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APPLYING THE RASCH MODEL TO MEASURE AND COMPARE FIRST- GENERATION AND CONTINUING-GENERATION COLLEGE STUDENTS' ACADEMIC SELF-EFFICACY

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ABSTRACT OF DISSERTATION

APPLYING THE RASCH MODEL TO MEASURE AND COMPARE FIRST-GENERATION AND CONTINUING-GENERATION COLLEGE STUDENTS' ACADEMIC SELF-EFFICACY

Students who are the first in their families to attend college are less likely to earn a college degree as compared to their continuing-generation peers. In efforts to increase college graduation rates for first-generation college students, support programs designed to assist first-generation college students are increasing in numbers. These first-generation programs are relying on existing research to build effective curriculums. Even though an extensive body of literature exists in the fields of self-efficacy and first-generation college students, research investigating the self-efficacy of first-generation college students are extremely limited. The research is further limited when examining academic self-efficacy and generational status. The purpose of this study is to investigate if parental levels of education affect college students' self-reported levels of academic self-efficacy. The following research questions guided this study: 1) Do survey response hierarchies differ between first-generation college students and their continuing-generation counterparts on a scale that measures academic self-efficacy?, 2) Do levels of item endorsability vary based upon parental levels of education? and 3) Do the results produced from the college student survey support the existing literature on first-generation college students and academic-self-efficacy? Quality control indicators were utilized to assess the soundness of the instrument and to ensure that the rating scale functioned appropriately. Variable maps were used to compare and contrast student responses and item hierarchies. Pairwise differential item functioning (DIF) was used to examine item endorsability based upon levels of parental education. Results encourage practitioners to be mindful of the importance of data-informed decision making.

KEYWORDS: Rasch Analysis, Academic Self-Efficacy, First-Generation College Students, Continuing-Generation College Students, Parental Levels of Education

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DISSERTATION

A dissertation submitted in partial fulfillment of the
Requirements for the degree of Doctor of philosophy in the
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By
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Introduction

Institutions of higher education use existing literature to generalize differences

between first-generation college students (FGCS) and their continuing-generation

(CGCS) peers in order to create programming for first-generation college students.

Despite the fact that research on FGCS has grown significantly over the past decade, an

agreed upon definition in the literature is nebulous. For this study, a frequently used

definition in the field of first-generation literature will be used. FGCS will refer to a

student whose parents have not attended formal education after high school (Gibbons &

Borders, 2010; Ramos-Sanchez & Nichols, 2007; Wang & Castaneda-Sound, 2008). In

the literature, "non-first-generation students" is the common phrase used to describe a

student with at least one parent who has attended a formal institution of higher education

after high school. This study will instead use the phrase, "continuing-generation college

students" (CGCS) to describe a student whose parents have attended formal education

after a high school or equivalent (GED) degree has been earned. Formal education

includes technical schools and training as well as four-year colleges and universities.

Over the past decade, support programs designed to assist FGCS to graduate from

college have increased in numbers and these programs are relying on existing research to

build effective programs. Although a robust body of literature exists in the fields of

FGCS and self-efficacy, research investigating self-efficacy and generational status of

college students are extremely limited (Ramos-Sanchez & Nichols, 2007). The research

is even more limited when examining academic self-efficacy and generational status.

In his book, Self-Efficacy: The Exercise of Control, Albert Bandura describes academic self-efficacy as a confidence in an individual's ability to accomplish specific tasks that are needed for success in school (1997). Students who have high academic self-efficacy are better able to utilize successful learning strategies including time-management and self-regulating behaviors (Chemers, Hu, & Garcia, 2001). A student's confidence in his/her abilities to master an academic subject is directly related to academic self-efficacy and in turn, to a strong academic performance for highly efficacious students (Chemers, Hu, & Garcia, 2001).

It is well supported in the literature that students who are the first in their families to attend college are at a heightened risk when it comes to a lack of academic preparation (Hudley, Moschetti, Gonzalez, Cho, Barry, & Kelly, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004). One explanation for why FGCS are at a greater risk of being less prepared for college academics is that as compared to their non-first-generation peers, the parents of first-generation students do not understand the significance of enrolling in a challenging pre-college curriculum (Reid & Moore, 2010). It could be postulated that this lack of academic preparation could cause first-generation students to lack confidence in their abilities to perform the necessary tasks to be academically successful in college, which might suggest that FGCS would be affected by low academic self-efficacy. This is a concern as academic self-efficacy is directly related to academic expectations and academic performance in college students (Chemers, Hu & Garcia, 2001).

Existing research confirms that FGCS fear failing in college more so than do their peers whose parents possess a college degree (Bui & Khanh, 2002). Entering college with a fear of academic failure starts students off with a disadvantage from day one as students

who enter college with confidence in their abilities to succeed academically outperform their peers who are less confident in their academic abilities (Chemers, Hu & Garcia, 2001). Furthermore, it is well documented in the literature that across the board, FGCS underperform in college as compared to their peers (D'Allegro & Kerns, 2010; McMurray & Sorrells, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Ramos-Sanchez & Nichols, 2007). Findings on first-generation students strongly suggest that simply being a FGCS decreases the likelihood that a student will leave college with a degree in hand. While being a first-generation student is not a variable that can be altered, working with a student to increase their academic self-efficacy could be a powerful factor in predicting whether or not a student will complete a college degree. If more research on academic self-efficacy and college student generational status was conducted and published, institutions could feel more confident when using the existing literature to fine-tune specific programs for FGCS, classroom pedagogy, co-curricular programming and academic programming.

Institutions of higher education rely on research and existing literature to when making decisions at the local level. In addition, this research is driving the allocation of institutional resources. Even in a time when budgets are being cut, financial and staffing resources are being devoted to programs geared towards retaining and graduating FGCS. It could be argued that institutions have an ethical responsibility to provide resources to the students that they are admitting into their doors. One way to uphold this ethical obligation to FGCS, in addition to ensuring that limited resources are being well stewarded, is to participate in on-going, quality, institutional research.

Purpose

The purpose of this study is to investigate if parental levels of education affect college students' academic self-efficacy. This study will investigate whether the results produced from the academic self-efficacy items on *the Survey of First-Year Students*, at Research University[1], support the existing findings in the literature on first-generation college students and academic self-efficacy. This question is significant for the reason that when an institution's empirical data does not support the existing literature, institutions need to think twice before basing their own initiatives upon existing literature.

In addition, this study will explore whether or not survey response hierarchies differ between first-generation and continuing-generation counterparts on a scale that measures academic self-efficacy? Finally, this study will investigate levels of item endorsability based upon parental levels of education. These questions will serve as a guideline to determine if the results from *the Survey of First-Year Students* at Research University support the existing literature on first-generation college students and academic self-efficacy. As mentioned above, while the body of literature on FGCS has grown, the numbers of existing studies that specifically examine the relationships between first-generation and continuing-generation students' perceptions of academic self-efficacy are limited.

If the results from this study do not support the existing findings in the literature, this could suggest that as there are relatively few studies that specifically examine the academic self-efficacy of FGCS, the existing findings on this topic are limited and should not be generalized across institutions. Finally, if the results do not support the existing

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[1] The university utilized in this study will be referred to as Research University.

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literature, this disparity could provide support for continued research to occur on the perceived academic self-efficacy levels of first-generation college students. On the other hand, if the institution's results from this study uphold the findings in the existing literature, this outcome could provide one more study to support the current findings on the academic self-efficacy of FGCS. If the results from this study support the literature, this finding will encourage institutions to continue to develop programming and initiatives modeled from the literature on FGCS and academic self-efficacy.

This study will encourage practitioners and researchers to be cognizant of potential limitations when using the findings from existing research studies to implement policies and programs at their home institutions, especially when working with a limited pool of literature. In addition, this study urges institutions to participate in the development of high-quality, original research. Subsequently, institutions should compare these institutional findings against existing research at other institutions and use this multi-faceted approach when making decisions at the local level. Furthermore, this study examines the quality of *the Survey of First-Year Students* instrument items on academic self-efficacy and provides recommendations on how this instrument could be improved. Lastly, this study will contribute to the existing literature on academic self-efficacy in FGCS. This addition to the literature is crucial given that very few research studies examine self-efficacy and generational status (Ramos-Sanchez & Nichols, 2007). This study will also provide a resource for practitioners who develop and implement programs designed to increase the college graduation rates for FGCS.

To date, the studies that explore academic self-efficacy use classical test theory to compare findings between FGCS and their continuing-generation peers. This study will

employ a less frequently used technique in higher education, Rasch modeling. Rasch analysis allows for both the person and the individual item on the survey to be measured using academic self-efficacy as a unidimensional attribute. Rasch analysis will identify if the individual survey items on academic self-efficacy are more or less endorsable between the two groups (FGCS and CGCS). As first-generation students are graduating at rates significantly below their peers, it is vital that researchers continue to explore how pedagogy and practice can be fine-tuned to best assist first-generation students in completing college degrees.

Research Questions

This research study will focus upon the following research questions: 1) Do survey response hierarchies differ between first-generation and their continuing-generation counterparts on a scale that measures academic self-efficacy?, 2) Do levels of item endorsability vary based upon parental levels of education?, and 3) Do the results from *the Survey of First-Year Students* at Research University support the existing literature on first-generation college students? To answer these two research questions, an existing survey used annually at a large, Research 1 University will be used. *The Survey of First-Year Students* is a census survey distributed annually to all first-year, currently registered, freshmen students. Approximately 4,000 students receive the web-based survey each year. *The Survey of First-Year Students* includes approximately 30 questions and was created to measure high school experiences, demographic information, and students' perceptions regarding their beliefs, values and expectations as they pertain to college. The survey items relating to academic self-efficacy will be used in this study in addition to the demographic questions that identify generational status and sex.

In the fall 2009 semester, the Office of Institutional Effectiveness sent out a broadcast email with an imbedded web-survey link to all first-year students (as determined by the University Registrar). This survey is referred to as the *Survey of First-Year Students.* The dependent variable for the current study is academic self-efficacy. The independent variable is the parents' level of education as reported by the student. This information will then be used to sort the students into two comparison groups, 1) first-generation students (FGCS) and 2) continuing-generation students (CGCS). FGCS refers to a student whose parents have not attended formal education after high school (Gibbons & Borders, 2010; Ramos-Sanchez & Nichols, 2007; Wang & Castaneda-Sound, 2008). CGCS is the term used to describe a student with at least one parent who has attended a formal institution of higher education after high school. Formal education includes technical schools and training as well as four-year colleges and universities.

The continuing-generation students will be further broken down into three comparison groups based upon the highest level of education achieved by their parents; 1) some college; 1 to 3 years of college or technical training, 2) a 4-year college degree and 3) a graduate degree. The third category, graduate degree will be further broken down into two groups, one group that includes students who identify that at least one parent possesses a master's degree and the second group that includes students who identify that at least one parent possesses a Ph.D. or another terminal degree such as a J.D.

The survey question reads as follows:

What is the highest level of education achieved by your parents? (Mark one per column for mother and father)

A   Less than high school graduate

B   High school graduate or GED

C   1 to 3 years of college or technical training

D   4-year college degree (BA, BS)

E   Master's degree

F   Ph.D., Ed.D., M.D., or J.D

Using the pre-determined definitions for a first-generation college student and continuing-generation student, students will be sorted into two categories. Students who respond with options A or B will be labeled as FGCS. Students who respond to this survey item with response options C, D, E, or F will be labeled as CGCS. As outlined above, the CGCS will then be further broken down into three groups; 1) 1-3 years of college or technical training, response C, 2) an earned four-year college degree, response option D and the final group, 3) where at least one parent has earned a graduate degree, response options E and F.

This study is guided by three main inquiries. First, do survey response hierarchies differ between first-generation and their continuing-generation counterparts on a scale that measures academic self-efficacy? Secondly, do levels of item endorsability vary based upon parental levels of education? The stated hypothesis is that survey response hierarchies will differ between first-generation and continuing-generation students and levels of item endorsabilty will vary based upon parental levels of education. This hypothesis is based upon the literature-supported assumptions that differences in

academic self-efficacy exist between FGCS and continuing-generation college students. In a study examining the role of generational status in academic self-efficacy, FGCS reported significantly lower levels of academic self-efficacy than did their continuing generation peers (Wang & Castaneda-Sound, 2008).

The third question guiding this study asks whether or not the results from *the Survey of First-Year Students at Research University* support the existing literature on first-generation college students. At this research question is exploratory in nature, a hypothesis was not formed.

Educational Significance

This study will encourage practitioners and researchers to be cognizant of potential limitations when utilizing existing research studies. In addition, this study urges institutions to participate in the development of high-quality, original research and in turn, to contribute to the existing literature on academic self-efficacy and FGCS. Subsequently, institutions should compare the findings against existing literature and use this multi-faceted approach when making decisions at the local level. This study will also examine the quality of the *Survey of First-Year Students* instrument used and provide recommendations on how this instrument could be improved. Finally, this study will contribute to our knowledge in the area of academic self-efficacy for FGCS. As FGCS are underperforming in post-secondary education at rates significantly below their peers, it is vital that researchers continue to explore how pedagogy and practice can be fine-tuned to best assist FGCS in completing a college degree (D'Allegro & Kerns, 2010; McMurray & Sorrells, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Ramos-Sanchez & Nichols, 2007). A more in depth understanding of how FGCS report their own

levels of academic self-efficacy could provide valuable insights for researchers and practitioners.

Conclusion

The purpose of the present study was briefly outlined. In the subsequent chapters, a comprehensive literature review will be provided followed by a detailed discussion of the methods for this study. The results of the study will then be presented. Finally, a discussion of the results will be provided in addition to recommendations for future research.

Chapter Two

Review of Literature

This chapter is a synthesis of the existing literature on academic self-efficacy, first-generation college students and Rasch modeling. Albert Bandura's social cognitive theory, specifically, the domain of academic self-efficacy will serve as the theoretical framework for this study. The survey items that will be explored in this study pertain to students' self-perceptions of academic self-efficacy during their first semester at a Research 1 University. First-generation college students (FGCS) refer to a student whose parents have not attended formal education after high school (Gibbons & Borders, 2010; Ramos-Sanchez & Nichols, 2007; Wang & Castaneda-Sound, 2008). A continuing-generation college student (CGCS) is the term used in this study to describe a student with at least one parent who has attended a formal institution of higher education after high school. For the purpose of this study, formal education includes technical schools, training schools, and four-year colleges and universities. Over the past decade support programs devised to assist FGCS to graduate from college have multiplied. These first-generation programs are relying on existing research in efforts to build curriculums that produce college graduates. The following review of literature on academic self-efficacy and on first-generation college students will help to frame and guide the research design of this study. An overview of the assumptions of the Rasch model will provide a context for the methodology.

Academic Self-Efficacy

Albert Bandura maintains that the effects of cognitive processes are best explained through social cognitive theory (1997). Self-efficacy, rooted in social cognitive

theory, is one class of cognitive processes that influences a person's behavior, which in turn, influences outcomes (Bandura 1997). Bandura (1993) explains that, "Efficacy beliefs influence how people feel, think, motivate themselves, and behave" (p 118). Bandura describes academic self-efficacy as a confidence in an individual's ability to accomplish specific tasks that are needed for success in school (1997). Research has demonstrated that self-efficacy is directly related to enhanced cognitive performance on academic tasks, even beyond measures such as past performance on academic tasks (Chemers, Hu, & Garcia, 2001). According to Bandura, if an individual has a high or strong perception of self-efficacy, then he or she is more likely to establish more advanced aspirations for themselves (1993). Students with high self-efficacy levels establish greater aspirations for themselves, exhibit more strategic problem-solving, perform at stronger levels and are better able to gauge their performance as compared to equal ability students who have lower levels of self-efficacy (Chemers, Hu, & Garcia, 2001). On the other hand, if an individual encompasses a lower level of self-efficacy, they are more likely to identify lower goals for themselves.

