

EXPLORING POTENTIAL RELATIONSHIPS OF MINDSET AND SCARCITY IN THE
INEQUITABLE EXPERIENCE AND OUTCOMES OF FIRST GENERATION AND LOW
INCOME STUDENTS IN HIGHER EDUCATION

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State University's regulations and meets the accepted standards for the degree of

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ABSTRACT

First generation and low income college students continue to experience outcome differences despite higher education's efforts to reduce inequality. Despite abundant research exploring intelligence mindset, there have been few attempts to explore relationships between mindset and scarcity. To reduce this gap in knowledge, and support student success, this study explored relationships between scarcity and beliefs about intelligence – including the intelligence mindset of students and the failure mindset of parents – as well as the connection between scarcity and student demographics. Survey research design was used, and participants were gathered using a census of undergraduate students of a Midwest university in spring 2020 (N = 9,760). Results indicate scarcity continues to be of vital importance to the discussion about inequity in higher education, as found in the direct relationships between perceived scarcity and student demographics, and the indirect relationship of perceived scarcity with intelligence mindset through perceived failure mindset of parents.

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CHAPTER 1. INTRODUCTION

Higher education strives to develop and implement successful interventions to best support students and to help them thrive and reach their full potential as creative and critical thinkers who are engaged in their learning and community. However, there is a need to continue to acknowledge and explore the relationships within a vast array of complex barriers that hinder the opportunities and success of underrepresented students. The work of this study focuses on two specific underrepresented student groups - first generation college students and low income college students. Despite efforts and changes in education policy to reduce clear outcome disparities, the academic achievement and educational attainment gaps have continued to grow between students from low income and high income families (Bailey & Dynarski, 2011; Reardon, 2013) and between first generation college students and their continuing generation peers (Chen, 2005; Ishitani, 2006; Saenz et al., 2007). This study begins by examining common barriers and characteristics of both first generation college students and low income students to better get to know these populations.

After exploring the characteristics and challenges of first generation and low income students, attention will be turned to beliefs about the nature of intelligence and how these beliefs may impact and shape students' success and experience (Dweck & Leggett, 1988; Dweck, 2006; Hong et al., 1999). Additionally and importantly, while what a student believes about their own intelligence is impactful, what proximal others believe about a student's intelligence (Moorman & Pomerantz, 2010; Schleider et al., 2016), and failure (Haimovitz & Dweck, 2017; Haimovitz & Dweck, 2016), can also impact student outcomes. Specifically examined in this study will be the relationship between student's intelligence mindset and the perceived failure mindset of their parents.

Finally, financial scarcity will be explored as a vitally important consideration to student success, including the negative impact of experiencing scarcity on cognitive performance and the complex cognitive processes important to students' success in higher education. Indeed, scarcity itself, independent of other factors, has been shown to decrease both attention and memory (Mullinathan & Shafir, 2013; Zhao & Tomm, 2018). With scarcity contributing such notable impacts on cognitive function and experiences, possible relationships between scarcity and mindset deserve exploration, especially as we move to create the most effective interventions intended to decrease the challenges and inequitable outcomes of first generation and low income students.

Statement of the Problem

Despite abundant research exploring intelligence mindsets, and a growing literature on the positive impact of brief interventions to help students adopt a growth mindset and thereby improve the social and academic situations of students (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003; O'Rourke et al., 2014; Park et al., 2017; Quay, 2018; Yeager et al., 2014), there have been few, if any, attempts to explore the relationship of scarcity with mindset. As noted above, and discussed in detail in Chapter 2, low income and first generation college students continue to experience achievement gaps and outcome differences despite attempts and efforts to reduce the inequality. To support the purported commitment of higher education to reduce these achievement gaps for first generation and low income students, and to develop the best informed interventions to support the success of all students, this gap in knowledge about possible relationships between beliefs about intelligence, perceived parental failure mindset, and scarcity deserve to be explored.

Purpose of the Study

With scarcity contributing to such notable impacts on cognitive function and experiences, possible relationships between scarcity and mindset deserve exploration as we move to optimize interventions intended to decrease the challenges and inequitable outcomes of first generation and low income students. To reduce this gap in knowledge, the purpose of this study is to explore the possible relationships between scarcity and beliefs about intelligence – including the intelligence mindset of students, and the failure mindset of parents – as well as the connection between scarcity and student demographics, such as first generation and low income status.

Research Questions

This study was guided by the following research questions:

1. What is the nature of the relationship between participant intelligence mindset, perceived parental failure mindset, and scarcity?
2. Are there differences in experiences of scarcity depending on student demographics?

Need for Study

Higher education must be dedicated to finding meaningful ways to help reduce achievement gaps for first generation and low income students. There is a continuing need to discover, explore, and acknowledge the relationships within a vast array of complex barriers that hinder the opportunities and success of underrepresented students. Through a continued exploration of relationships between the complex situations and beliefs that contribute to inequitable outcomes, there is opportunity to better guide interventions that can help us achieve equitable academic and experiential outcomes for all students.

This study explored the connection and relationships between perceived scarcity, students' intelligence mindset, and students' perceived parental failure mindset. While hitherto

unexplored, the connections between perceived scarcity and beliefs about intelligences and failure have the potential to contribute important and direct implications to facilitate the reduction of achievement gaps for first generation and low income students, including being able to best inform interventions developed to help all students reach their full potential.

Organization of the Study

Chapter 2 contains a review of related literature and research related to the characteristics and barriers of low income and first generation college students, intelligence mindset, perceived parental failure mindset, and the impacts of scarcity. Chapter 3 discusses the research design, methods, data collection, and analysis used for this study. Chapter 4 includes an analysis of the collected data and a summary of findings. Finally, Chapter 5 presents a discussion of the implications of the findings of the study along with recommendations for future research.

CHAPTER 2. LITERATURE REVIEW

Higher education strives to develop and implement successful interventions to best support students and to help them thrive and reach their full potential as creative and critical thinkers who are engaged in their learning and community. However, there is a need to continue to acknowledge and explore the relationships within a vast array of complex barriers that hinder the opportunities and success of underrepresented students. Once discovered, these barriers inherent at the national, regional, institutional, and individual levels invite us to work with energy to contribute to addressing these issues to create meaningful change for higher education, while also positively impacting the experience and journey of individual students.

Despite efforts and changes in education policy to reduce clear outcome disparities, the academic achievement and educational attainment gaps have continued to grow between students from low-income and high-income families (Bailey & Dynarski, 2011; Reardon, 2013). The work of this thesis focuses on two underrepresented student groups: first generation college students and low income college students. First, common barriers and characteristics of each of these students groups will be examined to better get to know these populations. Next, issues and challenges faced by first generation and low income students will be explored, including challenges to higher education access; the transition from secondary to higher education; navigating the campus experience; and finally the inequitable collegiate outcomes common for these students.

After exploring characteristics and challenges of first generation and low income students, attention will be turned to beliefs about the nature of intelligence and how these beliefs may impact and shape students' success and experience. Student experiences and outcomes have been shown to be impacted by what they believe about their intelligence, and whether they

believe that their intelligence is a fixed and set trait which cannot grow or be developed, or if they believe that intelligence is something that can be developed through challenge and learning (Dweck & Leggett, 1988; Dweck, 2006; Hong et al., 1999). Additionally and importantly, while what a student believes about their own intelligence is impactful, what proximal others believe about a student's intelligence (Moorman & Pomerantz, 2010; Schleider et al., 2016), and others' beliefs and attitudes about failure (Haimovitz & Dweck, 2017; Haimovitz & Dweck, 2016) can also impact student outcomes. Specifically examined in this thesis is the relationship between students' intelligence mindset and the perceived failure mindset of their parents.

Finally, financial scarcity will be explored as a vitally important consideration to student success, including the negative impact on cognitive performance and complex cognitive processes important to students' success in higher education. Indeed, scarcity itself, independent of other factors, has been shown to decrease both attention and memory (Mullinathan & Shafir, 2013; Zhao & Tamm, 2018), and the stereotype threat experienced by low income students can also directly impact measures of intelligence (Croizet & Claire, 1998; Fiske, 2011). With scarcity contributing such notable impacts on cognitive function and experiences, possible relationships between scarcity and mindset deserve exploration, especially as we move to create the most effective interventions intended to decrease the challenges and inequitable outcomes of first generation and low income students.

Despite abundant research exploring intelligence mindsets, and a growing literature on the positive impact of brief interventions to help students adopt a growth mindset and thereby improve the social and academic situations of students (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003; O'Rourke et al., 2014; Park et al., 2017; Quay, 2018; Yeager et al., 2014), there have been few, if any, attempts to

explore the relationship of scarcity (and the resulting cognitive impacts) with mindset. If higher education is committed to finding ways to help reduce the achievement gaps for first generation and low income students, and to best inform interventions given to all students, this gap in knowledge about possible relationships between beliefs about intelligence and scarcity deserve to be explored.

First Generation and Low Income: Exploring Two Underrepresented Student Groups

While acknowledging that each student's experience and educational journey is unique, there are common shared characteristics of both first generation college students and low income college students. Where the following section will explore some of the experiences of first generation and low income college students independently, it is also important to acknowledge the large overlap between these two student groups. A larger percentage of first generation students come from the lowest earning households than their continuing generation peers (Redford & Mulvaney Hoyer, 2017). Due to this overlap, for the purposes of this study first generation and low income college students will be considered collectively as the experiences and arguments for one group apply in large part to the other.

First Generation College Students

Who first generation college students are, and what percentage of the student population they occupy, depends in part on how the group is defined. The Pell Institute (2008) defines first generation college students as students whose parent(s) did not attain a bachelor's degree while the National Center for Education Statistics (2018) defines first generation college students as students who are the first in their family to attend college. The reported national percentage of first generation college students can range from 20% (Chronicle, 2014) to more than 40% (Davis, 2010). Regardless of definition, they face unique challenges within higher education.

While acknowledging that first generation college students are a varied group of students, they do share prominent common background characteristics. First generation students are more likely to be of an ethnic minority, be of a lower socioeconomic background, to speak a language other than English, and score lower on college entrance exams (Bui, 2002). They are also more likely to be part-time students, tend to be older on average, and have one or more children (Choy, 2001). Because of their family obligations, they are also more likely to live off campus and are more likely to work full or part time while enrolled in college (Pascarella et al., 2004). Since many first generation college students are from underrepresented or minority groups they are also more likely to experience racial, ethnic, or gender discrimination (Terenzini et al., 1996).

First generation college students also have different reasons for pursuing higher education than their peers whose parents have some college experience. First generation college students indicate reasons such as helping their families after college, wanting to bring honor to their family, and wanting to gain respect/status by having a college degree. In contrast, students whose parents have some college experience are more likely to report different reasons for attending college such as having siblings or other relatives that were going to (or went) to college, or because they wanted to move out of their parents' house (Bui, 2002).

Low Income College Students

Differences in students' access and success in higher education by socioeconomic status are a reflection of the larger issues faced by our society including systemic, structural, and policy determinations which contribute to widening income inequality. Income inequality has continued to increase over the past 40 years for families which include minor children (Duncan et al., 2019) and along with the widening income disparity between the wealthy and the poor, despite apparent efforts in education policy, the academic achievement and educational attainment gaps

have continued to grow between children living in low-income and high-income families. The gap in standardized testing scores between high- and low-income students has increased 40% since the 1960s (Reardon, 2013), and while college completion rates for students in the low-income brackets have remained unchanged, completion rates continue to rise for students from high-income families (Bailey & Dynarski, 2011).

Students experiencing financial scarcity experience a range of challenges and barriers, however they also share some common characteristics. Students from low-income families are less likely to enroll in college, and if they do are less likely to attend a college that is a good match to their academic abilities (Smith, Pender, & Hurwiitz, 2013). Going to college, especially one that is an appropriate match to a person's abilities, is a huge economic advantage over a lifetime. Individuals that do go to and graduate from college earn over \$15,000 more each year than those with only some college (Baum, Ma, & Payea, 2013). Additionally, Carnevale, Rose, and Cheah (2011) found that individuals with a bachelor's degree earn 84% more than individuals who did not graduate with an undergraduate degree.

Also, just as the reasons first generation students have for pursuing a college degree vary from their continuing generation peers, differences have been seen in how students approach college based on socio-economic status. Armstrong and Hamilton (2013) found lower-income students view college as a serious endeavor and path to upward mobility, while upper- and middle-class students were more likely to view college as an opportunity and time for fun and exploration.

Issues and Challenges for First Generation and Low Income College Students

The issues and challenges facing first generation and low income college students are numerous and varied but can be placed in four primary challenge categories relating to higher

education: (a) access; (b) matriculation; (c) campus culture and experience; and (d) retention and equity in outcomes.

Access

First generation and low income college students face compounding issues related to access. Each hurdle seems to feed into the next, making it a challenge for many students to even see higher education as an option, let alone be able to access the schools that could offer the best fit and opportunities. First generation college students and low income students are more likely to attend under-resourced high schools. Schools that have teachers and counselors that may not have time or see the potential in each student. Unlike students at the best-resourced high schools, first generation students may not be provided with mentoring to navigate the application process, or encouraged to apply to colleges at all (McCartney, 2017). Without similar mentoring and support, or adequate college preparation in high school, first generation college students are at a disadvantage before they even fill out their first application. During their final year of high school only 53 percent of first generation college students expect to earn a bachelor's degree compared to over 90 percent of continuing generation college students (Choy, 2001).

