fit for dependent correlations to address my first research question, *among first-generation students, are orientations toward asserted or assisted autonomy satisfaction differently associated with the endorsement of interdependent motives for attending college?* First, I obtained bivariate correlations between each type of motives and autonomy orientations. I also obtained correlations for these variables with independent and interdependent self-construal, as previous research has suggested that differences in students' motives for college or autonomy orientations may be associated with views of the self as independent or interdependent. Table 7 presents these correlations.

Table 7. Correlations between motives for college, autonomy orientations, and self-construal.

	1	2	3	4	5	6
1. Independent Motives	1.00					
2. Interdependent Motives	0.47*	1.00				
3. Asserted Orientation	0.40*	0.29*	1.00			
4. Assisted Orientation	0.36*	0.20*	0.52*	1.00		
5. Independent Self-Construal	0.18*	0.25*	0.53*	0.48*	1.00	
6. Interdependent Self-Construal	0.09	0.21*	0.14	0.18*	0.06	1.00

*Correlation is significant at the 0.01 level (2-tailed).

In my sample of first-generation college students, asserted autonomy orientation was significantly, positively associated with both independent motives for college ($r=0.40$, $p < .01$) and interdependent motives for college ($r=0.29$, $p < .01$). Assisted autonomy orientation was also significantly associated with both independent motives for college ($r=0.36$, $p < .01$) and interdependent motives for college ($r=0.20$, $p < .01$).

To address my research question, I investigated whether the two autonomy orientations were differently associated with interdependent motives for college. I followed a procedure for assessing the equal-fit hypothesis for dependent correlations (Kline, 2011). Using MPlus software, I estimated one model where assisted autonomy orientation, asserted autonomy orientation, and interdependent motives were all correlated, but constrained the association between orientations and interdependent motives to be equal. Thus, the constrained model estimated five parameters (three variances for the variables, the correlation between the two autonomy orientations, and one correlation for the association between orientations and interdependent motives). With this equality constraint in place, I obtained an estimate of model fit ($\chi^2 = 1.76$, $df=1$). I then released the constraint, specifying a new model that freely estimated the associations between each type of orientation and interdependent motives ($\chi^2 = 0$, $df=0$). When I tested the difference between these estimates of model fit ($\chi^2_{diff} = 1.76$, $df_{diff} = 1$), they did not exceed the critical value for a significant difference under the χ^2 distribution ($\alpha = 0.01$, $df=1$, $\chi^2_{critical} = 6.635$). I retained the null hypothesis that there was no difference in the correlations between interdependent motives and either autonomy orientation.

I further examined the correlations between types of motives, self-construals, and orientations in this sample of first-generation students. As discussed in my literature review, previous research has suggested that first-generation students are more likely than continuing-generation students to have interdependent motives for college because they

are more likely to come from cultural backgrounds that foster an interdependent self-construal. I found that among first-generation students, interdependent motives for attending college were positively associated with both independent ($r=0.25$, $p < .01$) and interdependent ($r=0.21$, $p < .01$) self-construals. However, independent motives for attending college were only significantly associated with independent self-construal ($r=0.18$, $p < .01$).

In research with the general population, interdependent self-construal was linked to an orientation toward assisted autonomy whereas independent self-construal was linked to an orientation toward asserted autonomy. In my sample of first-generation students, independent self-construal demonstrated a significant, moderate positive association with both orientations toward asserted ($r=0.53$, $p < .01$) and assisted ($r=0.48$, $p < .01$) autonomy satisfaction. However, interdependent self-construal was only significantly associated with assisted autonomy orientation ($r=0.18$, $p < .01$), and this association was relatively weak.

In this sample of first-generation students, I found no evidence to suggest that their motives for college were differently associated with their disposition toward obtaining autonomy satisfaction (by asserting their individual desires and disrupting the status quo, or by relying on relationships and supportive environments). Each type of autonomy orientation, self-construal, and motives for college could be endorsed to some degree by each participant. I found that independent self-construal was positively, weakly associated with both types of motives for college and demonstrated a moderate, positive association with each autonomy orientation. However, interdependent self-construal was only associated with interdependent motives for college and assisted autonomy orientation.

Research Question 2

Multiple regression was used to address my second research question: *among first-generation students, do asserted and assisted autonomy orientations predict increased overall need satisfaction at college?* To predict overall need satisfaction in college, I specified a regression model with three covariates (perceived social class, year of college, and participation in programs for first-generation students) and the two (asserted and assisted) autonomy orientations as the predictors of interest. I hypothesized that both autonomy orientations would predict a positive increase in need satisfaction in college when controlling for social class, years of college, and participation in programs for first-generation students. Table 8 presents the coefficients obtained for this regression model.

Table 8. Regression model predicting overall need satisfaction in college.

	B	Std. Error	Beta	t	Sig.	Lower 99% C.I.	Upper 99% C.I.
(Constant)	0.013	0.062		0.211	0.833	-0.148	0.174
Social Class	0.087	0.061	0.087	1.426	0.156	-1.072	0.246
Year of College	0.027	0.060	0.027	0.449	0.654	-0.128	0.182
FGS programs	-0.138	0.202	-0.041	-0.684	0.495	-0.663	0.387
Asserted Orientation	0.025	0.069	0.025	0.362	0.718	-0.154	0.204
Assisted Orientation	0.489	0.070	0.489	6.966	0.000	0.307	0.709

The five predictors explained 28% of the variance in overall need satisfaction in college ($R^2 = 0.282$, $F(5, 205) = 16.13$, $p < .01$). The only significant predictor of overall need satisfaction in college was assisted autonomy orientation ($\beta = 0.49$, $p < .01$). The 99% confidence interval for the unstandardized estimate of assisted orientation did not contain zero (0.31 – 0.71), providing support for rejecting the null hypothesis that assisted

orientation had no relationship with overall need satisfaction. However, I did not find evidence for an effect of asserted autonomy orientation on overall need satisfaction, given the nonsignificant estimate of the effect and a 99% confidence interval that contained zero (-0.154 – 0.204). In my sample, a relatively low percentage (9.4%) of participants reported participation in programs geared toward the academic integration of first-generation students. When participation in these programs was included in the model as a dichotomous predictor of need satisfaction, the effect was nonsignificant. I also found that perceived social class and year in college did not significantly predict overall need satisfaction.

Although the overall test of this model indicated that the predictors explained a significant amount of variance in overall need satisfaction in college, I only found evidence for a positive association between asserted autonomy orientation and need satisfaction. Perceived social class, year of college, and participation in programs for first-generation students did not explain significant variability in the outcome. Asserted autonomy orientation was also a nonsignificant predictor, which contradicted my hypothesis that both autonomy orientations would be linked to greater psychological need satisfaction at university for first-generation college students.

Research Question 3

I used multiple regression to predict participants' agentic engagement in the classroom. to address my third research question, among first generation students, does the perception of need-supportive teaching practices predict increased agentic engagement in the college classroom when controlling for orientation toward asserted autonomy? I hypothesized that students' asserted autonomy orientation and perceived use of supportive teaching practices in the classroom would both predict increased agentic engagement. This hypothesis was based on the idea that a trait-level disposition toward asserted autonomy

and perceived environmental support from the teacher may both contribute to students' efforts to shape their learning environment. My predictive model also included overall need satisfaction, class value, and class size as covariates. Table 9 presents the findings.

Table 9. Regression model predicting agentic engagement in class.

	B	Std. Error	Beta	t	Sig.	Lower 99% C.I.	Upper 99% C.I.
(Constant)	-4.49E-16	0.052			0.000	-0.136	0.136
Overall Satisfaction	-0.027	0.058	-0.027	-0.471	0.638	-0.177	0.123
Class Importance	0.055	0.057	0.055	0.966	0.335	-0.093	0.202
Class Size	-0.261	0.055	-0.261	-4.729	0.000	-0.404	-0.117
Asserted Orientation	0.245	0.055	0.245	4.495	0.000	0.103	0.387
Supportive Practices	0.443	0.059	0.443	7.517	0.000	0.290	0.597

Overall need satisfaction at college, class importance, class size, asserted orientation, and supportive practices explained 44% of the variance in classroom agentic engagement ($R^2 = 0.438$, $F(5, 205) = 32.018$, $p < .01$). Agentic engagement was predicted by both greater perceived use of supportive teaching practices ($\beta = 0.44$, $p < .01$) and higher levels of asserted autonomy orientation ($\beta = 0.25$, $p < .01$). The 99% confidence intervals for asserted orientation (0.10 – 0.39) and supportive practices (0.29 – 0.60) also did not contain zero, providing further support to reject the null hypothesis that they were not associated with agentic engagement. Although I did not find evidence that overall college need satisfaction nor the personal importance of a class were related to agentic engagement, I did find that agentic engagement was predicted to decrease with class size ($\beta = -0.26$, $p < .01$; 99% confidence interval bounded by -0.40 and -0.12).

Overall, this model explained a moderate amount of the variance in agentic engagement using five factors: college need satisfaction, class importance, class size,

asserted autonomy orientation, and supportive practices. Multiple regression results supported my hypothesis that students' asserted autonomy orientation and teachers' supportive classroom practices are both positively associated with greater agentic engagement among first-generation students. Agentic engagement was also found to decrease as students perceived larger class size. I did not find evidence that agentic engagement was associated with two covariates, overall satisfaction in college and class importance.

THE QUALITATIVE INVESTIGATION (RESEARCH QUESTION 4)

The qualitative investigation aimed to address my fourth research question, how do first-generation students describe their resources and strategies for need satisfaction in college? Guided by this question, I analyzed participants' narratives of need satisfaction and frustration that were collected through open-ended survey questions. In this section, I describe themes that were commonly represented in participants' narratives about each of the psychological needs for autonomy, competence, and relatedness. These results represent a broad view of how first-generation students used resources and strategies for need satisfaction in college. To represent more fully the range and richness of participants' narratives, unusual or contradictory cases are incorporated throughout these findings.

When participants described salient experiences of need satisfaction or frustration, certain features of college life typically provided context for responses to the various prompts centered on autonomy, competence, or relatedness. Relationships also intertwined with the satisfaction and frustration in different features of college life, as well as with the strategies that first-generation students used to manage their motivation. Appendix D presents tables with the proportions of participants who described each strategy in response to a given prompt. I have organized my findings surrounding these processes around the

three psychological needs for autonomy, competence, and relatedness. Next, I address how other people were salient influences on need satisfaction or frustration across all three psychological needs. Ultimately, I provide a summary of the qualitative findings.

Autonomy

First-generation students' experiences of autonomy satisfaction tended to focus on freedom to choose when managing daily life as an emerging adult or making choices about the majors and coursework they would pursue. This finding was mirrored by responses to the autonomy frustration prompt, which commonly described perceived obligation to meet academic requirements and the resistance of social pressure. I also present findings regarding students' most common strategies for autonomy satisfaction and frustration across the various features of college life described by their narratives.

Satisfaction with freedom to choose in adulthood and paths of study.

Half of all participants (50.4%) described a sense of freedom to choose when they discussed a salient experience of autonomy satisfaction. Freedom to choose was often intertwined with discussion of how a choice reflected their values or interests. An additional 36 participants (17%) described an experience during which they felt enjoyment or intrinsic interest in their activities without referring to choices or decision-making. When asked to describe a salient experience of autonomy satisfaction in college, nearly a quarter (24%) of participants discussed selecting a major or planning their coursework. Among those students who described their path of study as a source of freedom to choose, more than half described resisting perceived pressure from family members. Adult freedom and responsibility were another major resource for autonomy satisfaction: 19% of participants described how managing their everyday lives was a major source of satisfaction because

they felt in control. This feeling typically centered on a sense of freedom to choose or pride in the personal accomplishment of managing their tasks. For example, one participant “felt a lot of power” while grocery shopping for the first time without his parents, one felt “pride and motivation” in managing his schedule, and another enjoyed “the ability to do what I wanted freely and fix my problem on my own” when she felt stressed about managing her coursework alongside other responsibilities.

A similar proportion of students (19%) identified extracurricular activities and student organizations as the context for autonomy satisfaction. For these students, autonomy satisfaction was typically described as a feeling of intrinsic interest and enjoyment, although this often intertwined with freedom to choose or a sense of relevance to their future goals. Supportive peers were typically a feature of these stories. Only 10% of participants' responses focused on classroom experiences that provided autonomy satisfaction, coinciding with descriptions of intrinsic interest and enjoyment, freedom to choose, relevance to personal goals, and excitement about challenge, growth, or learning. The only other code applied to more than 5% of responses was work or career development (in 6.6% of autonomy satisfaction narratives).

Although the broad themes of autonomy satisfaction emphasized freedom to choose and personal interests, moments of contradiction in the data add depth to understanding first-generation students' experiences. For example, one participant rejected the premise of the autonomy satisfaction prompt. (Note that in all excerpts, I present participants' words exactly as they were typed into the online survey.)

It's not exactly possible to be doing something COMPLETELY autonomously or not, because even when we are making decisions for our future, they almost never are made without thinking of what expectations are had of you by society, family, etc.

The participant proceeded to describe how he had decided to apply to a job on campus without consulting his parents or friends, but that he still considered whether they would support his choice. His experience demonstrates how internalized expectations from important others can be a salient influence on decisions, even when choices are seemingly made alone.

Moreover, one participant's response to the question about autonomy satisfaction highlights the shortcoming of assuming that freedom to choose necessarily supports a sense of well-being:

I think that, as a first-generation student, I was given autonomy the moment I left my family. I don't think the autonomy was a good thing as I struggled to find my interests and felt a little lost. I found myself thinking the "grass is greener on the other side" in regards to young adults whose parents have a sort of set out plan for them. Even if I was to break free from the plan my parents would have set out for me, I believe I would have been better off with some sort of plan. Having autonomy can be scary.

This response highlights how a sense of personal control is not always satisfying in itself. In this study, the freedom to choose was satisfying for students who often felt that they were expressing their personal interests or values. However, this implies a sense of competence: that one has the necessary knowledge of one's interests and the ability to evaluate the consequences of choosing. This participant's counterexample illustrates the danger of assuming that parental expectations or pressure in college are necessarily threatening to first-generation students' motivation. In the absence of parental guidance, the freedom to choose can be overwhelming.

Frustrating obligations from academic requirements and close others.

The greatest proportion of experiences of autonomy frustration centered on difficulty with academic requirements (17.9% of all responses, or 38 participants).

Frustration was commonly described as a lack of choice, typically regarding required coursework that was deemed uninteresting or irrelevant. This was exemplified by the participant who succinctly described autonomy frustration as “taking classes I didn't enjoy because someone decided I need to know something to be a good mechanical engineer.” Other participants describing frustration with academic requirements expressed feeling anxious or incompetent as they struggled to maintain their GPA or keep financial aid.

A sense of resignation to academic requirements tended to permeate participants' discussion of strategies used to counter their autonomy frustration. For example, one participant wrote that putting effort toward uninteresting classes was “just part of being a disciplined student,” whereas another said “I have no choice but to take the required classes and complete the necessary assignments to ultimately reach my goal of earning a degree.” When participants described using strategies, they typically focused on adjusting their efforts or beliefs to accommodate the situation (e.g., “I try to think of it as expanding my knowledge in all areas and making me more knowledgeable in general to help me later in my career”). The next most commonly used strategy was simple acceptance, as the participant who wrote “I usually end up telling myself, ‘just X more weeks of this and then I'm done.’”

An additional 31 students (14.6%) described classroom experiences when discussing autonomy frustration. Of these classroom experiences, nine focused on a sense of obligation or lack of interest in a particular class, ten mentioned experiencing failure or doubting their ability to succeed, and six described feeling isolated in class or struggling with an inability to relate to classmates. Leisure time and socializing were the focus of 13% of participants' narratives of autonomy frustration, typically in stories that centered on peer pressure to attend parties or drink alcohol. When discussing autonomy frustration, 9.4% of all participants described perceived pressure to follow certain paths of study.

When autonomy frustration intertwined with relationships, peers (in 36 responses) and family members (in 34 responses) were the most typical others described as introducing a sense of outside pressure. Although almost all peer pressure stories centered on socializing or collaborative efforts in class, pressure from family members (usually parents) was mentioned across a variety of situations. Among the 20 participants describing pressure to choose a path of study, 12 of them mentioned parents (e.g., “My choice was psychology, but my mom was against it because she did not believe that it would be useful or make good money in the future”). Yet, various other features of college life were associated with the pressure to choose activities based on parental expectations, including work and career development (e.g., “my mother guilted me into not accepting the job”), distance from home (“my stepfather wanted me to phone home every day and visit every two weeks”), and academic requirements (e.g., “I had to make good grades in classes I did not like or have interest in because my family and peers would not support me otherwise”).

The interweaving of parental pressure throughout stories of autonomy frustration also points to the value of considering unusual cases. Mentions of parent or family support were not typical in the context of any particular survey prompt or strategy described by students, but they were often represented once or twice in the narratives regarding each feature of college life. During the transition to college, “reassurance and motivation from my parents” helped one student to “keep going” after failing most of her classes in the first semester. Many students described seeking guidance or comfort through conversations with parents when struggling with academic requirements, choosing a major, or difficulties in daily life. Parents supported adult freedom and academic achievement with their assistance (e.g., “giving me a car for me to use” or “I did what my mother told me to do and I took everything one task at a time”).

Moreover, family members occasionally entered students' narratives of satisfaction as a driver of motivation to succeed without explicitly being identified as supporters. For example, one student wrote, "When I received my final grades at the end of my first semester, I realized that I actually might be able to obtain a good job in the future to help support my family." Another student reported how this motivation contributed to a spontaneous moment autonomy satisfaction "after pulling an all-nighter in the library." She wrote, "I looked up and realized that I am not just studying on behalf of myself, but I was studying to help benefit my loved ones in the future." Thus, although family pressure was a common source of autonomy frustration, occasional narratives highlighted how relationships with family also supported need satisfaction.

Autonomy strategies: accommodating situations or affirming integrity.

In response to experiences of autonomy frustration, three of the four most commonly-mentioned strategies were unlikely to alter a frustrating environment: acceptance (in 25.9% of narratives), adjustment of beliefs or effort to accommodate the situation (16.9%), or avoidance (13.2%). As previously discussed, students who used these strategies often voiced a sense of resignation in the face of frustrating academic requirements. Acceptance was also a typical response to peer pressure to participate in social events and drinking (e.g., "I usually say yes because I am afraid of being looked at like a 'party pooper'" or "I didn't have a good excuse not to go, so I went").

However, almost a quarter (23.9%) of participants described responding to moments of autonomy frustration through affirming their personal integrity, often in a way that they believed was resistant to others' expectations. This strategy of intentional self-acceptance was also the most frequently mentioned strategy in narratives of autonomy satisfaction. In 16 cases, this strategy coincided with expressing thoughts to peers or

parents who were perceived as the source of pressure or frustration. A total of 12 participants described actively countering peers (e.g., “I changed the situation by still being true to myself and refusing to drink a lot... I’ve learned to say no”). Resistance to expectations intertwined with four descriptions of expressing thoughts and emotions to parents, exemplified by the narrative of a student whose mother pressured her path of study:

For my first year of college, my mother wanted me to be a nurse. She pressured me many times to be in the career field even when I told her I did not want to. It was easier talking to her about how I felt since it was over the phone rather in person. Eventually I told her what I actually wanted to do and what degree I had chose. I was able to speak up for once and give my opinion on my life.