Bandura (1993) explains that the relationship between self-efficacy and goal setting is attributed to an individual's self-assessment of their capabilities; self-efficacy perceptions are directly correlated to the level of commitment an individual exerts in reaching that goal. As an example, if a high school student has a low level of perceived academic self-efficacy, he/she is less likely to ascertain lofty aspirations when it comes to earning a college degree. A student with low academic self-efficacy may set a goal of attending a trade school or perhaps enrolling in the local community college. In contrast, a student who is considered to have a high level of academic self-efficacy will most

likely establish goals for himself/herself at an advanced caliber. A student with high academic self-efficacy may plan on applying to more prestigious and academically rigorous institutions, expect to be competitive for academic scholarships, and set goals to graduate in the top of their class and aspire to attend graduate school.

A study examining academic self-efficacy and first-year college student performance at the University of California, Santa Cruz found that when a student is confident in his/her abilities to execute a task to the point of completion, he/she are more likely to approach the task at hand in a composed, efficient and thorough manner (Chemers, Hu, & Garcia, 2001). It is worth noting that despite the fact that this longitudinal study, examining academic self-efficacy in first-year students produced strong results, the researchers caution against the generalizability of their findings as the University of California, Santa Cruz operates on a non-traditional and an experimental approach to pedagogy.

The same study also established that confidences in abilities can be vital to one's success when approaching a sizeable task, such as earning a college degree. Self-efficacy affects a student's ability to cope with stressors that result from demanding circumstances and to in turn, view these demanding circumstances as challenges rather than a threat (Chemers, Hu, & Garcia, 2001). If a student possesses high levels of self-efficacy, they are most likely to approach a demanding schedule and the tasks at hand by employing problem-solving techniques and devising a plan to utilize the resources available to them. For example, when a college student is faced with a particularly demanding schedule during finals week, where they have multiple exams in one week, a paper due, a class presentation and perhaps a conflict with a roommate or friend, their level of self-efficacy,

particularly academic self-efficacy can affect how the student approaches these demands. A student with high self-efficacy may plan ahead to identify that this week will be particularly challenging academically and devise a study schedule leading up to this particular week throughout the semester. This student may create flashcards and review sheets, cut back on their social commitments and take advantage of study groups and review sessions. On the contrast, students with low self-efficacy in regard to their academics will most likely approach this week filled with anxiety as they are less capable of employing problem-solving skills and decision-making strategies (Chemers, Hu, & Garcia, 2001). While students with high self-efficacy are prone to focus on positive outcomes from achieving their goals, the students with low self-efficacy operate in a contradictory manner by identifying very low goals for themselves and setting the standard for academic failure (Chemers, Hu, & Garcia, 2001).

Although a robust body of literature exists in the fields both of FGCS and self-efficacy, research investigating self-efficacy and generational status of college students is extremely limited (Ramos-Sanchez & Nichols, 2007). Studies that examine efficacy beliefs in students, particularly high-risk populations are needed in order to add to the literature on academic self-efficacy (Chemers, Hu & Garcia, 2001). Research on self-efficacy is even more limited when examining academic self-efficacy and generational status. Continued research on this area is vital as first-generation students are considered an at-risk population in postsecondary education (D'Allegro & Kerns, 2010; McMurray & Sorrells, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Ramos-Sanchez & Nichols, 2007).

Academic Self-Efficacy and Generational Status

While research on academic self-efficacy and generational status is sparse, one research study that has explored the role of generational status and academic self-efficacy found that FGCS reported lower levels of academic self-efficacy as compared to their continuing-generation peers (Wang & Castaneda-Sound, 2008). In this study, Wang & Castaneda-Sound used several existing inventories and scales to survey 367 college students at a large, public university on the west coast. Of the participants, 34.9% identified as being a FGCS and 65.1% identified as being a CGCS.

The scale that was used to measure academic self-efficacy was the *College Self-Efficacy Inventory (CSEI)*. The CSEI was developed by Solberg, O'Brien, Villareal, Kennel & Davis and was designed to measure confidence levels in students in regards to required college tasks (1993). Originally, the CSEI was used among Hispanic college students. The CSEI was later used by another team of researchers to examine African-American college students at a predominately white institution. Wang and Castaneda-Sound hypothesized that FGCS would report lower levels of academic self-efficacy as compared to their peers. Despite the fact that few studies have examined academic self-efficacy and generational status, Wang and Castaneda-Sound drew from research on college persistence and performance in FGCS to form their hypothesis as it is well-documented in the literature that students who are the first in their families to attend college are at a heightened risk when it comes to a lack of academic preparation (Hudley, Moschetti, Gonzalez, Cho, Barry, & Kelly, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004). Furthermore, many researchers concede that across the board, FGCS underperform in college as compared to their peers (D'Allegro & Kerns, 2010;

McMurray & Sorrells, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Ramos-Sanchez & Nichols, 2007).

While the CSEI contains three subscales (course efficacy, social efficacy and roommate efficacy), only the first two were used by Wang & Castaneda-Sound in their study. While titled course efficacy, the items included in the subscale were designed to assess confidences in completing college tasks such as writing papers (Wang & Castaneda-Sound, 2008). The social efficacy subscale focused on common interactions that a college student would encounter in a university setting and included items such as, *talk to professors, talk to university staff, ask a professor a question, participate in class discussions* and *make new friends at college.* The researchers chose not to include the roommate efficacy subscale in the study as this subscale did not pertain to all college students in their sample. Some of the participants in the study lived alone or with their parents and therefore did not have roommates. Of the two subscales that were included, 7 items measured course efficacy and 7 items measured social efficacy. Each of the 14 items was rated on a likert-type scale, spanning from 0 (no confidence) to 11 (complete confidence). The higher the response number that a student selected on the scale, the higher level of confidence or self-efficacy, they reported on that survey item. Undergraduate students at the university were randomly sampled and contacted via email. The online survey was distributed to students early in the spring. The survey responses were analyzed using classical test theory, predominantly MANOVAs. Results indicated that FGCS scored significantly lower on measures of academic self-efficacy as compared to their continuing-generation peers.

Another study by Ramos-Sanchez and Nichols (2007) used Albert Bandura's Social Cognitive Theory to examine generational status and self-efficacy between FGCS and CGCS. While the researchers in this study did not specifically state that they were examining academic self-efficacy, they did examine the relationship between self-efficacy and academic outcomes in using the College Self-Efficacy Instrument (CSEI) developed by Solberg, O'Brien, Villareal, Kennel & Davis (1993).

This longitudinal study spanned over one academic year and was conducted at a private, liberal arts institution on the west coast. The sample consisted of 192 first-year freshmen. A total of 33% of the sample were FGCS and 66% were CGCS. Based upon existing literature which indicates that first-generation students experience greater challenges in college than their peers, the researchers hypothesized that self-efficacy would mediate the relationship between generational status and academic outcomes (grade point average and college adjustment). Secondly, the researchers hypothesized that CGCS would report higher levels of self-efficacy than students who were the first in their families to attend college. As did Wang & Castaneda-Sound (2008), Ramos-Sanchez and Nichols also used the CSEI to measure self-efficacy and similarly, only used two of the three subscales. The subscales for course efficacy and social efficacy were used while the third subscale, roommate efficacy, was omitted. The items on the course efficacy subscale asks students how confident they are at specific course tasks such as taking notes, conducting research and writing papers. The items on the social efficacy subscale ask students about their confidences in relation to contacting their professors and participating in classroom experiences. While the researchers used the two subscales from the CSEI some of the items within these two subscales were excluded. A total of 10

items from the CSEI were included; 6 from the course efficacy subscale and 4 from the social efficacy subscale.

Ramos-Sanchez and Nichols found that three conditions must take place in order for self-efficacy to mediate the relationship between a student's generational status and academic outcomes (operationalized as grade point average and college adjustment): 1) generational status must be significantly associated with self-efficacy, 2) generational status must be significantly associated with the academic outcome variables (grade point average and college adjustment), and 3) the relationship between generational status and the academic outcome variables (grade point average and college adjustment) is not significant when controlling for self-efficacy. These findings suggest that self-efficacy does not function as a mediator between generational status and college adjustment. This finding suggests that regardless of a student's generational status, higher self-efficacy levels predict a higher level of self-perceived college adjustment. The researchers did find that self-efficacy levels at the beginning of the year significantly predicted college adjustment at the end of the year. In addition, this study found that as compared to their FGCS peers, CGCS exhibited significantly higher levels of self-efficacy on items relating to academic success in college. This finding held true at both the beginning and the end of the academic year. Irrespective of generational status, levels of self-efficacy did not increase significantly over the course of the academic year.

First-Generation College Students

Disparities between graduation rates based upon first-generation and continuing-generation status are found at national levels. In 2005, the National Center for Educational Statistics and the U.S. Department of Education found that first-generation

students reported lower educational goals and graduated with bachelor's degrees at rates much lower than their continuing-generation peers (Chen & Carroll, 2005). Additionally, this longitudinal study reported that even when FGCS successfully completed rigorous pre-college curriculums (i.e. pre-calculus, calculus) they were still less likely to complete degree than were the CGCS (Chen & Carroll, 2005). Within the same study, a transcript analysis of over 7,000 undergraduate students revealed that first-generation students complete fewer credit hours in the first year of college, prolonging time to degree. This cumulative pattern in course enrollment delays graduation and is strongly associated with the likelihood that a student will leave the university without earning a degree (Chen & Carroll, 2005).

Research on first-generation students supports finding that this student population encounters greater challenges than their non-first-generation counterparts (Engle, Bermeo, & O'Brien, 2006). Since these students are the first in their families to go to college, their parents are unlikely to be familiar with the college process and the terminology that accompanies higher education, all of which are taught skills. Devoid of this terminology and a post-secondary navigational map, these students often find themselves struggling in the transition from high school to college. Collier and Morgan (2008) defined the transitional challenges from high school to college for first-generation students as a lack of understanding the "college student role". One struggle that has been identified is the "imposter phenomenon" (Davis, 2010). The "imposter phenomenon" suggests that FGCS feel like a fraud as a college student. This leads FGCS to refrain from class participation, perceiving that the "real" students who belong in college have nothing to gain from the FGCS (Davis, 2010).

Lacking an awareness of the college experience, parents of have difficulty understanding why their students need to study more in college than they did in high school and also, why it is beneficial for students to spend time engaging in the campus community. Parents who have experienced the college process possess the skills and abilities to guide their student through the necessary steps and serve as an invaluable advantage for continuing-generation students to adjust to the "college student role". Parents of FGCS may place additional pressures upon students to return home often and to assist with family chores, attend family events, look after younger siblings, elderly family members, and even contribute to household finances. Since FGCS are the first in their families to achieve a college degree, they tend to come from homes with limited financial resources (Engle & O'Brien, 2006). Simply being a first-generation student heightens the likelihood of leaving college without a degree, especially during their second year of college (McMurray, 2009).

Research indicates that first-generation students work more hours off campus, complete fewer credit hours in the first year of college and receive less support from family and friends than their continuing-generation peers (Terenzini et al, 1996; Pascarella et al, 2004). A lack of family support can affect a student's likelihood to stay in college and to complete his/her degree (Ramos-Sanchez & Nichols, 2007). When students are working off-campus more than 20 hours a week, they have less opportunity to build a connection to campus through meeting peers, involvement in student organizations, attending tutoring sessions, meeting with professors during office hours and as a result, may struggle to complete 15 credit hours per semester. In addition, the lack of support from family and non-college going friends pulls these students away from

campus and decreases their motivation and confidence towards completing a college degree.

Another theory for why FGCS are underperforming in college is attributed to self-esteem. A study by McGregor et al (1991) and Corcoran (1995) found that traditional college students had higher self-esteem scores than did comparative first-generation students. One explanation for this finding is that parents from low socio-economic status backgrounds may not promote self-confidence in their children at the same levels as students whose parents have college degrees. Schunk and Pajares (2002) explain that primary sources of self-efficacy are found in the family environment. When parents provide an environment conducive to curiosity, mastery learning is developed and in turn, children develop stronger levels of self-efficacy and confidences in their abilities.

Another prevalent challenge for FGCS is feeling academically underprepared for college (Ramos-Sanchez & Nichols, 2007). FGCS report feeling less confident and academically inferior to their peers (Chen, 2005; Cushman, 2007; Ishitani, 2006). All of these factors may lead to decreased academic motivation, lower self-efficacy levels and ultimately, dropping out of college. Simply being a FGCS places students into a high-risk category when it comes to completing a college degree (National Center for Educational Statistics, 2005). To address the challenges commonly experienced by FGCS, retention strategies are critical early in the students' college careers, before the students either choose to drop out of college voluntarily or are forced to leave as a result of poor academic performance. Research indicates that support programming, such as first-year orientation seminars, aids in the transition to college for FGCS and increases retention and degree attainment levels (Jenkins et al, 2009; Davis, 2010). These opportunities offer

personalized connections and supports within the university. Individual attention can be offered in the form of positive role-models through faculty, staff, additional advisors, and through peer mentoring.

Research suggests that peer resources are more significant to student success than family resources (Dennis et al, 2005). As it is common for FGCS to experience pressure from their family members to often return home, it's beneficial for the students to have a peer support network on campus. Students benefit from experiences with a mentor who is like them; this is why FGCS reap the most benefits from mentors who are also first-generation (Davis, 2010). In addition to peer mentors, Gullat and Yan (2003) identified the inclusion of adult role models as a key component of a successful program for FGCS.

In an attempt to target, recruit and graduate first-generation students from colleges and universities, national programs such as Student Support Services, Upward Bound, Talent Search and Gear Up were developed to provide specific services to first-generation students in hopes that these programs would increase college admittance as well as degree attainment rates. Aside from national programs aimed at serving FGCS, states, foundations and postsecondary institutions have created programs and scholarships to assist these students starting with the college preparation process and continuing to the point of degree completion. FGCS face unique challenges and need additional support and interventions to ensure they are retained and graduate at similar rates to their continuing-generation peers. Ramos-Sanchez and Nichols assert that while programs exist that target FGCS, interventions that concentrate on raising self-efficacy levels are limited (2007). Increasing students' levels of self-efficacy in relation to their academic competencies could result in heightened levels of degree attainment.

Rasch Modeling

As a society, we are introduced to measurement tools early in life; scales to measure our weight, rulers to measure our height, measuring cups to measure amounts of ingredients for recipes, thermometers to measure temperature in our own bodies and of course, to measure the temperature outside so that we can determine the proper attire to wear. These measurement tools rely on calibration or an accurate and agreed upon standard to determine if the measurement is indeed correct. For example, if a child has grown three inches, we have an agreed upon measurement calibration for the length of an inch and we can visualize the length that three inches represents. When studying a variable that it is not easily observable such as psychosocial trait or a cognitive factor such as academic self-efficacy, the underlying construct is referred to as a latent variable. Unfortunately, latent variables can be difficult to measure as they are not able to be directly observed.

Assumptions of the Rasch Model

Using Rasch analysis, researchers are able to develop ordered continuums in which latent variables can be measured by means of a unidimensional construct (Bond & Fox, 2007). Unidimensionality is perhaps the most important underlying assumption of the Rasch Model as unidimensionality signifies that one attribute or latent trait will be measured at a time (Bond & Fox, 2007; Mueller, 2006). In this study, academic self-efficacy is the latent variable that is being measured. A Principal Component Analysis will be employed to ensure that the latent variable is sufficiently unidimensional. The Rasch model was selected as the method of analysis for this study as a central purpose of this research study is to identify if differences in responses exists between the comparison

groups based upon generational status on an instrument that measures academic self-efficacy. If the assumption of unidimensionality is not met, then Rasch analysis should not be employed (Mueller, 2006).

Two additional assumptions of the Rasch Model refer to the instrument itself. First, a researcher must consider the independence of the items. That is, information from one item on the instrument should not be able to be used by the respondent as a mechanism for assistance in responding to another item on the instrument (Bond & Fox, 2007). Each item on the instrument must be independent from the others and the inter-item correlations between the items should be near zero (Bond & Fox, 7007; Mueller, 2006). The second assumption regarding the instrument refers to *item fit*. Each item on the instrument should be a meaningful measure of the unidimensional construct (Bond & Fox, 2007). This determination can be made by referring to the fit indices for each item. If an item is misfitting, the researcher can decide if he/she wants to reword the item or determine if the item should be removed from the instrument.