Lower teacher expectations, limited resources, and lack of options for rigorous classes in high school leave first generation college students academically unprepared for college. In terms of preparedness, many first generation college students have not achieved benchmarks for college readiness. According to ACT and the Council for Opportunity in Education (COE) the percentage of first generation college students who meet the college readiness benchmarks has remained unchanged for the past five years with 52% of first generation college students not meeting any of the benchmarks for college readiness (ACT, 2015).

Once the decision to pursue higher education is made, first generation college students are often faced with navigating and understanding a complex world of college planning, admissions, and financial aid applications without support from family, mentors, or school counselors. Application procedures that many take for granted are out of reach for many first generation college students. A White House report (2014) indicated the cost of application fees alone was a main deterrent for low income students to apply to college.

Without the ability to apply to or visit multiple schools, and doubting their own competence (Bui, 2002), many first generation college students apply to only one non-selective school close to home and, compared to students whose parent(s) have a high level of postsecondary education, attend institutions with a significantly lower level of academic selectivity (Pascarella et al., 2004). As stated earlier, attending an institution that is a good match to a student's abilities can have important and long ranging impacts to their financial future.

Matriculation: The Interesting Case of the Missing Students

The concept of "summer melt" explores the challenges students face between high school graduation and the first day of college. Situations, conditions, and challenges that may cause students who fully intend on going to college to fail to matriculate. Challenges that, like many aspects of success in higher education, disproportionately affect first generation and low income students. As many as one-in-five high school graduates intending on going to college "melt" during the summer and do not go to college in the fall (Castleman & Page, 2014).

Students from all backgrounds can struggle with the transition from high school to college. Keeping up a strong academic motivation, dealing with a huge amount of college related paperwork, and managing a stream of deadlines the summer before college can be daunting to anyone. However, first generation students face challenges that their continuing generation

counterparts do not. Without the support and knowledge of parents or caregivers that have experienced college before, first generation students are faced with navigating a complex array of tasks on their own during a time when they have the least amount of access to support. During these summer months figuring out who and where to ask for help can be overwhelming. Filling out complicated financial aid forms, making decisions on financial aid packages, and making arrangements and paying for transportation to get to college are just some of the barriers these students face. These logistical issues which are easily abated with the guidance of a college-knowledgeable adult add to the other pressures that first generation students often face.

Not all barriers to low income student college access or matriculation are intuitive or easy to see. Castleman and Page (2017) articulated that there are many little things – that individually or cumulatively become big things - that contribute to summer melt and prevent low income students who plan to go to college from matriculating. Not being able to afford the internet access needed to get the emails from colleges regarding deadlines and paperwork can lead to missed deadlines that close the door to college. Not being aware of or able to afford unanticipated small costs, like parking or program fees, can make something as small as a \$40 processing fee the ultimate barrier to attending college in the fall. Not having the funds or a vehicle available to attend orientation can get in the way of registration. Other struggles include finding funds to fill the gap between a financial award and final tuition costs, or having funds on hand to pay for tuition and fees that are often due before financial aid is distributed. Even though they may know the check is coming, many families do not have the funds to cover required costs in the meantime. Sometimes it simply comes down to family need. Many low income students decide not to go to college because they are needed by their families to help with childcare or provide income to help the family pay for basic bills.

Campus Culture and Experience

Once admitted to college, first generation and low-income college students face a new set of unique challenges including navigating campus culture, alienation, and not feeling like they belong. Mixed feelings concerning family relationships and obligations also play a role in the experiences and challenges faced by first generation and low-income college students. These students may carry feelings of guilt for abandoning their families to pursue college, while concurrently carrying the weight and pressure of feeling that they are now placed in the role of being both the representative for the family and a good role model for other family members (London, 1989). Even when their family does show pride and support about their college journey, many first generation college students, especially those of color, continue to feel the heavy pressure to succeed while also doing so in isolation because they do not feel comfortable enough to disclose their first generation and low income status to their college peers (Orbe, 2004). Since many first generation college students are from underrepresented or minority groups they are also more likely to experience racial, ethnic, or gender discrimination (Terenzini et al., 1996).

Regardless of institution attended, first generation college students have a harder time navigating the institutional culture and social aspects of college, while also having less confidence in their academic competence (Bui, 2002). Compounding the difficulty in navigating the social aspects of college, out of necessity first generation and low income college students work more hours per week, are less likely to live on campus, and have lower levels of involvement in extracurricular activities and interaction with peers – although, when they do participate in extracurricular activities and interact with peers, first generation college students see greater outcome benefits from involvement than other students (Pascarella et al., 2004).

Mattering

This difficulty integrating into the social aspects of college is a real barrier to first generation and low income students. Students need to feel welcome, supported, and be given the skills needed to be competent and believe they can succeed to be successful in higher education. Opportunities to integrate and feel a sense of mattering become important, along with pathways and skills to succeed academically. Administrators may believe they are demonstrating to students that they matter to the university by providing numerous services such as writing centers, counseling centers, and career advising, however, if students take part in these services, but do not feel as if they are recognized, cared for, or needed, the students will not develop a sense of mattering (France, 2011). Institutions that create environments that focus on mattering and greater student involvement are more successful in creating campuses where students are motivated to learn and continue on to graduation (Schlossberg, Lynch, & Chickering, 1989).

During a life transition, such as entering college, the potential for feeling marginalized arises (Schlossberg, 1989). Perceiving oneself as not fitting in, not making friends, feeling like no one cares about you or what you do, not believing yourself to be important or that you matter, whether true or not, impacts a person's feeling of mattering and sense of fitting in. According to Schlossberg (1989), there are five aspects impacting the feeling of mattering.

1. Attention/Awareness – the feeling of being noticed.
2. Importance – the belief that we are cared about beyond just being noticed.
3. Ego Extension – the feeling that someone else will be proud of us when we do well, or will sympathize with our failures.
4. Dependence/Reliance – feeling needed and that others depend on us, a sense of purpose and a feeling that our presence is necessary and helpful.

5. Appreciation – the feeling that our efforts are appreciated by others.

While mattering is a subjective perception of our significance to other individuals or an institution (Rosenberg, 1981), and people can have different notions of how mattering is expressed (Elliott, 2009), generally we feel that we matter when recognized, cared for, appreciated, and needed (France, 2011). Mattering is so essential to us it can dictate our behavior (Elliott, 2009).

Belonging

In addition to mattering, the feeling of belonging is also important. Hagerty et al. (1992) describes two dimensions of belonging: (1) valued involvement - feeling needed and accepted and (2) fit – one’s perception of being similar to others in the same system. Belonging has some similarities with these definitions of mattering, however, mattering has little to do with perceived fit (France, 2011) and while mattering may involve an element of caring, it is less than the emotional bonding associated with belonging (Elliott, 2009). Both valued involvement and fit are necessary for a person to feel a sense of belonging (France, 2011). The integration model of Tinto (1993) contributes a combination of pre-entry student characteristics (family background, skills, abilities, and prior schooling) and the extent of their academic and social integration at the university as predictive of persistence. Feelings of isolation, not engaging in interaction outside of the classroom, not feeling at home, or that the university will help them reach their goals decrease student persistence.

When students are uncertain about whether or not they belong, or enter a situation suspecting they will not belong, they are watchful for cues that reinforce their lack of belonging. This extra watchfulness and stress diminishes student performance and discourages building relationships, however it has been shown that direct-to-student programs and changes in

instructional practices have been linked to long-term gains in academic performance and reductions in achievement gaps on the basis of race/ethnicity, gender, and being the first in one's family to go to college (Mindset Scholars Network, 2019). Applying this to college life, if students feel that they matter to their university they should be motivated to behave in ways that lead them to become involved with university activities and academics and help them persist and succeed (France, 2011).

Social Class and Belonging

Further complicating integrating into the campus culture and experience is that first generation college students are more likely to feel left out or out of place at college (Housel & Harvey, 2009). Beyond feeling that they matter and belong, first generation college and low income students need to believe that they, and people with similar backgrounds like theirs, deserve to be a college student and that they can succeed and do well there (Steele, 2010).

Ostrove and Long (2007) examined the impact of social class on the feeling of belonging, and students' subsequent performance in college. They found that regardless of whether social class was measured objectively through family income and parental education level, or subjectively through a self-reported social class measure, a student's social class was strongly related to a sense of belonging, further indicating that students' social class (whether objective or perceived) structures a sense of who belongs in college and who does not. This diminished sense of belonging for students due to lower social class predicted lower student academic achievement and decreased quality of their college experience.

Attempting to mediate social-class achievement gaps, Stephens, Hamedani, and Destin (2014) utilized a difference-education intervention with 168 incoming students using the real life stories of seniors to illustrate how diverse backgrounds can shape each student's experience in

higher education. During their first month on campus, freshman students attended an hour long student discussion panel about adjusting to college and were told that the discussion's goal was to improve the transition to college for all students. Students in the difference-education condition heard stories from a demographically diverse group of senior students who shared their real life stories about how their different backgrounds, specifically linking the context of their stories to their social class backgrounds, matter in college. The control participants heard general information about the transition to college without discussion about how different backgrounds, including social class, matter. Results indicated a reduction in social class achievement gaps for the first generation college students and low income students who received information about how differences, specifically social class differences, matter in college. First generation students in the intervention group were more likely to use campus resources, which improved their academic performance and increased their GPAs. Further, while the impact for first generation and low income students was significant, results indicate the difference-education intervention and discussion about how differences matter in college improved the transition to college for all students. By engaging in conversation about why differences matter, particularly how social class backgrounds impact college experience, students saw how differences can be a source of both strength and challenge. Conversations engaged students about how their differences shape their own and others' experiences in college, increased empathy, and engagement in how their own differences can help them navigate their college experience.

Retention and Equity in Outcomes

There are several collegiate persistence and completion differences between first generation college students and their peers. According to an analysis report by Chen (2005), because of their lower preparedness first-generation students often required more remedial

courses, had lower GPAs which persisted through each year in college, were less likely to take courses in math, science, computer science, humanities, history, and foreign language, and once enrolled were more likely to withdraw from courses they attempted.

Saenz et al. (2007) found that first generation college students start trailing their peers in credits earned as early as the first year, earning an average of 18 credits in the first year compared to 25 credits earned by students who had at least one parent go to college. This earned-credit difference set up first generation college students for a prolonged time to get a degree and is also associated with discontinuing enrollment before earning a degree. Nearly 90% of first generation college students enrolled in the United States fail to graduate within 6 years of enrollment. Compared to continuing generation college students, they are more likely to leave college during any of the four years, with the highest rate of departure between the second and third year (Ishitani, 2006). Low income students also graduate at lower rates with only about 36% of low income students graduating compared to 56% of high income students (Engstrom & Tinto, 2008). With a better understanding of the characteristics and challenges faced by first generation and low income students, attention will now be turned to how beliefs about the nature of intelligence may impact and shape students' success and experience in higher education.

The Nature (or Nurture) of Intelligence - Students' Beliefs and Understanding Matter

How many of the achievement gaps of first generation and low income college students can be attributed to educational and environmental factors that surround students, versus the intelligence and capability passed down genetically from parents to children? With so much passed down in our genetic code it may be tempting to attribute educational achievement gaps to our 'nature' and think of intelligence as inherent and set, allowing us to throw our hands up and justify helping the 'inherently bright' students and allowing the others to fall away.

Perhaps one of the best known books linking race and genetic differences with intelligence and lower socio-economic status is *The Bell Curve* (1994) where Herrnstein and Murray posit several main arguments – notably that intelligence is set and based on heredity; that intelligence is measurable by IQ tests; that IQ tests are not biased against social, economic, ethnic, or racial groups; that this measured intelligence is a better predictor of future outcomes than parental socioeconomic status; and that differences in the social outcomes of different groups are explained by intelligence differences rather than socioeconomic status, race, or ethnicity. After a relatively recent speech given by Murray at Middlebury College on March 2nd 2017, *Bell Curve* book sales increased accompanied by enthusiastic reviews celebrating the continued relevance of Murray’s work, speaking to the persistence of these ideas and prejudice. Gillborn (2016) used critical race theory to explore racism in both intelligence and genetic research and argues that both the research interest and belief that genes shape ethnic group achievements and inequities has not diminished - and if anything has returned in a form which refrains from explicit reference to race, but still carries damaging racist consequences.

However, if intelligence is not a genetic predetermination but instead is malleable and able to grow in the right environment with the right support, programs in higher education concerned with decreasing achievement gaps of first generation and low income students can indeed move to create systems, policies, and programs that help every individual thrive. The next section explores why what students believe – and what they perceive those close to them believe - about our intelligence matters.

Mindset – The Influence of Our Belief About Our Intelligence

What students believe about their intellectual ability and how intelligence is developed can shape their experience, responses to challenges in school, and their academic achievement.

Students who have the same innate intellectual abilities are likely to respond very differently to academic challenges depending on their belief about intelligence. Especially when students are facing failure there are differences in how individuals with fixed and growth mindsets interpret their performance, which can subsequently impact their persistence.