Yet, in most cases (37 responses), resistance to parent or peer expectations did not involve direct conversations. In general, expressing thoughts and emotions tended to be a way to seek emotional support from people other than those who contributed to a sense of frustration or pressure. Thus, in most cases of affirming integrity and resistance, students simply described embracing their values or interests despite perceived pressure to change. For example, one participant wrote that she felt autonomy frustration intertwine with her identity as a Black woman:

when I dress "urban" or "edgy" to classes with predominantly white kids and white professors. My appearance seems to be the most eye-catching. I still do what I want though and dress how I want. :)

Just as this participants’ sense of frustration with the situation did not immediately undermine her intention to act with autonomy, many participants intentionally persisted in acting in accord with their interests and values despite concern about others’ expectations. For example, students who were frustrated with a path of study that their parents promoted sometimes decided to change their major anyway. As a student who left his pre-med major

described: “I decided that I had to do what was best for me. That's how I overcame the feeling of being a disappointment.”

Competence

Participants’ responses to the competence satisfaction and frustration prompts shared an emphasis on classrooms and belonging. Thus I present the findings for both competence prompts together, then discuss the typical strategies for competence across all features of college life.

Satisfaction and frustration in classrooms intertwined with belonging.

Perhaps unsurprisingly, these college students’ responses to the competence satisfaction prompt tended to focus on students' experiences in specific classes (43.9% of participants) or on exceeding general academic requirements such as a certain semester GPA or receiving academic honors (23.6%). When students described competence in the classroom, they often described a sense of forward-looking self-efficacy, or a belief that they could succeed (68 participants). This sense of self-efficacy often involved descriptions of being knowledgeable and prepared (e.g., “I had so much knowledge about the material already so I was confident that I would be able to succeed”). Supportive professors were represented in 14 of these responses, and often warmth of the teacher was intertwined with descriptions of scaffolding. For example, one freshman chemistry student wrote that he felt confident in organic chemistry because the “professor was extremely kind and supportive. The material was difficult, but he told us how to achieve success in his course. He treated every student respectfully and equally.”

In a similar number of narratives about competence satisfaction, participants described pride in their effort or ability after receiving satisfying grades (63 participants).

Confidence for the future and pride in accomplishment also occasionally coincided in the same response:

Coming in, I was nervous because academics here are known to be so rigorous. However, after making my first good test grade I finally began to believe I was capable of achieving my goals.

As in this narrative, autonomy was intertwined with competence satisfaction when participants discussed how academic achievement was complemented by interest in course material or relevance to future goals. Other common themes of classroom competence satisfaction included receiving encouragement or assistance from peers (19 participants) or instructors (14 participants). In contrast, competence satisfaction with academic requirements almost always described pride in a past accomplishment (43 of 50 participants), with fewer mentions of confidence regarding future performance (9 participants). The next two most commonly mentioned places for senses of accomplishment or confidence in personal ability were the workplace (18 participants) and extracurricular activities (14 participants).

The majority (60.4%) of participants focused on experiences from a specific class when describing competence frustration. Half of these experiences focused on themes of low self-efficacy while struggling with coursework and feeling an inability to succeed (67 participants), whereas a mostly non-overlapping group of the same size (63 participants) discussed feeling bad after receiving a poor grade or negative evaluation. Whether participants described a lack of confidence or disappointment after failure, a common theme (in 18% of classroom stories) centered on feelings of not belonging due to negatively evaluating personal ability in comparison to peers (e.g., “I felt like everyone else was better than me and didn't really feel like I fit in”). Often these comparisons highlighted perceived differences in their identities or social backgrounds. For example, one student who had

delayed his entrance to college wrote, “I felt as if I had to work 4 times as hard to keep up with the students who were younger and had more resources than I did.” A film major wrote that he felt incompetent trying to operate expensive equipment in his upper division classes. He felt frustrated that “students who had more money were able to have access to this equipment in their own life, while my only access was through education.” He described spending hours working with the equipment after class to catch up with his peers, an example of adjusting effort.

In their narratives of classrooms, students often described that competence frustration undermined belonging. This finding was mirrored across the entire sample of narratives regarding competence frustration: 40 participants' (18.9%) descriptions of low self-efficacy or failure intertwined with mentions of relatedness, fearing they would disappoint family and friends, or concerned that they did not belong at the university. The most common strategies mentioned when discussing competence frustration in the classroom were adjusting effort (57 participants) or seeking help (31 participants). Of those participants who described seeking help from a specific person in a frustrating classroom experience, half approached their instructor (11 participants). Half approached their peers (10 participants), as in the following example:

I took a biochemistry where the majority of the class were Asian and White. There was a particular topic that I was having a hard time to understand, but it seemed like the others were understanding. So it felt a little intimidating as a black student. I decided to swallow my pride and ask for help from other students to get a different explanation from the professor's explanation. It helped quite a lot and I was glad I made the decision to not suffer in silence.

This narrative exemplified the common competence frustration themes of classroom learning, comparison to peers, feeling isolated based on one's identity or social background, and help seeking to restore competence satisfaction.

Although it was unusual for competence narratives to focus on struggles outside of academics, worries about personal ability also arose in other situations: at the workplace (13 participants), during extracurricular activities (2 participants), when applying for financial aid (2 participants), and a handful of other situations. The workplace and extracurriculars respectively formed the context for 8.5% and 6.6% of all narratives. Nonetheless, learning to manage the demands of college courses was the overriding theme when the first-generation students in this study described salient experiences with competence satisfaction and frustration.

Competence strategies: adjusting effort and connecting with others.

The typical strategies for competence in stories about the classroom were also the most commonly described strategies across all competence frustration narratives: 39% of participants described adjusting their effort or beliefs, and 20% described seeking help. The next most common strategy in response to competence frustration was avoidance: 12% of participants described dropping a class or ceasing to put effort toward projects when they felt incompetent. Students who used the strategy of affirming integrity in response to competence frustration (8.5%) typically echoed the themes of belonging at university and differences in social background or identity. One Mexican-American student wrote that his feeling of incompetence was “reinforced in a prominent white setting” at the university, and that he was “constantly trying to fight this negative thought by reminding myself that I belong here.” As another example, one 21-year-old history major wrote that competence frustration felt like “not belonging” when her classmates talked about their grades. She wrote, “I made myself process the fact that I go to school full time and work full time to support my family.”

Stories of competence satisfaction also contained descriptions of strategies that students proactively used to boost their confidence. In these narratives, the proportion of participants who adjusted effort or beliefs (12.7%) was followed by supporting others (6.7%) then seeking help (5.6%). Supporting others typically involved tutoring peers. One participant wrote that she tutored other students on the material in courses for her major because “being able to help others makes me feel that I am in the right place.” An undergraduate research assistant in a psychology lab described competence satisfaction through mentoring his peers and answering their questions: “due to this that I realized that I do know what I am doing and I have come a long way.”

Relatedness

At a large university, diverse student organizations provided the context for many satisfying experiences of belonging among peers, although leisure time and classrooms were also commonly mentioned. In contrast, relatedness frustration tended to center on negative evaluation of ability relative to classmates, or a painful awareness of underrepresentation that challenged students’ sense of connection to the broader university community. Across all features of college life, reaching out for new relationships with peers was the most common strategy to boost relatedness. However, first-generation students also commonly described staying separate from their peers – a process which sometimes involved self-acceptance, but also commonly reflected the acceptance of feeling disconnected.

Satisfying peer interactions in organizations, leisure, and classrooms.

Narratives of relatedness satisfaction most frequently focused on stories about participating in student organizations or extracurricular activities (78 participants, 36.8%).

Peer support was the overriding theme of these narratives, mentioned in 61 out of the 78 responses. Common themes were that spending time in student organizations helped students feel warmth and mutual regard with peers (41 participants), simply feel satisfied at being part of a group (26 participants), enjoy a sense of shared understanding or interests (19 participants), or connect with those who shared their social identity (18 participants).

These were stories of participation in spirit groups, fraternities and sororities, hobby organizations, and societies for students with shared majors or cultural backgrounds (including faith, race/ethnicity, heritage language, or first-generation status). A rich variety of organizations were represented in the data, with students bonding with others around such wide-ranging topics as passion for accounting, enjoyment of “an esoteric sport,” shared origins in Hong Kong, or attending college after age 25. In an organization for Vietnamese students, a student wrote that she “realized the existence of my cultural identity and felt kinship with people.” In a group for Hispanic business students, a participant felt satisfied to be around “many people that looked like me and acted like me and had the same background.” A Catholic student wrote that his church group helped him feel at home “because every mass has the same traditions and readings.”

On a large university campus, the variety of student organizations afforded feelings of belonging and a “home away from home” (an exact phrase used by four different participants). This bonding over shared values or interests created a rich illustration of how autonomy and belonging were intertwined. As observed in the narratives of competence, belonging was also intertwined with feelings about personal ability:

Being in an organization with people that have similar backgrounds and having pushed through the struggles of being a first generation student really made me feel like I could succeed and that I am not alone in this university.

Many stories of relatedness satisfaction also focused on leisure time and socializing (48 participants, 22.6%) in which almost every response mentioned supportive peers (46 participants) who provided a sense of warmth and mutual regard or common understanding.

Finally, 28 participants (13.2%) discussed classroom experiences as a source of relatedness satisfaction. Supportive peers were mentioned in 20 of these responses, and supportive instructors in five responses. In the classroom, relatedness satisfaction was often described as a sense of common understanding and shared experience. Shared experiences could satisfy relatedness whether they were based on prior history (e.g., classmates who “grew up almost the same way which was learning Spanish at home through family”), positive in-class experiences (e.g., “we would have genuine conversations”) and collaboration (“we were all talking and helping each other and relating to each other”), and even shared difficulty or failure (e.g., “the feeling that I’m not alone in my struggles helps me to not lose hope”). Several participants described feeling a sense of warmth and closeness toward their classmates, and in six cases, participants discussed feeling connected to classmates with a common social identity (e.g., “As a Latina on campus, sometimes it can feel isolating but this class felt like home, like I was among family” in a Latinx Psychology course). Strategies that tended to coincide with relatedness satisfaction included reaching out to new people to try to spark relationships (41 participants), expressing thoughts and emotions (typically to peers, 29 participants), and satisfaction in collaborating with others toward a shared goal (20 participants).

Frustration with perceived differences in ability and background.

When asked to recall a moment where they felt the opposite of relatedness, 59 participants (27.8%) described classroom experiences. Common themes included a sense

of isolation from classmates (described by 41 participants), which typically intertwined with descriptions of anxiety about performance relative to peers (19 participants). Supportive peers were mentioned in 14 of participants' narratives of relatedness frustration, typically as classmates who became friends after reaching out, or as the targets of help seeking when students were concerned about their performance. An additional 10 participants described feeling an inability to relate to the experiences of their classmates.

These stories of an inability to relate in the classroom typically focused on perceived differences in backgrounds and social identity. For example, one student wrote that he was “one of two Black kids” in an upper-division course for his major, and that the small number of other Black students in his college was “alienating... I’ve never felt much relatedness in my classes.”

Although social identity was only in 10 of the 59 classroom relatedness frustration narratives, it was similarly represented in stories of the transition to college or narratives about the broader campus community. Across all relatedness frustration responses, 38 participants (17.9%) mentioned that their membership in an underrepresented racial/ethnic group contributed to a sense of dissatisfaction, which was often described as feeling isolated or unable to relate to their peers. One participant wrote

Going to a PWI and sometimes having the experience of being the only Black person in the room becomes overwhelming. It's hard to relate and connect to people who don't understand me, my history, or my culture. Representation matters and seeing people who look like me on a daily basis is something I do not have the pleasure of doing.

Feelings of isolation and distance also coincided with other aspects of students' identity, including their first-generation status and family income. One student described how when her economics professor used an anonymous survey to graph family income in the class, she saw her own data as an outlier:

90 percent of the class had family incomes of \$150,000 or more and mine was at like \$30,000 and I felt like this was not a university for me and I was not supposed to be here.

These themes were similarly represented in the narratives of 40 participants who discussed relatedness frustration in the context of the broader campus community. Similar to their role in the classroom stories, frustration with peers on campus was more typically due to comparison (14 participants) rather than outright disagreement, rejection, or hostility (6 participants).

The most common response to relatedness frustration with the broader campus community was intentional self-acceptance or resisting expectations (11 participants), followed by simply reaching out to a new person or organization (7 participants). A total of 29 participants (13.7%) focused their stories of relatedness frustration on the transition to college, describing feelings of isolation (23 participants) or difficulty as members of underrepresented racial/ethnic groups in a predominately white institution (6 participants). Finally, roughly 11% of responses focused on leisure time or extracurricular activities and student organizations as the context for relatedness frustration. Reaching out to try to start new relationships, avoidance, or leaving a person/group for a better fit were all strategies that students used to counteract frustration in these situations.

Relatedness strategies: reaching out or staying separate.

In narratives of relatedness satisfaction, positive experiences often followed reaching out to new people or organizations (22% of participants), expressing their thoughts and feelings (13.7%), or collaborating with others (9.4%). Reaching out for new relationships was described by a similar percentage of participants (22%) in stories of their responses to relatedness frustration. The second most common strategy in response to

relatedness frustration was affirming integrity (15%). For example, the student who felt frustrated seeing a graph of students' family incomes in her economics class coped through expressing her thoughts and opinions and affirming her integrity:

To overcome that feeling, I leaned on my other low income and first generation college student friends... we talked about our struggles getting to the university and being here, and I reminded myself that my parents started at very different points than many of the other peoples' families and I'm running my own race.

Affirming integrity was also a way to cope with frustration that arose from a lack of racial/ethnic representation (e.g., "I just remind myself that I was also accepted to this university and I also belong here") or experiences of rejection (e.g., telling oneself that "there are different groups at [university] and I will not fit in every single group"). Acceptance, adjusting beliefs or effort, and seeking help were all represented in 8.5% of responses. Sometimes acceptance involved resignation (e.g., "all of these things have made it nearly impossible for me to fit"), although 10 students described simply waiting to eventually connect with classmates or friends (e.g., "it naturally resolved itself as I made it further along in college").

In three unusual cases, participants' acceptance of relatedness frustration was accompanied by opinions that feeling disconnected was not necessarily a negative experience. One participant wrote that he had "never experienced" relatedness in college, but opined that "I do not see feeling distant as a legitimate problem; people feel out of place in plenty of situations as it is a pretty normal thing to encounter." Another participant wrote that he did not feel belonging on campus "because everyone seems wealthy," but insisted "I don't really care... these kids mean nothing to me unless they are my friend or a connection for networking." A 21-year-old junior wrote, "I do not believe feeling distant from other people here on campus is a bad thing." He elaborated that given his outside

responsibilities, he was not interested in “what the typical college student kid is worrying about as a full-time student.” For these few participants, their unusual response to feeling isolated was to dismiss the value of belonging.

Relationships Intertwined with Well-being and Strategic Action

Across participants’ narratives of autonomy, competence, and relatedness, I observed that peers were the most commonly described influencers of need satisfaction, and also were critical supports of first-generation students’ use of social strategies like help-seeking. I will briefly present these findings that developed from my examination of all explicit mentions of relationships in participants’ narratives.

Peers are salient supporters and thwarters of need satisfaction.

Across their responses to all of the open-response questions, 183 participants (86.3%) explicitly mentioned at least one supportive relationship, and 154 participants (72.6%) explicitly mentioned at least one relationship that they perceived to have a negative impact on their need satisfaction. Table 10 (on the following page) summarizes how relationships were explicitly mentioned in first-generation students’ narratives of need satisfaction or frustration in college.

Table 10. Relationships explicitly mentioned in narratives of satisfaction or frustration.

	Relationship	N unique participants	% of sample (n=212)	Number of responses (1272 total responses)
Explicitly mentioned as supporting motivation or well-being	<i>Peers</i>	173	81.60%	264
	<i>Instructors</i>	32	15.09%	39
	<i>Other relationships</i>	30	14.15%	36
	<i>Family members</i>	25	11.79%	27
	<i>University staff</i>	13	6.13%	13
Explicitly mentioned as having a negative impact on motivation or well-being	<i>Peers</i>	119	56.13%	173
	<i>Peers (excluding peer comparison)</i>	65	30.66%	83
	<i>Family members</i>	46	21.70%	53
	<i>Instructors</i>	14	6.60%	14
	<i>Other relationships</i>	18	8.49%	21
	<i>University Staff</i>	4	1.89%	4

Whether participants explicitly identified others as having a positive or negative influence on their sense of satisfaction in college, the others involved were most commonly peers. The vast majority of participants (81%) described supportive peers at least once during their responses to open-ended questions. This far exceeded the percentage of participants who explicitly mentioned instructors of college classes (15.1%), whose role in supporting students was often tied to providing help with coursework, warmth, or words of encouragement. The majority of participants (56.1%) also made at least one explicit mention of peers having a negative influence on their sense of autonomy, competence, or relatedness. However, in almost half of these cases, participants described comparing themselves to their peers during discussions of pre-college preparation or their achievement in college classes. For example, one participant wrote that during his transition to college, he was talking with his friends at the university and “hearing about the coursework that

they had to do compared to mine made me feel incompetent and that I wouldn't be successful here at UT.”

Excluding these instances of comparison to peers allowed me to examine where fellow students, friends, and co-workers were more actively engaged in frustrating behaviors. These included peer pressure (e.g., to drink at parties or take on unwanted responsibilities in organizations), social exclusion (e.g., “they started excluding me from things and made a secret group chat without me”), disagreement or disapproval (e.g., “when I joined a fraternity, a lot of friends from back home and family members looked down on it”), and perceived rejection (“they don't even make eye contact with you which makes me feel less than”). A troubling but very small number of these narratives (3 total) included hostility toward students' racial or ethnic identity (one participant discussed that other students passing by in the street “yelled out negative comments about me being Hispanic,” and two participants discussed feeling alienated when their classmates made racist comments about the group to which they belonged). Pressure, exclusion, rejection or hostility were ways that peers became active thwarters of first-generation college students' sense of well-being. Such peer thwarters of motivation were mentioned by nearly one third of all participants (30.7%), less than half of the number who mentioned peer supporters.

Social strategies typically target peers

Supportive peers were also implicated in participants' use of strategies for motivation. Certain strategies were clearly intertwined with social relationships: reaching out to start a new relationship, help-seeking, expressing thoughts and feelings, collaborating toward a shared goal, and supporting others. When participants explicitly described other people involved in their use of these social strategies, it was more typical to see mention of supportive peers than any other type of relationship. For example,

participants mentioned reaching out for new relationships 125 times, typically to peers (who were mentioned in 59% of these responses). Out of 48 mentions of collaborating with others, 36 mentioned that their collaborators were classmates, friends, or fellow members of student organizations.