A final assumption to be taken into consideration is the person ability and accompanying error estimate (Bond & Fox, 2007). In the case of a survey, such as in this study, the endorsability of an item is being measured. On a test, the measure would be on a person's ability (i.e. a math exam). Rasch analysis allows for both the person and the individual item on the survey to be measured. In the Rasch model, the relationship between the latent ability of an individual and the difficulty of a particular item is modeled as a probability. When an individual's amount of the latent trait increases, the probability that the individual will endorse the item increases as well (Bond & Fox, 2007; Royal & Elahi, 2011). This principle also works in reverse. As the individual's amount of

the latent trait decreases so does the probability that that the individual will endorse that survey item.

In the basic dichotomous model, primarily used with tests, the probability between the person's ability and the test item is expressed through a dichotomous Rasch model where item responses are considered "correct" or "incorrect" using a mathematical equation, $ln(P_{nij}/P_{ni0}) = B_n - D_i$ (Bond & Fox, 2007). P_{nij} represents the probability that a person (*n)* who responds to survey item (*i*) will be observed in category *j.* In the equation, B_n represents the measure of an individual's or person's "ability", with *B* denoting to the ability and $_n$ denoting the person. When using the Rasch Rating Scale Model (RRSM) to analyze survey data, B_n refers to the "endorsability" measure of the person (Royal & Elahi, 2011). The "difficulty" of the item is represented as *D,* with $_i$ representing the measure of the item. As the dichotomous model is used when item responses can be considered "right" or "wrong" another Rasch model is called for when utilizing an instrument with a rating-scale such as the Likert-type response scale where several response options are available.

The Rating Scale Model

The *Rating Scale Model* (Andrich, 1978) is employed when working with multiple response options, such as polytomous data that are routinely collected in surveys (Bond & Fox, 2007). The algebraic expression for the rating-scale model is: $P_{nik} = e^{(B_n - D_i - F_k)}/1 + e^{(B_n - D_i - F_k)}$. In this formula, (B_n) represents the person or respondent, while how endorsable the individual item is (for example, easier or harder to agree with) is represented as (D_i). How endorsable a given item is at a specific threshold is represented as (F_k) (Bond & Fox, 2007). The academic self-efficacy items on the *Survey of First-Year*

Students have five thresholds as the accompanying rating scale for each item is comprised of five options (1 – Strongly Disagree, 2 – Disagree, 3 – Not Sure, 4 – Agree, 5 – Strongly Agree).

Differential Item Functioning (DIF)

Differential Item Functioning (DIF) is employed when a researcher wants to compare estimates between groups, such as males and females, dog owners to cat owners or in the case of this research study, first-generation and continuing-generation college students. While DIF analysis can be used to compare several groups, this study will utilize pairwise DIF. Pairwise DIF means that in each DIF analysis, two groups will be analyzed against one another to examine if meaningful differences exist. When DIF is present, this suggests that individuals are responding to items disproportionately. Stated another way, when a survey item exhibits DIF this suggests that the item is functioning inconsistently among individuals with the same amount of a latent trait. Bond and Fox (2007) provide the following example where a specific test question exhibits gender-related DIF: on a particular test question, boys outperform girls of the same ability level. It is not expected that this response difference would occur. One would presume that students with the same demonstrated ability level would respond to the same question in the same manner. While the reason why DIF is occurring is not straight-forward, we can attribute this to a gender-related difference in item functioning as the difference is present between groups of males and females of the same ability on this particular question. In a DIF analyses, outliers are excluded from the analysis as extreme scores do not exhibit differential ability across the items (Linacre, 2011).

Variable Maps

Variable maps serve as a visual representation of person and item distributions based upon which items are the easiest to endorse versus the most difficult to endorse (see figure 1). The items that are the easiest to endorse fall on the bottom of the hierarchy and items that are the most difficult to endorse are represented at the top of the item hierarchy (Bond & Fox, 2007). The variable maps also identify the mean of the items as well as the mean of the persons; these are indicated by the letter "M" on the left most side of the item map scale. Standard deviations are also distinguished on the variable maps by the letter "S", indicating one standard deviation and by the letter "T" for two standard deviations. The variable maps allow for a visual interpretation of the persons on the left hand side and the items on the right hand side. The distance between the items in the hierarchy illustrate how the items are functioning in relation to one another.

Conclusion

Bandura's theory of academic self-efficacy will serve as the theoretical framework to discuss the results of the Rasch analysis applied to the academic self- efficacy items from *the Survey of First Year Students*. If students are selecting low ratings on the items that pertain to their perceived levels of academic preparation, according to Bandura's theory of self-efficacy, they are less likely to commit to achieving those goals. For example, item "m" from the survey reads, *I am very capable of succeeding at [name of the institution]*. If a student responds that they strongly disagree with item "m", applying Bandura's theory of self-efficacy, we would presume that this student is less

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likely to assert a high level of commitment in achieving the goal of succeeding at the institution.

Researchers have also found that FGCS are less likely to complete college and are more likely to earn lower grade point averages in their first year of college (Gibbons & Borders, 2010). Even though the existing research on generational status and academic self-efficacy is limited, the studies that have been conducted on this topic suggest that a student's level of self-efficacy is correlated to college adjustment. When a student encompasses a belief that they can succeed academically in college, they are more likely to better adjust in college (Ramos-Sanchez & Nichols, 2007). In addition, studies have found that FGCS perceive themselves as less capable and less confident in their abilities when it comes to academic performance in college (Ramos-Sanchez & Nichols, 2007; Wang & Castaneda-Sound, 2008). If researchers can identify early on, the specific areas where a student is lacking confidences in his/her abilities, this information could be utilized by college administrators to create targeted, early intervention programs and services for students.

Chapter Three

Methodology

Purpose

Institutions of higher education use existing literature to generalize differences

between first-generation college students (FGCS) and their continuing-generation

(CGCS) peers in order to create programming for first-generation college students. For

this study, a frequently used definition in the field of first-generation literature will be

used. FGCS will refer to a student whose parents have not attended formal education

after high school (Gibbons & Borders, 2010; Ramos-Sanchez & Nichols, 2007; Wang &

Castaneda-Sound, 2008). CGCS is the term used to describe a student with at least one

parent who has attended a formal institution of higher education after high school. Formal

education includes technical schools and training as well as four-year colleges and

universities. Over the past decade, support programs designed to assist FGCS to graduate

from college have increased in numbers and these programs are relying on existing

research to build effective programs.

Despite the fact that a robust body of literature exists in the fields both of FGCS

and self-efficacy, research investigating self-efficacy and generational status of college

students are extremely limited (Ramos-Sanchez & Nichols, 2007). The research is even

more limited when examining academic self-efficacy and generational status. In his

book, Self-Efficacy: The Exercise of Control, Albert Bandura describes academic self-

efficacy as a confidence in an individual's ability to accomplish specific tasks that are

needed for success in school (1997). Students who have high academic self-efficacy are

better able to utilize successful learning strategies including time-management and self-

regulating behaviors (Chemers, Hu, & Garcia, 2001). A student's confidence in his/her abilities to master an academic subject is directly related to their academic self-efficacy and in turn, to the predicted grades that a student will earn in an academic setting (Chemers, Hu, & Garcia, 2001).

Research Questions

Three research questions are driving this study: Question 1) Do survey response hierarchies differ between first-generation college students and their continuing-generation counterparts on a scale that measures academic self-efficacy? Question 2) Do levels of item endorsability vary based upon parental levels of education? Question 3) Do the results produced from the college student survey support the existing literature on first-generation college students and academic-self-efficacy? If the findings from the Survey of First-Year Students do not support the existing literature, this disparity could provide support for continued research on academic self-efficacy and FGCS. On the other hand, if the institution's results taken from *the Survey of First-Year Students* uphold the existing literature, this finding could provide support for institutions to continue to develop programs modeled from national findings.

Data Source

The Office of Institutional Research sent out a broadcast email with an imbedded web-survey link to all first-year students (as determined by the University Registrar) at the university in the fall 2009 semester. The Office of Institutional Research identified 4,153 first-year students in the fall of 2009. Instructions read that the survey would take approximately 15-20 minutes to complete. Students were informed that although student identification numbers were collected by the Office of Institutional Research, all

responses would be aggregated and kept confidential. Student responses were stored on a secure web server on a university computer in the Office of Institutional Research. All data were aggregated and stored in an excel spreadsheet on the secure sever belonging to the Office of Institutional Research. A secure file of the data, with student identification information removed was sent to the Principle Investigator.

The entire instrument is comprised of 29 items including six items for questions pertaining to student demographic information. The scale examined in this study is a five-point likert-type rating scale (1 – Strongly Disagree, 2 – Disagree, 3 – Not Sure, 4 – Agree, 5 – Strongly Agree). The survey item asked respondents to indicate how much they agree or disagree with a series of 13 statements related to academic self-efficacy. The survey instructions stated that there are no correct or incorrect responses and instructed students to rate the response that best reflects their values and beliefs. The focus of this study is to examine student perceptions of academic self-efficacy therefore; question number 12, containing 13 sub-questions will be the focal point of the study. These 13 statements (labeled a-m) were adapted by the institution's Office of Institutional Research, for use in the *Survey of First-Year Students,* from existing scales to measure student self-efficacy and procrastination in regard to postsecondary academic self-efficacy.

Items *a, c, d, e, g, i, l,* and *m,* were adapted from a self-efficacy scale created by Chemers, Hu and Garcia (2001). The eight item measures on academic self-efficacy were created from existing literature on academic self-efficacy by Albert Bandura and include items pertaining to specific skills necessary to succeed in college. These skills include test-taking, note-taking, conducting research and writing papers. The scales were created

to measure academic self-efficacy and first-year college student performance and adjustment at the University of California, Santa Cruz (Chemers, Hu & Garcia, 2001). The questionnaire items pertaining to academic self-efficacy used an eight-item measure and a 7-point Likert scale. Students were asked to rate their agreement on the questionnaire statements. A structural equation model (SEM) was applied to test the model and results found that model was of quality (Chemers, Hu & Garcia, 2001).

The statements from item letters *b, f, h, j,* and *k* were adapted from an existing instrument developed by Tuckman (1991). This scale was developed to measure the relationship of procrastination to self-reported measures of self-efficacy in college. Five items from this scale were included in the *Survey of First-Year Students* as procrastination is a self-regulated behavior and has been found to be significantly related to self-efficacy in a college academic setting (Tuckman, 1991). The initial validity study using this instrument found that the Procrastination Scale is valid and reliable in measuring procrastination behaviors (Tuckman, 1991). The preliminary scale included 35 items, yielding a reliability score of .90. In a subsequent study, the researchers scaled the items back to 16, from the original 35. The 16 item scale resulted in a reliability score of .86 suggesting that the shorter version of the Procrastination Scale can be utilized without sacrificing reliability. It worth noting that for the *Survey of First-Year Students*, the university's Office of Institutional Research selected the five items that they felt were most applicable to the institution's academic rigor, organizational type and student body.

Reverse Worded Items

The 5 items from the Procrastination Scale that were included in the *Survey of First-Year Students* were reverse coded as the statements and response options are

opposite. For example, survey item *b* states; I needlessly delay finishing jobs, even when they're important. If a student selected response option 5, "Strongly Agree" this suggests a negative response as the student is strongly agreeing that they needlessly delay finishing jobs, even when they're important. The procrastination items are considered as reverse coded since agreeing with these items indicates a negative behavior. When examining the item hierarchies and interpreting results, it is important to identify reverse coded items so that results are not misinterpreted based upon reverse coded items. All reverse coded items were adjusted for.

A reverse-worded item refers to a question or statement that is worded in the opposite direction as compared to the other survey items (Barnette, 2000; Woods, 2006). Reverse-worded items are commonly used in research that is based upon respondents self-reporting their beliefs, personality tendencies and attitudes (Woods, 2006). This is the case with the Survey of First-Year Students, where five items were reverse coded (items *b, f, h, j*, and *k*) and in turn, rephrased so that all survey items read in a positive direction. All of the reverse coded items were items intended to measure students' self-perceptions towards academic procrastination. For example, item *j* was the most difficult to endorse, as identified on the variable map, when the first pilot analysis was run. Upon further investigation, item *j* is reverse coded and states; I'm a time waster now, and I can't seem to do anything about it. As this item is reverse coded, the difficulty to endorse item *j* indicates that students strongly disagreed with the statement.

In survey research, re-wording items is a topic for deliberation that has extended for decades (Barnette, 2000). Some researchers believe that re-wording items from a positive statement to a negative or from a negative statement to a positive interferes with

the construct of the survey (Barnette, 2000; Greenberger, Chen, Dmitrieva & Farruggia, 2002; Woods, 2002). One argument against re-wording items during the coding process is that it should not be assumed that a negatively worded item is the exact opposite of a positively worded item (Barnette, 2000). On the contrary, a well cited rationale for including negative or reverse-worded questions in survey research is to protect against careless responding or the tendency for participants to respond to the general topic versus the particular survey item (Barnette, 2000; Bradley, Royal & Bradley, 2008). The inclusion of negatively worded items is often an attempt to capture the attention of the respondent and to in turn, encourage the respondent to pay attention to each item (Barnette, 2000).

Sampling Frame

A total of 1,665 students returned the survey. All respondents were first-time, first-year students at a large research university in the southeast United States. The university's Office of Institutional Research identified a potential of 4,153 first-year students in 2009. All enrolled first-year students were sent the survey link through campus email, yielding in a response rate of 40.1%. The response rate is consistent with the response rates for the previous administrations of the *Survey of First-Year Students*.

Criteria for Inclusion

When a student did not respond to any of the 13 items on academic self-efficacy (item #12) or did not respond to the parental education questions (item #28) their survey was eliminated from the data set. If a student did not identify his/her sex, he/she was not removed from the overall dataset; however, if a student did not disclose his/her sex, he/she was not included in any analysis that used sex as a variable. Of the total sample,

704 (47%) identified as male and 796 (53%) identified as female. Two students did not

identify their sex; both were labeled as continuing-generation students. One of the

students was placed in category D, 4-year college degree and the other student was

placed in category E, Master's degree. For this reason, the male and female totals will not

be equal to the sum of the parts in these two categories; they will each be one short to

account for the two missing responses. In total, 1,502 surveys were included in the data

set. Students that failed to complete questions pertaining to generational status and all

questions pertaining to academic self-efficacy were removed from the dataset.

Generational Status

Students were categorized by generational status based upon the highest level of

education that they reported for at least one parent. For example, when a student

responded that his/her father possessed a high school degree and his/her mother held a

Master's degree, this student was coded as a continuing-generation student. In this study,

FGCS is defined as a student whose parents have not attended formal education after high

school and CGCS is the term used to describe a student with at least one parent who has

attended a formal institution of higher education after high school. Formal education

includes technical schools and training as well as four-year colleges and universities.

Within the overall sample, 12 students reported that at least one parent had less

education than a high school diploma; 7 of these students were male and 5 were female.

This category (A) was the smallest in the sampling frame. A total of 195 students

reported that at least one parent possessed a high school diploma or GED. Of these

students, 89 were male and 106 were female. A total of 239 students reported that at least

one parent had achieved 1-3 years of college or technical training with 97 of these

students identifying as male and 142 identifying as female. 504 students responded that at least one parent had achieved a 4-year college degree; 233 were female respondents and 270 were male respondents. With a total of 504 respondents, the largest category in the sampling frame was category D, where at least one parent had completed a 4-year college degree. A total of 403 students responded that at least one parent had achieved a Master's degree with 199 of these students identify as male students and with 203 identify as female students. Finally, a total of 149 students responded that at least one parent had achieved a Ph.D., Ed.D., M.D., or J.D. In this category, 79 of the students were male and 70 were female.

Students were coded as CGCS if they responded that even one parent had achieved any education beyond high school or GED (response options C, D, E and F). If a student responded that neither parent had achieved education beyond high school or GED (response options A and B) they were coded as FGCS. Of the total respondents, 207 (14%) were coded as FGCS and 1,295 (86%) were coded as CGCS, for a sum of 1,502. (see Table 1).