Entity theorists, commonly referred to as fixed mindset, are individuals who believe that intelligence is a rigid fixed trait predetermined at birth which is unable to be developed or improved through effort. A belief that intelligence is something you are born with and either have or do not. Students with a fixed mindset may also be worried about proving their ability or avoiding “looking dumb” leading them to avoid challenges and give up when they struggle. Fixed mindset individuals, seeing their performance as an indicator of their inherent intelligence, often engage in easy tasks that they know they can perform well but which also do not lead to increased competence, skill improvement, or mastery. When academic struggle is encountered, or effort is needed, it is viewed as evidence of an inherent lack of intelligence and these students are more likely to give up during these points of struggle, seeing those moments as points of failure instead of opportunities for growth (Dweck & Leggett, 1988; Hong et al., 1999).

In contrast, incremental theory of intelligence - or growth mindset - is the belief that intelligence is malleable and can be developed through effort and challenge. Students with a growth mindset tend to embrace challenges as opportunities to grow their intelligence, not as situations to be avoided. They tend to prioritize learning and challenging themselves over proving their ability and to focus more on learning goals instead of performance. These students also are less likely to give up in the face of academic challenge, rather they will develop effective strategies to develop mastery (Dweck, 2006).

Demonstrating the importance of perceiving challenge as opportunity and trying new strategies, a qualitative study of successful first generation college students by Demetriou et al. (2017) examined the activities, roles, and relationships of successful first generation students who were within one semester of completing a bachelor's degree. They examined successful first generation college students utilizing Bronfenbrenner's bioecological systems theory (1979), which views the individual and personal identity as being part of, and influenced by, interactions with other individuals and the larger society structure. Each of us has a combination of these interactions every day. From the personal interactions with our family, friends, co-workers, and our favorite barista to larger societal interactions with workplace culture and governmental policies. For college students, these close interactions with others could be with other students, faculty, friends, family, or mentors while interactions with their larger society would include the university system and its policies. Bronfenbrenner's theory indicates that for development to occur, an individual must be an active agent in her or his environment and must interact with the environment in a progressively complex manner as the individual becomes more competent. The successful first generation college student participants interviewed in this study actively and repeatedly sought out activities, learning experiences, relationships, and opportunities for participation in the college community and continuously added to the complexity of those interactions as they became more comfortable and competent. Several attitudes were also identified that seemed to contribute to success: being flexible and willing to change, feeling independent, perceiving challenges as opportunities for growth, and risk taking. However, it is unclear whether these attitudes were developed while in college or if they were previously held.

Mindset – The Influence of Others’ Belief About Intelligence

It is not only important what an individual student believes about their own intelligence. What a student’s parent believes about intelligence, and whether they hold a fixed or growth mindset, can have important impacts on a student’s learning and mental health. A parent’s involvement can be constructive – such as holding a focus on supportive autonomy and on mastery instead of achievement. Conversely, a parent’s involvement can be unconstructive – such as being controlling or performance focused. Parents with a fixed mindset are more likely to see their children’s intelligence as innate and static, which has been shown to negatively impact positive and constructive involvement in their child’s learning. When faced with a child struggling academically parents holding a fixed mindset may become distressed by their children’s failure, seeing these struggles as indications of their child’s inherent intelligence rather than opportunities for growth (Schleider et al., 2016). Moorman and Pomerantz (2010) found that mothers holding a fixed mindset were more likely to help their child experiencing struggle using unconstructive involvement such as controlling language, performance-oriented teaching, or negative affect. These mothers also tended to respond less constructively than mothers holding a growth mindset to their child’s helplessness and be more likely to provide answers rather than encouraging independent problem solving. These unconstructive or negative interventions by parents holding a fixed mindset can lead children to feel that failure is shameful or unacceptable – further increasing their anxiety in the face of challenges or setbacks.

Importantly, parents’ views and beliefs about failure – their failure mindsets - have also been shown to predict whether children will hold a growth or fixed mindset. Haimovitz and Dweck (2016) argued that it is not a parent’s view of intelligence that predicts a child’s intelligence mindset, but rather a parent’s view of failure. They found that parents who perceive

academic struggle as opportunity are more likely to support their child's success than those who fear failure. In a series of studies, they explored how parental failure mindset can predict parenting practices, which in turn impacts their child's intelligence mindset. Both intelligence and failure mindset were measured for parents using an online questionnaire. Parental failure mindsets were assessed using six items, and intelligence mindsets were assessed using an additional four questionnaire items. Children's intelligence mindsets were also measured using a four item variant of the adult measure. While intelligence mindsets (growth versus fixed) were not related between parent and child, there was a significant relationship between a parent's failure mindset and the child's intelligence mindset. Parents who had a higher 'failure is debilitating' mindset were more likely to have children who believed that their intelligence was fixed. Parents who saw failure as debilitating were also found to have less focus on their child's learning and place more focus on their child's behavior. A focus which the children were aware of, reporting seeing their parents as being concerned with their performance and grades rather than their learning and improvement. These are interesting findings and relationships to explore when considering how to best view the relationship between students' mindset and proximal others' mindset and beliefs about intelligence and how these relationships may impact the development of interventions intended to improve student success.

Mindset Interventions

If higher education is committed to work to find a way to help first generation and low income students reach their full potential, what are the beliefs and interventions that can help us achieve this outcome of success? There is a growing number of brief interventions that have been shown to promote a growth mindset in students and to improve academic success. Promoting a growth mindset has been shown to be possible by teaching students about

neuroscience and presenting them with evidence that the brain is malleable and gets stronger through effort, trying new strategies, and seeking help when necessary. These interventions have been shared with students using tools such as educational games (O'Rourke et al., 2014), brief writing interventions and social interactions (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003), 'wise interventions' looking at how people make sense of themselves and their situations (Quay, 2018; Yeager, et al., 2014), and even encouraging growth mindset beliefs by interacting with peer-like robots (Park et al., 2017). All these different tools lead to a wonderful and positive array of interventions to increase student growth mindset, and increase effort and achievement in students.

However, despite the abundant work surrounding student intelligence mindset and the multitude of interventions shown to produce improvements in student achievement, I argue that there may be an additional gap in the research that deserves consideration; namely, the potential relationship between experienced or perceived scarcity with students' beliefs about intelligence and subsequent collegiate achievement. In order to best inform interventions, we should continue to explore the relationship of mindset with barriers experienced by students, especially those that disproportionately impact first generation and low income students.

Scarcity – Why What We Do Not Have is Important to Cognitive Function

Scarcity is experiencing any condition of not having needed resources to cope with the demands at hand (Zhao & Tomm, 2018) and can be experienced in various physical or conceptual ways such as monetary, food, shelter, and even time. Monetary scarcity resulting in poverty can create impediments and barriers such as decreased availability of healthy and nutrient-rich food (Policy Link, 2010), increased exposure to violence and crime (American Psychological Association, 2019), and a host of other detriments that can complicate

conversations about the relationship between scarcity, intelligence, and academic achievement. However, the condition of scarcity itself, independent of other factors, has been shown to consume cognitive resources including attention and memory (Zhao & Tomm, 2018), which are important factors in the success of all students. Reflecting on Maslow's (1943) hierarchy of needs, Mullainathan and Shafir (2013) found that when faced with economic and resource disadvantage people were so cognitively depleted by making ends meet every day that there were not enough cognitive reserves left for them to have the attention needed to deal with complex processes. In the situation of financial scarcity all energy – cognitive and physical - is expended on efforts to find funds, food, shelter, and other basic needs.

Scarcity also causes focus and cognitive resources to be placed primarily on urgent demands, the things that we do not have, causing neglect of other potentially important information. Cognitive and behavioral impairment have been found in various contexts, including instances of food scarcity (Piech, Pastorino, & Zald, 2010), water scarcity (Aarts & De Vries, 2001), and with individuals experiencing financial anxiety (Gutierrez & Hershey, 2013). As an example of cognitive focus being placed on an item or condition of scarcity and distracting attention from other important information, Tomm and Zhao (2017) found that participants in low-income categories spent more time attending to price details on a menu and less time on, or even completely ignoring, other fundamental pieces of information such as the names of the food items, or health-important information such as the calorie content of items. Further, participants in the low-income category were so focused on the costs of the food items that they ironically missed information regarding discounts that were listed on the bottom of the page, information that could help improve their financial situation.

While many studies have looked at contrived situations of poverty, examining an authentic context Mani, Mullainathan, Shair, and Zhao (2013) studied rural farmers in India who experience relative wealth just after a harvest but scarcity up to the harvest time, often having to take out loans, pawn personal items, and experience difficulty paying bills. They found decreased fluid intelligence and cognitive performance under the pre-harvest period of financial duress and increased fluid intelligence during the bountiful period after the harvest. Adding evidence to contradict the misconception that those experiencing financial scarcity are inherently less intelligent, these results indicated that an individual's financial concerns, that the condition of poverty itself, creates cognitive demands that decrease cognitive functioning and fluid intelligence.

The willingness for risk taking has also been shown to decrease with financial scarcity. In a review by Haushofer and Fehr (2014) the evidence indicates that “poverty causes stress and negative affective state which in turn may lead to short-sighted and risk-averse decision making, possibly by limiting attention and favoring habitual behaviors at the expense of goal-directed ones” (p. 862). When reflecting on the work of Demetriou et al. (2017) reviewed in a previous section, this particular impact of scarcity may be important to consider further given one of the behaviors related to the success of underrepresented students is their willingness and ability to take risks.

Scarcity, Stereotype Threat, and Self-fulfilling Prophecies

In addition to experiencing scarcity and its negative cognitive effects, people experiencing economic disadvantage are often met with negative stereotypes which attribute their situations to attitudinal or psychological shortcomings. The impression that individuals are experiencing poverty because they are lazy, incompetent, or less intelligent persists but does not

account for the cognitive or physical consequences experienced due to the condition of scarcity itself.

More recent focus has been placed on viewing the poor as not particularly different from the average person. Bertrand, Mullainathan, and Shafir (2004) argue that people experiencing scarcity have the same biases and weaknesses as others, but due to the incredibly small margins of error related to poverty the same behaviors manifest in more pronounced ways with more devastating outcomes. For example, an individual taking the same action of spending extra funds on groceries, or needing to complete a small vehicle repair, may have no felt consequences for someone not living with financial scarcity, however due to these small margins of error the same action for someone in poverty may have the devastating outcome of not having enough resources to pay for housing or electricity.

Just as low income students' outlooks regarding their capacity to succeed can be shaped by what they - and those around them - believe about learning and intelligence, low income students face a huge cognitive load associated with what they - and those around them - believe about social status and poverty. The stigma of poverty can have a huge impact on low-income students. Fiske (2011) found biases held toward low income individuals (similar to biases held toward addicts and individuals experiencing homelessness) include feelings of scorn, hostility, and being perceived as incompetent. Croizet and Claire (1998) found the stereotype threat associated with the intelligence of low income individuals alone accounted for worse performance on measures of intelligence. Participants in both low and high income conditions were asked to complete word problems. Half were given instructions under a threat condition (told their answers were assessing intelligence) and half were instructed under a non-threat condition (their answers were assessing attention). Low income participants in the threat

condition, where they believed their answers were assessing their intelligence, had worse performance than high-income participants. Interestingly, there was no difference between low or high income participants in the non-threat condition. So in addition to impairments to cognitive function and attention due to scarcity, stereotype threat and the stigma of poverty may further contribute to an individual's cognitive impairment, further impact students' mindset beliefs, and lead to additional self-fulfilling negative beliefs and decreased academic performance.

Conclusion

If higher education is committed to finding ways to help reduce achievement gaps for first generation and low income students, including being able to best inform interventions developed to help all students reach their full potential, there is a continuing need to discover, explore, and acknowledge the relationships within a vast array of complex barriers that hinder the opportunities and success of underrepresented students. Through this continued exploration of relationships between the complex situations and beliefs that contribute to inequitable outcomes, there is opportunity to better guide interventions that can help us achieve an ideal of equitable academic and experiential outcomes for all students.

As outlined in this review, despite abundant intelligence mindset research and growing literature on the positive impact of brief interventions helping students to adopt a growth mindset, there have not been adequate attempts to explore the relationship of scarcity and its resulting cognitive impacts with mindset. With scarcity contributing to such notable impacts on cognitive function and experiences, possible relationships between scarcity and mindset deserve exploration as we move to optimize interventions intended to decrease the challenges and inequitable outcomes of first generation and low income students.

To reduce this gap in knowledge, this thesis explores the possible relationships between scarcity and beliefs about intelligence – including the intelligence mindset of students, and the failure mindset of parents.

CHAPTER 3. METHODS

Finding ways to help reduce achievement gaps for first generation and low income students, including being able to best inform interventions developed to help all students reach their full potential, necessitates discovering, exploring, and acknowledging relationships among a vast array of complex barriers that hinder the opportunities and success of underrepresented students. Through this continued exploration of relationships between the complex situations and beliefs that contribute to inequitable outcomes, there is opportunity to better guide interventions that can help us achieve an ideal of equitable academic and experiential outcomes for all students.

As outlined in Chapter 2, despite abundant intelligence mindset research and growing literature on the positive impact of brief interventions helping students to adopt a growth mindset, there have not been adequate attempts to explore the relationship of scarcity and its resulting cognitive impacts with mindset. With scarcity contributing to such notable impacts on cognitive function and experiences, possible relationships between scarcity and mindset deserve exploration as we move to optimize interventions intended to decrease the challenges and inequitable outcomes of first generation and low income students.