Among 74 participants who mentioned expressing their thoughts and feelings, 36 (48.6%) did so to peers, although in only 12 of these cases were participants expressing themselves to peers with whom they disagreed or felt frustrated. Only three participants mentioned expressing their thoughts and feelings to instructors, whom in all cases were described as supportive. As previously discussed, there were only 16 mentions of students who expressed their thoughts or opinions as a strategy to counteract frustrating others, and in no case did they talk to instructors: 12 expressed themselves to peers, and 4 expressed themselves to family. Among 33 mentions of supporting others as a way to enhance personal well-being, 16 mentioned supporting friends, fellow members of organizations, or mentees in their student organizations. The remaining participants described helping people they served through work or extracurricular activities (e.g., teaching elementary school students, assisting clients at an internship, performing music for people in a nursing home), or the person or person(s) supported were not identified (e.g., "I just try my best to help others"). There were 102 mentions of help-seeking as a strategy. In 30 of these (29.4%), peers were targeted for help, followed by instructors (16 mentions, 15.7%), university staff in non-teaching roles (9 mentions, 8.8%), family members (8 mentions, 7.8%), and unnamed others (6 mentions, 5.9%).

Summary of Qualitative Findings

For the first-generation students in this study, salient experiences of autonomy often centered on feelings of choice or obligation, and situations affording satisfaction or

frustration mirrored each other. The freedom to choose coursework or manage one's life in adulthood was met by the frustration of attempting to maintain grades, fit coursework into planned degree requirements, or find balance between personal values and others' expectations. When participants identified others who were a source of pressure, peer pressure was almost always associated with leisure time or classroom settings, but pressure to please parents wove throughout widely varying situations. It was most typical for students experiencing autonomy frustration to choose strategies that were unlikely to change their environment (such as acceptance, avoidance, and adjusting personal effort or beliefs). However, almost a quarter of these first-generation students emphasized the value of intentional self-acceptance. Their strategy of affirming integrity often required resistance to pressure but rarely resulted in direct confrontation.

Experiences in specific classes dominated students' narratives of salient experiences with competence. Success or failure in academic endeavors was often intertwined with stronger or weaker feelings of belonging in the university. The sense of falling behind peers, inability to succeed, or disappointment after failure most commonly led to an intentional adjustment of personal effort or beliefs to accommodate the situation. Yet, peers were also critical supporters, particularly when first-generation students boosted their sense of competence through the commonly used strategies of help seeking or supporting others.

Finally, these first-generation students were attending a large university that offered a variety of student organizations and courses that could help students connect with peers who shared their interests or experiences. However, peers were also commonly targeted for comparisons of ability or resources during moments of frustration. Moreover, almost a fifth of students highlighted difficulty connecting with others on campus when the majority did not share their cultural knowledge or experiences as members of

underrepresented racial/ethnic minorities. Perceived differences from peers in economic resources tied to college preparation were also cited as a source of frustration. Reaching out for new relationships with peers through classes, social events, or student organizations was a common strategy to seek relatedness satisfaction, as were finding opportunities to collaborate with peers toward shared goals in organizations or classes. Affirming integrity was also a critical strategy for coping with isolation and rejection.

Overall, peers stood out as the most salient influencers of satisfaction and frustration in these narratives of college experiences and were critical supporters of first-generation students' strategic efforts to manage well-being and motivation.

Chapter 5: Discussion

In this chapter, I discuss the findings from the quantitative and qualitative investigations. I then describe points of consistency, contradiction, and complementarity between the methodologies used. After discussing the overall theoretical implications of my findings, I conclude with a discussion of this study's limitations and relevance to practice.

DISCUSSION OF FINDINGS FROM THE QUANTITATIVE INVESTIGATION

This study found evidence that first-generation students' interdependent motives for college can coincide with an assertive, insistent approach to seeking autonomy satisfaction, as well as an orientation toward experiencing this satisfaction through supportive environments or relationships. Moreover, there was a moderate, positive association (.54, $p < .01$) between these orientations among first-generation students in this study, in contrast to the weak correlation (.13, $p < .05$) reported by Legault et al. (2017a) during the development of their measure. The new findings demonstrate that the autonomy orientations are not mutually exclusive modes of seeking fulfillment, and that first-generation students' self-reliance for autonomy does not imply less value for college as a way to support others. This study replicated the finding that the assisted and asserted autonomy orientations are moderately, positively associated with independent self-construal, but only the assisted orientation was linked to interdependent self-construal. Thus, these findings contribute new evidence that the assisted and asserted autonomy orientations are distinguished by the former's link to perceived interdependence between the self and relationships. Regression analyses for my second research question provided further evidence for this distinction between orientations. As only the assisted orientation

predicted satisfaction in college among first-generation students, future research is necessary to describe how asserted autonomy impacts the fulfillment of psychological needs.

This study's findings suggest that agentic engagement has potential to link asserted autonomy to well-being. I found evidence that supportive teaching practices and students' own orientations toward asserted autonomy predicted increased agentic engagement. Previous research has demonstrated that students' perceptions of learning environments as supportive of their needs for competence, autonomy, and relatedness (and interventions to boost these perceptions) can enhance educational achievement via greater cognitive, emotional, behavioral, and agentic involvement among learners. Studies have also demonstrated that students' perceptions of their own alignment with educational environments, ability, and closeness to others can create a virtuous cycle over time: perceived psychological need support fosters engagement that in turn increases need support. For first-generation students in an institutional context that threatens their values or sense of fit, classroom interactions can be an important way to initiate this virtuous cycle. Thus, asserted autonomy may be a distinct path to greater need satisfaction over time through increasing students' agentic engagement. Future research should further examine asserted autonomy as a potentially protective factor in student success and differentiate it from other constructs. For example, some literature has emphasized the role of resilience in first-generation students' adaptive coping with difficulty in higher education, but resilience is distinguished from asserted autonomy because it does not share the presumed willingness to threaten group harmony.

DISCUSSION OF FINDINGS FROM THE QUALITATIVE INVESTIGATION

The qualitative findings from this study extended self-determination theory by mapping how many common features of college life are themselves resources for need satisfaction and frustration. For example, these findings extend research describing choice as a common path to autonomy satisfaction (and obligation as a path to frustration) through the voices of participants who described feelings toward their path of study, adult freedoms and responsibilities, and academic requirements. I also observed that many first-generation students' narratives of competence centered on the classroom and highlighted how closely feelings of achievement, ability, or resources among others were intertwined with perceptions of whether one belongs in an educational environment.

Along these lines, first-generation students frequently compared their own resources and abilities to those of their peers. This echoed findings that high-achieving first-generation students are more likely than their continuing-generation counterparts to endorse performance avoidance goals, centered on concerns that one not look incapable relative to others (Jury et al., 2015). A common intervention to reduce the negative outcomes of performance avoidance is to promote learners' growth mindset. However, it is worth noting that among students who are members of underrepresented groups in university, interventions to promote a growth mindset as a personal belief do not show the same effects on academic integration as promoting the perception that growth mindset is part of the ethos of the larger educational institution (Yeager et al., 2016). In this study, participants' narratives highlighted a pervasive focus on peer comparison that previous research has linked to classroom- and school-level practices (Darnon, Butera, & Harackiewicz, 2007; O'Keefe, Ben-Eliyahu, & Linnenbrink-Garcia, 2012; Senko & Dawson, 2017; Shin, 2018).

Those interested in promoting first-generation students' integration into university life have often pointed to the importance of establishing relationships with peers and participating in organizations or extracurricular activities. These have been seen as both influences and outcomes of successful integration into academic settings. Findings for relatedness in the qualitative study certainly resonated with this research. Moreover, participants' sense of an environment lacking representation of their racial or ethnic group resonated with previous research documenting the double disadvantage of students who are first-generation and members of underrepresented racial/ethnic minorities in university. As one participant in the study wrote, "representation matters." From the perspective of self-determination theory, interventions to boost students' sense of alignment with their academic activities or perception of personal ability are insufficient without also addressing students' sense of isolation or struggle to relate to others.

Just as the bulk of previous research investigating need satisfaction has emphasized supportive environments over individuals' agentic effort, it has typically targeted teachers as key supporters of autonomy, competence, or belonging during learning. However, the qualitative findings from this study demonstrated the overwhelming importance of peers as supporters of first-generation students' need satisfaction. In students' strategic effort to support their own need satisfaction, it was perhaps unsurprising to find that peers were central to reaching out for new relationships, expressing thoughts and opinions, supporting others, or collaborating toward a shared goal. However, peers were also the most common target of help-seeking to cope with competence frustration across various features of college life. The importance of peer knowledge as a resource for first-generation student success deserves further study. Social support and self-efficacy are often treated as distinct supports for first-generation student success (e.g., Phinney & Haas, 2003; Wang & Castaneda-Sound, 2008), but they are clearly interconnected when students who struggle

in various situations target peers from whom to seek help, leveraging the power of learners' collective knowledge.

The findings that first-generation students' strategies to manage motivation often involved peers were one part of the expanded view of learner agency provided by this study. As demonstrated by learners' use of strategies even in narratives of satisfying experiences, environmentally-assisted need satisfaction can still represent an active mode among learners. In narratives of frustrating experiences, acceptance and avoidance were common – yet so were efforts to change the situation, most typically through strategies for self-regulation. One strategy that straddled the line between accommodating or changing frustrating environments was affirming personal integrity. When learners perceive that their values are threatened by the environment, intentional self-acceptance and persistence toward those values can itself represent a reconstitution of the larger context. Although agentic engagement emphasizes taking action to alter environments, these findings demonstrated how learners often take an active role in supporting their own need satisfaction through self-regulation rather than direct confrontation.

INTEGRATION OF FINDINGS ACROSS METHODOLOGICAL STRANDS

Points of consistency and contradiction represent their own complementarity between the two methodological strands within this study. However, I have organized this section to address consistency first, then to highlight contradictions between the quantitative and qualitative findings. I end with a discussion of complementarity that emphasizes how the qualitative data offered insights into the strengths and weaknesses of constructs or their measures in the quantitative investigation.

Consistency

A clear point of consistency for methodological strands was the link between reliance on supportive relationships and environments and the experience of satisfaction in college life. There are good reasons for the longstanding emphasis on nurturing contexts (over individuals' proactive self-support) in the theory of basic needs. This study's findings demonstrated that supportive contexts do not only afford the passive experience of need satisfaction, they nourish self-directed efforts to obtain it. Educational practices are amenable to intervention, and ideally our academic institutions would foster student growth without calling for extraordinary resilience to frustration among the learners themselves. Although the qualitative findings from this study join previous research that has documented the adaptability of first-generation students, "we need not introduce or expose individuals to damaging conditions to help them grow" (Ryan, Soenens, & Vansteenkiste, 2019, pg. 120).

Another point of consistency between methodological strands in this study centers on our emerging understanding of individuals' active quest for autonomy satisfaction. The classroom findings highlighted that agentic engagement increases with both self-reliance and perceived need support. Previous research has demonstrated that the individualistic practices and messages often found in higher education can threaten the motivation and performance of interdependent students. An asserted autonomy orientation is a potential resource for many first-generation students with interdependent motives, as it predicts increased agentic effort and may help them self-support autonomy in frustrating situations. However, only the assisted autonomy orientation was associated with interdependent self-construal. Thus, it is possible that those students most likely to clash with the college environment are also more likely to rely on environmental support – not only to feel satisfaction, but to energize their own agentic efforts.

Contradiction

Considering students' proactive efforts to seek need satisfaction also raised a point of contradiction in my findings. In the qualitative investigation, first-generation students described how their own efforts often contributed to the experience of need satisfaction, or to its restoration following frustrating experiences. Why was asserted autonomy not a predictor of greater overall satisfaction in college in the quantitative investigation of my second research question? Limitations of the measures employed, potential missing covariates, and the associative nature of regression are all reasons that a definitive answer to this question will require further study.

However, the qualitative findings suggest a path forward. In most cases, the strategies that students described were self-focused rather than directly confronting or changing an environmental influence on frustration. Moreover, in situations where other people or institutional practices thwarted autonomy or relatedness, affirming personal integrity or personally embracing one's values could entail perceived resistance to outside pressure. That is, to the extent that an orientation toward asserted autonomy hinges on the perception of fighting obstacles to personal interests and desires or searching for self-expression, the orientation may be easily endorsed – even when struggle involves increased regulation of the self, rather than confronting others or visibly disrupting the status quo. Nonetheless, the quantitative investigation of my third research question did find evidence that asserted autonomy is linked to agentic efforts to reshape the flow of classroom interactions and activities. That is, self-reliance for autonomy satisfaction predicts the use of strategies beyond accommodation and self-adjustment in educational settings.

Complementarity

The findings for my third research question also help demonstrate how the complementarity of methods provides a deepened understanding of first-generation students' motivation in college. In the variable-centered approach of my quantitative analyses, I saw that self-reliance for need satisfaction and supportive teaching can both be important resources for first-generation students because they predict the remolding of the classroom environment. Yet, the narratives of first-generation students also highlighted an important and unmeasured covariate in classroom support – the quality of peer interactions. Future research into teachers' need supportive practices (and interventions to promote these practices) should be expanded beyond their current emphasis on the teacher-student relationship. Teachers' choices can guide peer-to-peer interaction. Yet initiating collaborative work in class, facilitating conversations about learning that deemphasize competition, or fostering peers as a resource for help-seeking have so far largely fallen outside of the study of supportive teaching in self-determination theory.

The qualitative data also suggest some strengths and shortcomings of the measures employed. This study used an expanded scale for academic engagement that introduced items for peer interaction, which complemented the salience of peers in first-generation students' pursuit of need satisfaction. However, students' experiences also highlighted potentially contested meanings of indicators on scales used to measure constructs. This included the asserted autonomy scale (as previously discussed) and the Basic Psychological Needs Satisfaction in College scale. For example, endorsing the statement that “I understand the purpose of my classroom requirements” may not necessarily imply internalization of that purpose for students whose autonomy is frustrated by academic requirements. Statements like “I am free to express my opinions at school” or “I feel like I can pretty much be myself at school” were connected with both autonomy and relatedness

in participants' narratives, although they were designed as indicators of autonomy. Finally, a relatedness item, "I consider the people I attend [university] with to be my friends," targets an overall view of the campus community. Yet participants' narratives emphasized that perceived security in shared experiences (or the representation of people who share one's social identity) may better indicate belonging among first-generation students. For example, an improved relatedness item might target the perception that "there are plenty of people at this university who are a lot like me."

Complementarity also highlights how methodologies contextualize the usefulness of constructs like autonomy orientation for future research with first-generation students. The qualitative data highlighted the importance of nuance in formulation of autonomy orientations. That is, asserted autonomy is currently described as an agentic, active mode of pursuing need satisfaction, and assisted autonomy as interdependent and reliant on others. However, I observed an association between these two traits that could muddle their distinct relations with other constructs. Moreover, participants' narratives revealed the potential for contested meanings surrounding the fight for personal interests and self-expression that theoretically distinguishes asserted autonomy from reliance on other people.

As we seek to extend our understanding of individual dispositions toward seeking need satisfaction, examining these orientations (and their association with other constructs) within diverse cultural groups will be critical to establishing their importance to the theory that psychological needs are inherent to the human experience. This is particularly critical for these traits because they are presumed to form through socialization over time. For example, Legault et al. (2017a) linked the asserted autonomy orientation to retrospective perceptions of authoritarian parenting, because this parenting style could presumably produce prolonged frustration of children's need for autonomy. However, constructs like

authoritarian parenting can be misleading when they are developed within one cultural group, then applied to the socialization practices of another. What happens to a person with strong collectivistic values when he or she consistently feels a lack of self-endorsement toward activities? The individualistic formulation of asserted autonomy could limit its ability to describe how frustrating experiences can orient individuals to strive for self-determination.

THEORETICAL IMPLICATIONS

This study's findings make a contribution to self-determination theory as a framework for educational interventions by contributing new evidence that learners' beliefs and agentic effort are critical during the process of need satisfaction. Describing a broadened role for the individual in need satisfaction is particularly critical to a theory which has, at its core, the premise of an inherent human tendency toward growth.

Among first-generation students, I found that interdependent motives could coincide with two different (but compatible) orientations toward obtaining autonomy satisfaction. An asserted orientation, with its focus on self-reliance, did not predict satisfaction in college but seemed to be a distinct resource for energizing some learners' efforts to remold educational environments. The assisted orientation, with its emphasis on supportive contexts and relationships, was distinguished by its relationship with students' satisfaction in college. However, participants' narratives demonstrated the need to recognize that learners are not passive recipients of autonomy, competence, and relatedness support. Rather, these supports also nourish students' proactive efforts by providing resources for strategic action. Additional evidence for this assertion is the finding that supportive teacher practices predicted increased agentic engagement among learners, even when controlling for a disposition toward fighting obstacles to satisfaction. Thus, my

findings suggest reliance on the self or on the environment may both empower students to provide feedback to their teacher, adjust classroom interactions, and shape the setting for learning to foster their own autonomy, competence, and belonging.

I also suggest that a critical environmental resource – peers – has so far been undervalued in the self-determination framework as potential contributors to well-being in the classroom. Although many investigations have examined classmates as a resource for belonging, peers also seem to support learners' competence satisfaction. Among students who have had limited access to intergenerational information about college, I observed that peer resources thwart well-being when targeted for comparison, but support well-being when recognized as a target for seeking assistance. Self-determination theory has largely emphasized the intertwining of relatedness and autonomy in peer relationships, although competence satisfaction is presumed to support relationship quality (Deci & Ryan, 2014). The experiences of first-generation students in this study call for expanding our view of interdependence between psychological needs in educational settings: relationships contribute to the structure for competence satisfaction. Peer relationships afford necessary knowledge surrounding tasks, provide security when taking on challenges, and impact the evaluation of personal achievement.

Findings also have implications for theory centered on first-generation students' engagement and achievement in higher education. First, this study adds nuance to the view that interdependent motives for college imply interdependent self-construal and a heightened threat from the individualistic culture of higher education. These findings do not dispute the premise that contexts for socialization contribute to patterns in first-generation students' perceptions of college as a means to provide for their family and community or achieve prosocial goals. However, my findings demonstrated that interdependent motives can coincide with an individualistic view of self, as well as two

different orientations (toward reliance on the self or environment) for the support of personal interests.

Finally, this study highlighted the value of psychological theory for organizing investigations of first-generation students' well-being at university, providing insight into the connection between experiences and outcomes. Uncovering the mechanisms that boost first-generation students' persistence and achievement will require integrating theoretical frameworks (and often, methodologies) in future investigations. To illustrate, consider two distinct interventions to foster first-generation students' transition to college: deemphasizing social backgrounds (i.e., introducing the lay theory that all students struggle during transition) or making social backgrounds more salient (and thus highlighting how they confer strengths and weaknesses). Perhaps these two kinds of interventions share a mechanism: shifting appraisal of struggle or frustration in university toward the affirmation of one's integrity as a full participant in the college community. Through continued efforts to incorporate and integrate psychological theories in investigations of first-generation student success, researchers in higher education can help create coherent frameworks for intervention into student persistence.