Table 1

Characteristics of Sample (n = 1502)

Characteristic	n
%	
Sex	
Female	796
53.1	
Male	704
46.9	
Generational Status	
CGCS	1295
86.2	
FGCS	207
13.8	
Parental Education Level	
Less than High School	12
0.8	
High School or GED	195
13	
1-3 Years of College or Technical	239
16	
4-Year Degree	504
33.6	

(continued)

Table 1 (continued)

Characteristics of Sample (n = 1502)

Characteristic	n
%	
Master's Degree	403
26.8	
Ph.D, Ed.D, M.D., J.D.	149
10	

Data Analysis

Rasch analysis was used to identify if the survey items are more or less endorsable between the two groups (FGCS and CGCS) and between the CGCS subgroups using Differential Item Functioning (DIF). Using the pre-determined definitions for a first-generation college student and continuing-generation student, student participants were sorted into two categories. Students who responded with options A (less than a high school graduate) or B (high school graduate or GED) were labeled as FGCS. Students who respond to this survey item with response options C, D, E, or F for at least one parent were labeled as CGCS.

The CGCS were then further broken down into three groups; 1) 1-3 years of college or technical training, response C, 2) an earned four-year college degree, response option D and the final group, 3) where at least one parent has earned a graduate degree, response options E and F. If a respondent did not complete the entire series of questions, the lacks of responses were coded as zeros and were then removed from the data set. This was only done when a respondent failed to respond to the entire series of questions. One

respondent was removed from the dataset as they did not respond to any of the 13 items. In the instances where a respondent completed some of the 13 questions, a blank response was coded as zero and the participant was included in the analysis. A total of 1502 participants were included in the final data set

The Rasch Rating Scale Model (Andrich, 1978) was applied to test the overall data fit to the model by using the software package, WINSTEPS (2009) measurement software (Linacre, 2009). The algebraic expression for the rating scale model is: $P_{nik} = e^{(B_n - D_i - F_k)} / 1 + e^{(B_n - D_i - F_k)}$. When using this formula with the Rasch Rating Scale Model, (B_n) represents the person or respondent, while how endorsable the individual item is (for example, easier or harder to agree with) is represented as (D_i) (Royal & Elahi, 2011). How endorsable a given item is at a specific threshold (five in this study) is represented as (F_k) (Bond & Fox, 2007).

Evaluating Construct Validity

The framework that was presented in this study for evaluating construct validity was taken from a similar research design by Royal and Elahi (2011). Royal and Elahi utilized the design structure for evaluating construct validity that was created by Samuel Messick in 1989. This framework employs a series of quality control checks that are applied when using a Rasch analysis, including reliability estimates and ensuring that the rating scale is properly functioning.

Educational Significance

This study will encourage practitioners and researchers to be cognizant of potential limitations when using existing literature. In addition, this study urges institutions to participate in the development of high-quality, original research and in turn, to contribute to the existing literature on academic self-efficacy and FGCS. Subsequently, institutions should compare the findings against existing literature and use this multi-faceted approach when making decisions at the local level. This study will also provide recommendations on how the *Survey of First Year Students* could be improved.

Finally, this study will contribute to our knowledge in the area of academic self-efficacy for FGCS. As FGCS are graduating at rates significantly below their peers, it is vital that researchers continue to explore how pedagogy and practice can be fine-tuned to best assist these students in their pursuit for a college degree. Being a first-generation student is not a variable that can be adjusted for; however, institutions could work with this student population in efforts to increase their academic self-efficacy and perhaps, to increase the likelihood that FGCS will leave college with a degree in-hand.

Conclusion

This chapter provided a detailed description of the methods, data source, and sampling frame for this research study. The results of this study will be presented in the following chapter.

Chapter Four

Results

This chapter presents the results of Rasch analysis that was performed in order to answer the three research questions guiding this exploratory study: 1) Do survey response hierarchies differ between first-generation college students and their continuing-generation counterparts on a scale that measures academic self-efficacy? 2) Do levels of item endorsability vary based upon parental levels of education?, and 3) Do the results from the *Survey of First-Year Students* at Research University support the existing literature on first-generation college students. To answer these research questions, the data of an existing survey at a large, Research 1 University were analyzed. The *Survey of First-Year Students* is a census survey distributed annually to all first-year, currently registered, freshmen students at the university. Approximately 4,000 students receive the web-based survey each year. The *Survey of First-Year Students* includes approximately 30 questions and was created to measure high school experiences, demographic information, and students' perceptions regarding their beliefs, values and expectations as they pertain to college. The survey data used in this research study were taken from the fall, 2009 freshmen cohort. This chapter describes the procedures and results of the Rasch analysis used to investigate and answer the three research questions outlined above.

In order to address the first question, variable maps were generated based upon the independent variables (parents' level of education). The survey question asks students to mark the highest level of education achieved by their parents. There is one column for mother and a second column for the fathers' level of education. Question #28 on the survey provides five category responses (labeled A-F) for reporting the level of parental education.

A   Less than high school graduate

B   High school graduate or GED

C   1 to 3 years of college or technical training (also referred to as Some

        College)

D   4-year college degree (BA, BS)

E   Master's degree

F   Ph.D., Ed.D., M.D., or J.D

The highest level of education reported for either mother or father was used to sort students into two comparison groups, 1) first-generation students (FGCS) and 2) continuing-generation students (CGCS). FGCS refers to a student whose parents have not attended formal education after high school (Gibbons & Borders, 2010; Ramos-Sanchez & Nichols, 2007; Wang & Castaneda-Sound, 2008). CGCS is the term used to describe a student with at least one parent who has attended a formal institution of higher education after high school. Formal education includes technical schools and training as well as four-year colleges and universities.

The continuing-generation students were further broken down into three comparison groups based upon the highest level of education achieved by their parents; 1) some college; 1 to 3 years of college or technical training (response option C), 2) a 4-year college degree (response option D) and 3) a graduate degree (response options E and F). The third category, graduate degree was further broken down into two groups, one group that included students who identify that at least one parent possesses a Master's degree (response option E) and the second group that includes students who identified

that at least one parent possesses a Ph.D. or another terminal degree such as a J.D. (response option F).

The following questions guided the analyses:

1. If the hierarchies vary based upon the reported levels of parental education, which items show the greatest variance between comparison groups?

2. Are specific survey items exhibiting differential item functioning (DIF) based upon generational status? If so, between which comparison groups are the DIF's present?

Principal Component Analysis of Residuals

While the reliability of the Procrastination Scale has been tested at 35 items and at 16 items, it has not been tested at 5 items. Furthermore, even though procrastination has been found to be significantly related to self-efficacy in a college academic setting, it is vital that all items are examined to ensure that one construct is being measured. As an important principle of the Rasch model is focusing on one dimension (Bond & Fox, 2007), it is problematic when a scale measures multiple attributes. To ensure that all 13 survey items on academic self-efficacy fit the unidimensional construct, a Principal Component Analysis (PCA) of residuals was run. The PCA identifies patterns in the data by plotting each component against the item calibration (Linacre, 2011). If the variance is significant (eigenvalues greater than 2.0) then the items should be divided based upon where they fall in the plot; either the top half or the bottom half of the plot. As the second contrast has an eigenvalue of only 1.4, evidence is present that a unidimensional construct exists. In fact, any second factor would have to have an eigenvalue of at least 2.0 to be considered a secondary dimension (Linacre, 2011). In total, 40.8% of the Rasch

dimension is explained and the overall variance explained by the items is 23.8%. In sum,

sufficient evidence for the existence of a unidimensional construct is present, thus

ensuring the Rasch Rating Scale Model is an appropriate tool for data analysis.

Survey Validation Process

Reliability

Table 2 identifies the reliability and separation estimations. Linacre explains that

separation is the ratio of a sample deviation corrected for error, to the average estimation

error (2011). Explained another way, separation is the spread of a sample into a range of

statistically distinguishable levels (Royal & Elahi, 2011). Two types of reliability and

separation estimations are utilized in Rasch Analysis; "Real" and "Model". "Real" is

used to identify the lower bound and "Model" is the term used to identify the upper

bound of the estimates. The true reliability and separation estimations likely fall between

the "Real" and the "Model" (Linacre, 2011). In this case, the true person estimates fall

somewhere between .80 and .84. The spread in the separation estimates reveal that an

adequate level of discrimination is present. The item reliability estimates (1.00) signify

that the survey items are sufficiently diverse and therefore, a spread that is conducive for

quality discrimination could be generated.

Table 2

Reliability and Separation

	Reliability (Real)	Reliability (Model)	Separation (Real)	Separation (Model)
Persons	.80	.84	1.99	2.30
Items	1.00	1.00	18.39	19.11

Person Measure Quality

Person measure quality is assessed by examining the fit statistics, stability of measures and the size of the standard errors (Royal & Elahi, 2011). An average standard error of .37 indicates that the person measure is relatively stable (see Table 4). According to Wright and Linacre (1994), criteria for reasonable infit and outfit mean square values should range between 0.6 to 1.4 for person measure fit statistics. Of the total sample (n=1502), approximately 8.7% (130 students) were identified as possible misfits and candidates for removal. Upon further investigation, the overall fit statistics indicate a strong fit and as a result, the 130 potential misfitting students were not removed from the sample. The fit statistics, stability of measures and the size of standard errors all provide evidence for quality person measures.

Table 3

Summary Statistics

	Measure	Model Error	INFIT Mean Square	OUTFIT Mean Square
Persons				
Mean	.84	.37	1.02	1.00
S.D.	.95	.07	.65	.64
Items				
Mean	.00	.03	.99	1.00
S.D.	.66	.00	.20	.20

Rating Scale Effectiveness

The rating scale quality addresses the degree of appropriate response options, proper functioning of the categories and also investigates whether the response options were deciphered consistently by the respondents (Royal and Elahi, 2011). Table 5 provides the rating scale diagnostics. The results suggest that while students utilized all five response options, the extreme (negative) option, "Strongly Disagree", was only utilized 2% of the time. The INFIT and OUTFIT mean square values provide information on how each of the response options fit the rating scale structure (Royal & Elahi, 2011). The last column, Category Measure, orders response option categories to indicate that the students were able to identify an ordinal response pattern. The category measures range from 3.75 to -3.37, with the highest measure of 3.75 for "Strongly Agree" and the lowest measure of -3.37 for "Strongly Disagree". This ordering indicates a stepwise order,

meaning that the students were able to appropriately recognize an ordinal response

pattern. Likewise, the structure calibrations progress in an ordered manner. These rating

scale quality indicators provide evidence that the response scale functioned appropriately.

Table 4

Summary of Rating Scale Diagnostics

Rating Category	n	%	INFITM MnSq	OUTFIT MnSq	Structure Calibration	Category Measure
Strongly Disagree	477	2	1.10	1.26	None	-3.37
Disagree	2,804	14	.95	.95	-2.16	-1.46
Not Sure	4,066	21	.97	.98	-.31	-.16
Agree	8,959	46	.96	.96	-.13	1.40
Strongly Agree	3,146	16	1.06	1.03	2.61	3.75

Item Measure Quality

Table 5 identifies the item statistics for the 13 survey items. The difficulty

measure (how edorsable the item is) is denoted as Di and an estimate of the standard error

is also provided for each item. The INFIT and OUTFIT mean square statistics are also

included for each of the 13 items. The INFIT and OUTFIT mean square statistics are

used to examine the content validity of the survey items (Royal & Elahi, 2011). Wright

and Linacre (1994) recommend that mean square fit statistics should range between .60

and 1.40. The mean square fit statistics for the 13 academic self-efficacy items range

from .66 to 1.42 indicating that the content validity of the items are sound. Item *g* is the

only item that is slightly outside of the mean square fit statistics range with an OUTFIT

mean square of 1.42, thus indicating slight "off-variable noise".

Table 5

Item Quality Indicators

Item	Di	Error	INFIT Mean	OUTFIT Mean
Qa I am good at research and writing papers.	.46	.03	1.27	1.28
Qb I don't delay finishing jobs when they're important.	.48	.03	1.14	1.16
Qc I know how to schedule my time to accomplish tasks.	-.21	.03	.72	.73
Qd I find my academic work interesting and absorbing.	.38	.03	.90	.94
Qe I know how to take notes.	-.42	.04	.99	1.00
Qf When I have a deadline, I don't wait until the last Minute	.79	.03	1.04	1.06
Qg I know how to perform well on tests.	.34	.03	1.36	1.42
Qh I don't put off improving my work habits.	.59	.03	.86	.89
Qi I usually do very well in school and at academic tasks.	-.54	.04	.90	.88
Qj I am not a time waster and I can do something about it [time wasting].	-.11	.03	.91	.89
Qk I promise myself I will do something and then I don't drag my feet.	.48	.03	.95	.99
Ql I am a very good student.	-.51	.04	.66	.67
Qm I am very capable of succeeding at [name of institution].	-1.72	.05	1.20	1.15

Summary of Survey Validation Findings

Variable Maps

Variable maps present a visual representation of person and item distributions using a hierarchy to display the item response patterns. The items that are the easiest to endorse fall towards the bottom of the hierarchy and items that are the most difficult to endorse are represented towards the top of the item hierarchy (Bond & Fox, 2007). The outliers near the top of the hierarchy indicate that some students are likely to strongly disagree with all of survey items and the outliers towards the bottom of the hierarchy demonstrate that some students are likely to strongly agree with all of the survey items. The variable maps also identify the mean of the items as well as the mean of the persons. The means are indicated by the letter "M" on the left most side of the item map scale. Standard deviations are also distinguished on the variable maps by the letter "S", indicating one standard deviation and by the letter "T" for two standard deviations. Variable maps allow for a visual analysis of the persons on the left hand side and the items on the right hand side. The distance between the items in the hierarchy illustrate how the items are functioning in relation to one another. As explained by Bond and Fox (2007) the logit scale is an interval scale, meaning that the distance between the logits are of equal size.

A total of seven variable maps were produced based upon the students' generational status: 1) First-Generation and Continuing College Students, 2) First-Generation College Students, 3) Continuing-Generation College Students, 4) Some College (1-3 years of college or technical training), 5) Bachelor's Degree, 6) Master's Degree and, 7) Doctorate of Philosophy or Equivalent. On all seven variable maps, the mean of the students' responses is higher than is the mean of the items' difficulty, thus

signifying that the survey could utilize more difficult items and overall, the survey items are much too easy for the students. The results of the variable maps demonstrate that all 13 of the survey items fall below the person means and in addition, all survey items are at or below 1 logit, again signifying that the survey items are not particularly well-targeted for the students. As the items are much too easy for the students in all generational groups, the student distributions are all positively skewed. The results of this analysis also indicate that the easiest survey item, for all students to endorse was question *m*, *I am very capable of succeeding at [name of institution]*. Item *m* was considerably easier for the students to endorse than were any of the other items on the survey. This finding is indicated by the large gap that occurs on the variable maps between item *m* and the other survey items. Item *m* is the only survey item that falls below the -1 to 1 logit range. All of the other survey items fall within the -1 to 1 logit range. Following item *m,* items *i*, *I usually do very well at school and at academic tasks*, *e*, *I know how to take notes* and *l*, *I am a very good student,* were all relatively easy to endorse among all the students. The variable maps indicate that item *e*, *I know how to take notes*, was slightly more difficult for the FGCS to endorse (figure 2.1). The FGCS were the only group where item *c*, *I know how to schedule my time to accomplish a task,* was easier to endorse than was item *e*, *I know how to take notes*.

The most difficult item for the continuing-generation students to endorse was item *f*, *When I have a deadline, I don't wait until the last minute*. This item was the most difficult to endorse within all of the continuing-generation student groups and for each of the continuing-generation variable maps, item *f* fell above one standard deviation. The variable map for first-generation college students (Figure 2) indicates that no items fell

above one standard deviation signifying that there is slightly less variance in the questions within the first-generation college student sample. While item *f* was difficult to endorse within the first-generation student sample, two other survey items were equally difficult to endorse. This is referred to as closely packed or overlapping items (Bond & Fox, 2007). The overlapping items indicate that in addition to item *f*, items *a I am good at research and writing papers, h, I don't put off improving my work habits,* were proportionately challenging for the first-generation students. Overlapping items occur five separate times within the FGCS variable map (Figure 2) and three times within the CGCS variable map (Figure 3). While overlapping is present on all variable maps, the map for Some College (1 to 3 years of college or technical training)(see Figure 4) shows the greatest depth of closely packed items within the generational groups, with five items (*a, b, d, g*, and *k*) overlapping at approximately .5 logits.