To reduce this gap in knowledge, the purpose of this study is to explore the possible relationships between perceived scarcity and beliefs about intelligence – including the intelligence mindset of students, and the failure mindset of parents – as well as the connection between the experience of scarcity and student demographics.

Research Questions

This study was guided by the following research questions:

1. What is the nature of the relationship between participant intelligence mindset, perceived parental failure mindset, and scarcity?
2. Are there differences in experiences of scarcity depending on student demographics?

Research Design

Survey research design was used for this study to explore the possible relationships between perceived scarcity and beliefs about intelligence – including the intelligence mindset of students and the failure mindset of parents – as well as the connection between the experience of scarcity and student demographics. Utilization of a survey design was chosen based on the need to execute large-scale data collection in order to generate statistically manipulable data and make generalizations about the population (Cohen, Manion, & Morrison, 2011).

The present study utilized a Qualtrics online survey that incorporated existing instruments to measure intelligence mindset (Dweck, 1999), perceived parental failure mindset (Haimovitz & Dweck, 2016), and perceived scarcity through needs satisfaction (Taormina & Gao, 2013). In addition, a range of participant demographic information was gathered including first generation college student status, age, academic year in college, status as a first year or transfer student, whether they live on or off campus, gender identity, sexual orientation, racial identity, and low income status determined by Pell eligibility.

Participants

Participants in this study were gathered using a census of the undergraduate student body of a four-year public land grant research university in the Midwest for the spring semester of the academic year 2019-2020. All university undergraduate students who were at least 18 years old (N = 9,760) had the opportunity to be included in the study. Student participants were required to be at least 18 years old and currently enrolled at the time of recruitment.

Through a relationship with and cooperation from the Office of Institutional Research, which allowed for a direct emailing of all undergraduate students, emails were sent directly to the official university email address of all eligible students to inform them about the nature of the survey and invite them to participate by clicking a link to the survey hosted on Qualtrics. All students invited to participate were informed that participation was voluntary and that choosing not to participate in the survey would not affect their standing. Students who did not complete the survey after the first invitation were sent additional emails via Qualtrics automatic tracking at one and two weeks following the initial email inviting them to participate in the study.

Instrumentation

The items on the instrument used for this study, the Intelligence Mindset and Scarcity Questionnaire, were developed using three existing instruments to develop the subscales of participant intelligence mindset, participant perceived parental failure mindset, and participant experienced scarcity. In addition, a range of demographic information was included on the questionnaire. The entire instrument used for this study, including the questions' order and response options, can be seen in Appendix A.

Part one of the questionnaire contains several fields that were automatically populated for each participant upon their consent to participate in the study and their choice to begin the survey. Through cooperation with the Office of Institutional Research, participants' Pell eligibility, term of entry, and status as either a first year or transfer student were automatically populated. This auto-population of key demographic variables is important and unique as these demographic results, such as Pell eligibility, did not rely on participant self-reporting but were instead pre-loaded by the Office of Institutional Research. This adds to the strength of the demographic information gathered in this study.

Part two of the questionnaire contains eight items examining the incremental and entity theories of intelligence. Participants' own growth or fixed intelligence mindset, respectively. Participants' theories of intelligence were measured using the Implicit Theories of Intelligence Scale (Dweck, 1999), which contains 4 incremental and 4 entity theory items examining general beliefs about the malleability of intelligence (See Appendix B for scale items). The instructions, item wording, and six-point Likert scale are exactly as presented in the original study. The four incremental scale items were reverse scored. An average rating score across all eight items of participant intelligence mindset was used, with the higher the participant's subscale score the more fixed mindset they hold. Overall, research indicates the scale has good internal consistency ($\alpha = .82$ to $.97$, Dweck, Chiu & Hong, 1995; $\alpha = .87$ to $.88$, DeCastella & Byrne, 2015) and reliability at two weeks ($\alpha = .80$ to $.82$, Dweck, Chiu & Hong, 1995).

Part three of the questionnaire contains four items which examine participants' perceived parent/guardian failure mindset. As argued in Haimovitz and Dweck (2016), a parent's view and belief about failure – their failure mindset – predicts whether children will hold a growth or fixed mindset. They found that while intelligence mindsets (growth versus fixed) were not related between parent and child, there was a significant relationship between a parent's failure mindset and the child's intelligence mindset. Parents who had a higher 'failure is debilitating' mindset were more likely to have children who believed that their intelligence was fixed. A focus which the children were aware of, reporting seeing their parents as being concerned with their performance and grades rather than their learning and improvement. The original study assessed perceived parental failure mindset using four items ($\alpha = .77$). The current study will utilize the same items as the original study to examine participants' perceived parental failure mindset. The instructions, item wording, and six-point Likert scale are exactly as presented in the original

study (see Appendix B for items). For the first two questions, the higher the participant's agreement with the statement, the more of a failure mindset they perceive their parent/guardians hold. The final two questions are reverse scored, the lower the participant's agreement with the statement, the more of a failure mindset they perceive in their parent/guardian. As in the original study, an average rating score across all four items of participant perceived parental failure mindset, with the higher the participant's subscale score, the more of a failure mindset they perceive their parent/guardians hold.

Part four of the questionnaire contains items examining perceived scarcity in the framework of Maslow's hierarchy of needs. Adapted from a longer list of questions from the needs satisfaction scale of Taormina and Gao (2013), which measures the satisfaction of all of the needs in Maslow's hierarchy, the current nine-question instrument uses four questions from the physiological needs satisfaction sub-scale and five questions from the safety-security needs satisfaction sub-scale. Questions from the physiological needs and safety-security needs satisfaction scales were chosen as they most closely align to physical scarcity. Both scales were shown to have suitable reliability in the original study; Cronbach's alpha reliability scores were computed as .81 for the physiological needs scale and .87 for the safety-security needs scale (Taormina & Gao, 2013). However, to the best of my knowledge, this scale has not been utilized in a study concerned with university students. The questions used in the current study have been adapted from the original list of questions to better match the needs, concerns, and environment of university students, and provide the best indicators of perceived scarcity (see Appendix B, Tables A1 and A2 for comparison of original items to adapted items). The original five-point Likert scale was retained. An average rating score across all nine items was used, with a lower

mean score indicating lower levels of needs satisfaction, and thus higher levels of perceived scarcity.

Part five of the questionnaire puts focus on participants' demographic information including age, academic year in college, whether they live on or off campus, gender identity, sexual orientation, racial identity, and first generation college student status. To best protect participant confidentiality all demographic information was optional for participants to share except the one question used to determine first generation college student status. Due to the importance to this study of determining participants' first generation college student status, defined as neither parent having completed and graduated with a four-year degree, this was the sole demographic question that participants were required to answer. As mentioned above, additional demographic information was automatically populated for each participant including term of entry, first year or transfer student status, and low income status determined utilizing participants' Pell eligibility.

Data Collection

The Intelligence Mindset and Scarcity Questionnaire was administered to all currently registered undergraduate students at a four-year public land grant research university in the Midwest during spring semester of the 2019-2020 academic year. All students received an initial email invitation to complete the questionnaire. The first email invitation was sent on a Sunday approximately two weeks into the start of spring semester classes. A second email invitation was sent out to non-participants one week after the initial email invitation. A final invitation to participate was emailed out to any remaining non-participants one week after the second email invitation.

Emails were sent on behalf of the researcher via a representative of the University Office of Institutional Research, who also facilitated determining the Pell eligibility status, term of entry, and status as a transfer student or first year student for each of the participants. The only participant identifier was each participant's official university email address, which was utilized to auto-populate the participants' Pell eligibility status, term of entry, and whether they are a transfer student or first year student. This sole identifier was removed from the data set upon downloading the data and was not associated with participant responses at any point.

Data Analysis

The current study utilized covariance structure analysis (CSA), looking at zero-order and partial correlations, as a quantitative research approach. Based in the theories outlined above and in the previous chapter, the model (see Figure 1) explored non-directional associations and the nature of the relationships between: students' intelligence mindset and students' perceived parental failure mindset; perceived parental failure mindset and perceived scarcity; and intelligence mindset and perceived scarcity.

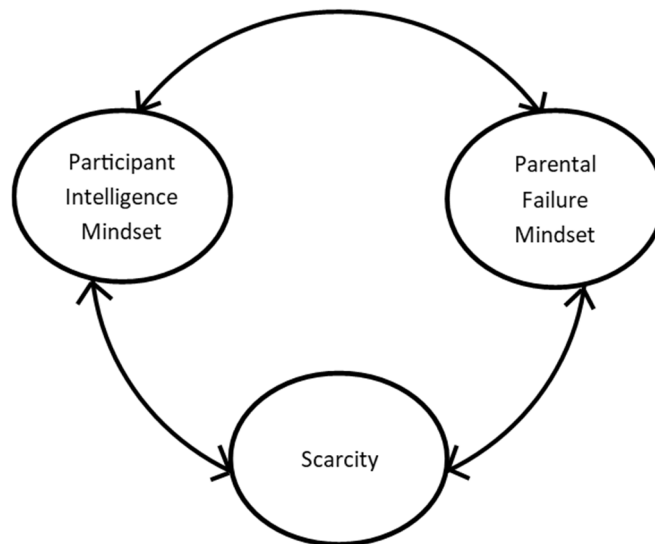


Figure 1. Covariance Structure Analysis (CSA) model for analysis.

Independent samples T-tests and one-way ANOVAs were used to analyze associations between students' perceived scarcity and demographic characteristics, specifically whether there are differences in perceived scarcity based on first generation college student status, low-income status, sexual orientation, gender identity, racial identity, year in school, and living on or off campus.

Essential Boundaries

Participants in this study were limited to undergraduate students currently enrolled at a four-year public land grant research university in the Midwest for the spring semester of the academic year 2019-2020 (N = 9,760).

The scale developed by Taormina and Gao (2013) examining scarcity in the framework of Maslow's hierarchy of needs satisfaction has not, to my knowledge, been used within a study concerned with higher education or with university students. The questions used in the instrument for the current study have been adapted from the original list of questions to better match the needs, concerns, and environment of university students, and provide the best indicators of scarcity.

CHAPTER 4. RESULTS

The purpose of this study was to explore the possible relationships between scarcity and beliefs about intelligence – including the intelligence mindset of students, and the failure mindset of parents – as well as the connection between the experience of scarcity and student demographics. This study was guided by the following research questions:

1. What is the nature of the relationship between participant intelligence mindset, perceived parental failure mindset, and scarcity?
2. Are there differences in experiences of scarcity depending on student demographics?

To explore the nature of the relationships between participant intelligence mindset, perceived parental failure mindset, and perceived scarcity, the present study utilized a Qualtrics online survey which incorporated three existing or modified instruments (details below). To explore differences in experiences of scarcity depending on student demographics, a range of participant demographic information was also gathered including: first generation college student status, age, academic year in college, status as a first year or transfer student, whether they live on or off campus, gender identity, sexual orientation, racial identity, and low income status as determined by Pell eligibility.

Participants in this study were gathered using a census of the undergraduate student body of a four-year public land grant research university in the Midwest for the spring semester of the academic year 2019-2020. Student participants were required to be at least 18 years old and currently enrolled at the time of recruitment. Email invitations to participate in the survey were sent to the official university email address of all eligible students, $N = 9,760$. The total number of students who agreed to participate in the survey was $N = 1,052$, producing a total response rate of 10.78%. Participant response rates varied for each of the scales, with $N = 1,051$ students

responding to the eight participant intelligence mindset questions, N = 1,003 students responding to the four perceived parental failure mindset questions, and N = 990 students responding to the nine scarcity questions.

Demographics

To best protect participant confidentiality, all demographic questions – including racial identity, gender identity, sexual orientation, year in school, and housing type – were optional for participants to answer. The exception was the sole question used to determine first generation college student status; due to the importance of the information to this study, participants were required to answer this demographic question. Additional demographic information was automatically populated for each student at the time they agreed to participate in the survey, including term of entry, first year or transfer student status, and low income status determined utilizing participants' Pell eligibility. See Table 1 for participant demographic information.

Research Question One

To examine the first research question and explore the nature of the relationship between participant intelligence mindset, perceived parental failure mindset, and scarcity, three existing instruments were utilized or adapted for this study. To begin, confirmatory factor analysis (CFA) was completed using STATA version 15.1 to determine whether the reflective indicators pertaining to each of the three scales being used – participant intelligence mindset, perceived parental failure mindset, and scarcity – accurately reflect their corresponding latent variable and fit the model indicated. Following the CFA, covariance structure analysis (CSA) was performed to explore the relationships between the factors of participant intelligence mindset, perceived parental failure mindset, and perceived scarcity.