LIMITATIONS

This study aimed to extend literature on first-generation students and self-determination theory by exploring the relationships among learners' beliefs, environmental supports, and strategic effort to support well-being. However, the sample of first-generation students in this study tended to represent students farther along in their college studies, with almost half of the sample representing senior-level students. Although previous studies have found that first-generation students are at higher risk of attrition than continuing-generation students at every year of college, the first two years of university are

a critical period for student retention (Ishitani, 2006; Martinez, Sher, Krull, & Wood, 2009; National Center for Education Statistics, 2018). This is an important consideration, given the retrospective nature of quantitative and qualitative data collected from this study's sample.

Participants' retrospective narratives provided our findings regarding first-generation students' strategic efforts to manage their motivation and well-being. It is important to note that this certainly influenced the resulting picture of student agency. The investigation elicited narratives across many facets of the college experience, which likely contributed to the dominance of peers in participants' descriptions (as, unlike instructors, family members, or staff, peers are present across a variety of college contexts). My findings do not diminish the importance of other relationships that support student success. To illustrate, my pilot study (focused specifically on classroom strategies, see Appendix A) found that professors were common targets for help-seeking whether students were frustrated with autonomy, competence, or relatedness in class. To add nuance, seeking help from the professor joined other strategies in the pilot investigation that students more typically would recommend to others than use themselves. As a result, I also do not presume that first-generation students' reported use of particular strategies in their narratives of college life represents the full range of their knowledge regarding potential courses of action.

Because the findings from both methodological strands represent first-generation students farther along in their college careers, they may be biased to reflect those first-generation students who were more likely to persist in college. Assisted and asserted autonomy orientations were both represented in the sample, but it would be interesting for future research to examine whether their relationship with need satisfaction in college shifts over time. In this study, year of college was not a significant predictor of the relationship

between teacher practices, asserted autonomy orientation, and agentic engagement; however, replication with a sample that better represents underclassmen will further contribute to an understanding of what agentic engagement means for students with different levels of comfort in academic settings. Ultimately, I see it as a strength of this study to present findings from the narratives of many students who have successfully used strategies to foster their motivation, overcome barriers, and persist toward being the first in their families to graduate. Future research can build on these findings through examination of the shifting need satisfaction and agentic effort among first-generation students earlier in their college career.

A related limitation is my reliance on a survey design. The exclusive use of self-report measures in this study introduced the potential for shared measurement variance into my quantitative investigation, which can potentially alter the observed associations among student beliefs, environmental supports, and engagement. The findings from regression also hinge on the potential impact of unmeasured covariates, along with shortcomings of the measures employed. For example, this study failed to link the asserted autonomy orientation or participation in academic integration programs to overall college need satisfaction. However, because previous research into psychological needs has emphasized reliance on environments, assisted autonomy scale items more closely mirrored the wording of items to measure satisfaction. An improved understanding of how asserted autonomy connects to the subjective experience of need satisfaction may require future study to use behavioral or physiological measures of well-being. Participants' limited report of participation in university programs for first-generation students' academic integration also reduced power to observe any connection to need satisfaction in college. Integrating findings from this mixed-method study allowed some initial evaluation of shortcomings for the constructs and measures employed. Future investigations that observe

satisfaction, support, or engagement through classroom behavior (or other alternatives to self-report) will help develop convergent lines of evidence for this study's findings.

Surveying a convenience sample also raises limitations. In a mixed-method study, it limits quantitative results in their generalizability and limits qualitative results in their ability to develop trustworthy theory. However, for a researcher with limited resources, convenience sampling offered the benefit of access to a large sample that could boost the power of quantitative analyses and provide an abundance of perspectives through open-response questions. Although obtaining qualitative responses through a survey precluded my ability to probe participants' responses and likely limited the detail in their written narratives, the many responses to the survey offered their own rich and varied description of first-generation students' experiences at the university. As the analysis of this data emphasized summarizing occurrences and coincidences of the codes applied, it obscured individual cases and did not attempt to synthesize all cases into a larger theory of need satisfaction. However, my analysis served the scope of this investigation's resources and research questions. Ultimately, the exploratory nature of this study contributes to our understanding of first-generation students' resources and strategies for well-being in college, but there is much left to explain.

RELEVANCE TO PRACTICE

It is exciting to consider how the practical implications of this study speak to the shifting landscape of higher education. The author E. B. White observed that "writers will often find themselves steering by stars that are disturbingly in motion," and this is certainly true when writing about the dynamic world of educational practice. To illustrate, near the end of data collection for this study, I attended the first campus-wide celebration of first-generation students at the university I jointly attended with this study's participants. The

celebration was an outgrowth of recent institutional commitments to foster awareness of and embrace the first-generation student identity, targeting resources toward their continued academic achievement. This study's findings underscore the importance of supportive learning environments, and demonstrate the ongoing need for college programs that aim to serve underrepresented groups or facilitate institutional responses to their concerns. However, participants' stories also highlight how critical it is for student resources to operate in tandem. An ongoing effort to integrate campus resources for autonomy, competence, and belonging (such as peer interest groups) or to simplify the navigation between them can help learners find that there is no wrong door to success in university. To support well-being in college life, there is also a clear role for peers helping peers. Instructors can help cultivate peer relationships by encouraging collaborative work and discussion, and by reducing emphasis on comparative performance in course structure. This study extended literature pointing to classroom educators' critical role in welcoming student efforts to improve the learning environment. Regardless of students' disposition toward asserting their need for autonomy, supportive teacher practices predict more student agency.

CONCLUSION

Using the self-determination theory of basic needs as a framework, this study aimed to identify first-generation students' resources and strategies for satisfaction in college. Findings were based on a mixed-method investigation of 212 first-generation students' survey responses. Interdependent motives for college were found to coincide with two orientations (reliance on the self or on the environment) for the expression of personal interests. However, an orientation toward assisted autonomy was distinctly associated with overall college satisfaction. Both supportive teacher practices and the disposition toward

asserted autonomy predicted agentic engagement in classrooms. First-generation students' narratives highlighted that strategic effort and engagement are often supported by the environment and relationships, especially relationships with peers at university. Taken as a whole, the study calls for an expanded view of students' agency and contribution to satisfying learning experiences.

Chapter 6: Afterword

Throughout the process of conducting this study I practiced reflexivity, reflecting on how my position and perspectives mediated this research. This brief chapter is intended to recognize how my social position and perspective have influenced every aspect of this research study. As a social scientist, I believe that it would be disingenuous to claim that personal biases certainly had no influence on my work. Instead, I embrace the opportunity to be transparent about how I was situated within the social context for this study. Ultimately, my hope is that critical reflection and clarity regarding my perspective will aid others in their evaluation of my research.

My interaction with the first-generation student experience has been that of an outsider: listening to friends, family members, and students describe college experiences that often differed from my own. For example, when discussing this research study with my mother, she told me that she did not realize she was a first-generation student. She said that as a Latina who felt close ties to an extended family, it did not occur to her that “first-generation” should count only immediate family. Comparing her experience to mine, my mother mentioned that “the biggest difference for you was that your parents expected you to go to college.”

On the other hand, my husband was a first-generation student who certainly shared my sense of parental expectations that drove him to university. Nonetheless, he eventually left college, finding his path outside of academia. At times, excitement about my research led me to pester my husband with questions (“What do you think about this author’s findings for first-generation students who drop out of college? Do you remember anything about your professors in classes? What would you say were your motives for attending college?”) He has rightly pointed out that these questions are difficult to answer, and that

it can be frustrating when someone treats your lived experiences as the subject of inquiry. I am grateful that he helped me learn to focus on active listening when I would mention my dissertation to peers and find that it prompted them to share their experiences as first-generation students.

In the design of this study, I also chose not to inform participants that their first-generation status was the criterion used to invite their participation. I did this to avoid potentially encouraging a perception among participants that feelings of frustration or satisfaction in college were directly linked to their first-generation student status. When I was teaching a course in educational psychology, each semester (during a discussion of sociocultural factors in motivation) I would facilitate a discussion of research on first-generation students. I would instruct the small groups of students in my class to discuss how their social backgrounds may have shaped their college experiences. After one class, a student approached me with tears in her eyes and stated that as a first-generation student, it was difficult to participate in those classroom conversations. She felt pressured to describe her background as a risk factor and told me, “maybe you shouldn’t do that anymore, or find a different way to do it.”

These experiences (and others like them) have shown me that as a researcher, teacher, and supporter of first-generation students, I certainly have a limited understanding of the first-generation student experience. Academic practices shaped by the world of higher education were part of daily life throughout my childhood. In college, I was not blazing a new trail for my family but treading a path through known territory (and often given rather clear instructions about how to follow the map). Many participants in my study also described experiencing an awareness of underrepresentation, that they did not have many others who shared their racial or ethnic heritage or cultural knowledge at university. Here too, I have blind spots. In my undergraduate studies, I was a white-skinned Latina at

a university surrounded by many others who looked like me and came from similar backgrounds.

In an unequal society, systems for education or seeking knowledge intertwine with systems of oppression and privilege. Although individual positions and identities constantly shift and evolve, I have typically occupied a privileged place in these systems – I am a white, middle class, American woman with two postsecondary degrees. I have no visibility as other, no mark to exclude me from membership in dominant social groups. For me, critical reflection on this privilege immediately raises questions. How can you make claims as a social scientist without abusing your power relative to research participants and other people? How do you avoid reproducing the social inequalities that have often worked to your benefit? In answer to these questions, I am still finding my way. I am dedicated to openness to others' experiences. I seek gaps in my knowledge. I strive to clarify the intentions and assumptions behind my work.

Despite the gaps in my knowledge, I was undeterred from researching the first-generation student experience. In part, this is because whether or not we are the first in our families to attend college is only one facet of our identities and lives. I sought to design this study without the comparison of first-generation students to continuing-generation students because I believe it is critical for social scientists to recognize diversity within social groups. As a result of this diversity, my participants and I certainly have unfathomably many commonalities and differences. The communication between my participants and me during this research study thus likely presented many places for shared understanding, although I strove to consider potentially contested meanings. I hoped that using participants' own words in the report of qualitative findings could help reflect their voices.

This study also reflects my embrace of educational research as a way to support human potential. Research can direct resources toward persistent social problems and contribute to our collective human effort to build and rebuild knowledge. I do not presume that academic literacies (with their ways of knowing, technical skills, and practices tied to a discipline) are superior to the multitude of practices and knowledge that people use to thrive outside of academic domains. However, I believe that by collaborating in the search for knowledge and promoting the free flow of knowledge between people, we may all find our lives enriched by new understandings and explanations of our world.

Ultimately, my position and perspectives as a researcher shaped every choice in this investigation. Use of a mixed-method design reflects how I privilege the role of subjective experiences in human behavior, but also view these experiences as often reconstituting larger patterns and probabilities. The theory that I chose to use has often been critiqued for presuming universality: that satisfaction of needs for autonomy, competence, and belonging will necessarily drive greater engagement in learning. I hoped this study would contribute to the ongoing critical evaluation of this theory. However, it shaped my perspective on the literature, my questions and measures, and the prompts that elicited students' experiences. My interest in speaking to this theory organized the voices of my participants, which I view as a contribution and limitation of the study. From my perspective, a knowledge seeker's methods and findings will always have weaknesses intertwined with strengths. There is nothing for it but to be transparent about the social context and human intentions that animate research.

Appendices

APPENDIX A: PILOT STUDY OF MEASURES AND CLASSROOM STRATEGIES

In Spring 2018, I administered a pilot survey to 227 college students through the Educational Psychology Subject Pool. Although I was still developing the design for my primary investigation, the pilot survey used similar procedures. The quantitative data that I obtained allowed me to evaluate the reliability and validity of measures that I later used in my primary investigation. Because of my interest in students' resources and strategies for need satisfaction, I also analyzed findings from open-response questions in the pilot survey that elicited strategies for need frustration in the classroom. To provide context for the primary investigation, this appendix presents the pilot study in three sections: the data collection procedure and sample characteristics, the investigation of measures, and the investigation of classroom strategies that students described in open-response survey questions. I conclude with a brief discussion of findings from the pilot survey, focusing on their relevance to the primary investigation.

Section 1. Data Collection Procedure and Sample Characteristics

Although 227 students responded to the survey in the pilot study, 6 terminated the survey early. Of the remaining 221 complete responses, 40 were suspect because participants failed an attention check. Among participants who provided complete responses to the survey and passed the attention check, there were 92 first-generation students and 90 continuing-generation students. Initially, I retained all 221 complete responses but created a dummy variable to identify participants that failed the attention check so that I could later control for their impact on analyses. To further prepare pilot

survey data, I obtained standardized scores on key variables, reverse coded negatively-worded items so that all responses were on a positive scale.

To characterize the sample of pilot survey participants, I obtained descriptive statistics (central tendency, standard deviation, range) for age, GPA, and grade level (ranging from 1, Freshman, to 4, Senior). Results for the full sample are presented in Pilot Study Table 1 along with results for the subsets of first-generation and continuing-generation students. My purpose in presenting results within these two groups is not to draw a comparison between them. Rather, I aim to further characterize the sample, particularly because I used this sample to investigate measures that were ultimately administered to only first-generation students.

Pilot Study Table 1. Descriptive statistics: pilot study participants' age, GPA, and grade.

		First-generation (n=117)	Continuing- generation (n=104)	Full sample (n=221)
Age (in years)	<i>Mean</i>	21.22	20.84	21.04
	<i>Standard Deviation</i>	2.736	2.38	2.58
	<i>Range</i>	18-39	18-42	18-42
GPA (on a 4-point scale)	<i>Mean</i>	3.12	3.34	3.22
	<i>Standard Deviation</i>	0.54	0.35	0.47
	<i>Range</i>	1.7 - 4.0	2.4 - 4.0	1.7 - 4.0
College grade level (from 1-4)	<i>Mean</i>	2.85	3.05	2.95
	<i>Standard Deviation</i>	1.11	1.03	1.07
	<i>Range</i>	1 - 4	1 - 4	1 - 4

Participation in the pilot survey was initially restricted to first-generation students. Once 100 responses from first-generation students were collected, the study was opened to all students. As a result, although first-generation students constitute 20-23% of each incoming class at the university, they constituted 52.9% of the pilot study sample. Among participants in my sample whose parents did not graduate from college, only 10 (roughly 9%) reported participation in university programs for first-generation students.

Overall, the sample of participants in the pilot study represented older college students (mean age 21.4 years, range of 18-42 years). Out of 221 participants, 11 were over age 25. On average, students had a GPA of 3.22 (standard deviation of .47). This average GPA was in the "B" range, although the full range of achievement in university was represented (1.7 to 4.0). The average grade level (2.95) indicated that the sample represented students farther along in a 4-year degree. As grade level increased from Freshman to Senior, so did the proportion of the sample that participants represented. Perhaps this pattern resulted from sampling through the Educational Psychology subject pool, which draws participants from elective courses that are popular among upperclassmen (who also receive earlier access to class registration). To further characterize my sample, I obtained the percentages of students reporting each category of gender and race/ethnicity (presented in Pilot Study Table 2).

Pilot Study Table 2. Descriptive statistics: pilot study participants' sex, race/ethnicity.

		First- generation (n=117)	Continuing- generation (n=104)	Full sample (n=221)
Sex	<i>Female</i>	69 (59.0%)	57 (54.8%)	126 (57%)
	<i>Male</i>	44 (37.6%)	47 (45.2%)	91 (41.2%)
	<i>Preferred to self-describe</i>	4 (3.4%)	0 (0%)	4 (1.8%)
Race/ Ethnicity*	<i>Black or African American</i>	8 (6.8%)	8 (7.7%)	16 (7.2%)
	<i>East Asian or Asian American</i>	18 (15.4%)	14 (13.5%)	32 (14.5%)
	<i>Hispanic or Latino</i>	42 (35.9%)	16 (15.4%)	58 (26.2%)
	<i>Middle Eastern or Arab American</i>	1 (0.9%)	2 (1.9%)	3 (1.4%)
	<i>South Asian or Indian American</i>	11 (9.4%)	7 (6.7%)	18 (8.1%)
	<i>White, Caucasian, or European American</i>	24 (20.5%)	45 (43.3%)	69 (31.2%)
	<i>Biracial/Multiracial</i>	11 (9.4%)	12 (11.5%)	23 (10.4%)
	<i>Preferred to self-describe</i>	2 (1.7%)	0 (0%)	2 (0.9%)

**Participants who selected multiple categories for their racial/ethnic identification were counted in the Biracial/Multiracial category for this analysis.*

Women constituted a slight majority of the sample (57%), while men constituted 41.2% of the sample. Less than 2% identified as non-binary or preferred to self-describe. The greatest proportion of students identified as White/Caucasian/European-American (31.2%), followed by Hispanic or Latino (26.2%), East Asian or Asian-American (14.5%), Biracial or Multiracial (10.4%), South Asian or Indian-American (8.1%), Black or African-American (7.2%), and Middle Eastern or Arab-American (1.4%). Previous research has demonstrated that first-generation students tend to represent greater racial/ethnic diversity than their continuing-generation peers. I also observed this pattern in the proportional representation of racial/ethnic groups among participants in my pilot study: 79.5% of first-generation students (compared to 56.7% of continuing-generation students) did not self-identify as White, Caucasian, or European-American. This was largely due to the greater proportion of students who identified as Hispanic or Latino among first-generation students in my sample.

Section 2. Investigation of Measures

As previously mentioned, the pilot survey data provided an opportunity for me to investigate the properties of three measures used in the larger study: the Academic Engagement Scale, Autonomy Orientations Scale, and Basic Psychological Needs Satisfaction in College Scale. Because the latter two measures were developed relatively recently, understanding their properties was particularly important to my primary investigation. Because I used validation to force participants to respond to all pilot survey questions, missing data was not a concern. However, my choice to force responses did heighten the need to screen my data for quality. Thus I undertook a series of steps to examine responses, investigate how variables were measured by each scale, and prepare

for Confirmatory Factor Analyses. I analyzed all pilot study data using SPSS or MPlus software.

Using data collected from the entire sample (n=221), I obtained the means, standard deviations, and range (the minimum and maximum composite score) for each measure and its subscales, as well as estimates of skewness and kurtosis. The results of this analysis are presented in Pilot Study Table 3.

Pilot Study Table 3. Descriptive statistics for measures administered in the pilot study.