Gaps between the items are present in both the FGCS (Figure 2) and the CGCS (Figure 3) variable maps. Gaps between the items reveal that items are not spanning the student responses properly. The largest gap on all of the variable maps comes after item *m*, towards the bottom of the maps. This indicates that item *m* is far easier to endorse than the other survey items. The FGCS variable map (Figure 2) reveals that two other gaps are present between the item distributions. One gap is at approximately -.5 logits and the other at approximately .25 logits. While a gap also occurs on the CGCS variable map at approximately .25 logits, this is the only gap in the distribution other than after item *m*. This finding suggests that the items are more appropriately spanning the students' responses within the CGCS sample than they are in the FGCS sample. The item

hierarchies within the CGCS sub-samples were all relatively similar suggesting that

significant differences in item endorsabilities were not present.

```
            Student - MAP - Question
               <more>|<rare>
      6              . +


                      |
                      |
                   .  |
      5                +
                      |
                      |
                   .  |
                      |
      4             . +
                      |
                   .  |
                      |
                   #  |
      3            .# +
                   .# T|
                   .  |
                  .## |
                 .### |
      2           .## +
                #### S|
                .#### |
         .##########  |T
              .###### |
      1       .###### +
         .########## M|  Q12f
         .##########  |S Q12h
              ####### |  Q12a    Q12b    Q12d    Q12g    Q12k
         .##########  |
      0    .######### +M
             .####### S|  Q12c    Q12j
              .##### |  Q12e
                .## |S Q12i    Q12l
                 #  |
     -1          .  T+
                 .  |
                 .  |T
                      |
                 .  |  Q12m
     -2                +
               <less>|<frequent>
  EACH "#" IS 13. EACH "." IS 1 TO 12
```
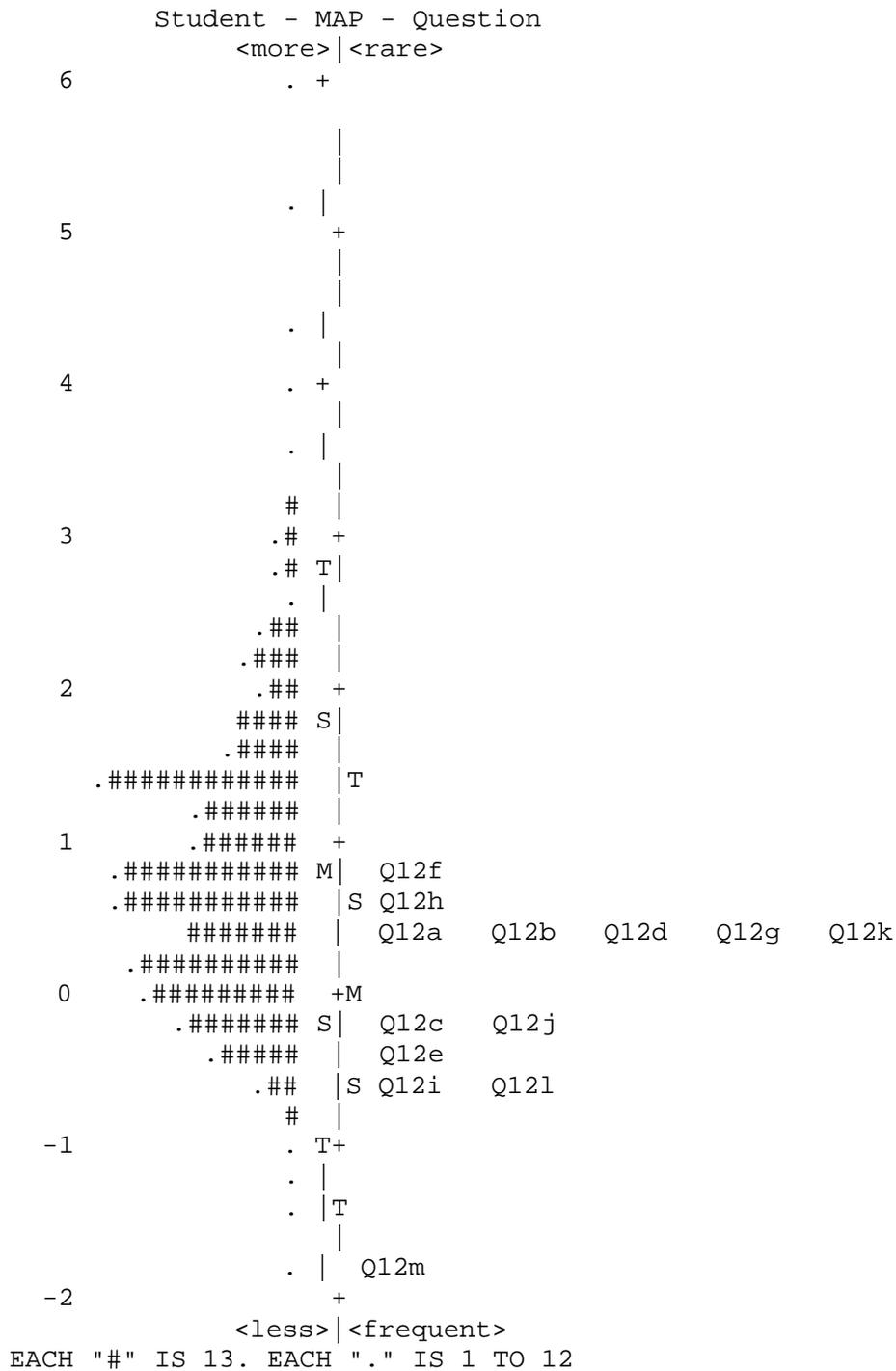
Figure 1. First-Generation and Continuing-Generation College Students (n = 1502)

```
              Student - MAP - Question
                   <more>|<rare>
        4                    +
                        .  |
                           |
                           |
                        #  |
                           |
                        #  |
        3                    +
                       ##  |
                          T|
                        #  |
                       .#  |
                           |
                     ##### |
        2               ###  +
                           |
                     #### S|
                    .####  |
                      .##  |
                    ###### |
                    .##### |T
        1           ######  +
                    ##### M|
                  .####### |
                    ###### |S Q12a    Q12f     Q12h
             .########### |  Q12g    Q12k
                     #### |  Q12b    Q12d
                  .###### |
        0            #### S+M
                    ##### |  Q12e    Q12j
                      .# |  Q12c
                    ##### |
                    .### |S Q12i    Q12l
                           |
                           |
                           |
       -1               T+
                          |T
                     .  |
                           |
                           |
                          |  Q12m
                           |
                           |
                           |
       -2                    +
                   <less>|<frequent>
       EACH "#" IS 2.  EACH "." IS 1.
```

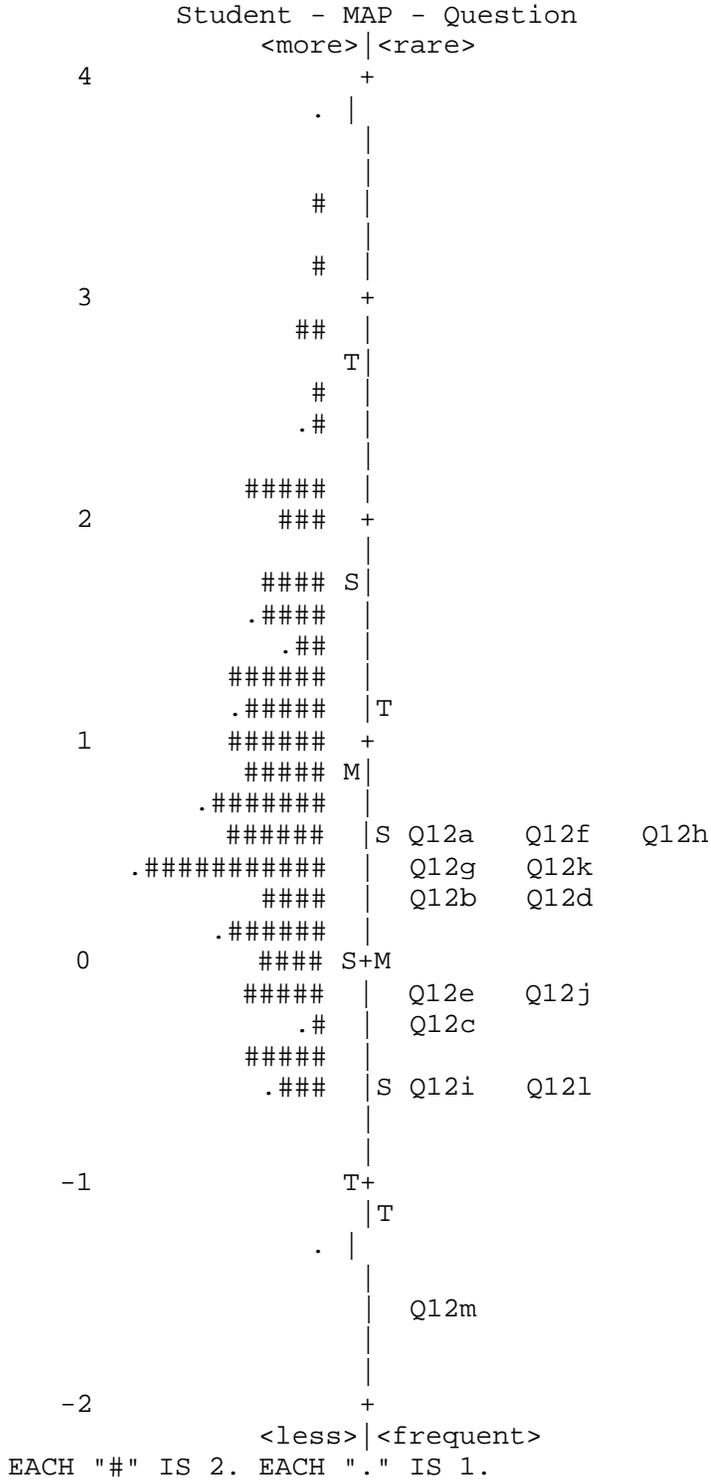*Figure 2.* First-Generation College Students (n = 207)

```
          Person - MAP - Response
             <more>|<rare>
   6              .  +
                     |
                     |
                     |
                  .  |
   5                 +
                     |
                  .  |
                     |
                     |
   4              .  +
                     |
                  .  |
                     |
                  #  |
   3             .#  +
                 .# T|
                  .  |
                .##  |
               .###  |
   2            .##  +
              #### S|
             .####  |
   .###########  |T
          .######  |
   1      .######  +
    .##########  M|  Q12f
    .##########   |S Q12b        Q12h        Q12k
        .######   |  Q12a        Q12d        Q12g
     .##########   |
   0   .########  +M Q12j
       .######## S|  Q12c
         .#####   |  Q12e
           .##   |S Q12i        Q12l
           .#    |
  -1       .# T+
            .   |
            .   |T
                |
            .   |  Q12m
  -2             +
             <less>|<frequent>
 EACH "#" IS 11. EACH "." IS 1 TO 10
```

Figure 3. Continuing-Generation College Students (n = 1295)

```
              Student - MAP - Question
                 <more>|<rare>
      5                 +
                        |
                        |
                        |
                        |
                    #   |
      4                 +
                        |
                    .   |
                        |
                   .#   |
                   .##  |
      3                T+
                    #   |
                    .   |
                   .##  |
                   ###  |
                 ###### |
      2           #### S+
                        |
                ####### |
                 .#### |
                ####### |T
                 ##### |
      1 .############ M+
               .####### |  Q12f
               .###### |S Q12h
              .######### |  Q12a    Q12b    Q12d    Q12g    Q12k
               .##### |
              .######## |
      0         .##### S+M
               ###### |  Q12c    Q12j
                .### |
                .### |  Q12e    Q12l
                .### |S Q12i
                  .  |
     -1                T+
                        |
                        |T
                        |
                        |
                        |  Q12m
     -2                 +
                 <less>|<frequent>
EACH "#" IS 2. EACH "." IS 1.
```

Figure 4. Some College (1 to 3 years of college or technical training) (n = 239)

```
               Student - MAP - Question
                   <more>|<rare>
      5                 .  +
                           |
                           |
                        .  |
                           |
                           |
      4                 .  +
                           |
                           |
                        .  |
                       .#  |
                           |
      3                .#   +
                           |
                       .# T|
                      .##   |
                           |
                      .##   |
      2                .#   +
                     .###   |
                     .## S  |
                  .######   |
                   .#####   |T
                   .#####   |
      1             .#####    +
                   .##### M|  Q12f
              ##########   |S Q12h
                   .####    |   Q12b     Q12k
            .###########    |   Q12a     Q12d     Q12g
                   .###    |
      0       .#######   +M Q12j
                ########  S|   Q12c
                   .##    |
                   .###    |   Q12e     Q12i     Q12l
                    .#   |S
                     .   |
     -1              .#    +
                     .  T|
                     .   |T
                           |
                           |   Q12m
                     .   |
     -2                     +
                   <less>|<frequent>
         EACH "#" IS 5. EACH "." IS 1 TO 4
```

Figure 5. Bachelor's Degree (n = 504)

```
               Student - MAP - Question
                  <more>|<rare>
      6                .  +
                          |
                          |
                          |
                       .  |
      5                   +
                          |
                          |
                          |
                          |
      4               .#   +
                          |
                       .  |
                          |
                       .  |
      3               .#   +
                       .  T|
                          |
                     .#   |
                    ####   |
      2              .#   +
                    ### S|
                    ####  |
             .######### |T
                .#####  |
      1          ######  +
             ########## M|  Q12f
              .######## |S Q12a    Q12b    Q12h
               .####   |  Q12d    Q12g    Q12k
            .##########  |
      0    ###########  +M
              .####### S|  Q12c    Q12j
                .###   |  Q12e    Q12i
                 .#   |S Q12l
                     .  |
     -1               .  +
                     .  T|
                          |T
                          |
                          |
                          |  Q12m
     -2                   +
                  <less>|<frequent>
     EACH "#" IS 4. EACH "." IS 1 TO 3.
```

Figure 6. Master's Degree (n = 403)

```
         Student - MAP - Question
            <more>|<rare>
   4              .  +
                     |
                     |
                     |
                  .  |
                 .#  |
   3                 +
               ### T|
                 .  |
                     |
                 .#  |
               ###   |
   2            #   +
                  S|
               .##  |
              .#### |
             ####### |T
              .###  |
   1        ########  +
               ### M|  Q12f
                ##  |S Q12b    Q12h
       .########### |  Q12d    Q12k
                ###  |
               .#### |  Q12a    Q12g
   0             # S+M Q12j
               ##### |  Q12c
                .#  |
               #### |  Q12e    Q12l
                 .  |S Q12i
                 .  |
  -1             .  T+
                     |
                 .  |T
                     |
                     |  Q12m
                     |
  -2                 +
             <less>|<frequent>
EACH "#" IS 2. EACH "." IS 1.
```
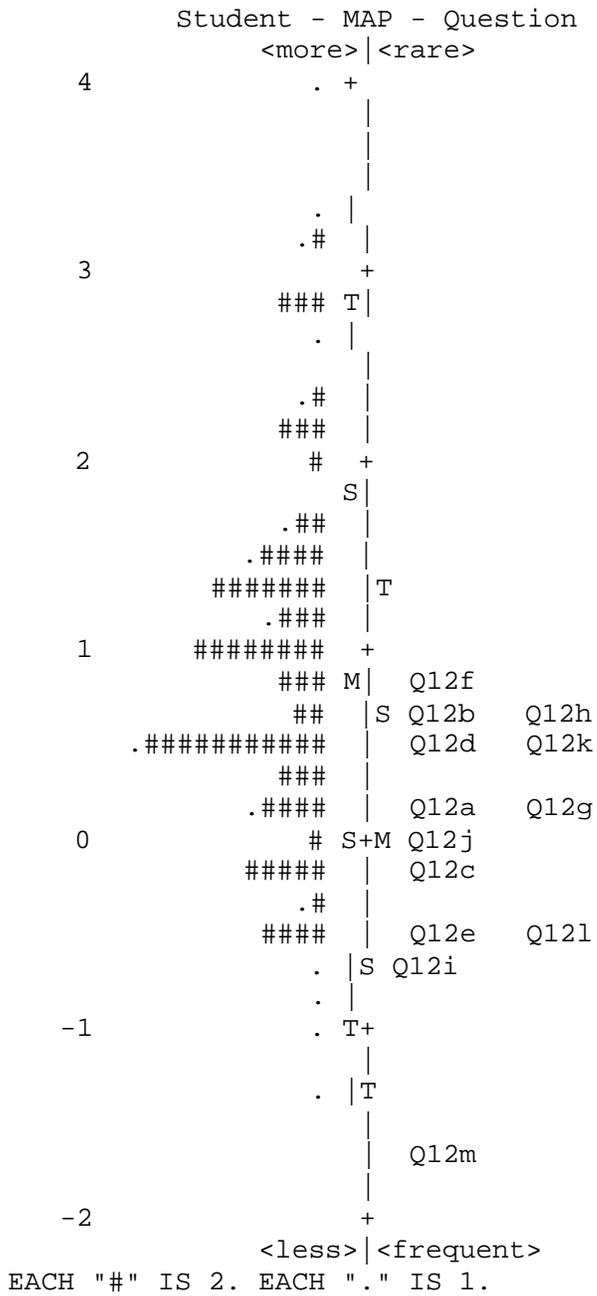
Figure 7. Doctorate of Philosophy or Equivalent (n = 149)

Table 6

Variable Map Item Key

Item

Q12a - I am good at research and writing papers.