Table 1

Participant Demographic Information and Needs Satisfaction, Perceived Parental Failure Mindset, and Intelligence Mindset Means and Standard Deviations

Characteristic	<i>N</i>	Percentage	NS <i>M (SD)</i>	PPFM <i>M (SD)</i>	IM <i>M (SD)</i>
Pell eligibility	1052				
Pell eligible	241	22.91	4.08 (0.85)	2.81 (0.07)	2.70 (0.07)
Not Pell eligible	811	77.09	4.34 (0.85)	2.72 (0.04)	2.78 (0.04)
First generation college student	989				
First generation student	307	31.04	4.23 (0.83)	2.76 (0.06)	2.69 (0.60)
Continuing generation student	682	68.96	4.30 (0.87)	2.72 (0.04)	2.77 (0.04)
Racial identity	964				
Student of color	105	10.89	4.04 (0.85)	2.85 (0.10)	2.70 (0.10)
White	859	89.11	4.31 (0.85)	2.71 (0.03)	2.76 (0.04)
Housing type	988				
On campus – in a residence hall	385	38.97	4.21 (0.80)	2.76 (0.95)	2.74 (0.97)
On campus – not in a residence hall	76	7.69	4.37 (0.75)	2.69 (0.91)	2.65 (0.99)
Off campus – with parents	85	8.60	4.68 (0.88)	2.77 (1.10)	2.55 (1.10)
Off campus – not with parents	442	44.74	4.24 (0.90)	2.71 (0.99)	2.81 (1.10)
Gender identity	989				
Gender fluid or non-binary	7	0.71	3.11 (0.96)	3.14 (1.10)	2.46 (1.35)
Transman	1	0.10	3.78 (0.00)	2.00 (0.00)	3.38 (0.00)
Transwoman	0	0.00			
Woman	565	57.13	4.23 (0.89)	2.80 (0.98)	2.72 (0.99)
Man	409	41.35	4.36 (0.80)	2.64 (0.93)	2.79 (1.10)
Prefer not to disclose	7	0.71	4.37 (0.54)	2.89 (0.83)	2.68 (1.35)
Sexual orientation	961				
Asexual, bisexual, gay, or lesbian	105	10.93	4.06 (1.00)	2.92 (0.11)	2.61 (0.11)
Straight	856	89.07	4.31 (0.83)	2.70 (0.03)	2.76 (0.04)
School year	989				
Freshman	324	32.76	4.18 (0.80)	2.80 (0.97)	2.73 (0.95)
Sophomore	207	20.93	4.34 (0.86)	2.69 (0.99)	2.72 (0.99)
Junior	231	23.36	4.38 (0.90)	2.74 (0.96)	2.79 (1.10)
Senior	210	21.23	4.35 (0.88)	2.66 (0.94)	2.76 (1.15)
Professional program	17	1.72	4.35 (0.97)	2.71 (1.30)	2.60 (1.07)
First year or transfer student	1052				
First year	826	78.52	4.25 (0.84)	2.73 (0.03)	2.76 (0.04)
Transfer student	226	21.48	4.38 (0.93)	2.76 (0.07)	2.74 (0.07)

To measure participant intelligence mindset, the eight-item Implicit Theories of Intelligence Scale (Dweck, 1999) was used to examine general beliefs about the malleability of

intelligence. This is a well-established scale that has been shown to have good internal consistency ($\alpha = .82$ to $.97$, Dweck, Chiu & Hong, 1995; $\alpha = .87$ to $.88$, DeCastella & Byrne, 2015) and reliability at two weeks ($\alpha = .80$ to $.82$, Dweck, Chiu & Hong, 1995). In the current study, the eight reflective indicators for participant intelligence mindset were examined by executing a CFA which allowed the error terms to correlate to handle method effects due to reverse coding of half of the items. Fit was determined by evaluating the resulting Chi-square value of 113.35; $df = 14$; $p < 0.001$; RMSEA = 0.082; comparative fit index (CFI) = 0.987; and standardized root mean squared residual (SRMR) = 0.019. While a non-significant Chi-square value is preferred as an indicator of good fit, large sample sizes can distort this indicator of fit. Other indicators of fit including the RMSEA, the CFI, and the SRMR all indicated a good model fit supporting one factor for participant intelligence mindset. The reliability of the scale was also confirmed, $\alpha = 0.943$. In the current study, as in the original instrument, an average rating score across all eight items of participant intelligence mindset was used, with a higher mean score indicating a higher fixed mindset.

To assess perceived parental failure mindset, a newer four-item scale from Haimovitz and Dweck (2016) was used, which was also previously shown to have good reliability ($\alpha = .77$). In the current study, the four reflective indicators for perceived parental failure mindset were examined by executing a CFA which again allowed the error terms to correlate to adjust for a method effect due to reverse coding of half of the items. Model fit was determined by examining the resulting Chi-square value of 6.02; $df = 1$; $p = 0.014$; RMSEA = 0.071; CFI = 0.998; and SRMR = 0.007. Again, while the significant Chi-square value did not indicate a good model fit the rest of the indicators all indicated a good model fit supporting one factor for perceived parental failure mindset. The reliability of the scale was also confirmed, $\alpha = 0.825$. Due to the

limited known use of the original instrument from Haimovitz and Dweck (2016), this confirmation adds to the value of this scale. As in the original study, this study utilized an average rating score across all four items of participant perceived parental failure mindset, with a higher mean score indicating a higher perceived parental failure mindset.

Examining scarcity, this study utilized nine questions adapted from a longer list of questions from the needs satisfaction scale of Taormina and Gao (2013). While the original study measures the satisfaction of all of the needs in Maslow's hierarchy, the current nine-question instrument uses four questions from the physiological needs satisfaction sub-scale and five questions from the safety-security needs satisfaction sub-scale. Questions from these scales were chosen as they most closely align to physical scarcity. Both scales from which questions were adapted were shown to have suitable reliability in the original study ($\alpha = .81$ for the physiological needs scale and $\alpha = .87$ for the safety-security needs scale). In the current study, the nine reflective indicators for scarcity were examined by executing a CFA which allowed the error terms to correlate. Model fit was determined by examining the resulting Chi-square value of 155.56; $df = 24$; $p < 0.001$; RMSEA = 0.075; CFI = 0.964; and SRMR = 0.056. As with the other factors, the Chi-square value did not indicate a good model fit, however the rest of the indicators all indicated good model fit, supporting one factor for perceived scarcity. The reliability of the scale was also confirmed, $\alpha = 0.831$. Since, to the best of my knowledge, this scale has not been utilized in a study concerned with university students, this confirmation of fit and reliability was meaningful as the questions used in the current study had been adapted from the original questions to better match the needs, concerns, and environment of university students, and provide the best indicators of scarcity through needs satisfaction for this population. An average

rating score across all nine items was used in this study, with a lower mean score indicating lower levels of needs satisfaction and thus higher levels of perceived scarcity.

The CFA results support the use of all three scales for the purpose of further analysis. As such, mean scale scores were calculated for all three factors and used in the following covariance structure analysis (CSA) to examine the relationships between participant intelligence mindset, perceived parental failure mindset, and perceived scarcity.

The relationships between the factors of participant intelligence mindset, perceived parental failure mindset, and perceived scarcity were examined using covariance structure analysis (CSA) utilizing STATA version 15.1. As a note and useful reminder regarding the scale values, for participant intelligence mindset a higher scale score indicated a higher fixed mindset, for perceived parental failure mindset a higher score indicated a higher perceived parental failure mindset, and for perceived scarcity *lower* scale values indicated higher perceived scarcity due to the scale measuring needs satisfaction.

The zero-order correlation of participant intelligence mindset (IM) and perceived parental failure mindset (PPFM) was statistically significant ($r = 0.14, p = < 0.001$), as were the zero-order correlations for IM and perceived scarcity (PS) ($r = -0.08, p = 0.015$), and PPFM and PS ($r = -0.22, p = < 0.001$). The partial correlation between IM and PPFM, controlling for perceived scarcity, was also statistically significant ($pr = 0.12, p = < .001$). This result indicates that, controlling for perceived scarcity, as participants show a greater fixed intelligence mindset, they also perceive a higher failure mindset from their parents. Similarly, as participants perceived a higher parental failure mindset, they also indicated higher perceived experienced scarcity, indicated in partial correlation between PPFM and PS controlling for IM ($pr = -0.21, p = < 0.001$). However, the relationship between IM and PS was no longer statistically significant

when controlling for PPFM ($pr = -0.05, p = 0.120$), indicating that participant intelligence mindset does not have a statistically significant relationship with perceived experiences of scarcity when controlling for perceived parental failure mindset. There were no moderating effects (interactions) between any two variables on the other. See Figure 2 for CSA model with results and Table 2 for CSA results including means, standard deviations, zero-order and partial correlations.

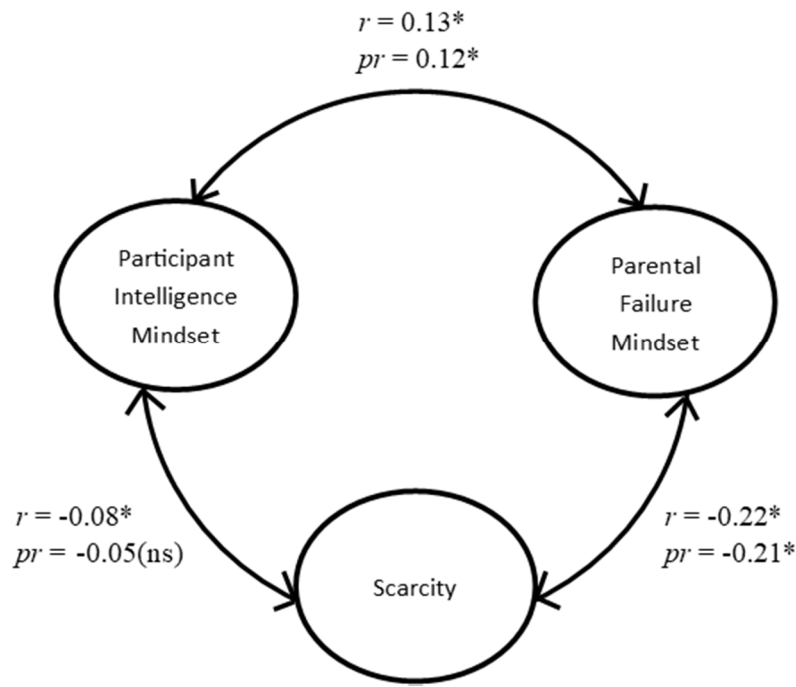


Figure 2. CSA results examining the relationships between participant intelligence mindset, perceived parental failure mindset, and perceived scarcity indicating both zero-order and partial correlations. ($*p < .05$)

Research Question Two

To explore differences in experiences of scarcity depending on student demographics an average rating score across all nine items of the needs satisfaction scale was used, where a lower mean score indicates lower levels of needs satisfaction and thus greater levels of perceived scarcity. See Table 1 for participant demographic information along with the corresponding needs satisfaction means and standard deviations.

Table 2

CSA Results Including Zero-order and Partial Correlations

Variable	<i>M</i>	<i>SD</i>	correlations		
			IM	PPFM	PS
Intelligence mindset (IM)	2.758	1.037	--		
Perceived parental mindset (PPFM)	2.738	0.972	0.13*	--	
Perceived scarcity (PS)	4.279	0.858	-008*	-0.22*	--
			partial correlations		
Intelligence mindset (IM)			--		
Perceived parental mindset (PPFM)			0.12*	--	
Perceived scarcity (PS)			-0.05	.021*	--

Note: * = significant at $p = <0.05$

Pell Eligibility and Scarcity

An independent samples T-test was conducted to determine if experiences of perceived scarcity were different for students based on Pell eligibility status. For the 1,052 participants who agreed to complete the survey, Pell eligibility was automatically populated and indicated that 241 students (22.91%) were eligible for the Pell grant and 811 students (89.11%) were not Pell eligible. While noting the analysis was unable to run on the full 1,052 population, as only 990 participants completed the needs satisfaction scale questions, there was a statistically significant difference in perceived scarcity between students who were Pell eligible ($M = 4.08$, $SD = 0.845$) and those that were not Pell eligible ($M = 4.34$, $SD = 0.85$), with Pell eligible students experiencing greater perceived scarcity as reflected in lower needs satisfaction scores, $t(988) = 3.911$, $p = <0.001$.

Race and Scarcity

An independent samples T-test was conducted to determine if experiences of perceived scarcity were different for students based on racial identity. With 964 respondents indicating their racial identity, 859 (89.11%) students identified their sole race as white, while 105 (10.89%) identified as a student of color. These percentages closely resemble that of the enrolled student population, where 86.2% of enrolled undergraduate students identify as white only. It may also be important to note this result within the context of the institution in which this survey was conducted. Over the past six years of enrollment, this institution has had 85.81-86.32% of students identify their race as white only, with the highest percentages of students identifying as white only being the past three years. There was a statistically significant difference in perceived scarcity based on race, with students of color experiencing greater scarcity ($M = 4.04$, $SD = 0.85$) than students who identified as white only ($M = 4.31$, $SD = 0.85$), $t(962) = 3.063$, $p = 0.002$.

Housing and Scarcity

A one-way ANOVA was conducted to determine if experiences of perceived scarcity were different for students based on their housing type. With 988 respondents answering the question about housing, 442 (44.74%) students indicated that they lived off campus not with their parents, 385 (38.97%) students indicated that they lived on campus in a residence hall which includes a meal plan, 85 (8.6%) students indicated that they lived off campus with their parents, and 76 (7.69%) students indicated that they lived in on campus housing but not in a residence hall. There was a statistically significant difference in perceived scarcity based on type of housing as determined by the one-way ANOVA, $F(3,984) = 7.64$, $p = <0.001$. Post-hoc comparisons using the Tukey test indicated that the mean score for students living off campus with their parents ($M = 4.68$, $SD = 0.88$) was significantly different than students living off

campus not with their parents ($M = 4.24$, $SD = 0.90$), with students living off campus not with their parents experiencing higher scarcity than students living off campus with their parents. This result makes sense, with the assumption that most students living off campus with their parents experience some form of assistance and support with food and adequate shelter. Similarly, students living off campus with their parents ($M = 4.68$, $SD = 0.88$) experienced less scarcity than students living on campus in a residence hall ($M = 4.21$, $SD = 0.80$). This result is interesting in that students that are living in the residence hall also have access to a meal plan and should have the tangible items related to scarcity provided (adequate shelter, heat, cooling, and healthy and ample food), but may be experiencing differences in perceived scarcity having to do with the non-tangible items (i.e., financial insecurity) related to scarcity in the scale. There were no other statistically significant differences in the experiences of scarcity based on housing type.