Measure		Mean	Standard Deviation	Minimum-Maximum	Skewness Index, <i>(standard error=0.16)</i>	Kurtosis Index, <i>(standard error=0.33)</i>
Academic Engagement Scale	Overall	5.31	1.01	2.8 – 7.0	-0.26	-0.62
	<i>Behavioral Subscale</i>	5.64	1.07	2.7 - 7.0	-0.56	-0.48
	<i>Agentic Subscale</i>	4.70	1.44	1.0 - 7.0	-0.26	-0.60
	<i>Cognitive Subscale</i>	5.42	1.07	2.0 - 7.0	-0.35	-0.25
	<i>Emotional Subscale</i>	5.48	1.37	1.0 - 7.0	-0.87	0.14
Autonomy Orientations Scale	<i>Assisted Subscale</i>	5.54	0.95	2.25 - 7.0	-0.66	0.34
	<i>Asserted Subscale</i>	4.87	1.09	1.75 - 7.0	-0.04	-0.33
Basic Psychological Need Satisfaction in College Scale	Overall	5.19	0.78	3.1 – 7.0	-0.26	-0.44
	<i>Autonomy Subscale</i>	5.45	0.88	2.5 - 7.0	-0.65	-0.01
	<i>Competence Subscale</i>	4.96	0.90	2.6 – 7.0	-0.01	-0.66
	<i>Relatedness Subscale</i>	5.17	0.97	2.5 - 7.0	-0.33	-0.55

For all measures, participants' responses tended to collect slightly above the midpoint of the scales used (i.e., measures of central tendency in the 5-5.5 range rather than 4). For every scale, the Skewness Index and Kurtosis Index did not immediately raise concerns about severe non-normality; typically values between -1 and 1 are acceptable, and findings from simulation studies suggest that a Skewness Index greater than 3 indicates extreme skew (Curran, West, & Finch, 1997, as cited by Kline, 2011). None of the scales' skew indices surpassed this cutoff. I did interpret the Skewness Index for the Emotional Engagement subscale (-0.87) to suggest that I should further evaluate the distribution of those responses.

Visual inspection of frequency distributions for responses along each scale mirrored the findings from Skewness Indices for each measure. Most of these distributions did not demonstrate severe non-normality, with the exceptions of negatively skewed response distributions for the behavioral and emotional engagement subscales of the Academic Engagement scale. When I inspected box plots, I saw that there were outliers contributing to negative skew on multiple subscales: emotional and cognitive engagement, assisted autonomy orientation, and the BPNSC autonomy subscale. I obtained Z-scores for all responses so that I could inspect the magnitude of these outliers. Boxplots also revealed a multivariate outlier where one respondent showed a consistent pattern of extremely low scores. Returning to the data, I found the participant had used straight-line response throughout the survey, which was sufficient justification for listwise deletion. For other outliers, I did not see a pattern of extreme responses and chose to retain their cases.

Looking forward to using these measures in my primary investigation, I took two other steps in preliminary analysis. First, I inspected scatterplots, which did not uncover any non-linear relationships between pairs of variables. Second, I computed bivariate correlations between all four variables (see Pilot Study Table 4).

Pilot Study Table 4. Bivariate correlations for measures administered in the pilot study.

	1	2	3	4
1. Asserted Autonomy	1	--	--	--
2. Assisted Autonomy	0.44*	1	--	--
3. Academic Engagement	.34*	.37*	1	--
4. Basic Psychological Need Satisfaction in College	.39*	.73*	.37*	1

*All correlations were significant at the $p < .001$ level.

Most correlations were moderate. The exception was a strong association ($r=0.73$, $p<.001$) between assisted autonomy orientation and basic psychological need satisfaction, which I expected from theory about how the measures were interrelated.

Findings from the Confirmatory Factor Analysis of Each Measure

During the initial confirmatory factor analysis of each measure, I based my hypothetical models on those presented in the original publication of each measure by its authors. Thus, my models were specified as follows: the Agentic Engagement Scale included four latent factors (behavioral, cognitive, emotional, and agentic) and 17 indicators; the Autonomy Orientation Scale included two latent factors (asserted and assisted) and 8 indicators; and the Basic Psychological Needs Satisfaction in College Scale included three latent factors (autonomy, competence, relatedness) and 13 indicators. For all measures, models specified each factor's direct effect on its indicators and assumed latent factors to covary. I constrained all factor variances to 1 in order to freely estimate all item loadings. All models relied on covariance matrices obtained from 220 total observations. Pilot Study Table 5 presents model fit indices estimated during my initial confirmatory factor analysis of each measure.

Pilot Study Table 5. Model fit indices estimated during initial CFA of each measure.

	χ^2 test	RMSEA	CFI	TLI	SRMR
Academic Engagement Scale	$\chi^2 = 512.76$ df = 113 p < 0.001	RMSEA = 0.127 90% C.I. (0.116-0.138) p of close fit < 0.001	0.864	0.836	0.080
Autonomy Orientations Scale	$\chi^2 = 65.718$ df = 19 p < 0.001	RMSEA = 0.106 90% C.I. (0.078-0.134) p of close fit < 0.001	0.947	0.921	0.051
Basic Psychological Need Satisfaction in College Scale	$\chi^2 = 202.499$ df = 62 p < 0.001	RMSEA = 0.101 90% C.I. (0.086-0.117) p of close fit < 0.001	0.865	0.830	0.069

For every measure analyzed, my confirmatory factor analysis resulted in a significant χ^2 test. As a result, in every case I could not retain the null hypothesis that there was no difference between the population covariance matrix estimated in my sample and the matrix implied by the specified model. Kline (2011) emphasized that when the χ^2 test indicates potential problems with the specification of a structural equation model, it is critical to diagnose reasons for this failure, even when other fit indices appear to be supportive. Nonetheless, I examined other fit indices for each model that I specified to thoroughly evaluate the evidence for and against each confirmatory factor model.

Other fit indices that I obtained provided decidedly mixed support for my hypothetical models. The Root Mean Square of Approximation (RMSEA) increases when there is poor fit by incorporating information about χ^2 , the number of known values versus parameters freely estimated, and sample size. Previous research has suggested that RMSEA values less than .05 indicate good fit, while values between .05-.08 are typically interpreted to indicate adequate fit (Kline, 2011; Whittaker, 2016). Thus each of model was further called into question by the RMSEA estimates and confidence intervals that I obtained. The Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) are both incremental fit

indices that use a proportion to summarize how a specified model demonstrates improved fit to the data, as compared to a null model wherein all variables are presumed to have no association. Typically, 0.90 is the recommended cutoff for support of the measurement model (Whittaker, 2016). Only my confirmatory analysis of the Autonomy Orientations scale resulted in CFI and TLI values above this cutoff.

Finally, I inspected the Standardized Root Mean-Square Residual (SRMR) for each model, a metric that summarizes the magnitude of covariance residuals that increase with greater discrepancy between observed and predicted covariance matrices. In the case of perfect fit, the SRMR will equal zero, although researchers often assume that SRMR values of less than 0.10 indicate acceptable fit (Kline, 2011; Whittaker, 2016). All three of my models met this cutoff for acceptable fit. However, based on the lack of support from other obtained fit indices (particularly the failed χ^2 test for each model), I determined that I could not retain the hypothesis that each model was a good fit to the data.

I considered possible reasons that my confirmatory factor analyses were unsuccessful. First, my initial investigation of measures had revealed outliers and univariate non-normality for subscales with items that performed poorly in the CFA. My decision to retain outliers when I lacked theoretical justification for their removal likely contributed to my difficulty confirming the hypothetical measurement model. Second, my choice to rely on self-report scales potentially introduced error due to a shared method of measurement. Reise, Waller, and Comrey (2000) discussed other reasons that confirmatory factor analyses may not reproduce expected factor structures. One potential issue they raised that was relevant for my pilot data centered on the nature of using Likert-style items for measuring personality variables. Although it is common in the social sciences to treat these items as continuously measured, this may be inappropriate given the CFA algorithms used in software. A second issue they mentioned is that confirmatory factor analysis is

more likely to succeed when scales have simple structure (high item loadings on only one factor). Self-determination theory argues that the psychological needs are mutually supportive and operate in tandem. In this case, what makes sense in theory might inhibit easy measurement. For example, the second autonomy item on the need satisfaction scale states “I feel like I can pretty much be myself at school.” A student’s strong sense of belonging might intertwine with this perception as much a sense of autonomy.

Findings from the Exploratory Factor Analysis of Each Measure

Given these limitations, I decided to conduct an exploratory factor analysis for each measure. I assumed that providing a more detailed description of how each measure functioned would help me better understand the strengths and weaknesses of their validity for measuring key constructs. For the exploratory factor analysis of each scale, I used maximum likelihood estimation and specified an oblique rotation because I assumed factors to be correlated. I requested extraction of factors when Eigenvalues were greater than 1 (i.e., using Kaiser’s rule). A disadvantage of Kaiser’s rule is that it is a simple heuristic that may easily result in retaining either too few factors or retaining factors that are not meaningful (Pituch & Stevens, 2015). However, given the failure of my confirmatory factor analysis for each measure, I thought this approach was more appropriate than requesting extraction of a hypothesized number of factors. Moreover, I intended to use the rule in combination with scree plots that would help me further evaluate where factors might meaningfully contribute to the explanation of variance.

As part of the exploratory factor analysis of each measure, I obtained bivariate correlations between items and visually inspected whether items seemed to associate with other items on their subscales as expected. Although patterns of bivariate correlations generally followed an expected pattern on the scales measuring autonomy orientations and

features of academic engagement, this was not the case for the Basic Psychological Need Satisfaction in College scale. In general, items on this scale were only modestly correlated with each other. I also obtained tables of communalities that provided an estimate of how much item variance was explained by extracted factors. The post-extraction communalities for items on the autonomy orientation and engagement scales were generally moderate to high. However, communalities for items on the BPNSC tended to be weak or moderate.

For the Autonomy Orientations Scale, I obtained a two-factor solution that explained 61% of the common variance in scores after extraction. As previously noted, the two factors were moderately correlated ($r=0.48$). The rotated factor matrix (Table 6) showed an expected pattern of factor loadings, with every item showing a high correlation with one factor and not the other.

Pilot Study Table 6. Rotated factor matrix from EFA of the Autonomy Orientations Scale.

Item	Item Text	Factor 1 Loading	Factor 2 Loading
ASSERT1	I fight for opportunities to be who I really am.	0.00	0.76
ASSERT2	I fight against the obstacles that prevent me from expressing my interests and desires.	-0.14	0.85
ASSERT3	I always search for ways to express who I am.	0.12	0.66
ASSERT4	I look for every opportunity to express my ideas and opinions.	0.14	0.68
ASSIST1	I feel like I get the chance to be my true self.	0.72	0.07
ASSIST2	My interests are supported by the people in my life.	0.72	0.08
ASSIST3	I feel like my social group (e.g., friends, family) allow me the chance to express myself and my feelings.	0.82	-0.01
ASSIST4	I feel supported by my social environment.	0.92	-0.09

I interpreted the results of this exploratory factor analysis as supportive of the autonomy orientation scale's measurement of the two (asserted and assisted) orientations toward obtaining autonomy satisfaction.

I then turned to the Academic Engagement Scale. With few exceptions, the engagement items loaded as expected across four factors that explained 67% of the variance after extraction. Pilot Study Table 7 (on the following page) presents the rotated factor matrix for the Academic Engagement Scale. The fourth behavioral engagement item, "In this class, I work as hard as I can" did not load as strongly on factor 1 as the other behavioral engagement items. Instead, it showed a similar moderate correlation with factor 2 (associated with agentic engagement items) and factor 4 (associated with emotional engagement items). Information about student effort was perhaps better captured through the third behavioral item, "I try hard to do well in this class." However, this did not pose a major threat to the construct validity of the measure for the purposes of my study because I intended the agentic engagement subscale would be the focus of my primary investigation.

The other Academic Engagement indicator that did not load as expected was the first emotional engagement item, "When we work on something in this class, I feel interested." This item had a moderate loading on the factor associated with other emotional engagement items, yet it was also moderately correlated with the cognitive engagement factor. Silvia (2008) described interest as a "knowledge emotion" (p. 57) because it involves a sense of attraction to learning through novel information or experiences. Interest exemplifies how cognitive processes like attention and evaluation intertwine with emotional processes like the experience of arousal and enjoyment (Harackiewicz, Smith, & Priniski, 2016). In this case, I thought there was clear theoretical justification for the scale's lack of simple structure and chose to retain the item.

Pilot Study Table 7. Rotated factor matrix from EFA of the Academic Engagement Scale.

Item	Item Text	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading	Factor 4 Loading*
BEH_1	When I'm in this class, I listen very carefully.	0.82	0.02	0.15	-0.04
BEH_2	I pay attention in this class.	0.98	-0.03	0.11	-0.08
BEH_3	I try hard to do well in this class.	0.57	0.04	-0.09	0.24
BEH_4	In this class, I work as hard as I can.	0.34	0.31	-0.23	0.27
AGENT_1	I let my teacher know what I need and want.	-0.03	0.97	-0.11	0.04
AGENT_2	I let my teacher know what I am interested in.	-0.09	0.94	0.04	0.03
AGENT_3	During class, I ask questions to help me learn.	0.10	0.65	0.01	-0.01
AGENT_4	During this class, I express my preferences and opinions.	0.01	0.61	0.13	0.05
AGENT_5	When I need something in this class, I'll ask the teacher for it.	0.05	0.69	0.12	-0.07
COG_1	When I study for this class, I try to connect what I am learning with my own experiences.	0.02	0.08	-0.04	0.69
COG_2	I try to make all the ideas fit together and make sense when I study for this class.	0.03	-0.03	0.11	0.76
COG_3	When doing work for this class, I try to relate what I am learning to what I already know.	0.06	-0.10	0.04	0.79
COG_4	I make up my own examples to help me understand the important concepts I study for this class.	-0.05	0.12	0.06	0.56
EMO_1	When we work on something in this class, I feel interested.	0.11	0.15	0.49	0.37
EMO_2	This class is fun.	0.09	0.20	0.74	0.08
EMO_3	I enjoy learning new things in this class.	0.15	-0.08	0.71	0.31
EMO_4	When I'm in this class, I feel good.	0.15	0.21	0.72	-0.02

**To ease interpretation, the sign for all loadings on Factor 4 were reversed.*

Among the three measures, the Basic Psychological Needs Satisfaction in College Scale appeared the least likely to be capturing latent constructs as intended. On the following page, Pilot Study Table 8 presents item loadings across three factors that explained 48% of the common variance after extraction.

Pilot Study Table 8. Rotated factor matrix from EFA of the Basic Psychological Need Satisfaction in College Scale.

Item	Item Text	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading
REL_1	I really like the people I go to school with.	0.74	-0.02	-0.02
REL_2	I get along with people at UT.	0.78	-0.13	-0.04
REL_3	I consider the people I attend UT with to be my friends.	0.81	0.13	0.01
REL_4	There are not many people at UT that I am close to.*	0.28	0.10	0.30
COMP_1	I do not feel very competent with school work.*	-0.02	-0.07	0.58
COMP_2	People at UT tell me I am good at what I do in school.	0.40	-0.14	0.02
COMP_3	I have been able to learn interesting new skills in college.	0.30	-0.36	0.12
COMP_4	Most days I feel a sense of accomplishment from attending class and studying.	0.12	-0.49	0.15
COMP_5	At school, I do not get much of a chance to show how capable I am.*	-0.08	-0.08	0.83
AUT_1	I am free to express my ideas and opinions at school.	0.58	-0.16	0.02
AUT_2	I feel like I can pretty much be myself at school.	0.35	-0.30	0.01
AUT_3	I understand the purpose of my classroom requirements.	-0.01	-0.89	-0.02
AUT_4	I am encouraged by my professors at UT to participate in my classes.	0.07	-0.65	0.13

*Reverse-coded items

The first three relatedness items had strong loadings on the first factor, which was also moderately associated with two competence items. Both of these competence items (competence 2, “People at UT tell me I am good at what I do in school” and competence 3, “I have been able to learn interesting skills in college”) only appeared to share a sense of satisfaction with the other items. I was also surprised to see two autonomy items load on the first factor, with both focused on a sense of free self-expression. I interpreted this to suggest that the first factor in the study was perhaps associated with students’ sense of security among other people at the university.

The fourth relatedness item was only moderately associated with the first factor. I questioned why this item (“There are not many people at UT that I am close to”) joined the first and fifth competence items in loading on Factor 3. Examining these items more closely, they were originally negatively-worded. Thus factor 3 appeared to center more on students’ willingness to endorse items that stated dissatisfaction.

Finally, five items showed moderate to strong loadings on the second factor. These included two competence items (COMP_3 and COMP_4) and the last three autonomy items. Three of these items with relatively strong loadings (COMP_4, AUT_4, and AUT_5) explicitly mentioned classroom learning, while the two items with moderate loadings had also loaded on the first factor. These findings contradicted my expectation that the BPNSC items were representing latent constructs (the three psychological needs) as intended in their measurement of need satisfaction.

Section 3. Investigation of Strategies for Classroom Need Frustration

The pilot survey included six open-response questions designed to elicit information about students’ strategies for responding to need frustration in the classroom. For each psychological need, the first question focused on a general situation where a

student felt need frustration in class. For example, I present the classroom autonomy frustration prompt:

Imagine that a student in one of your classes at UT feels controlled or perceives a lack of freedom in class, or frequently feels forced to do activities that he/she does not value and would not freely choose to do. What are a few things that this student should do to increase his or her sense of *freedom from external control* in class?

The competence and relatedness frustration prompts followed the same format. A student experiencing competence frustration was described as someone who “feels insecure about his/her ability to perform well or successfully learn the material in class,” and a student experiencing relatedness frustration was described as someone who “feels disconnected from the classroom community, or frequently struggles to feel related to the instructor and classmates.” Participants’ responses to these questions were typically brief, listing 1-5 ways of responding to the situation. For example, I present one student’s complete response (exactly as it was entered into the survey) to address the classroom autonomy frustration prompt:

The student could contact the professor and/or TA about how their feeling. They could also talk to an advisor and see if there's another class they can take in place of that one if they truly don't feel comfortable with that particular professor/class.

Each prompt eliciting strategies recommended to increase a sense of need satisfaction in class was immediately followed by a question about what strategies the participant would personally be likely to use (e.g., “What would you personally be most likely to do if you were in that situation and wanted to increase your feeling of freedom from external control in class?”).

Procedure for Analysis of Qualitative Data from the Pilot Study

The analysis of strategies for need frustration in the pilot study relied on the same coding procedure used in the primary investigation, but responses were only coded for their mention of strategies. The strategy codes from the scheme used in the primary investigation were used with minor changes (see Appendix C, Section 5). Help-seeking was expanded into four codes that applied when students mentioned seeking help from the professor, the teaching assistant in class, a trusted peer, or another person outside of class (e.g., university staff, family members). I added two additional codes in place of the “other strategy” code from the primary investigation: *specific study strategies* and *adjusting assignments*. Responses fitting these codes were relatively common in pilot data but rare in the primary investigation. A third new code, *out of class*, was introduced for responses where students suggested that a person should seek need satisfaction from endeavors outside of class. Finally, the code *unsure* was introduced for participants who wrote that they were unsure what they would recommend or personally do in frustrating classroom situations. These four codes (with examples in students’ own words) are presented in Pilot Study Table 9.