Q12b - I don't delay finishing jobs when they're important.

Q12c - I know how to schedule my time to accomplish tasks.

Q12d - I find my academic work interesting and absorbing.

Q12e - I know how to take notes.

Q12f - When I have a deadline, I don't wait until the last minute.

Q12g - I know how to perform well on tests.

Q12h - I don't put off improving my work habits.

Q12i - I usually do very well in school and at academic tasks.

Q12j - I am not a time waster and I can do something about it [time wasting].

Q12k - I promise myself I will do something and then I don't drag my feet.

Q12l - I am a very good student.

Q12m - I am very capable of succeeding at [name of institution].

Differential Item Functioning (DIF)

After the Variable maps were completed, pairwise differential item functioning was used to compare item responses based upon levels of parental education. In total, six pairwise DIF's were run: All Students, Male vs. Female; FGCS vs. CGCS; , Male vs. Female; Some College vs. Bachelor's Degree; Bachelor's Degree vs. Graduate Degree; Master's Degree vs. Graduate Degree. The DIF hypothesis is that each survey item has

the same endorsability for each of the student groups. For example, the hypothesis states that survey item *a* will be at the same level of endorsability for all students, based upon their generational status.

DIF Contrasts

In order for DIF to be noticeable, the DIF contrast logits need to be at minimum, 0.5 (Linacre, 2011). The DIF contrast is the difference in item endorsability between the two comparison groups (Linacre, 2011). Stated another way, the DIF contrast is the difference between the DIF measures for each group. The results from the DIF pairwise comparisons indicate that the only group that displays noticeable DIF is in Plot C, First-Generation College Students by Sex. Of the 13 items, three items indicated the presence of DIF. These were items "g", *I know how to perform well on tests,* "j", *I am not a time waster and I can do something about it [time wasting],* and "k", *I promise myself I will do something and then I don't drag my feet.*

DIF Measures

DIF measures display the item endorsability level by group (Linacre, 2011). In a pairwise DIF, there will be two DIF measures per item. For example, when examining males and females, each item will have a DIF measure; one for the males and one for the females. The DIF measures for each pairwise DIF are displayed in the following Excel plots. The more difficult an item is to endorse, the greater the DIF measure (Linacre, 2011). As discussed above, while only one group exhibited DIF, the plotted DIF measures indicate which items are more or less difficult to endorse within the comparison groups. *Figure 8* includes all student respondents and the corresponding DIF measures are displayed for both males and females. The survey items are denoted on the horizontal

63

axis and the DIF measures are on the vertical axis. The DIF measures indicate that items *b, f* and *j* are slightly more difficult to endorse for the males whereas items *a, e,* and *m* are marginally more difficult to endorse for the females. DIF measures are equal between males and females on items *d, h, k* and *l*, meaning that the DIF contrast is .00 for these four items.
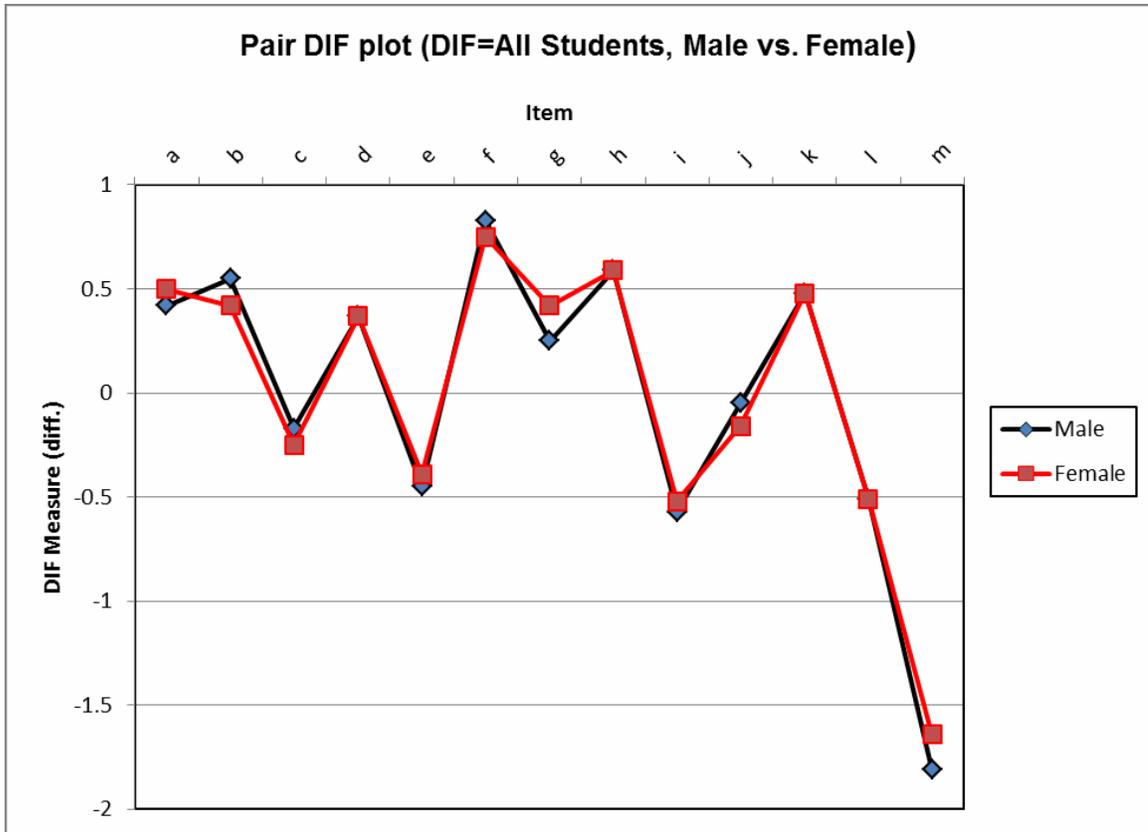
Figure 8. All Students by Sex

    Figure 9 displays the DIF measures for FGCS and CGCS. Items *a, e, g* and *m* are slightly more difficult to endorse for the FGCS and items *b, c, f, h, j, k,* and *l* are slightly more difficult to endorse for the CGCS. The DIF measures are equal between the FGCS and CGCS on items *d* and *i*. The largest DIF contrast is present on item *e*.
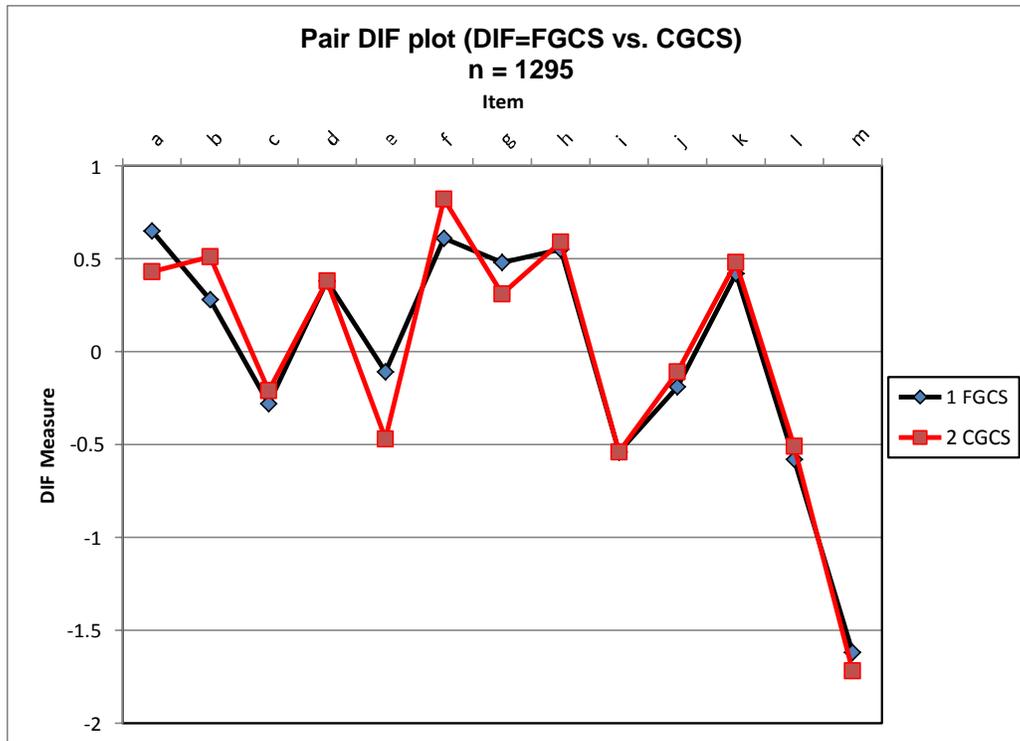
Figure 9. First-Generation vs. Continuing-Generation College Students

Figure 10 displays the DIF measures for FGCS by sex. Results indicate that several differences exist between the males and females when examining the levels of item endorsability. Results reveal that items *a, d, f, g* and *m* are more difficult to endorse with the female FGCS. Items *b, c, h, j,* and *k* are more difficult to endorse with the male FGCS. The item with the greatest DIF contrast is item *g,* closely followed by item *j* and then item *m*. As indicated in *Figure 10*, all three of these items present a noticeable DIF, as the DIF contrasts are above 0.5 logits. This indicates that the students are responding to these particular items disproportionately. In the pairwise DIF analysis of first-generation male and female students two DIF measures are equal, resulting in a DIF contrast of .00 for items *e* and *l*.
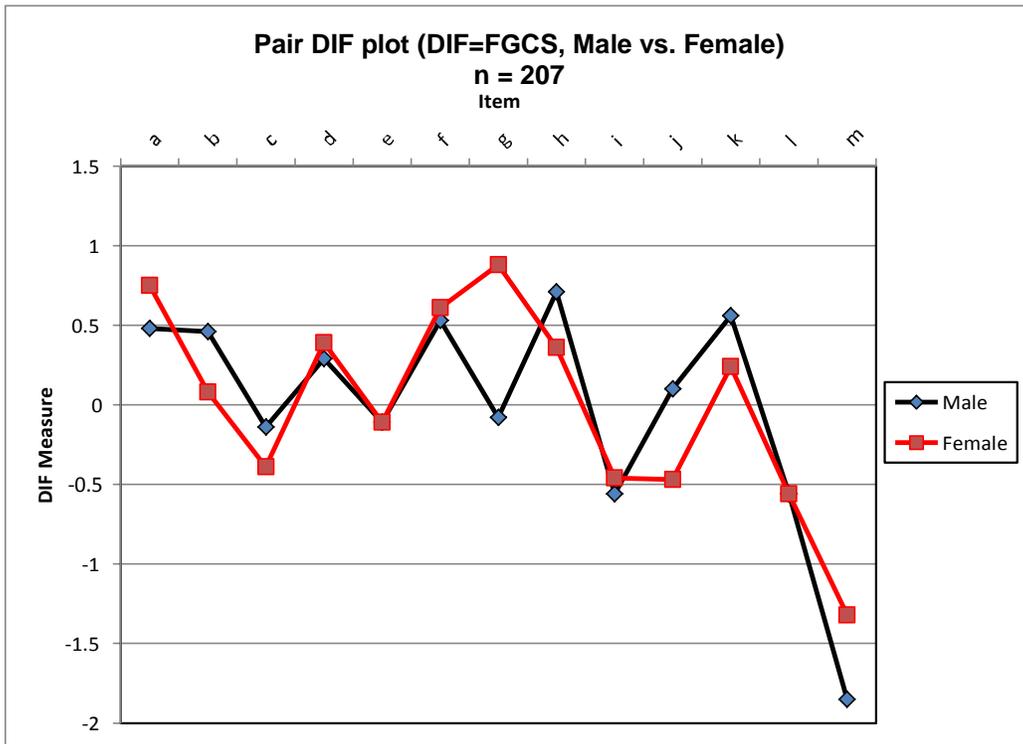
Figure 10. First-Generation College Students by Sex

     Figure 11 displays the DIF measures for students who reported that at least one of
their parents have between 1-3 years of college or technical training and also for students
who reported that at least one of their parents possesses a Bachelor's degree. The DIF
measures were similar between the two groups on most items. The largest DIF contrast
was .14 for both items *g* and *j*. A DIF contrast of .00 occurred on one item, item *h*.
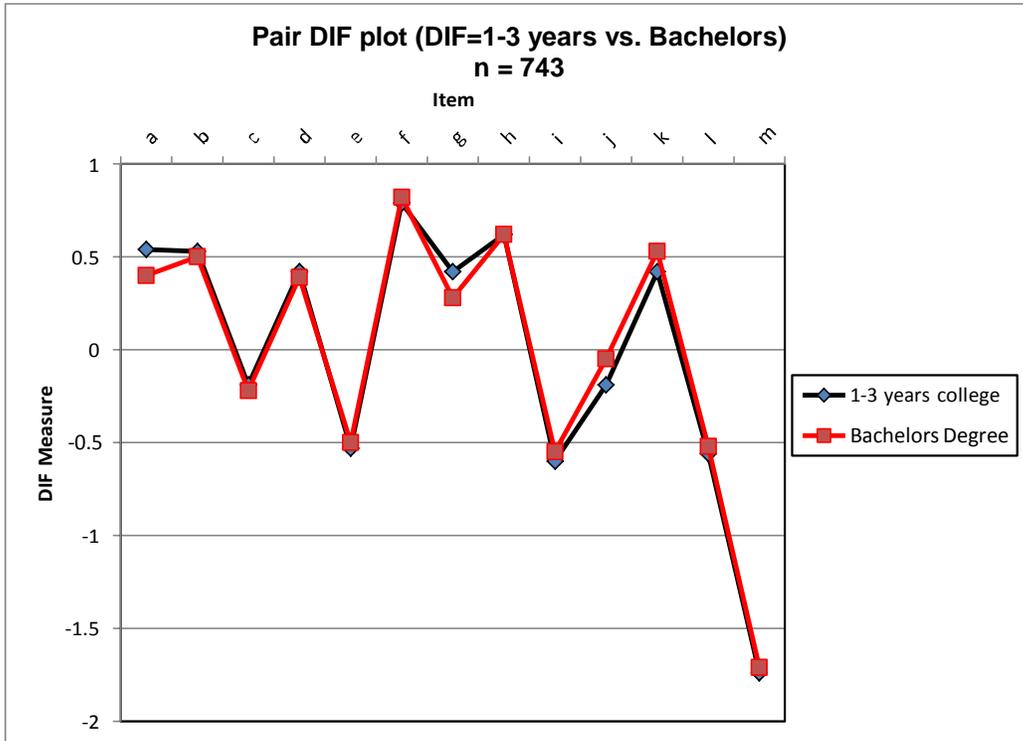
Figure 11. Some College to Bachelor's Degree