Gender Identity and Scarcity

A one-way ANOVA was conducted to determine if experiences of perceived scarcity were different for students based on their gender identity. With 989 respondents indicating their gender identity, 1 (0.10%) student identified as a transman, 7 (0.71%) students identified as gender fluid or non-binary, 565 (57.13%) students identified as a woman, 409 (41.35%) identified as a man, and 7 (0.71%) students preferred not to disclose. There was a statistically significant difference in perceived scarcity based on gender identity as determined by the one-way ANOVA, $F(4,984) = 4.75$, $p = <0.001$. Post-hoc comparisons using the Tukey test indicated that the mean scores significantly differed for students who identified as gender fluid ($M = 3.11$, $SD = 0.96$) as compared to students who identified as a man ($M = 4.36$, $SD = 0.80$), a woman ($M = 4.23$, $SD = 0.89$), or those that preferred not to disclose ($M = 4.37$, $SD = 0.54$). Taken together, these results may have important implications about the scarcity experienced by students who do

not identify exclusively as either a man or woman. Mean scores did not differ significantly for students who identified as a woman ($M = 4.23$, $SD = 0.89$) compared to those who identified as a man ($M = 4.36$, $SD = 0.80$).

Sexual Orientation and Scarcity

An independent samples T-test was conducted to determine if experiences of perceived scarcity were different for students based on their sexual orientation. With 961 respondents answering the item pertaining to their sexual orientation, 856 (89.07%) identified as straight and 105 (10.93%) identified as either asexual, bisexual, gay, or lesbian. There was a statistically significant difference in perceived scarcity based on sexual orientation, with students identifying as asexual, bisexual, gay, or lesbian experiencing more perceived scarcity ($M = 4.06$, $SD = 1.00$) compared to students identifying as straight ($M = 4.31$, $SD = 0.82$), $t(959) = 2.870$, $p = 0.004$.

First Generation College Student Status and Scarcity

An independent samples T-test was conducted to determine if experiences of perceived scarcity were different for students based on their status as a first generation college student. With 989 respondents indicating their status as either first generation or continuing generation, 307 (31.04%) students identified as a first generation college student, while 682 (68.96%) students identified as a continuing generation student with at least one parent or guardian having graduated with a four-year degree. There was not a statistically significant difference in perceived scarcity between students who identified as first generation college students ($M = 4.23$, $SD = 0.83$) and those who identified as continuing generation college students ($M = 4.30$, $SD = 0.87$), $t(987) = 1.14$, $p = 0.253$.

Year in School and Scarcity

A one-way ANOVA was conducted to determine if experiences of perceived scarcity were different for students based on their year in school. With 989 respondents indicating their year in school, proportions of respondents did not accurately reflect current enrollment in each class. While more freshman responded to the survey than seniors, more seniors than freshman are actually enrolled. The sophomore, junior, and professional program responses are proportionally closer to actual enrollment numbers. There was not a statistically significant difference in perceived scarcity based on students' year in school as determined by one-way ANOVA, $F(4,984) = 2.22, p = 0.065$.

First Year or Transfer Student Status and Scarcity

An independent samples T-test was conducted to determine if experiences of perceived scarcity were different for students based on their status as either a first year or transfer student. First year or transfer student information was automatically populated for all respondents, with 826 (78.52%) first year students and 226 (21.48%) transfer students responding. There was a statistically significant difference in perceived scarcity with first year students experiencing greater scarcity ($M = 4.25, SD = 0.84$) compared to transfer students ($M = 4.38, SD = 0.93$), $t(988) = -2.00, p = 0.045$.

Summary

Exploring the nature of the relationships between participant intelligence mindset, perceived parental failure mindset, and perceived scarcity yielded interesting results. Upon initial examination, all zero-order correlations exploring the relationships between participant intelligence mindset (IM), perceived parental failure mindset (PPFM), and perceived scarcity (PS) were statistically significant and indicated a relationship between these factors.

However, once partial correlations were explored controlling for each factor, a different way of looking at these relationships emerged.

Parental perceived failure mindset was found to be related to student intelligence mindset. Controlling for PS, the relationship between IM and PPFM was statistically significant, indicating that as participants perceive a higher failure mindset from their parents they also show a greater fixed intelligence mindset. This result generates interesting inferences about the importance and complexity of the relationship of parental failure mindset to students' intelligence mindset. This result also creates implications regarding how educators continue to look at and develop the interventions given to students intended to develop a growth mindset.

Parental perceived failure mindset was also found to be related to students' perceived scarcity. Controlling for IM, the relationship between PPFM and PS was statistically significant, indicating that as participants indicated higher perceived scarcity they also perceived a higher parental failure mindset. Interestingly however, when controlling for PPFM, the relationship between IM and PS was not statistically significant, indicating that participants' own intelligence mindset does not have a direct relationship with their perceived experiences of scarcity. These results certainly speak to the complexity of these factors and their resulting relationships, which will be explored in greater detail in Chapter 5.

The results of this study also indicated that there are differences in experiences of scarcity depending on student demographics. The results of this study support that underrepresented students continue to experience barriers in higher education, with scarcity being one important consideration to the complex and intersecting barriers that first generation, low income, and other underrepresented students face.

Further discussion regarding interesting relationships between PS and IM and PPFM, the differences in perceived scarcity by student demographics, and the importance and implications of these findings will continue in Chapter 5.

CHAPTER 5. DISCUSSION

Higher education strives to develop and implement successful interventions to best support students and to help them thrive and reach their full potential as creative and critical thinkers who are engaged in their learning and community. However, there is a need to continue to acknowledge and explore the relationships within a vast array of complex barriers that hinder the opportunities and success of underrepresented students. Through this continued exploration of relationships between the complex situations and beliefs that contribute to inequitable outcomes, there is opportunity to better guide interventions that can help us achieve an ideal of equitable academic and experiential outcomes for all students.

The work of this study focused on two specific underrepresented student groups - first generation college students and low income college students. Despite efforts and changes in education policy to reduce clear outcome disparities, the academic achievement and educational attainment gaps have continued to grow between students from low-income and high-income families (Bailey & Dynarski, 2011; Reardon, 2013) and between first generation college students and their continuing generation peers (Chen, 2005; Ishitani, 2006; Saenz et al., 2007).

The literature review began by examining common barriers and characteristics of both first generation college students and low income students to better get to know these populations. Next, issues and challenges faced by first generation and low income students were explored, including challenges to higher education access; the transition from secondary to higher education; navigating the campus experience; and the inequitable collegiate outcomes common for these students.

After exploring the characteristics and challenges of first generation and low income students, attention was turned to beliefs about the nature of intelligence – specifically growth

versus fixed mindset – and how these beliefs may impact and shape students’ success and experience (Dweck, 2006; Dweck & Leggett, 1988; Hong et al., 1999). Additionally and importantly, while what a student believes about their own intelligence is impactful, what proximal others believe about a student’s intelligence (Moorman & Pomerantz, 2010; Schleider et al., 2016), and failure (Haimovitz & Dweck, 2016; Haimovitz & Dweck, 2017), can also impact student outcomes. Specifically examined in this study was the relationship between student’s intelligence mindset and the perceived failure mindset of their parents.

Finally, scarcity was explored as a vitally important consideration to student success. The negative impact of experiencing scarcity on cognitive performance was explored alongside the complex cognitive processes important to students’ success in higher education. Indeed, scarcity itself, independent of other factors, has been shown to decrease both attention and memory (Mullinathan & Shafir, 2013; Zhao & Tomm, 2018). With scarcity contributing to such notable impacts on cognitive function and experiences, possible relationships between scarcity and mindset deserve exploration as we move to optimize interventions intended to decrease the challenges and inequitable outcomes of first generation and low income students. Despite abundant research exploring intelligence mindsets, and a growing literature on the positive impact of brief interventions to help students adopt a growth mindset and thereby improve the social and academic situations of students (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003; O’Rourke et al., 2014; Park et al., 2017; Quay, 2018; Yeager et al., 2014), there have been few, if any, attempts to explore the relationship of scarcity with mindset.

To reduce this gap in knowledge, the purpose of this study was to begin to explore the relationships between scarcity and beliefs about intelligence – including the intelligence mindset

of students, and the failure mindset of parents – as well as the connection between scarcity and student demographics, including first generation, low income status, racial identity, gender identity, sexual orientation, and housing situation. This study was guided by the following research questions:

1. What is the nature of the relationship between participant intelligence mindset, perceived parental failure mindset, and scarcity?
2. Are there differences in experiences of scarcity depending on student demographics?

The remainder of this chapter will discuss the study findings, implications of the results, and recommendations for further areas of exploration and research.

Discussion and Implications

Research Question One

While it has been shown that growth mindset can be taught to students through brief interventions (Aronson, Fried, & Good, 2002; Blackwell et al., 2007), I wondered if there were unexplored relationships that might impact the effectiveness of these interventions. First, I was curious about whether there is a relationship between students' perceived scarcity and their intelligence mindset. Further, if there is a relationship between perceived scarcity and intelligence mindset, what implications might that have on the effectiveness of interventions given to students intended to increase growth mindset. Explicitly, I wondered if interventions intended to increase growth mindset might be less effective for students who are perceiving scarcity. Considering the negative cognitive impacts due to scarcity discussed in Chapter 2, if a student is hungry, or does not have adequate shelter, do interventions intended to instill a growth mindset continue to be effective? Since no research, to my knowledge, has explored the

relationship between scarcity and intelligence mindset, this study's goal was to begin the exploration to see what, if any, relationships exist between scarcity and intelligence mindset.

In addition to this interesting question about possible relationships between scarcity and intelligence mindset, emerging research raised my curiosity about parents' beliefs about intelligence and the impacts of those beliefs on student intelligence mindset. There are persisting questions about what parental practices instill and encourage a growth mindset in children. Multiple studies have shown that, contrary to initially thought, intelligence mindsets are not directly transmitted from parents to their children (Gunderson et al, 2013; Haimovitz & Dweck, 2017). Indeed, Haimovitz and Dweck (2017) posit that the intelligence mindset held by adults is not the primary variable influencing parental responses and reactions toward children which impact children's intelligence mindset. Instead they argue that a better predictor of a parent's response is their belief about how to instill motivation in their children. Specifically how they react, in words or actions, to children's key moments of failure or setback. Supporting this assertion, Haimovitz and Dweck (2016) found that while parents' own intelligence mindset did not predict children's intelligence mindset, their failure mindset did. To further explore the relationship between students' intelligence mindset with that of their parents' beliefs about failure, this study examined the relationship of students' own intelligence mindset (IM) with that of the perceived failure mindset of their parents (PPFM).

In the current study, exploring the nature of the relationships between participant intelligence mindset, perceived parental failure mindset, and perceived scarcity yielded interesting results. To begin, a confirmatory factor analysis (CFA) was completed using STATA version 15.1 to determine whether the reflective indicators pertaining to each of the three scales being used – participant intelligence mindset, perceived parental failure mindset, and perceived

scarcity – accurately reflect their corresponding latent variable and fit the model indicated. The CFA results supported the use of all three scales for the purpose of further analysis. As such, mean scale scores were calculated for all three factors and used in a covariance structure analysis (CSA) to examine the relationships between participant intelligence mindset, perceived parental failure mindset, and perceived scarcity. All zero-order correlations exploring the relationships between participant intelligence mindset (IM), perceived parental failure mindset (PPFM), and perceived scarcity (PS) were statistically significant. The zero-order correlation of participant IM and PPFM was found to be $r = 0.14, p = < 0.001$, the zero-order correlation for IM and PS was found to be $r = -0.08, p = 0.015$, and the zero-order correlation for PPFM and PS was found to be $r = -0.22, p = < 0.001$. However, once partial correlations were explored controlling for each factor, a different way of looking at these relationships emerged. Discussion regarding partial correlation results follows.

Participant Intelligence Mindset and Perceived Parental Failure Mindset

Controlling for perceived scarcity (PS), the relationship between IM and PPFM was statistically significant ($pr = 0.12, p = <.001$). This result indicates that, regardless of whether a student perceives themselves to be experiencing scarcity, as participants perceive a higher failure mindset from their parents they also show a greater fixed intelligence mindset. This expands on the work of Haimovitz and Dweck (2016) discussed above, who found that higher perceived parental failure mindset predicted a greater fixed mindset in children.