Pilot Study Table 9. Codes for pilot data that were not used in the primary investigation.

Code	Definition and examples
Specific study strategies	Participants described concrete behaviors for learning course material <ul style="list-style-type: none">• “Review over the notes learned in class after every day of class.”• “I would take practice exams and concentrate my effort on areas of learning pertaining to the questions I missed.”
Adjust assignments	Participants described expressing interest within constraints of coursework: <ul style="list-style-type: none">• “If a student feels that a course is restricting due to strict guidelines I would say that the student should try to add personal touches to as much as possible.”• “See if there is any way to do the assignment alternatively or change it to fit my interests more.”

Pilot Study Table 9 continued.

Out of class	Participants described tolerating a frustrating class but seeking need satisfaction outside of that class: <ul style="list-style-type: none">• “Find another way to have control, such as doing a solo sport or finding a hobby.”• “I would personally find some more fulfilling things outside of just class/academic focus.”
Unsure	Participants claimed they were unsure what strategies they would use or recommend: <ul style="list-style-type: none">• “I haven’t been in that situation so I’m not sure what I would do.”• “Not sure.”

In the primary investigation, specific study strategies or adjusting assignments to suit personal interests were typically captured by the other strategies code because they were rarely mentioned. In the pilot data, study strategies differed from adjusting effort or beliefs in their content because they were highly specific, and did not simply suggest that spending more time studying, trying harder, or shifting one’s mindset were viable means to improve performance.

Finding ways to adjust assignments to suit personal interests differed from affirming integrity or resisting expectations because it typically involved accepting the constraints of assignments, but finding ways to add value by incorporating personal interests. That is, although adjusting assignments and affirming integrity both draw on personal values as a resource for satisfaction, the former was more often associated with specific coursework and making decisions about its content or presentation.

The code for seeking need satisfaction out of class was not useful in the primary investigation given the wide-ranging variety of situations that were described for need satisfaction or frustration. When students experiencing frustration in classrooms suggested looking to other endeavors as a source of satisfaction (e.g., “Get a hobby. It sounds bad, but sometimes you just have to deal with classes you don't like”), it was typically coded as acceptance in the primary investigation. Within the pilot data, the suggestion of looking to

outside endeavors rather than classroom experiences was distinguished from simply tolerating a frustrating situation.

Finally, because some participants explicitly stated that they were not sure what they would recommend to a friend or personally do in situations of need frustration, the unsure code distinguished these responses from those that simply provided low information (as when a participant wrote they would recommend a friend “do something about it” when feeling frustrated with competence in the classroom, or another wrote “n/a” for situations of classroom autonomy frustration).

To analyze the pilot survey data using this expanded coding scheme, I first applied codes to all participants’ responses to the prompts that elicited strategies recommended to others. Next, I coded participants’ descriptions of what they personally would be likely to do in each situation. A majority of participants said that they would be likely to use the same strategies that they recommended to another person when experiencing classroom frustration of autonomy (57%), competence (54.8%), or relatedness (58%). In cases where participants wrote that they would use the same strategies (e.g., “I’d be likely to do the same thing” or “I would do what I just wrote”), the same codes from the previous response were applied again. I then counted the number of participants who mentioned each strategy and calculated each one as a percentage of the larger sample.

Findings: Strategies for Classroom Need Frustration

On the next three pages, Pilot Study Tables 10, 11, and 12 respectively present findings for classroom autonomy, competence, and relatedness frustration. The tables summarize the number and proportion of participants who recommended or endorsed each strategy for the sample overall, as well as the subsets of first-generation and continuing-generation students.

Pilot Study Table 10.

Number and percentage of pilot study participants who mentioned each strategy to address classroom autonomy frustration.

	Recommended to others						Endorsed for personal use					
	Entire sample (n=221)		First-gen (n=117)		Continuing-gen (n=104)		Entire sample (n=221)		First-gen (n=117)		Continuing-gen (n=104)	
	n	%	n	%	n	%	n	%	n	%	n	%
Avoid	13	5.9%	6	5.1%	7	6.7%	23	10.4%	14	12.0%	9	8.7%
Accept	21	9.5%	9	7.7%	12	11.5%	37	16.7%	19	16.2%	18	17.3%
Affirm Integrity	21	9.5%	6	5.1%	15	14.4%	17	7.7%	4	3.4%	13	12.5%
Collaborate	4	1.8%	2	1.7%	2	1.9%	3	1.4%	1	0.9%	2	1.9%
Express thoughts	26	11.8%	9	7.7%	17	16.3%	22	10.0%	8	6.8%	14	13.5%
Reach out	3	1.4%	1	0.9%	2	1.9%	2	0.9%	0	0.0%	2	1.9%
Adjust Standards	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Adjust Effort or Beliefs	30	13.6%	18	15.4%	12	11.5%	30	13.6%	18	15.4%	12	11.5%
Self-care	7	3.2%	6	5.1%	1	1.0%	6	2.7%	4	3.4%	2	1.9%
Find a better fit	1	0.5%	0	0.0%	1	1.0%	0	0.0%	0	0.0%	0	0.0%
Seek help from professor	93	42.1%	45	38.5%	48	46.2%	67	30.3%	36	30.8%	31	29.8%
Seek help from TA	21	9.5%	12	10.3%	9	8.7%	22	10.0%	11	9.4%	11	10.6%
Seek help from a peer	15	6.8%	7	6.0%	8	7.7%	25	11.3%	11	9.4%	14	13.5%
Seek help from other	23	10.4%	11	9.4%	12	11.5%	24	10.9%	11	9.4%	13	12.5%
Reflect	7	3.2%	5	4.3%	2	1.9%	5	2.3%	3	2.6%	2	1.9%
Support others	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Study Strategies	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Adjust Assignments	15	6.8%	8	6.8%	7	6.7%	10	4.5%	4	3.4%	6	5.8%
Out of Class	9	4.1%	3	2.6%	6	5.8%	9	4.1%	4	3.4%	5	4.8%
Unsure	1	0.5%	0	0.0%	1	1.0%	2	0.9%	0	0.0%	2	1.9%

Pilot Study Table 11.

Number and percentage of pilot study participants who mentioned each strategy to address classroom competence frustration.

	Recommended to others						Endorsed for personal use					
	Entire sample (n=221)		First-gen (n=117)		Continuing-gen (n=104)		Entire sample (n=221)		First-gen (n=117)		Continuing-gen (n=104)	
	n	%	n	%	n	%	n	%	n	%	n	%
Avoid	1	0.5%	1	0.9%	0	0%	1	0.5%	1	0.9%	0	0%
Accept	1	0.5%	1	0.9%	0	0%	2	0.9%	1	0.9%	1	1%
Affirm Integrity	5	2.3%	2	1.7%	3	3%	4	1.8%	2	1.7%	2	2%
Collaborate	47	21.3%	18	15.4%	29	28%	36	16.3%	11	9.4%	25	24%
Express thoughts	14	6.3%	7	6.0%	7	7%	8	3.6%	4	3.4%	4	4%
Reach out	12	5.4%	6	5.1%	6	6%	12	5.4%	6	5.1%	6	6%
Adjust Standards	5	2.3%	3	2.6%	2	2%	2	0.9%	1	0.9%	1	1%
Adjust Effort or Beliefs	83	37.6%	35	29.9%	48	46%	83	37.6%	41	35.0%	42	40%
Self-care	7	3.2%	3	2.6%	4	4%	6	2.7%	2	1.7%	4	4%
Find a better fit	0	0.0%	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%
Seek help from professor	119	53.8%	59	50.4%	60	58%	100	45.2%	53	45.3%	47	45%
Seek help from TA	40	18.1%	24	20.5%	16	15%	29	13.1%	16	13.7%	13	13%
Seek help from a peer	67	30.3%	33	28.2%	34	33%	74	33.5%	38	32.5%	36	35%
Seek help from other	26	11.8%	17	14.5%	9	9%	25	11.3%	16	13.7%	9	9%
Reflect	2	0.9%	1	0.9%	1	1%	2	0.9%	1	0.9%	1	1%
Support others	0	0.0%	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%
Study Strategies	36	16.3%	21	17.9%	15	14%	33	14.9%	18	15.4%	15	14%
Adjust Assignments	1	0.5%	0	0.0%	1	1%	0	0.0%	0	0.0%	0	0%
Out of Class	0	0.0%	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%
Unsure	1	0.5%	0	0.0%	1	1%	0	0.0%	0	0.0%	0	0%

Pilot Study Table 12.

Number and percentage of pilot study participants who mentioned each strategy to address classroom relatedness frustration.

	Recommended to others						Endorsed for personal use					
	Entire sample (n=221)		First-gen (n=117)		Continuing-gen (n=104)		Entire sample (n=221)		First-gen (n=117)		Continuing-gen (n=104)	
	n	%	n	%	n	%	n	%	n	%	n	%
Avoid	1	0.5%	1	0.9%	0	0%	2	0.9%	2	1.7%	0	0%
Accept	2	0.9%	1	0.9%	1	1%	20	9.0%	11	9.4%	9	9%
Affirm Integrity	4	1.8%	2	1.7%	2	2%	2	0.9%	2	1.7%	0	0%
Collaborate	50	22.6%	24	20.5%	26	25%	39	17.6%	17	14.5%	22	21%
Express thoughts	52	23.5%	32	27.4%	20	19%	52	23.5%	31	26.5%	21	20%
Reach out	141	63.8%	63	53.8%	78	75%	131	59.3%	62	53.0%	69	66%
Adjust Standards	0	0.0%	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%
Adjust Effort or Beliefs	19	8.6%	13	11.1%	6	6%	15	6.8%	9	7.7%	6	6%
Self-care	1	0.5%	0	0.0%	1	1%	2	0.9%	0	0.0%	2	2%
Find a better fit	2	0.9%	1	0.9%	1	1%	1	0.5%	1	0.9%	0	0%
Seek help from professor	54	24.4%	31	26.5%	23	22%	32	14.5%	17	14.5%	15	14%
Seek help from TA	10	4.5%	5	4.3%	5	5%	7	3.2%	3	2.6%	4	4%
Seek help from a peer	17	7.7%	6	5.1%	11	11%	13	5.9%	4	3.4%	9	9%
Seek help from other	7	3.2%	6	5.1%	1	1%	5	2.3%	4	3.4%	1	1%
Reflect	2	0.9%	2	1.7%	0	0%	0	0.0%	0	0.0%	0	0%
Support others	0	0.0%	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%
Study Strategies	0	0.0%	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%
Adjust Assignments	0	0.0%	0	0.0%	0	0%	0	0.0%	0	0.0%	0	0%
Out of Class	17	7.7%	11	9.4%	6	6%	17	7.7%	9	7.7%	8	8%
Unsure	1	0.5%	0	0.0%	1	1%	2	0.9%	0	0.0%	2	2%

Overall, the most common strategy for autonomy frustration in class was to seek help from the professor (93 participants, 42.1%), but 29 more students recommended this to others than said they would personally do it. The second most commonly recommended strategy was adjusting efforts or beliefs (13.6%, 30 participants), a strategy equally recommended and endorsed for personal use. However, the second most common strategy that students said they personally would use was accepting the situation (16.7%, 37 participants). Expressing thoughts or seeking help from other people outside of class were strategies recommended by 10-11% of participants overall. When describing strategies they would personally use in a class where they felt autonomy frustration, similar proportions of students said they would seek help from a trusted peer, the teaching assistant for the class, or someone outside of the class (strategies mentioned by 10-11% of all participants).

As in situations of classroom autonomy frustration, seeking help from the professor was also the most commonly recommended strategy for competence frustration, mentioned by over half of the sample (53.8%, 119 participants). Again, more students (19 participants) recommended this strategy than said they would personally seek help from the professor. The second most common strategy recommended or endorsed for personal use was adjusting effort or beliefs (83 participants, 37.6%), with no difference in the number who recommended the strategy or claimed that they would personally try to spend more time studying or change their mindset about the class. The third most common strategy recommended for competence frustration was seeking help from a trusted peer, which 30.3% of participants recommended and 33.5% said they personally would do in the situation. Overall, strategies for competence frustration in class were also distinguished by the necessity of a new code to capture instances of highly specific study strategies: similar

proportions of students recommended (16.3%) or personally endorsed (14.9%) such techniques as self-testing (e.g., “answer as many practice questions as possible”), methods of note-taking or using notes (e.g., “take comprehensive notes in my own words”), or elaboration (“go back to basics of what you know and relate back to the topic”). If these strategies were to be combined with adjusting effort, the category would have represented 53-54% of strategies recommended or endorsed for personal use.

For relatedness frustration in the classroom, the most common strategy recommended and endorsed was reaching out to a classmate to try to start a friendship (63.8% or 141 participants recommended this strategy, 59.3% or 131 participants said they would personally do it). Seeking help from the professor was the second most common strategy recommended (24.4%, 54 participants) but 22 fewer students (32 participants, 14.5%) said they would actually use this strategy themselves. The third most common strategy that students would personally use was expressing thoughts and opinions in class, with mentions of speaking up during class discussions or sharing thoughts and feelings with others (typically peers) in class. Expressing thoughts and opinions was equally recommended and endorsed for personal use (52 participants, 23.5%). A similar proportion of students recommended collaborating with classmates in group work or study groups to address relatedness frustration (22.6%, 50 participants), a strategy that participants also claimed they would personally use (17.6%, or 39 participants).

Looking across the three psychological needs, there were three strategies where the percentage of continuing-generation students exceeded that of first-generation students by more than 10%. First, when describing strategies for competence frustration in the classroom, 28% of continuing-generation students recommended collaborating with classmates, versus 15.4% of first-generation students who recommended collaboration. A

greater proportion of continuing-generation students also said they would personally collaborate with classmates to address competence frustration in class. Second, a greater proportion of continuing generation students (46%) recommended adjusting effort or beliefs to address competence frustration in class, which far exceeded the proportion of first-generation students who would tell a friend to increase effort or “study harder” (29.9%). Third, when describing recommended or personal strategies for relatedness frustration, continuing-generation students more commonly described reaching out to a classmate to try to start a new relationship: 75% of continuing-generation students recommended this strategy and 66% said that they personally would reach out, while roughly 53% of first-generation students recommended or endorsed the strategy.

Finally, acceptance and seeking need satisfaction out of class (which would typically be coded as acceptance in the primary investigation) were two codes that distinguished classroom strategies for autonomy or relatedness frustration from the strategies for competence frustration. In both autonomy frustration and relatedness, more participants said they would simply accept the situation than would recommend acceptance to a friend (16 for autonomy, and 18 for relatedness). This was not observed in students’ strategies for competence frustration, where only one or two recommended or endorsed the idea of simply accepting a sense of incompetence in class, and none suggested that a feeling of incompetence could be eased by looking to endeavors outside of the classroom.

Section 4: Discussion of Findings from the Pilot Study

The investigation of measures used in the pilot survey provided useful context for the primary investigation by offering insight into construct validity. First, the confirmatory factor analysis of each measure did not result in good fit to the data obtained. However,

exploratory analysis resulted in a two factor solution for the autonomy orientations scale, and these two factors were respectively associated with the assisted and asserted autonomy orientation indicators. Similarly, a four factor solution for the overall Academic Engagement Scale appeared to distinguish agentic engagement items from those that were intended to assess cognitive, behavioral, and emotional engagement. Thus, I found no reason to assume that these measures failed to capture their latent constructs as intended. In contrast, my exploratory factor analysis of the Basic Psychological Needs Satisfaction in College Scale led me to conclude that this measure does not neatly correspond to the three psychological needs. Instead, its items appeared to indicate a sense of security among other people at the university, satisfaction centered around learning or attending class, and dissatisfaction.

The findings from an investigation of students' strategies for classroom need satisfaction complemented the primary investigation by demonstrating a clear role for professors in supporting their students: students consistently suggested seeking help from professors to address classroom frustration with autonomy, competence, or relatedness. This expanded the picture developed by the primary qualitative investigation, in which strategies that involved others tended to involve peers. This primary investigation finding was also mirrored in the pilot survey responses by the popularity of reaching out to classmates or collaborating to boost relatedness. Seeking help from peers to boost competence in class was also a common strategy for competence frustration. It was interesting to observe that many students recommended boosting need satisfaction out of class by joining student organizations or pursuing extracurricular activities, given the prominence of student organizations and extracurricular activities as satisfying features of college life that first-generation students described in the primary investigation. In the pilot

survey, the popularity of adjusting effort or beliefs to accommodate a frustrating classroom situation also mirrored findings from the larger study. The finding that almost half of students would employ different strategies than those recommended for a friend also highlights how asking participants about their experiences in the primary investigation was unlikely to fully represent their knowledge of potential strategies for managing motivation.

APPENDIX B: COMPLETE SURVEY TEXT

This section presents the complete text of the survey used to collect data for the primary investigation. Notes on survey flow or response options are indicated with italics. Variable names are bracketed (e.g., [BPNSC Autonomy 1] for the first autonomy subscale item on the Basic Psychological Need Satisfaction in College scale). To ease interpretation, items from scales or subscales are presented together although they were mixed within survey sections.

Section 1. Consent Form

You are invited to take part in this study examining student beliefs, motivation, and experiences in the college classroom. This page will provide you with information about the study. Please read the following information before deciding whether or not to take part.

If you have any questions or concerns about this study, please contact Jen Freeman by phone at 512-417-8725 or by email at JLFreeman@utexas.edu. This research is being conducted by Jen Freeman and Diane Schallert, researchers within the Department of Educational Psychology at the University of Texas at Austin.

The purpose of this study is to better understand the different beliefs and experiences among college students and their motivation in the classroom. Participation in this study involves responding to an online survey. It is expected that this survey will take 30 minutes of your time to complete. Risks of participation in this study are no greater than those encountered in daily life. All information you provide will not be linked to your name to protect your privacy. All responses will be confidential.

There is no direct benefit to be gained from your participation. However, society may benefit in general from your participation in this research as we continue to develop our understanding of college students' experiences. At the end of the study, you will be asked to email the researcher to confirm your participation.

The researchers will aim to protect your confidentiality and privacy. Your responses will only be seen by the researchers involved in this project, and results will be reported regarding participants as a group. Your individual information will not be shared and you will not be identified in any materials shared with others outside of the research group.

The records of this study will be stored securely and kept confidential. If it becomes necessary for the Institutional Review Board to review the study records, information that can be linked to you will be protected to the extent permitted by law. The data resulting from your participation may be made available to other researchers in the future for purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate it with you.

This study is being conducted under the oversight of the Institutional Review Board. If you would like to obtain information about this study or discuss concerns with someone unaffiliated with this project, please contact the Institutional Review Board office by phone at 512-471-8871 or by email at orsc@uts.cc.utexas.edu. The IRB reference number for this study is 2018-02-0008. By clicking to proceed, you indicate that you have read the information above and wish to participate in this study. You may withdraw your participation at any time.

Section 2. Demographic Items

Please complete the following questions regarding your background characteristics.