    Figure 12 displays the DIF measures for students who self-reported that at least one parent had completed a Bachelor's degree as well as those students that indicated that at least one parent had completed a Graduate degree. For this pairwise DIF, Master's degree as well as Ph.D. and equivalent were included in the category of Graduate Degree. Of the six pairwise DIFs that were analyzed, plot E resulted in the greatest number of items displaying a DIF contrast of .00. Of the 13 survey items, 7 of the DIF measures were equal. For all 13 items, the DIF contrasts were extremely low or at .00. The largest DIF contrast was on item *m*, which was slightly more difficult to endorse with students in the Bachelor's degree group.
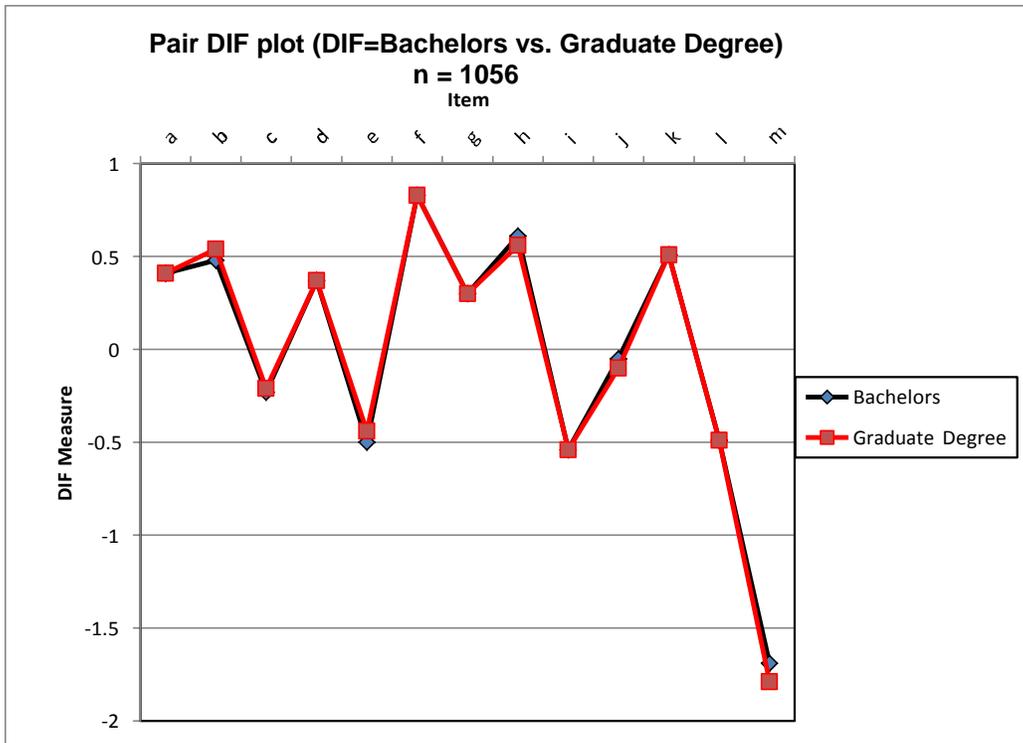
Figure 12. Bachelor's Degree vs. Graduate Degree

Figure 13 displays the DIF measures for students that self-reported that at least one parent possessed a Master's degree as well as those students that self-reported that at least one parent possessed a Ph.D. or equivalent. The results of *Figure 13* indicate that none of the DIF measures are equal. The greatest DIF contrast occurs on item *a* with the Master's Degree group experiencing more difficulty endorsing this item than the Ph.D. comparison group. In addition, the Master's Degree group also experienced slightly more difficulty endorsing items *f, g* and *i*. The Ph.D. and equivalent group resulted in marginally higher DIF measures for items *b, c, d, e, h, j, k,* and *l*.

Pair DIF plot (DIF=Masters vs. Ph.D or Equivalent)
n = 552
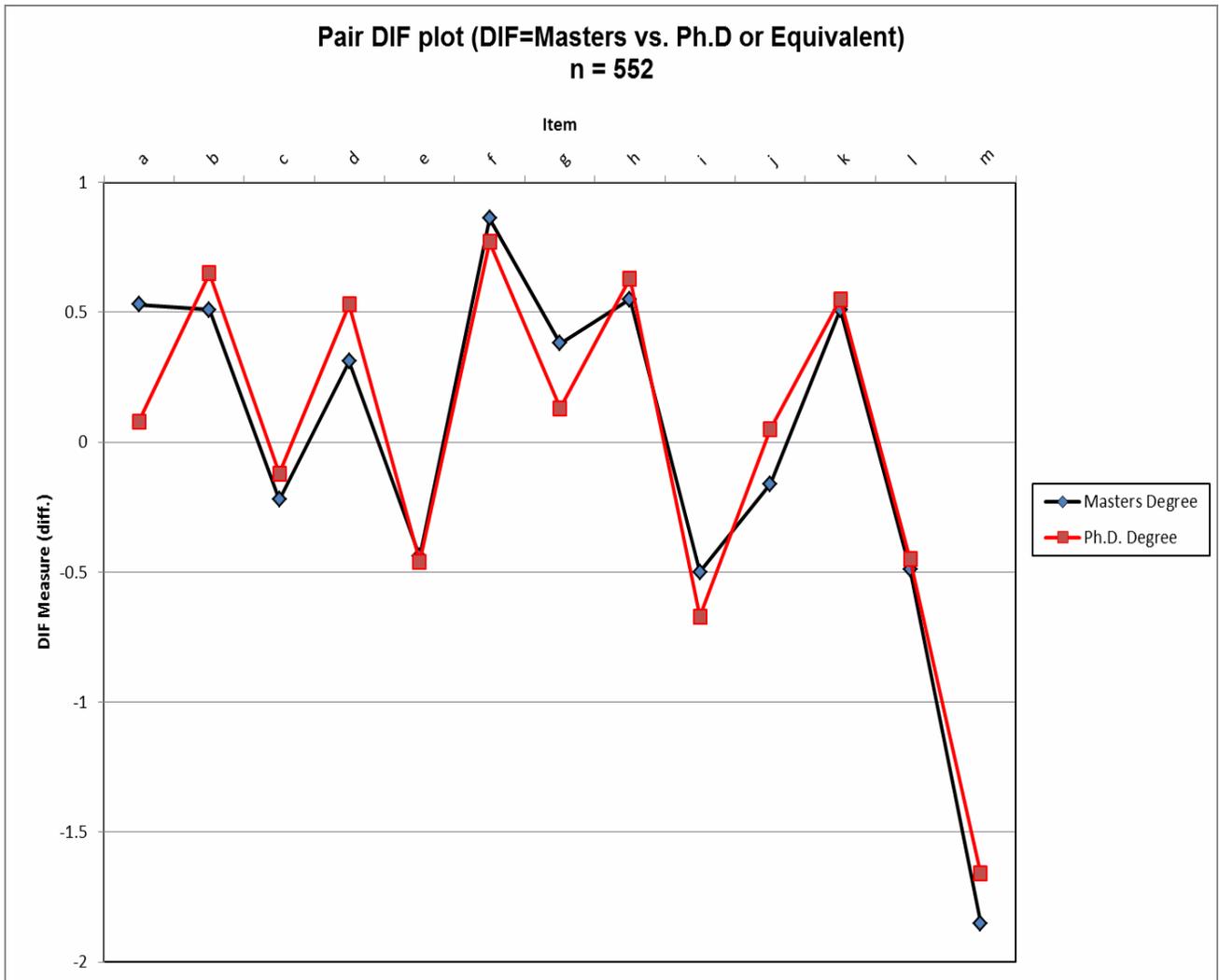
Figure 13. Master's Degree vs. Ph.D. or Equivalent

Conclusion

This chapter presented the results of the Rasch analysis. First, quality control measures were used to verify that the data fit the model and the measures are reliable. Next, it was determined that from the variable maps that survey response hierarchies do differ between first-generation college students and continuing-generation college students on the academic self-efficacy items from the *Survey of First-Year Students.* Specifically, item *e, I know how to take notes* was more difficult for the FGCS to endorse. Another noticeable difference is that three items overlapped at the top of the

FGCS variable map; meaning that in addition to item *f* being the most difficult to endorse for these students, items *a, I am good at research and writing papers* and *h, I don't put off improving my work habits* were also equally difficult to endorse. Furthermore, the variable maps indicated that the survey items more appropriately spanned the CGCS sample than they did for the FGCS.

Next, differential item functioning was employed in order to investigate the presence of disproportionate responses. Results revealed that DIF was exhibited in only group, First-Generation College Students by Sex (Plot C). Specifically, items *g, j,* and *m* present a noticeable DIF. Items *g, I know how to perform well on tests* and *m, I am very capable of succeeding at [name of institution]* are both significantly more difficult to endorse with the females than the males. Item *j, I am not a time waster and I can do something about it [time wasting]* was significantly more difficult for the male first generation college students to endorse as compared to the female first-generation college students.

The results of the Rasch Analysis were presented in this chapter. It was first determined that the data fit the model. The results of the variable maps identified the survey item hierarchies for the FGCS and the CGCS. Next, the pairwise DIF results were used to compare levels of item endorsability by parental levels of education as well as by sex. The final chapter will present a discussion of the results in addition to providing conclusions and recommendations for future research.

Chapter Five

Discussion and Conclusion

The purpose of this study was to investigate if parental levels of education affect college students' reported levels of academic self-efficacy. This study utilized the academic self-efficacy items taken from a first year survey at a large, Research I institution to explore if student responses varied based upon generational status as determined by reported levels of parental education attainment. First, this study discussed the existing literature on self-efficacy, academic self-efficacy and first-generation college students. Next, an overview of Rasch analysis was provided. Quality measures were used to confirm that the data fit the model. Variable maps were employed to identify and visually depict survey item hierarchies for FGCS and CGCS. Finally, pairwise DIF's were used to compare levels of endorsability for each of the 13 survey items based upon parental levels of education and by sex. Results of the analysis were provided in the previous chapter. This chapter will summarize the study and present the findings to the three research questions and the two guiding research questions. This chapter will also provide recommendations for improving the instrument used in this study as well as offer suggestions for future research in the area of first-generation students and academic self-efficacy.

The first research question utilized variable maps in order to compare the survey items based upon levels of endorsabilty and the generational status of the students. Endorsabilty refers to how likely the students were to agree or disagree with a particular item relating to academic self-efficacy. If students were less likely to endorse an item, that indicated lower levels of academic self-efficacy for that particular item. This

principle also works in reverse; the more likely students were to endorse an item indicates higher levels of academic self-efficacy for that item.

Research Questions and Selected Findings

> *Question 1) Do survey response hierarchies differ between first-generation college students and their continuing-generation counterparts on a scale that measures academic self-efficacy?*
>
> *Guiding Question) If the hierarchies vary based upon the reported levels of parental education, which items show the greatest variance between comparison groups?*

Variable maps were produced to display the item hierarchies for students, based upon generational status and parental levels of educational attainment (see Figures 1-7). Overall, the item hierarchies showed that students in the sample were reporting relatively high levels of academic self-efficacy. For the most part, each of the survey items were quite easy for students to endorse. This is evident based upon a positive skew in the persons column of the variable map, as well as the location of the items in relation to the person responses on the variable map. The results of this analysis also indicate that the easiest survey item for all students to endorse was question "m", *I am very capable of succeeding at [name of institution].* Following item "m", items "j", *I usually do very well at school and at academic tasks*, and "e", *I know how to take notes* and "l", *I am a very good student,* were all relatively easy to endorse among all the students. One difference between the FGCS and the CGCS was on item "e", *I know how to take notes.* This item was slightly more difficult for the FGCS (Figure 2) suggesting that FGCS feel less confident in their abilities to take notes. Interestingly, the FGCS were the only group

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where item "c", *I know how to schedule my time to accomplish a task,* was easier to endorse than was item "e", *I know how to take notes.* This suggests that the FGCS are more confident in their abilities to schedule and complete a task than they are in their abilities to take notes. One possible explanation for this finding is that while time management competencies may have been acquired before entering college, the concept of note taking as a learned skill becomes an essential component of the academic experience at the college level. In college, the students are responsible for organizing a larger amount of information in their notes than they may have experienced in the past. It is also likely that in high school environments, worksheets, outlines and support materials are provided to guide the students whereas in college, students may be responsible for directing and synthesizing information on their own, through note taking.

The most difficult items for all students to endorse were the items that pertained to conducting research and writing papers, interest in their academic work and test performance. It is worth noting that of the five procrastination items relating to academic self-efficacy, four were identified by all students as being less endorsable, meaning that the students felt less efficacious towards these items as compared to the other items on the survey. These items included delaying tasks, waiting until the last minute with regard to deadlines, putting off the improvement of work habits and dragging their feet. Item j the final procrastination item fell in the middle of the hierarchies, meaning that this item was neither easy nor difficult to endorse. This suggests that the students were not sure how efficacious they are when it comes to wasting time. This suggests that within the overall sample, students are reporting that they are the least academically efficacious when it comes to procrastinating on tasks related to college academics.

The variable map for first-generation college students (Figure 2) indicates that there is slightly less variance in the items within the first-generation college student sample. While item *f* was difficult to endorse within the first-generation student sample, two other survey items were equally difficult to endorse. In addition to item "f", items "a" *I am good at research and writing papers,* and "h", *I don't put off improving my work habits,* were proportionately challenging for the first-generation students. The most difficult item for the continuing-generation students to endorse was also item "f", *When I have a deadline, I don't wait until the last minute.* This suggests that unlike the FGCS who identified three items as being the most difficult to endorse, the CGCS only identified one item as being the most difficult to endorse.

Gaps between the items on the variable maps suggest that the items are more appropriately spanning the students' responses within the CGCS sample than they are in the FGCS sample. This means that the CGCS are better able to order the items on a continuum while the FGCS are more likely to combine items at the same endorsability level. In other words, the CGCS may have a better understanding of how their confidences compare on one academic self-efficacy item or task in relation to another than do their FGCS peers.

While some variations are exhibited when comparing the FGCS and the CGCS item response hierarchies, they are not significantly different. The item hierarchies within the CGCS sub-samples were all relatively similar suggesting that meaningful differences in item endorsabilities were not present. The hypothesis for this research question was based upon the literature-supported assumptions that differences in academic self-efficacy exist between FGCS and continuing-generation college students. The stated

hypothesis read that survey response hierarchies would differ between first-generation and continuing-generation students and vary based upon parental levels of education. The findings of this research question did not support the hypothesis.

The second research question pertains to the pairwise DIF's that were produced based upon parental levels of education and individual item measures.

Question 2) Do levels of item endorsability vary based upon parental levels of education?

Guiding Question) Are specific survey items exhibiting differential item functioning (DIF) based upon generational status? If so, between which items and comparison groups is DIF present?

To address the second research question, a series of DIF analyses were performed to compare item difficulty measures across student groups, based upon levels of parental education. While the DIF results revealed that item endorsability (as indicated through DIF measures and DIF contrasts) varied slightly between these groups, no noticeable differences were found. The hypothesis for this research question was based upon the literature-supported assumptions that differences in academic self-efficacy exist between FGCS and continuing-generation college students. The stated hypothesis read that levels of item endorsabilty would vary based upon parental levels of education. The findings of this research question did not support the hypothesis.