This result generates interesting implications regarding how educators continue to look at and develop the interventions given to students. Further exploring the relationship between students' intelligence mindset and parental failure mindsets may be able to help guide conversation and exploration to better inform interventions given to help achieve equitable

academic and experiential outcomes for all students. For example, while the majority of attention thus far has been given to interventions with students to increase their growth mindset, this significant relationship between IM and PPFM may indicate the need to further explore interventions with parents regarding their failure mindsets. The exploration of failure mindset interventions with parents is pertinent as research has shown that intelligence mindset does not appear to be directly transmitted from parents to children (Gunderson et al, 2013; Haimovitz & Dweck, 2017), but that parental failure mindset is (Haimovitz & Dweck, 2016). Perhaps interventions which assist parents in guiding their words and actions in response to failures or setbacks, rather than interventions focusing on growth mindset, can help promote growth mindset in their children. This could be as simple as sharing information to teach parents effective ways to model growth mindset-related responses to their children when experiencing their own failures, or sharing instructions or language parents can use to have growth conversations with their children who experience a challenge, instead of expressing that the failure is debilitating or shameful.

Also, perhaps especially applicable in higher education where there may be more independence of students from parents, it might also be possible to meaningfully move the perception of students without attempting to change the failure mindset of parents. For example, similar to how growth mindset interventions have been developed, exploration toward development of interventions given to students to illuminate the impact of parental failure mindset could be explored as potentially effective ways to decrease the impact of PPFM on IM.

A final, perhaps idealistic, thought on the importance of continuing to explore PPFM and its impact on IM. If successful interventions with parents can be developed to reduce parents' failure mindset and thereby limit the resulting negative behavior and response toward children

experiencing failure, or limit the impact of parental failure mindset with interventions directly with students, the generational cycle of learned behavior passed from parent to child has the potential to be broken. The discontinuation of this cycle could have important and long range impacts on increasing growth mindset in students.

Discussion regarding the partial correlation results for the relationships between PS and IM and PPFM follows.

Scarcity and the Complex Relationship with Student Intelligence Mindset and Parental Failure Mindset

The relationship between PPFM and PS, controlling for IM, was statistically significant ($pr = -0.21, p = <0.001$). This result indicates that, regardless of whether a student has a growth or fixed intelligence mindset, as participants indicated higher PS they also experienced higher PPFM. Interestingly however, when controlling for PPFM, the relationship between IM and PS was no longer statistically significant ($pr = -0.05, p = 0.120$). This is a fascinating result, which begs the question, why when controlling for the other factor is PS is related to PPFM but not related to IM?

Pell (family income) → PS. To gain a better understanding about these relationships, I believe these results need to be taken together within a larger context of scarcity. First, we will expand on PS by discussion one connection of scarcity to student demographics. As will be discussed in detail later in this chapter, this study did find differences in PS based on student demographics. This included the result that Pell eligible students indicated greater PS. Expanding on this particular relationship with PS, Pell eligibility is often used as an indicator of student low income status. Pell eligibility can also be viewed an indicator of *familial* low income status. Participants in this study were limited to largely traditional-age undergraduate students. In the

case of this student population, the Free Application for Federal Student Aid (FAFSA) would primarily include a student's family income to determine eligibility. Considering this likelihood, Pell eligibility in this study could reasonably be considered a reflection of the low income status of the family, not solely the student. With this new context for thinking about PS in this study, we now turn attention to building a better understanding of the relationship between PS and PPFM.

PS → PPFM. While this study did not assess parents' failure mindset directly, students have been found to reliably identify their parents' failure mindsets (Haimovitz & Dweck, 2016), so it is likely that students' PPFM in this study accurately reflects parents' actual failure mindset. As such, it is reasonable that PPFM be used as a proxy for parental failure mindset in this discussion. However, to best consider parental failure mindset and its implications to the findings in this study the discussion should go a bit deeper. Parental failure mindset is not necessarily how parents *view* failure, but how they *react* to failure. Haimovitz and Dweck (2016) found that parents who had a higher 'failure is debilitating' mindset placed less focus on their child's learning and more focus on their child's behavior. Parents with a failure mindset were also more likely to react to a child experiencing struggle using unconstructive involvement, such as controlling language, performance-oriented teaching, or negative affect. Further, children were aware of the negative focus and behaviors of their parents, reporting seeing their parents as being concerned with their performance and grades rather than their learning and improvement.

This leads to the question of *why* do parents react negatively to failure? Is it as Haimovitz and Dweck (2017) suggest and adults' reactions are due to their theories of motivation, and that reacting negatively to failure will better motivate students to improve? Or is it possible that, at least in part, parents who negatively react to failure have more of a scarcity

mindset? Perhaps experiences of scarcity for parents influence and contribute to these negative reactions to failure and setbacks in their children. It may be that failure and setbacks simply ‘cost too much’ for people experiencing scarcity. Expanding on the argument of Bertrand, Mullainathan, and Shafir (2004) discussed in Chapter 2, people experiencing scarcity have the same biases and weaknesses as others, but due to the incredibly small margins of error related to poverty, the same behaviors manifest in more pronounced ways with more devastating outcomes. Perhaps negative reactions to failure by parents experiencing scarcity are more pronounced as well. In short, the less you have, the less that failure or setbacks can be an option. This consideration provides insight to the relationship between PS and PPFM found in this study, where as one rises, so does the other. Overall, these results indicate the need to continue to explore what drives and influences parental failure mindset and reactions to children in times of failure or struggle. Specifically, these results indicate the need to look at scarcity as a contributing force to parental failure mindset.

PS → PPFM → IM. Finally, this brings us back to the relationship found between PPFM and IM, which was discussed in detail in the section above. While PS did not have a direct relationship to IM in this study, PS retains a vitally important relationship with students’ IM indirectly through PPFM. This study adds to the greater discussion about the importance of scarcity to student experience, with the indication that scarcity may play an important part in parental failure mindset, and the reactions of parents to failure. Just as the relationship between students’ intelligence mindsets and parental failure mindsets is being actively considered in research, I believe that how scarcity may impact IM through PPFM deserves further scrutiny.

Scarcity is important to consider as a potential driving force to parental failure mindset and the reactions to failure which impact student intelligence mindset. Scarcity also must

continue to be acknowledged as impacting some students more than others. The next section will reflect on the results for Research Question Two, and the continued importance and relevance of the relationships between PS and student demographics.

Research Question Two

Results of this study indicated that there are indeed differences in experiences of scarcity depending on student demographics. Importantly, the results of this study support that underrepresented students continue to experience barriers in higher education, with scarcity being one important consideration to the complex and intersecting barriers that first generation, low income, and other underrepresented students face. Discussion regarding specific demographic groups of interest in this study follows.

Low Income Status

There was a statistically significant difference in perceived scarcity between students who were Pell eligible ($M = 4.08, SD = 0.845$) and those that were not Pell eligible ($M = 4.34, SD = 0.85$), with Pell eligible students experiencing greater perceived scarcity as reflected in lower needs satisfaction scores, $t(988) = 3.911, p = <0.001$. Results in this study indicate that Pell eligibility does capture scarcity, at least to some degree. Using Pell eligibility as an indicator of low income status, it makes sense that Pell eligible students experienced greater perceived scarcity compared to students who were not Pell eligible.

However, Pell eligibility may not be an entirely accurate indicator of low income status, or experiences of scarcity for students. One important consideration is whether all low income and first generation college students successfully complete the FAFSA to be considered for the Pell grant. Feeney and Heroff (2013) found that both low income students and first generation college students did not complete the FAFSA in time to qualify for need-based aid as often as

higher income and continuing generation students. With need-based aid being awarded on a first-come first-served basis, this indicates that students with the greatest need for need-based aid may not be receiving it simply due to barriers to FAFSA completion. Further, the FAFSA assumes parental support and cooperation in completing the detailed, complex, and often confusing information required. This parental cooperation and support is not always available, or possible, for either low income or first generation college students. With the timely and accurate completion of the FAFSA being a barrier for low income and first generation college students, it is likely that there are many students experiencing scarcity who, for a vast number of reasons, do not receive Pell. Perhaps even more importantly, in terms of exploring the relationships of scarcity and beliefs about intelligence in this study, Pell eligibility may not be a sufficient indicator of *scarcity* for all students, especially considering that Pell eligibility for undergraduate students is also a reflection of familial income.

First Generation College Student Status

Although students who identified as first generation college students had slightly higher perceived scarcity, there was not a statistically significant difference in perceived scarcity between students who identified as first generation college students ($M = 4.23, SD = 0.83$) and those who identified as continuing generation college students ($M = 4.30, SD = 0.87$), $t(987) = 1.14, p = 0.253$. With so many shared characteristics between low income and first generation college students, at first glance this result may be surprising. If Pell eligible students show a difference in perceived scarcity, why is there not a significant difference for first generation college students as well? Simply, this result may indicate that at this university *both* first generation and continuing generation students perceive scarcity over-all. This result highlights

the persisting need for higher education to continue to examine scarcity as a concern that may be experienced by a range of students at both expected and unexpected places and times.

Non-majority Identities on Campus – Racial Identity, Gender Identity and Sexual Orientation

The results of this study indicate that non-majority identity students – including students of color, students identifying as LGBTQ, and students identifying any gender not exclusively a man or woman – are experiencing more scarcity than their majority-identity peers. Specifically, results indicated that students of color are experiencing greater scarcity ($M = 4.04$, $SD = 0.85$) than students who identified as white only ($M = 4.31$, $SD = 0.85$), $t(962) = 3.063$, $p = 0.002$. Further, students identifying as asexual, bisexual, gay, or lesbian are also experiencing more perceived scarcity ($M = 4.06$, $SD = 1.00$) compared to students identifying as straight ($M = 4.31$, $SD = 0.82$), $t(959) = 2.870$, $p = 0.004$. Finally, there were also statistically significant differences in perceived scarcity based on gender identity with post-hoc comparisons indicating that students who identified as gender fluid ($M = 3.11$, $SD = 0.96$) experience greater scarcity than students who identified as a man ($M = 4.36$, $SD = 0.80$) or a woman ($M = 4.23$, $SD = 0.89$).

Taken together, these results demonstrate the continued need to recognize and address the disparate, and intersecting, experiences that have been discovered of non-majority identifying students (Bui, 2002; Choy, 2001; Duncan et al., 2019; Engstrom & Tinto, 2008; Ishitani, 2006; Orbe, 2004; Ostrove & Long, 2007; Pascarella et al., 2004; Redford & Mulvaney Hoyer, 2017; Saenz et al., 2007; Terezini et al., 1996). These results have important implications for the opportunities within higher education to both provide support and develop meaningful services for these student populations. However, to achieve truly meaningful support and services on campuses, the continued exploration and discussion regarding the intersectionality of the experiences of non-majority identities and scarcity is important. Compounded influences and

barriers faced by individuals of multiple oppressed identities is important to acknowledge, and an area and opportunity to continue to explore relationships between perceived scarcity and beliefs about intelligence.

Housing

It is not surprising that students living with their parents or guardians experience less scarcity ($M = 4.68$, $SD = 0.88$) than students living off campus not with their parents ($M = 4.24$, $SD = 0.90$). This result makes sense, with the assumption that most students living at home with their parents experience some form of assistance and support, especially concerning the tangible items of scarcity including food, adequate shelter, heating, and cooling. The more surprising result is that students living at home with their parents indicate significantly less perceived scarcity ($M = 4.68$, $SD = 0.88$) than students living on campus in a residence hall ($M = 4.21$, $SD = 0.80$). This result is interesting given students who are living in the residence hall also have access to a meal plan and should therefore have the tangible items related to scarcity provided (adequate shelter, heat, cooling, and healthy and ample food). However, they may be experiencing differences in perceived scarcity having to do with the non-tangible items related to scarcity pertaining to financial insecurity, including the ability to get money whenever it is needed, a feeling of financial security, and enough money to cover monthly expenses.

Limitations

This study has several limitations that should be considered. First, this study only examined students attending one Midwest institution. While the results of this study support the continued experience of increased scarcity of low income and non-majority identity students, scarcity should continue to be acknowledged and explored at a range of institutions in future research examining intelligence mindset.

The particular timeframe in which the survey was administered is an additional limitation to this study. This study examines only one limited timeframe of student experience. Many things may impact students' identification of scarcity, including timing of financial aid distribution and holiday breaks for example. Remembering the work of Mani, Mullainathan, Shair, and Zhao (2013) discussed in Chapter 2, timeframes of greater scarcity (such as just before a harvest when existing resources have been depleted) versus timeframes of relative bounty (such as immediately post-harvest when resources have been restored) have significant impacts on cognitive function. It is plausible that students' identification of scarcity would also be influenced by timeframes of greater scarcity (such as the end of the semester when all financial aid has been used) compared to timeframes of relative bounty (such as right after financial aid has been distributed). Future work could better account for these timeframes of possible ebb and flow of resources for students in higher education.

The measure of perceived scarcity utilized in this study is an additional possible limitation. This study examined perceived scarcity versus the actual experiences of scarcity of students. Perceived scarcity of students was examined through the framework of Maslow's hierarchy of needs adapted from a longer list of questions from Taormina and Gao (2013) examining needs satisfaction. The questions used in the current study were adapted from the original list of questions to better match the needs, concerns, and environment of university students, and provide the best indicators of scarcity. It may be worthwhile to develop a scale which directly and specifically examines experienced scarcity of students and identifies the needs most pertinent to students at a university, including needs disproportionately experienced by underrepresented students.