[Age] What is your age (in number of years)? For example, type 18 if you turned 18 years old on your last birthday. (*provide number*)

[Sex] What is your sex? (*select option, optional open response*)

Female

Male

Prefer to self-describe:

[RaceEthnicity] Which of the following best describes your race/ethnicity? Please select all that apply. (*select option, optional open response*)

African-American/Black (please specify ethnic group if applicable)

Hispanic-American/Latino/Chicano (please specify ethnic group if applicable)

Native American (please specify ethnic group if applicable)

Asian-American (please specify ethnic group if applicable)

Caucasian/European-American (please specify ethnic group if applicable)

Middle Eastern/Arab American (please specify ethnic group if applicable)

Multiracial (Please specify)

Other (please specify)

[MomEducation] What is your mother's highest level of education completed? (*select option*)

- Did not complete high school
- High school diploma or GED
- Some college
- Associate's or 2-year degree
- Bachelor's or 4-year degree
- Graduate degree
- I don't know

[DadEducation] What is your father's highest level of education completed? (*select option*)

- Did not complete high school
- High school diploma or GED
- Some college
- Associate's or 2-year degree
- Bachelor's or 4-year degree
- Graduate degree
- I don't know

[GradeLevel] Your class standing can best be described as: (*select option*)

- Freshman
- Sophomore
- Junior
- Senior
- Other (Please Specify)

[International] Are you an international student? (*select option*)

- Yes
- No

If yes, display this question:

[Country] What is your country of origin? (*open response*)

[SocialClassLadder] What is your socioeconomic background? The highest number (10) represent the people who are the best off, those who have the most money, most

education, and best jobs. At the bottom (1) are the people who are the worst off, those who have the least money, least education, and worst jobs or no job. Indicate the number that best reflects your situation. (*select option*)

[SES] What do you consider your socioeconomic status to be? (*select option, optional open response*)

- Working class
- Middle class
- Upper middle class
- Upper class
- Other (please describe)

Major What is your academic major? (*open response*)

For example, academic majors include things like computer science or marketing or undeclared.

[GPA] What is your current cumulative GPA in college? (*enter number*)

[FGSprograms] Have you ever participated in any of the following programs at UT Austin? The Longhorn Link Program or Longhorn Scholars Program, McNair Scholars, the First Abroad Initiative, the University Leadership Network, or the Discovery Scholars Program. (*select option*)

- Yes
- No
- I'm not sure

Section 3. Autonomy Orientations and Self-construal

For each of the following statements, please rate how your level of agreement using the following scale:

1 = Strongly Disagree, 4 = Neutral, 7 = Strongly Agree (*select option*)

[Assisted Autonomy 1] I feel like I get the chance to be my true self.

[Assisted Autonomy 2] I feel like my social groups allow me the chance to express myself and my feelings.

[Assisted Autonomy 3] My interests are supported by the people in my life.

[Assisted Autonomy 4] I feel supported by my social environment.

[Asserted Autonomy 1] I look for every opportunity to express my ideas and opinions.

[Asserted Autonomy 2] I always search for ways to express who I am.

[Asserted Autonomy 3] I fight for opportunities to be who I really am.

[Asserted Autonomy 4] I fight against the obstacles that prevent me from expressing my interests and desires.

[Interdependent Self-Construal 1] I will sacrifice my self-interest for the benefit of the group I am in.

[Interdependent Self-Construal 2] My happiness depends on the happiness of those around me.

[Interdependent Self-Construal 3] I often have the feeling that my relationships with others are more important than my own accomplishments.

[Interdependent Self-Construal 4] If my brother or sister fails, I feel responsible.

[Interdependent Self-Construal 5] I will stay in a group if they need me, even if I am not happy with the group.

[Independent Self-Construal 1] I prefer to be direct and forthright when dealing with people I've just met.

[Independent Self-Construal 2] I'd rather say "No" directly, than risk being misunderstood.

[Independent Self-Construal 3] I act the same way no matter who I am with.

[Independent Self-Construal 4] I do my own thing, regardless of what others think.

[Independent Self-Construal 5] I act the same way at home that I do at school.

Section 4. Pre-college Messages about College and Motives for College

Think about pre-college information you received. Before students enter college, they often receive information or messages about university from their family members, friends, school staff, the media, or other sources of information.

What are three messages that YOU remember receiving about college before you came to university? Please list the message source (e.g., "high school teacher" or "mom") and briefly describe the message that you remember from that source (e.g., "college coursework is harder than the coursework we do in high school so you need to develop

good study habits now" or "you need to apply for financial aid early if you're going to afford your tuition").

Source 1 (*open response*)

Message from Source 1 (*open response*)

Source 2 (*open response*)

Message from Source 2 (*open response*)

Source 3 (*open response*)

Message from Source 3 (*open response*)

What are your most important reasons for attending college?

For each of the following statements, please rate how your level of agreement using the following scale:

1 = Strongly Disagree, 4 = Neutral, 7 = Strongly Agree (*select option*)

My most important goal attending college is to... (*select option*)

[Independent Motives 1] Become an independent thinker.

[Independent Motives 2] Expand my knowledge of the world.

[Independent Motives 3] Explore new interests.

[Independent Motives 4] Explore my potential in many domains.

[Independent Motives 5] Learn more about my interests.

[Independent Motives 6] Expand my understanding of the world.

[Interdependent Motives 1] Help my family out after I'm done with college.

[Interdependent Motives 2] Be a role model for people in my community.

[Interdependent Motives 3] Bring honor to my family.

[Interdependent Motives 4] Show that people with my background can do well.

[Interdependent Motives 5] Give back to my community.

[Interdependent Motives 6] Provide a better life for my own children.

Section 5. Open-Response Questions regarding College Experiences

Now focus on your college experiences. The following six questions are the final open-response questions in the survey. Your responses to these questions are incredibly valuable, so please take your time to carefully read and answer each one.

[Autonomy Satisfaction] Think of the moment or situation when, as a college student, you felt autonomy - like you were doing something because of your personal goals, interests, or values. Autonomy is a sense of personal freedom, that one's actions are fully self-chosen. Please describe the college experience that made you feel this sense of autonomy. When did this experience happen, where were you, what was the situation, and what were you doing? (*open response*)

[Autonomy Frustration] Now think of a time when, as a college student, you have felt the opposite of autonomy - like you were only doing something because of outside pressure (e.g., the need to earn a reward or positive evaluation) or a desire to avoid negative consequences (e.g., social disapproval or feeling guilty). What was the situation, and how did you respond? What strategies did you use to change the situation or overcome that feeling? (*open response*)

[Competence Satisfaction] Think of the moment or situation when, as a college student, you felt competence - like you were capable of achieving your goals or knew that you had the knowledge and ability to succeed. Competence usually involves a sense of confidence about your ability to achieve. Please describe the college experience that made you feel this sense of competence. When did this experience happen, where were you, what was the situation, and what were you doing? (*open response*)

[Competence Frustration] Now think of a time when, as a college student, you have felt the opposite of competence - like you did not have the knowledge or ability that you needed to be successful. What was the situation, and how did you respond? What strategies did you use to change the situation or overcome that feeling? (*open response*)

[Relatedness Satisfaction] Think of the moment or situation when, as a college student, you felt relatedness - a sense of belonging or feeling that you are connected to others. Relatedness usually involves feeling security and warmth from relationships with other people. Please describe the college experience that made you feel this sense of relatedness. When did this experience happen, where were you, what was the situation, and what were you doing? (*open response*)

[Relatedness Frustration] Now think of a time when, as a college student, you have felt the opposite of relatedness - like you did not belong or felt distant from other people around you. What was the situation, and how did you respond? What strategies did you use to change the situation or overcome that feeling? (*open response*)

Section 6. Overall Need Satisfaction in College

Keep thinking about your experiences at college in general.

For each of the following statements, please rate how your level of agreement using the following scale:

1 = Strongly Disagree, 4 = Neutral, 7 = Strongly Agree (*select option*)

[BPNSC Autonomy 1] I am free to express my ideas and opinions at school.

[BPNSC Autonomy 2] I feel like I can pretty much be myself at school.

[BPNSC Autonomy 3] I understand the purpose of my classroom requirements.

[BPNSC Autonomy 4] I am encouraged by my professors at UT to participate in my classes.

[BPNSC Competence 1] I do not feel very competent with school work.

[BPNSC Competence 2] People at UT tell me I am good at what I do in school.

[BPNSC Competence 3] I have been able to learn interesting new skills in college.

[BPNSC Competence 4] Most days I feel a sense of accomplishment from attending class and studying.

[BPNSC Competence 5] At school, I do not get much of a chance to show how capable I am.

[BPNSC Relatedness 1] I really like the people I go to school with.

[BPNSC Relatedness 2] I get along with people at UT.

[BPNSC Relatedness 3] I consider the people I attend UT with to be my friends.

[BPNSC Relatedness 4] There are not many people at UT that I am close to.

Section 7. Identification of a Specific Course

Please choose one of your classes (that you are taking this semester) to focus on during the final section of this survey. Please do NOT choose the class that assigned you to complete the subject pool requirement. You will be asked to think about how the class instructor interacts with students, and to reflect on how you personally feel about the class. Your responses will be kept confidential.

[Class Name] What is the name of the class you would like to focus on for the rest of the survey? Examples: Introduction to the study of society or Genetics (*open response*)

[Course Number] If known, what is the course number for the class you would like to focus on for the rest of the survey? Examples: SOC 302 or BIO 325 (*open response*)

[Major] Is this class for your major? (*select option*)

Yes

No

[Class Importance] How important is this class to you personally, on a scale from 1 (not at all important) to 7 (extremely important)? (*select option*)

1 - extremely unimportant

2 - not important

3 - mostly not important

4 - neutral

5 - somewhat important

6 - important

7 - extremely important

[Class Size] How many people would you estimate are in this class with you? (*select option*)

Under 30 students

30-60 students

60-100 students

100-300 students

More than 300 students

Section 8. Classroom Supportive Practices and Engagement

Think about your experience in [Class Name]. Please use the following scale to rate how much you agree with each of the following statements regarding the instructor that teaches [Class Name].

1 = Strongly Disagree, 4 = Neutral, 7 = Strongly Agree (*select option*)

[Class Autonomy 1] My instructor allows me to make choices about topics or assignments in this class.

[Class Autonomy 2] My instructor explains why what we are learning in class is important or useful for my goals.

[Class Autonomy 3] My instructor asks for student opinion or feedback about this class and assignments.

[Class Autonomy 4] My instructor acknowledges that he/she understands my perspective as a student.

[Class Autonomy 5] My instructor designs lessons and activities around students' interests.

[Class Autonomy 6] My instructor is strict about students doing everything his or her way in this class.

[Class Competence 1] My instructor's rules and procedures for this class are very clear and fair.

[Class Competence 2] My instructor provides activities that are well-matched to my skills in this class.

[Class Competence 3] My instructor gives useful feedback on how I can improve in this class.

[Class Competence 4] In this class, the instructor tells students that everyone can succeed if they make an effort.

[Class Competence 5] My instructor makes it difficult to meet his/her expectations for coursework.

[Class Competence 6] My instructor provides clear instructions on how to accomplish tasks in this class.

[Class Relatedness 1] My instructor demonstrates how to treat everybody with respect in this class.

[Class Relatedness 2] My instructor acts like he/she cares about me as a student.

[Class Relatedness 3] My instructor encourages students to understand other students' perspectives in this class.

[Class Relatedness 4] My instructor does NOT care about students' lives outside of this class.

[Class Relatedness 5] Students can depend on this instructor to support them no matter how they struggle.

[Class Relatedness 6] My instructor creates activities where students cooperate and help each other learn.

Continue to think about your experience in the same class. Rate how much you agree with each of the following statements regarding your experience in that specific class.

1 = Strongly Disagree

4 = Neutral
7 = Strongly Agree
(select option)

[AES Behavioral Engagement 1] When I'm in this class, I listen very carefully.
(behavioral1)

[AES Behavioral Engagement 2] I pay attention in this class. (behavioral2)

[AES Behavioral Engagement 3] I try hard to do well in this class. (behavioral3)

[AES Behavioral Engagement 4] In this class, I work as hard as I can. (behavioral4)

[AES Agentic Engagement 1] I let my teacher know what I need and want.

[AES Agentic Engagement 2] I let my teacher know what I am interested in.

[AES Agentic Engagement 3] During class, I ask questions to help me learn.

[AES Agentic Engagement 4] During this class, I express my preferences and opinions.

[AES Agentic Engagement 5] When I need something in this class, I'll ask the teacher for it.

[Expanded Agentic Engagement 1] If I think that the instructor's behavior is unfair, I tell him/her.

[Expanded Agentic Engagement 2] If I don't agree with the instructor's statement, I tell him/her.

[Expanded Agentic Engagement 3] I make sure that my instructor understands if there is something I don't like about this class.

[Expanded Agentic Engagement 4] During class, it can happen that I introduce new issues or topics.

[Expanded Agentic Engagement 5] I defend my opinions even if they are not in line with those of my classmates.

[Attention Check] Select 1 for Strongly Disagree if you are paying attention to this survey.

[AES Cognitive Engagement 1] When I study for this class, I try to connect what I am learning with my own experiences.

[AES Cognitive Engagement 2] I try to make all the different ideas fit together and make sense when I study for this class.

[AES Cognitive Engagement 3] When doing work for this class, I try to relate what I'm learning to what I already know.

[AES Cognitive Engagement 4] I make up my own examples to help me understand the important concepts I study for this class.

[AES Emotional Engagement 1] When we work on something in this class, I feel interested.

[AES Emotional Engagement 2] This class is fun.

[AES Emotional Engagement 3] I enjoy learning new things in this class.

[AES Emotional Engagement 4] When I'm in this class, I feel good.

Section 9. Survey Conclusion

This question will help us verify you completed the survey and assign credit for completion. Please enter your EID. (*open response*)

After you click to submit your EID below, make sure you read the final instructions to email the researcher for study credit!

APPENDIX C: COMPLETE CODING SCHEME FOR THE QUALITATIVE INVESTIGATION

Section 1. Features of College Life

Participants described situations of need satisfaction or frustration that they experienced "as a college student." What theme or situation dominates their description of the college experience? That is, what about the student's story makes it a story about life as a college student?

CODE	DEFINITION	EXAMPLES
Adult freedoms and responsibilities	Managing everyday freedoms and responsibilities associated with adulthood - organizing one's schedule, looking after chores and bills, transportation, living space, etc. Also includes stories focused on learning to manage or balance the various demands of life, work, and school while attending college.	"Having the ability to decorate my apartment how I want" "When I figured out how to take the bus and do my own grocery shopping" "When I kept sleeping through my classes because I stayed up too late"
Distance from origins, family or hometown	The student's family home, hometown, or social world before college. Preoccupied with the family or old friends, or returning to the hometown as a visitor. Also includes stories where the primary focus is tension between academic goals and maintaining relationships with home.	"When it was hard to keep up with my classes because my parents expected me to travel home every weekend" "When I went back to see my old high school friends over break and we didn't have as much in common" "During my first semester I struggled because I was homesick all the time"
Classroom contexts	Experiences tied to attending a specific class (or classes) - the learning environment, in-class time, classroom interactions, course material, class requirements, activities, and assessments. This includes experiences tied to the social world of a classroom or series of classes with a cohort.	"During discussions in my Child Development class" "When I attend honors seminars each semester for my honors program" "When my professor was discussing Derrida"
Leisure time and socializing	Free time focused on unstructured activities, fun, or relaxation. Watching Netflix, going out with friends, etc. Includes stories focused on attending parties, conversations with friends, time alone engaging in hobbies, etc.	"When I have nothing to do for a long time and everyone else is busy..." "When I went to a party for people involved in Greek Life" "When my frat brothers and I went to Galveston for spring break"

CODE	DEFINITION	EXAMPLES
Specialization and paths of study	The diversity of majors, classes, or domains where students can develop expertise. The student described feelings directed toward entire fields or domains, selecting their major, the process of selecting classes to take, etc. These situations are often looking toward the future.	"When I decided not to major in journalism anymore" "When I earned a certificate in small business management as a music major" "When I realized that Speech Pathology is what I want to do with my life" "During Spring registration when I was evaluating potential classes to take"
Academic requirements	An experience centered on meeting/struggling to meet the demands of coursework or graduation in general. The rules for satisfactory progress towards the student's degree or larger academic goal, requirements for graduation or receiving financial aid, GPA cutoffs for continued membership in the university or major.	"When my advisor told me I was on track to graduate" "I have been struggling to keep my GPA above a 3.0 because of mental health issues and life issues" "When I heard that I was on academic probation" "One semester I needed an internship to keep my scholarship... I stretched myself too thin"
Transition into university culture	An experience focused on different practices between the students' origins/background and the university or people within it. Culture shock, widespread conventions for how classes are taught or structured, an overall sense that the way people do things at UT is novel or challenging.	"The teaching styles of college professors are hard to get used to" "Being in a bunch of giant 200 plus people classes..." "I was not as prepared for UT as other people because my high school was not academically rigorous"
The broader university community	An experience focused on broad perceptions of the university community, practices in the student body perceived to be widely shared, student culture, or beliefs about what everyone else is doing.	"Getting used to the party culture here at UT" "Everyone here knows what they are doing with their lives and has a ton of friends" "None of the other students here get dressed up for their classes so I stopped dressing up too"
Office hours	Out-of-class interactions (not necessarily in office hours) with a professor, teacher, or TA.	"I went to office hours to talk to the TA about..." "When I was meeting with my professor and she told me I should apply to graduate schools"
Study abroad	Spending a semester travelling to study in another country, or an experience focused on intentionally travelling to a place or culture that is distinct from the students' home and the university. May include stories about the intention to study abroad/application process.	"When I spent a semester studying in Spain" "When I decided to study abroad and apply for the scholarships I would need for the trip" "When I went to Thailand because I wanted to experience a new culture and see the world."

CODE	DEFINITION	EXAMPLES
Extracurricular activities and organizations	Participating in structured activities, typically with other people who are formally organized around shared goals, culture, or interests. Organizations include those focused on social goals (e.g., sororities, ethnic student societies), expressing faith or heritage (church groups, ethnic associations), skills or performance (drama club, athletics), or academic integration (e.g., first-year interest groups, University Leadership Network).	"When I applied to a variety of student organizations to find friends" "When I decided to pursue my faith more, joining a ministry on campus" "When I joined UT's fashion magazine" "When I started volunteering at the campus radio station"
Previous academic institutions	Experiences attending or transferring from previous academic institutions (high school, other colleges).	"When I trying to keep my grades up at ACC so that I could transfer..." "In classes at my previous college..."
Study outside of class	Time and effort directed towards completing coursework, academic learning, and preparing for class that does not occur in the classroom.	"Trying to get ready for a big exam in my Psych class" "When I went to a study group..." "When I got on youtube to teach myself coding"
University events	Organized events that are designed to bring together the larger university community or specific groups within UT.	"When I attended the 'Gone to Texas' event" "When I went to New Black Students Weekend" "When some friends took me to my first UT football game"
Current events and social issues	The student primarily focuses on feelings about large social problems or current events. National elections, contentious or difficult topics in larger conversations in the media or broader society.	"I felt very disconnected from my fellow students the day after the 2016 election" "When I hear media stories about sexual assault" "The presidential election and the midterm elections have made me feel very distant"
Career development, work, and internships	Experiences that occur while the student is participating in activities at the workplace or activities he/she describes as career-building (whether the work is paid or unpaid). If the focus of the story is an entire field, code the experience as "Specialization and paths of study" instead.	"When I started sending out resumes and updated my LinkedIn profile Junior year" "When my boss at work told me I was reliable" "When I attended my first research conference to network and present a poster for my lab"
Other situation	A catch-all code when a response does not fit any of the other codes in this category.	"As an introvert, I actually love avoiding social interaction... It is hard to speak to people sometimes..."