Implications for Future Research

There are a wealth of opportunities for future exploration regarding the relationship between student intelligence mindset and perceived parental failure mindset. The current study supports recent research regarding the important impact of parental attitudes and behaviors pertaining to their beliefs about failure, and the resulting impact on children's intelligence mindset. Additionally, the current study contributes information about how scarcity may have a relationship, albeit complex, to bear on parental failure mindset, student intelligence mindset, and non-majority groups that are disproportionately impacted by scarcity.

Continued exploration is needed regarding parents' beliefs about failure and the relationship with children's intelligence mindset. Better understanding of this relationship will not only have an impact on the understanding of intelligence mindset, it will also importantly guide interventions given to students to help them develop a growth mindset. This exploration should also broaden to include whether there are differences between parents who view failure as debilitating or as process required for growth based on demographics or experiences of scarcity. Asking questions such as: What are the experiences of parents which lead to greater failure mindset – and what, if any, is that relationship to their experiences of scarcity?; At what student age, or education level, are interventions with parents to decrease parental failure mindset, and resulting behaviors, most effective to make the most positive impact to students' growth mindset?; Does parent failure mindset disproportionately impact low income, first generation college students, or other students of non-majority populations? As further consideration is given to the relationship between IM and PPFM, possible mediating variables should also be explored. For instance, while not addressed in this study, differences in IM compared to PPFM based on

student demographics such as student age, living near or with parents versus independently, race, gender identity, sexual orientation, or student year in school could be examined.

Final Conclusions

Higher education must be dedicated to finding meaningful ways to help reduce achievement gaps for first generation, low income, and other underrepresented students. To reduce these gaps, there continues to be a need to explore relationships between the complex systems that contribute to inequitable student outcomes. This study contributed to this understanding by examining the continued disproportionate experiences of scarcity for underrepresented students, and the connection and relationships between perceived scarcity, students' intelligence mindset, and students' perceived parental failure mindset. Collectively, the answers to the research questions explored by this study indicate that scarcity continues to be a vitally important factor to consider as an important contributor to student experience.

First, results of this study support previous research which indicates that underrepresented students continue to experience higher levels of scarcity – specifically on the basis of low income status, racial identity, sexual orientation, gender identity. As discussed earlier in this chapter, this result brings opportunities to provide support and develop meaningful services for these student populations to address scarcity as one consideration to the complex and intersecting challenges these students face. These continued experiences of scarcity for underrepresented students are important to keep in mind, especially when exploring other results of this study which highlight the complex relationship between scarcity and beliefs about intelligence – including students' own intelligence mindset and students' perceived parental failure mindset.

The relationship of greater perceived parental failure mindset being predictive of greater student fixed mindset emerged as an important consideration. One influential way to impact this relationship may be to directly reduce parents' failure mindsets through brief interventions. This has the potential to limit the negative responses of parents toward failure which contribute to the development of a fixed mindset in children. Another way to reduce the influence of parental failure mindset and make an impact on this relationship, and perhaps even more relevant to students in higher education, is to examine brief interventions given directly to students to make them aware of how their parents' views about failure are able to impact their own beliefs about intelligence. Similar to the brief interventions currently given to students to increase growth mindset, brief parental failure mindset interventions may be useful in developing a growth mindset in students without needing to have access to, or provide interventions directly to, parents.

This study also discovered an indirect relationship between PS and IM through PPFM. Taken within a larger context, scarcity may be an important consideration when further exploring contributors to parental failure mindset. Certainly the results of this study have created opportunities to continue to explore relationships between scarcity and beliefs about intelligence.

Overall, the results of this study carry an invitation to continue to explore the complex and intersecting systems and student experiences limiting access to, and success in, education. It also highlights the responsibility to continue to explore these layered relationships and influences to develop interventions which best help students, particularly underrepresented students, achieve equitable academic and experiential outcomes.

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APPENDIX A. INTELLIGENCE MINDSET AND SCARCITY QUESTIONNAIRE

Title of Research Study: Intelligence Mindset and Scarcity Survey

Dear [REDACTED] Student:

My name is Michelle Pearson. I am a graduate student in the School of Education at North Dakota State University, and I am conducting a research project to explore the possible relationships between scarcity and beliefs about intelligence. It is our hope that, with this research, we will learn more about ways to better help all students succeed at college.

Who: Because you are an enrolled undergraduate student at [REDACTED], you are invited to take part in this research project. Your participation is entirely your choice, and you may change your mind or quit participating at any time, with no penalty to you.

Time: It should take about 10 minutes to complete the following online questions about your beliefs about intelligence and experiences with scarcity.

Information Collected and Privacy: At the end of the survey we will be asking you to share some personal demographic information. While most demographic questions on this survey are optional, your eligibility for the Pell Grant will be automatically populated in order to help us better determine students who may be experiencing financial need. The term you began your studies at [REDACTED] along with whether you are a transfer student or not will also be automatically populated. We will keep private all research records that identify you. Your information will be combined with information from other people taking part in the study, and we will write about the combined information that we have gathered. You will not be identified in these written materials. We may publish the results of the study; however, we will keep your name and other identifying information private.

Risks: It is not possible to identify all potential risks in research procedures, however there are no known risks involved with your participation in this survey.

Questions: If you have any questions about this project, please contact me at michelle.pearson@ndsu.edu or 701-231-8090. You can also contact my advisor Dr. Erika Beseler Thompson at Erika.beseler@ndsu.edu or 701-238-9648. You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8995, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu, or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

Thank you for your taking part in this research. If you wish to receive a copy of the results, please contact me at michelle.pearson@ndsu.edu.

Continue to the survey: By selecting the arrow below you are consenting to and choosing to participate in this survey.

Select the arrow below to continue to the survey.

Instructions: The following questions are exploring students' ideas about intelligence. There are no right or wrong answers. We are just interested in your views. Using the scale below, please indicate the extent to which you agree or disagree with the following statements.

You have a certain amount of intelligence, and you can't really do much to change it.

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

Your intelligence is something about you that you can't change very much.

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

To be honest, you can't really change how intelligent you are.

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

You can learn new things, but you can't really change your basic intelligence

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

No matter who you are, you can significantly change your intelligence level

- Strongly Disagree (6)
 - Disagree (5)
 - Somewhat Disagree (4)
 - Somewhat Agree (3)
 - Agree (2)
 - Strongly Agree (1)
-

You can always substantially change how intelligent you are.

- Strongly Disagree (6)
 - Disagree (5)
 - Somewhat Disagree (4)
 - Somewhat Agree (3)
 - Agree (2)
 - Strongly Agree (1)
-

No matter how much intelligence you have you can always change it quite a bit.

- Strongly Disagree (6)
 - Disagree (5)
 - Somewhat Disagree (4)
 - Somewhat Agree (3)
 - Agree (2)
 - Strongly Agree (1)
-

You can change even your basic intelligence level considerably.

- Strongly Disagree (6)
 - Disagree (5)
 - Somewhat Disagree (4)
 - Somewhat Agree (3)
 - Agree (2)
 - Strongly Agree (1)
-

Instructions: For the next set of questions, think about your parent(s) or guardian(s) you grew up with, then read each sentence below and mark the choice that shows how much you agree with it.

My parent(s)/guardian(s) think failure is bad and should be avoided

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

My parent(s)/guardian(s) think failure hurts my learning

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

My parent(s)/guardian(s) think failure can help me learn.

- Strongly Disagree (6)
 - Disagree (5)
 - Somewhat Disagree (4)
 - Somewhat Agree (3)
 - Agree (2)
 - Strongly Agree (1)
-

My parent(s)/guardian(s) think failure can help me grow

- Strongly Disagree (6)
 - Disagree (5)
 - Somewhat Disagree (4)
 - Somewhat Agree (3)
 - Agree (2)
 - Strongly Agree (1)
-

Instructions: The next set of questions is about your satisfaction related to meeting various physical needs. Please indicate how much you agree or disagree with the following statements.

I am completely satisfied with the **quality of the food** I eat every day

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with the **amount of food** that I have available to eat every day

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with the amount of **heating** I have when the weather is cold

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with the amount of **cooling** I have when the weather is hot

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with the **quality** of the house/apartment/residence hall room I am living in

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with the **space available** for me in my house/apartment/residence hall room

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with my **financial security**

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with my **ability to get money** whenever I need it

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

I am completely satisfied with the **money I have available** to cover my monthly costs

- Strongly Disagree (1)
 - Disagree (2)
 - Somewhat Disagree (3)
 - Somewhat Agree (4)
 - Agree (5)
 - Strongly Agree (6)
-

Instructions: Thinking about the parent(s) or guardian(s) you grew up with, did either of your parent(s)/guardian(s) complete college/university and graduate with a four-year (undergraduate) college degree?

- Neither of my parents/guardians have completed a four-year degree (1)
 - At least one of my parents/guardians has completed/graduated with a four-year degree (0)
-

Instructions: Please answer the following demographic information questions. Answering these questions is optional, you do not have to share your information for any question(s) that you are not comfortable answering on this part of the survey.

What is your age?

▼ 18 (4) ... 99 (85)

What is your student status for the 2019-2020 school year?

- Freshman (1)
 - Sophomore (2)
 - Junior (3)
 - Senior (4)
 - Professional Program (5)
-

Do you live on campus/in campus housing or off campus?

- I live in a residence hall (1)
 - I live in campus housing, but not a residence hall (2)
 - I live off campus - with my parents or guardians (3)
 - I live off campus - not with my parents or guardians (4)
-

What is your gender identity?

- Gender Fluid / non-binary (1)
 - Transwoman (2)
 - Transman (3)
 - Woman (4)
 - Man (5)
 - Prefer not to disclose (6)
-

What is your sexual orientation?

- Asexual (1)
 - Bisexual (2)
 - Gay (3)
 - Lesbian (4)
 - Straight / Heterosexual (5)
 - Prefer not to disclose (6)
-

What is your racial identity? Please select all that apply.

- Asian (1)
 - American Indian or Alaskan Native (2)
 - Black or African American (3)
 - Hawaiian Native or Pacific Islander (4)
 - White (5)
 - Prefer not to disclose (6)
-

APPENDIX B. ORIGINAL SCALE ITEMS AND CURRENT STUDY SCALE ITEMS

Participant Intelligence Mindset Questions

The item wording for the participant intelligence mindset questions is exactly as presented in the original study. The four incremental scale items were reverse scored.

Entity (Fixed Mindset) Beliefs Subscale Items

- You have a certain amount of intelligence, and you can't really do much to change it.
- Your intelligence is something about you that you can't change very much.
- To be honest, you can't really change how intelligent you are.
- You can learn new things, but you can't really change your basic intelligence.

Incremental (Growth Mindset) Beliefs Subscale Items

- No matter who you are, you can significantly change your intelligence level.
- You can always substantially change how intelligent you are.
- You can always substantially change how intelligent you are.
- No matter how much intelligence you have you can always change it quite a bit.

Perceived Parental Failure Mindset Questions

The item wording for the perceived parental failure mindset questions is exactly as presented in the original study. The final two questions are reverse scored.

- My parents think failure is bad and should be avoided.
- My parents think failure hurts my learning.
- My parents think failure can help me learn.
- My parents think failure can help me grow.

Needs Satisfaction Questions

The questions used in the current study have been adapted from the original list of questions to better match the needs, concerns, and environment of university students, and provide the best indicators of perceived scarcity. Comparison of the original item wording compared to the adjusted wording used for this study is below.

Table A1

Physiological needs satisfaction items

Original instrument item wording	Current instrument item wording
I am completely satisfied with the quality of the food I eat every day	same as original
I am completely satisfied with the amount of food that I eat every day	I am completely satisfied with the amount of food that I have available to eat every day Note: changed to better reflect whether participant has access to enough food and to eliminate reporting of over or under eating.
I am completely satisfied with the amount of heating I have when the weather is cold	same as original
I am completely satisfied with the amount of cooling I have when the weather is hot	same as original

Table A2

Safety-security needs satisfaction items

Original instrument item wording	Current instrument item wording
I am completely satisfied with the quality of the house/apartment I am living in	I am completely satisfied with the quality of the house/apartment/residence hall room I am living in Note: changed to better include those participants who may be living on campus.
I am completely satisfied with the space available for me in my house/apartment	I am completely satisfied with the space available for me in my house apartment/residence hall room Note: changed to better include those participants who may be living on campus.
I am completely satisfied with my financial security	same as original
I am completely satisfied with my ability to get money whenever I need it	same as original
I am completely satisfied with the money I reserved for me to have a secure retirement	I am completely satisfied with the money I have available to cover my monthly costs Note: changed to better reflect the age and financial concerns of university students

APPENDIX C. IRB APPROVAL



January 9, 2020

Dr. Erika Beseler Thompson
School of Education

Re: IRB Determination of Exempt Human Subjects Research:
Protocol #HE20156, "Intelligence Mindset and Scarcity Survey?"

Co-investigator(s) and research team: Michelle Pearson, Brent Hill, Emily Berg
Date of Exempt Determination: 1/9/2020 Expiration Date: 1/8/2023
Study site(s): NDSU
Sponsor: n/a

The above referenced human subjects research project has been determined exempt (category #2(ii)) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol - received 1/2/2020.

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.
Sincerely,

A handwritten signature in purple ink that reads "Kristy Shirley".

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult https://www.ndsu.edu/research/for_researchers/research_integrity_and_compliance/institutional_review_board_irb/. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD

NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | [ndsu.edu/irb](https://www.ndsu.edu/irb)

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

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