Section 2. Relationships

Although roles and relationships are almost always implied by participants' descriptions of college life, these codes focus on the person(s) that were salient enough actors in the situation that their role in support or frustration was explicitly mentioned in a student's account.

CODE	DEFINITION	EXAMPLES
Family	Any family member: parent, sibling, cousin, grandparent, spouse, relatives in general.	"My grandfather told me that I was wasting my fancy college degree" "My parents gave me a car to use for my time in Austin" "I talked to my sister and she..."
Instructors or Tas	Instructional staff who typically work with students in a classroom setting (e.g., professors, lecturers, teaching assistants).	"When my professor released the first midterm scores and said that if we are in the bottom we should reconsider staying in class" "I met with the professor and she reassured me..."
Peers	Non-family members who are similar to the student in academic standing, life stage, or their role in a particular context. Friends, classmates, coworkers, etc. If the peer is mentioned as a source of frustration (rather than support), apply a peer subcode listed below.	
	Peer comparison Evaluating personal qualities relative to peers	"All of my classmates were complaining about their B and B plus grades and I'm sitting there feeling like I missed something" "As a first generation college student, as an immigrant, women with a very strong Mexican heritage there's many things that I can't relate to with classmates"
	Peer pressure Peers perceived as actively pressuring choices	"The friend I was studying with still had stuff to do and she didn't want to study alone, so she begged me to stay and made me feel guilty by bringing up past events" "I was peer pressured into going out when I didn't want to"
	Peer rejection or hostility Peers are perceived as speaking or acting with intention to socially exclude or harm	"When I turned to talk to my neighbor she had no interest in talking to me and blatantly ignored me and was on her phone." "Someone made a racist comment towards people of my ethnicity and many people started to chime in"
	Peer disagreement or disapproval A description of conflict with peers that includes argument over how to act, think, or manage situations	"I had gotten into arguments or issues with the new friends I made" "My friends were being so disrespectful about conservatives in our group message, forgetting that I am a conservative"

CODE	DEFINITION	EXAMPLES
University staff (in non-classroom roles)	University staff who do not typically interact with students in a classroom setting. Athletics coaches, mental health center counselors, academic advisors, learning center tutors, etc.	"I started to talk to the CHMC counselors about my beliefs and they help to reassure that I am meant to be here" "When I was told that the housing director does not care about students with financial issues"
Other relationship(s) or unnamed others	A catch-all code when a response does not fit any of the other codes in this category OR refers to some other person(s) without making relationship(s) clear.	"Lots of people have helped me get here" "Someone special once told me that..." "My neighbor in West campus"

Section 3. Special Codes

Identify those narratives where participants explicitly mention being a first-generation student. For participant responses that do not provide information about satisfaction or frustration in college life, differentiate whether the participant claimed he/she had no experience to describe, or simply provided a low-quality/low-information response.

CODE	DEFINITION	EXAMPLES
Mentions being first-generation	Explicitly mentions being the first in his/her immediate family to attend college (siblings are not counted).	"My cousin and I are both first-generation students" "As the first person in my family to attend college" "At an event for other first-generation students"
No experience to describe	Explicitly mentions that he/she does not have an experience to remember or share	"I am not sure I've ever felt competent in college"
Not enough information to code	If the entire response is too brief or low-effort to be meaningful, apply this code	"N/A" "failing" (Failing at what? A class? Life?) "having to work hard" (At school? Work?)

Section 4. Perceptions of Satisfaction or Frustration

How does the participant describe satisfaction or frustration in the situation? Multiple codes may apply. Coding was conducted by applying (1) or (-1) to indicate paired codes that share a letter in the listing below.

CODE	DEFINITION	EXAMPLES
A (1). Challenge, growth, or learning	A sense of optimal difficulty, testing ability or developing mastery, or interest in improving one's knowledge or rising to/exceeding high standards.	"I was so excited to know that I would be able to expand my knowledge..." "a point where I can now be able to push limits I haven't done before" "It was a great experience to learn and understand my weaknesses."
A (-1). Lack of challenge or improvement	A sense of disinterest in tasks because they are too easy or too difficult, or frustration with the feeling that one is not experiencing growth or change.	"I felt like I was going no where over at my CAP school" "As an instrumentalist, there are days where I feel I'm going nowhere with my instrument"
B (1). Freedom to choose and decision-making	Making a decision is central to this sense of freedom to follow one's interests - it is focused on taking action with personal control over one's future activities.	"I felt like I was making decisions for myself" "It was the first time I could be on my own schedule and had the ability to follow whatever I chose to prioritize that day" "Managing my own life and time activities"
B (-1). Obligation	Making a decision is central to the sense of obligation - it is focused on taking action that one perceives to be controlled by outside forces, choices constrained by people or circumstance.	"I normally wouldn't go to parties in high school but I felt pressured" "I missed the deadline to drop and I felt helpless knowing there was nothing I could do but finish the class" "I took out a college loan because my parent persuaded me. I wished I had not"
C (1). Confidence for future performance	A sense of structure, that requirements have been made clear, that one has necessary information to meet performance standards or improve. Forward-looking, and similar to the classic definition of self-efficacy. May include a strengthening of commitment when a sense of doubt has been removed.	"It felt good to know what I was doing" "I felt like I could actually succeed in college" "I felt more confident in my endeavors, my major, and my ability to succeed in the future" "I felt like I could do it, I knew I was capable" "I felt so confident"
C (-1). Inability to succeed	A sense of low-self efficacy because one does not have the necessary knowledge, information, or guidelines for a task.	"I felt like I wasn't learning from the lectures what I needed to know to complete the coding assignments" "I think 'I could never do that.' I feel like I don't have what it takes" "the professor stopped me mid presentation and told me to redo it. I felt like the dumbest person ever. I was confused about the task."

CODE	DEFINITION	EXAMPLES
D (1). Joy and intrinsic interest	A sense that some endeavor is inherently worthwhile because it is fun, enjoyable, a passion, etc. It's likely that this code will often combine with other codes (e.g., choice, mutual positive regard).	"it was something I was genuinely interested in" "I felt happy that I was able to work in something that interested me" "when we get together, we just have fun"
D (-1). Lack of interest or enjoyment	A sense of boredom or unhappiness while participating in some activity.	"I spread myself too thin so that... I was constantly tired and unhappy" "When studying for a test for this class that I really had no interest in"
E (1). Relief from stress	A sense that anxiety, stress, or worry has been reduced, feeling more relaxed	"After having anxiety, it was the first time in my academic career that I was able to put a hold on my studies for myself"
E (-1). Stress, anxiety, or overwhelm	A sense of tension or worry that undermines one's ability to direct attention or manage behavior.	"I ended up getting burnt out because of all the stress and pressure and I couldn't get myself to leave my dorm" "I responded by freaking out and had a panic attack"
F (1). Relevance to personal goals or purpose	A sense of relevance to one's personal goals or larger purpose, or that one is making progress toward those goals (some greater good) by participating in an activity.	"I reminded myself that this was going to keep me on track toward my goals" "I felt like I was doing something so useful that would have an important impact" "I knew this is what I was meant to do with my life"
F (-1). Irrelevance	A sense of frustration when making choices or participating in activities that are seen as lacking purpose or irrelevant to the pursuit of future goals.	"I didn't feel that I genuinely wanted to know or learn the information for my life but that I needed to learn it to get a good grade on my test" "In accounting I could not think about any of the real world applications of what I learned so I was always miserable"
G (1). Interpersonal perspective taking	A sense of common understanding based on empathy, common interests, or shared experiences. Other people understand or share my thoughts, feelings, values, interests, or activities.	"It is nice to feel connected to people at the university who have similar interests as you." "even though we came from different cultures or religions our upbringings were very similar which connected us on a deeper level" "it felt nice knowing I wasn't alone in this experience, other people could understand my struggles"
G (-1). Inability to relate	A sense of frustration that others do not understand personal interests or values, or that others are either unable or unwilling to empathize or understand one's experience.	"it is discomfoting to see others blatantly disagreeing with views that I feel promote basic human rights" "I was one of the few Asians and it felt weird because my cultural values and theirs did not relate"

CODE	DEFINITION	EXAMPLES
H (1). Mutual positive regard, warmth, or affection	A sense of interpersonal respect or liking, stability and warmth in a relationship. That others will be a reliable source of support, or mutual enjoyment of each other's company.	"people that I could rely on for anything and everything and felt secure being with" "my best friends are my rocks" "being able to randomly run into friends from all walks and talk to them over drinks and just about school in general makes me feel good"
H (-1). Conditional regard, isolation, rejection	A lack of liking, stability, or warmth in personal relationships. A sense that one is subject to others' disapproval, or a description of feeling a lack of closeness with other people.	"Everybody already had their cliques and I felt like an outcast" "I feel social pressure that if I do well I will be seen as try-hard or unnecessarily showing off" "I wanted to go home but I knew I would be judged by my family"
I (1). Accomplishment	A sense that that the student is has achieved something meaningful, that one's effort or ability has been recognized or affirmed, or a sense of validation. Other people do not necessarily need to be involved. Pride in a past achievement.	"after the football game when there was this universal sense of pride" "I felt so proud and satisfied to see that A on the grade report" "When my professor chose me to help her and interview ... I felt extreme competence and very achieved."
I (-1). Failure	A sense of frustration or disappointment in lack or achievement or the experience of failure. Feeling bad after receiving a negative evaluation of one's ability or performance.	"When I got a D in my o. chem class. It was the grade I deserved, but I felt the opposite of competence" "I ended up failing the test. I felt defeated and disappointed"
J (1). Shared social identity	A sense of common position in intergroup relationships or shared cultural knowledge based on heritage or social identity: specifically mentions shared membership in a group with common racial/ethnic identity, religion, sexual orientation, or language. May include geographic origin/home community.	"I felt as if I could relate to everything everyone was talking about and I could finally talk in my native tongue to people that were my age." "I felt connected when I went to a meeting for my organization and remember seeing so many hispanics and made me feel well at home" "I was finally able to find the right group of people from my country over here."
J (-1). Lack of representation	A sense of being the minority in the room based on one's heritage or social identity: explicitly mentions feeling frustrated or isolated around others who do not share one's racial/ethnic identity, sexual orientation, religion, language, or geographic origin.	"Going to a big school you would think that you would see more people of color within your class of 200 plus people" "Being in huge classes like chemistry and seeing that you are a minority there is a very unpleasant feeling" "When they had roll call, no hispanic name or last name was called out but mine. I felt so out of place"
K. Other support	A catch-all code when a response does not fit any of the other codes in this category.	

Section 5. Strategies for Seeking Satisfaction or Responding to Frustration

What are the ways that students describe attempting to manage their motivation or responding to the situations, relationships, and affordances in each experience? Multiple codes may apply.

CODE	DEFINITION	EXAMPLES
Avoidance	The student explicitly describes leaving the situation without seeking any alternative or taking additional action, avoidance of effort.	"I quit going to that student organization and just kept to myself the rest of the year." "I dropped the class." "I didn't know what I was doing so I let the other students in my group do all the work."
Acceptance	The student explicitly describes doing nothing to change the environment, or accepting that "this is just the way things are" and remaining in the situation. Waiting it out, or persistence via sheer determination.	"There was really nothing that could be done about the situation" "So I just did as I was told and followed instructions until I completed 125 hours of practicum" "I had to just put up with it until the class was over"
Affirming personal integrity or resisting expectations	Reflecting on a sense of commitment to personal values and beliefs, or intentional self-acceptance. May also include intentionally acting in a way that one believes to contradict expectations or norms imposed by other people or the situation.	"I think it was important to accept that I am different and focus on what matters to me personally." "I reminded myself that true friends would never make me do something I don't want to do." "It wasn't what my parents wanted me to major in, but I did it for myself and me alone."
Collaborating toward a shared goal	The student works with others to pursue a common goal or interest. Examples include working in study groups, cooperating on a class project, organizing community service.	"I learned that the best study environment is when I am surrounded by others and we can figure it out together"
Expressing thoughts and emotions	The student communicates his/her thoughts, feelings, or opinions.	"I spoke up for once and shared my opinion" "I talked to my husband about how I was feeling"
Reaching out to someone/something new	Trying to connect with a new person or person(s). Includes joining organizations, using social media to connect with a new friend, attempting to spark conversation with a classmate.	"I try to talk to new people in my classes in case we might become friends" "I decided to go out on a limb and join a spirit group" "I decided to take control of my life by applying for internships"
Setting or adjusting performance standards	The student describes setting a goal, deciding on a personal definition of success, or adjusting/re-evaluating his or her goals.	"I realized most other people failed the exam so a C wasn't that bad after all." "I took some time to rethink my goals." "I focused on running my own race instead of trying to make higher grades than other people."
CODE	DEFINITION	EXAMPLES

Adjusting effort or beliefs	Facing a difficult or unsatisfying experience, the student describes increasing his/her effort, or adjusting his/her beliefs to constructively adapt to the situation. Accommodating the situation by changing one's appraisal or habits.	"I realized I just needed to work harder." "I changed my study habits to keep up." "I told myself I should stop focusing on performance and try to take it as a learning experience." "I reframed my thinking and appreciated the opportunity to learn"
Intentional self-care	The student describes using a specific strategy he/she intends to promote physical or mental health - relaxation techniques, meditation, nutrition, etc.	"I did some deep breathing to help myself deal with the anxiety" "When I started to feel overwhelmed I decided to fix my sleep schedule and get more exercise."
Finding a better fit	When an environment, situation, or group seems unsatisfying or difficult, the student responds by leaving it for a different one where he/she can be more comfortable.	"I left that group and joined a smaller student organization where I can feel more comfortable" "I dropped the class and found a different one to fill the requirement"
Seeking help from others	When faced with a difficult or unsatisfying situation or task (or feeling that his/her resources have been exceeded), the student reaches out to some other(s) for assistance, information, or emotional support. Targeting books/the internet or other materials for assistance can also count as seeking help.	"I called my mom because she knows how to make me feel better" "I went to the tutoring center to figure out how to manage my coursework" "I got on youtube to get myself caught up in my calculus class"
Supporting others	The student describes acting to support other people, having others rely on him/her. Tutoring classmates or leading a study group, sending money to family, mentoring others, intentionally trying to foster social inclusivity, etc.	"I focused on being there for my mentees and helping them adapt to college" "When I talk to others and they tell me their problems, I realize we can relate as college students" "I found a church group where people love and care for me who I can also love and care for"
Reflection	The student describes reflecting on a situation, choice, or experience without great detail. Thinking it over, deliberating.	"I took a long look at what I wanted and how I was feeling" "It took a lot of self-reflection for me to realize that I was meant to..." "I prayed about it and used self-talk and reasoning to push through"
Other strategy	A catch-all code when a response does not fit any of the other codes in this category.	

APPENDIX D. STRATEGIES DESCRIBED FOR NEED SATISFACTION OR FRUSTRATION

Across all of the responses to each prompt, the following tables list the number and percentage of participants who described using a particular strategy to improve satisfaction of autonomy, competence, or relatedness. The percentage of participants who described each strategy is calculated as a proportion of the entire sample (n=212). In each table, strategies are listed in order from most to least frequent.

Strategies in experiences of autonomy satisfaction		
Strategy	N	%
Affirming integrity	32	15.1%
Reaching out	21	9.9%
Adjusting effort/beliefs	10	4.7%
Supporting others	9	4.3%
Collaborating	7	3.3%
Finding a better fit	6	2.8%
Avoidance	5	2.4%
Seeking help	5	2.4%
Expressing thoughts	4	1.9%
Self-care	4	1.9%
Acceptance	2	0.9%
Performance standards	1	0.5%
Reflection	0	0.0%

Strategies in experiences of autonomy frustration		
Strategy	N	%
Acceptance	55	25.9%
Affirming integrity	49	23.1%
Adjusting effort/beliefs	36	17.0%
Avoidance	28	13.2%
Expressing thoughts	21	9.9%
Finding a better fit	20	9.4%
Seeking help	15	7.1%
Self-care	10	4.7%
Reaching out	7	3.3%
Reflection	5	2.4%
Performance standards	3	1.4%
Supporting others	2	0.9%
Collaborating	0	0.0%

Strategies in experiences of competence satisfaction		
Strategy	N	%
Adjusting effort/beliefs	27	12.7%
Supporting others	14	6.6%
Seeking help	12	5.7%
Collaborating	6	2.8%
Performance standards	4	1.9%
Acceptance	3	1.4%
Expressing thoughts	3	1.4%
Reaching out	3	1.4%
Affirming integrity	2	0.9%
Avoidance	1	0.5%
Self-care	1	0.5%
Finding a better fit	1	0.5%
Reflection	0	0.0%

Strategies in experiences of competence frustration		
Strategy	N	%
Adjusting effort/beliefs	82	38.7%
Seeking help	43	20.3%
Avoidance	25	11.8%
Affirming integrity	18	8.5%
Acceptance	16	7.6%
Finding a better fit	9	4.3%
Collaborating	8	3.8%
Performance standards	8	3.8%
Self-care	6	2.8%
Reaching out	4	1.9%
Expressing thoughts	3	1.4%
Reflection	3	1.4%
Supporting others	0	0.0%

Strategies in experiences of relatedness satisfaction		
Strategy	N	%
Reaching out	44	20.8%
Expressing thoughts	29	13.7%
Collaborating	20	9.4%
Seeking help	9	4.2%
Supporting others	5	2.4%
Finding a better fit	2	0.9%
Adjusting effort/beliefs	1	0.5%
Reflection	1	0.5%
Avoidance	0	0.0%
Acceptance	0	0.0%
Affirming integrity	0	0.0%
Performance standards	0	0.0%
Self-care	0	0.0%

Strategies in experiences of relatedness frustration		
Strategy	N	%
Reaching out	46	21.7%
Affirming integrity	32	15.1%
Avoidance	26	12.3%
Acceptance	18	8.5%
Adjusting effort/beliefs	18	8.5%
Seeking help	18	8.5%
Expressing thoughts	14	6.6%
Finding a better fit	14	6.6%
Collaborating	7	3.3%
Supporting others	3	1.4%
Performance standards	2	0.9%
Self-care	2	0.9%
Reflection	2	0.9%

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