An additional finding revealed that DIF was exhibited when item measures were compared within the First-Generation College Student sample based on Sex (Plot C). Items *g, j,* and *m* present noticeable DIF. Items "g", *I know how to perform well on tests* and "m", *I am very capable of succeeding at [name of institution]* are both significantly

more difficult to endorse for females than the males. Item "j", *I am not a time waster and I can do something about it [time wasting]* was significantly more difficult for the male first-generation college students to endorse as compared to the female first-generation college students. It is worth noting that noticeable DIF was not present when comparing males and females within the overall student sample. When examining self-efficacy responses in males and females, it has been found that males tend to be more self-congratulatory while females have a tendency to be modest in their self-reporting (Schunk & Pajares, 2002). Why significant differences in DIF measures would be present within the FGCS sample when comparing males and females and not in the overall sample cannot be explained. The College Self-Efficacy Instrument (CSEI) that was used by Chemers, Hu, & Garcia (2001) and Ramos-Sanchez and Nichols (2007) was not found to be sensitive to differences based upon acculturation, gender or class level (Solberg, O'Brien, Villareal, Kennel & Davis, 1993). To better understand if sex-related differences in academic self-efficacy exist within FGCS, more research should be conducted in this area.

The third research question takes the findings from this study and compares them to the findings of existing studies on first-generation college students and academic self-efficacy. This research question was exploratory in nature and therefore, a hypothesis was not formulated.

Question 3) Do the results produced from the college student survey support the existing literature on first-generation college students and academic-self-efficacy?

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Extant research that investigates self-efficacy and generational status of college students is extremely sparse (Ramos-Sanchez & Nichols, 2007) and the literature is even more limited when examining academic self-efficacy and generational status. The findings of two primary studies were used to compare the findings of the current study. Both teams of researchers, Wang and Castenada-Sound (2008) and Ramos-Sanchez and Nichols (2007) found that FGCS exhibited significantly lower levels of academic self-efficacy as compared to their CGCS peers.

As discussed in Chapter 4 of this study, while slight differences in item hierarchies and DIF measures were present based upon parental levels of education, significant differences in self-reported levels of academic self-efficacy between FGCS and CGCS were not found. This finding is encouraging as it suggests that FGCS, at this particular institution, reported that they are academically efficacious when it comes to earning a college degree. This finding does not support the findings of other research studies examining academic self-efficacy in FGCS. It would be beneficial for other studies to investigate levels of academic self-efficacy within FGCS and CGCS in order to see if the findings in this study could be reproduced.

There are several possible factors that could have influenced the discrepancy in findings between the studies. First, as mentioned previously, the research on academic self-efficacy and generational status is quite sparse. It is possible that geographic location could also impact findings as the two studies used as comparisons were both administered on the West Coast while the current study took place in the South Eastern United States. It is reasonable to conclude that student demographics vary based upon the geographic location of the institution. For example, the university in this study draws

students from rural and Appalachian communities. Cultural and familial upbringings may affect students' levels of reported academic self-efficacy.

Institutional type could also affect the findings as the study by Ramos-Sanchez and Nichols (2007) took place at a private, liberal arts institution. The study by Wang and Castaneda-Sound took place at large, competitive admissions, public institution and the current study was executed at a large, selective admissions institution. Research has found that students whose parents have high levels of degree attainment attend more academically selective institutions of higher education as compared to their FGCS peers (Pascarella, et al., 2004). This finding in institutional selectivity could suggest that the reason a difference in self-efficacy was found between FGCS and CGCS in the existing studies could be attributed to institutional type. It is possible that as FGCS tend to enroll in less academically selective institutions; they exhibit lower levels of self-efficacy on some academic tasks when they do enroll in highly selective institutions. Alternatively, it is possible that within the selective institutions, the CGCS peers are exhibiting extremely high levels of academic self-efficacy. Additional research needs to be conducted in this area in order to draw conclusions on how or if institutional type affects the academic self-efficacy of FGCS.

A final explanation for the discrepancies in findings between the current study and the two existing studies on FGCS and self-efficacy could be attributed to differences in the scales. Chapter 2 described the subscales from the College Student-Efficacy Inventory (CSEI) that were used to measure academic self-efficacy items in the studies conducted by Wang and Castenda-Sound (2008) and Ramos-Sanchez and Nichols (2007) and provided examples of items for each subscale. Both Wang and Castenda-Sound and

Ramos-Sanchez and Nichols included items from both social and course-efficacy subscales to measure academic self-efficacy. *The Survey of First-Year Students* utilized in the present study also adapted items from existing scales on course-efficacy (Chemers, Hu and Garcia (2001), including procrastination items related to academic tasks developed by Tuckman (1991). This procrastination scale was developed to measure the relationship of procrastination to self-reported measures of self-efficacy in college. Although a principal components analysis of residual correlations was performed to assess dimensionality, it is possible that the addition and omission of social and procrastination items used to measure academic self-efficacy could affect the findings. It would be valuable for future research on academic self-efficacy to include items pertaining to procrastination of academic task, course-efficacy and social efficacy.

The final suggestion pertains to the items on *the Survey of First-Year Students.* Some of the items appear to be asking students to rate their levels of confidence on more than one academic task. For example, item "a" reads, *I am good at research and writing papers* and item "i" reads, *I usually do very well in school and at academic tasks.* If students feel confident in their abilities to conduct research for a paper, but do not feel confident in their ability to write the paper, students may not know how to respond using the five-point scale and as a result, select the middle option. Researchers should also be cautious when including leading or confusing wording such as, *I am a **very** good student or I am **very** capable of succeeding* as these phrases could affect the way students interpret and respond to the item. In addition to the items on the scale, it was noticed that question #28 on the survey does not provide options for all ranges of responses.

The survey question reads as follows:

What is the highest level of education achieved by your parents? (Mark one per column for mother and father)

A   Less than high school graduate

B   High school graduate or GED

C   1 to 3 years of college or technical training

D   4-year college degree (BA, BS)

E   Master's degree

F   Ph.D., Ed.D., M.D., or J.D

Category C indicates that a student should select that response option if one of his or her parents has completed 1 to 3 years of college or technical training. However, if that student wants to respond that his/her mother has attended college for 5 years but did not earn a degree, there is no option for him/her to select as the following category, category D is listed as a four-year college degree. A more appropriate statement for category C could read, *some college or technical training, but less than a 4-year degree.* As researchers and practitioners are creating and administering surveys to college students, they are encouraged to be mindful of scale construction, item wording and appropriate and plausible response options.

Conclusion

Although the bodies of literature on first-generation college students and self-efficacy are robust, few studies explore the relationship between parental levels of education and college students' academic self-efficacy. It is well-documented in the literature that FGCS are considered a high-risk population when it comes to earning a

college degree, as students who are the first in their families to attend college are often lacking academic preparation (Hudley et al., 2009; Pascarella et al., 2004). A longitudinal study produced in partnership with the National Center for Education Statistics (NCES) and the U.S. Department of Education reported that even when FGCS successfully complete rigorous pre-college curricula (i.e. pre-calculus, calculus) they were still less likely to complete degrees than were the CGCS (Chen & Carroll, 2005).

While the literature pool of FGCS is extensive, much of the research focuses out outcome variables or descriptive statistics, such as GPA, course enrollment patterns and retention tracking and degrees awarded. This research is important as it identifies areas where future research is needed. One well-supported finding in the literature is that FGCS are underperforming in post-secondary education at rates considerably lower than their peers, (D'Allegro & Kerns, 2010; McMurray & Sorrells, 2009; Pascarella, et al., 2004; Ramos-Sanchez & Nichols, 2007). Since this finding is well-supported, as researchers, we now need to dig deeper in order to explore how these outcomes can be addressed. Examining how pedagogy and practice can be fine-tuned to best assist FGCS is one area for continued research.

Another opportunity for continued study is examining latent variables. For example, perhaps FGCS are graduating at lower rates as compared to their peers as the perceived value for earning a degree differs between the groups. One consideration is that within the FGCS population, the opportunity cost of earning a college degree outweighs the immediate prospects that a student places a greater value on, such as earning an immediate income or starting a family. As a result, these students may not be as invested in earning a degree as are their continuing-generation peers.

As researchers and administrators continue to study FGCS and degree attainment levels, utilizing research on social cognitive theory, specifically, academic self-efficacy, may be one step towards better understanding why FGCS are underperforming in college and earning degrees at levels lower than their peers. According to Albert Bandura, if an individual possesses a strong perception of self-efficacy, then he or she is more likely to establish more advanced aspirations (1993). Research studies have shown that while students with high self-efficacy levels establish greater aspirations for themselves, they also exhibit more strategic problem-solving, perform at stronger levels and are better able to gauge their performance as compared to equal ability students who have lower levels of self-efficacy (Chemers, et al., 2001). Furthermore, Schunk and Pajares (2002) reported that students who feel efficacious towards learning or performing a task tend to work more eagerly, persist at the task for longer periods of time and overall, achieve at higher levels. All of these factors can greatly contribute to the likelihood that a student will leave college having earned a degree. A better understanding of the academic self-efficacy of FGCS could enable practitioners to develop and expand programs that directly impact the degree attainment levels of FGCS. As research on the academic self-efficacy of FGCS is sparse and the findings are varied, researchers are encouraged to continue conducting research in this area in attempts to better steward resources and programming efforts geared towards increasing the degree attainment levels of FGCS.

This study encourages educational researchers to consider applying the Rasch model as an alternative to classical testing techniques when utilizing a test or a survey instrument. As demonstrated in this paper, Rasch modeling is advantageous when measuring latent variables in the social sciences as it arranges responses along a

continuum (easiest to most difficult). The capabilities of the model allow for user-friendly visual references through the use of variable maps. Researchers can use the many available outputs and tables, including the variable maps as visuals to explain their research findings to a wide array of constituents. These visuals allow researchers to conveniently identify where groups of students are falling along the item continuum and vice versa. The Rasch Model is particularly helpful in assessing the survey or test instruments as the outputs and quality measures allow for misfitting items to be readily identified. When misfitting items are identified, then researchers can fine-tune the design of the survey item by item. Furthermore, this model proves useful in pinpointing how each student is performing as compared to his/her peers and allows for patterns to be revealed.

For an example, let us say that at State College, faculty members from the College of Arts and Sciences are stating that students do not have an understanding of what constitutes academic misconduct and they are witnessing an increase in academic misconduct incidences within their classrooms and something needs to happen to stop this behavior. The department chair from the College of Arts and Sciences states that they have an existing survey that they can use and in fact, have been using to measure academic misconduct. A faculty member suggests using the same survey with Rasch modeling to survey the incoming students. The researchers quickly identify which items/behaviors the students think are the most severe form of academic misconduct, which items/behaviors the students are not sure about and which items/behaviors are the least severe form of academic misconduct by utilizing the variable maps and the ability/endorsability estimates. The researchers share these findings with the academic

Ombud, faculty members, first-year extended orientation staff and even with the conduct and judicial affairs office that oversees cases of student academic misconduct, who can then use this information to create programs. It is quickly noted that the items pertaining to technology are all falling in the middle of the student responses suggesting that students are unsure of whether using cell phones for texting in-class and looking up answers to in-class exercises are academic misconduct. The faculty then decide that based upon the initial survey, a follow-up survey will be employed specifically focusing on technology and student perceptions of academic misconduct.

As the Rasch model enables researchers to identify ordinal data from a survey instrument, the researchers are able to identify what is and what is not acceptable academic conduct based on the survey results from the students. Using classical testing techniques, the researchers were treating each survey item or misconduct behavior as interval data when in fact, the students nor the institution agree that all incidences of academic misconduct are of equal caliber. Even as the survey had been used several times in the past, incorporating the Rasch model allowed for the researchers to identify an order to the questions instead of simply treating each item as interval as they had been doing with classical techniques thus conceding that the survey instrument itself could be improved and updated. As Rasch model takes into account both the items and the individuals, more attention is drawn to the construction of the survey.

The example above outlines an additional illustration of how the Rasch model can be useful in both research design and in practice by informing programming within an educational setting. The possibilities of situations where Rash modeling can be applied in an educational setting are unlimited. While the advantages of the model have been

outlined in this study, a disadvantage of the model is that while it is widely used in psychometrics, it is not commonly employed when conducting survey research in educational contexts. This study urges educational researchers to investigate and employ the Rasch model so that in turn, the scope of education research will be strengthened.

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2009 Survey of First Year Students

Beliefs, Values and Expectations

12. Indicate how much you agree or disagree with the following statements. Remember, there are no right or wrong answers. Fill in the answer that best reflects your beliefs and values.

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
a. I am good at research and writing papers..	O	®	®	O	O
b. I needlessly delay finishing jobs, even when they're important....................................	O	®	®	O	®
c. I know how to schedule my time to accomplish tasks..	O	®	®	O	O
	O	®	®	O	O
d. I find my academic work interesting and absorbing...	O	O	®	O	®
	O	O	O	O	O
e. I know how to take notes..	O	®	O	O	O
f. When I have a deadline, I wait until the last minute......................................	O	O	O	O	®
g. I know how to perform well on tests..	O	®	O	O	®
h. I keep putting off improving my work habits.......................................	O	O	®	O	®
i. I usually do very well in school and at academic tasks.................................	O	O	®	O	®
j. I'm a time waster now, and I can't seem to do anything about it.	O	O	O	O	®
k. I promise myself I'll do something and then I drag my feet.............................	O	O	O	O	®
l. I am a very good student..................................					
m. I am very capable of succeeding a					

13. How nervous (anxious) are you about leaving home to are attend college?

O not at all nervous   ® nervous
O somewhat nervous   O very nervous

14. How often do you plan to go home on the weekends when you're in college?

O never   O every other weekend
O very infrequently   ® every weekend
® once a month   (!) I live at home

15. About how many hours per week will you be employed during your first term at UK?

O Undecided   O 6 to 10
O 0 or only   O 11 to 15
   occasional jobs   ® 16 to 20
® 1 to 5   O Over 20

16. Of all the colleges that you applied to, was UK your

O First choice
O Second choice
® Third, or less, choice

17. On a scale of 1 to 10 (i.e., 1 is impossible and 10 is absolutely certain), what do you think your chances are of earning a 3.0 GPA or better during your first year at

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

18. On a scale of 1 to 10, what do you think your chances of graduating • · within 4 years?

◁] ® Q) ® ® @ (/) ® ®

19. How concerned are you about your ability to pay for your remaining college education?

O Not concerned, I'm confident I will have enough funds.
® Somewhat concerned, I'll probably have enough funds.
® Very concerned, not sure I'll have enough funds.

20. Indicate whether each of the following will be a major source, a minor source, or not a source of funding for your college education.

(Mark one in each row)

	Major	Minor	Not a Source
a. Parents/Relatives.................................	O	®	O
b. Veteran's benefits	O	®	O
c. Educational grants (Pell Grants, FSEOG, Private Grants, etc.).................	O	O	O
d. KEES Scholarship.................................	O	@	O
e. Other scholarships (Private, Federal, College, etc.)...........................	O	O	®
f. Student loans (Perkins loan, Federal Direct loan, etc.)......................	O	®	®
g. Employment while attending college (including Work-Study)	O	O	®
h. Personal savings..................................	O	®	O

21. Do you plan to join a fraternity/sorority?
   O   no
   O   not sure
   ®   yes

22. Please indicate how important each of the following goals
    or expectations are for you in your college
    career: (Mark one in each row)   -t

                        10 '''L₃) ᵈ1-
                          ''   ''
                            Ⅲ   roo   Ⅲ
   a. To develop my intellectual capabilities.   O O ®
   b. To become a cultured person..............   O O ®
   c. To qualify for a job............................,....   O O ®
   d. To study new subjects and ideas.........   CD O ®
   e. To make new friends...........................   CD O ®
   f. To join a student organization............   CD O ®
   g. To acquire a broad general education.   CD O ®
   h. To attend athletic events.....................   CD O ®
   i. To increase my earning power in the
       job market...   O O ®
   j. To please my parents...........................   CD O ®
   k. To train for a specific career................   CD O ®

23. What is the highest degree you ultimately plan to earn?
   CD   I do not plan to complete a degree
   O   Bachelor's degree
   ®   Master's degree
   O   Professional degree (e.g., law, dentistry, medicine)
   O   Doctoral degree (e.g., Ph.D., Ed.D.)

Demographic Information

24. Your sex:
   CD   male
   O   female

25. What group do you belong to?
   O White (not Hispanic)
   O Black/African American (not Hispanic)
   O Hispanic/Latino(a)
   O Asian/Pacific Islander
   O American Indian/Alaskan Native
   ® other (specify---------

26. About how many people live in your hometown?
   ®   1,000 or less   O   20,001 to 50,000
   O   1,001 to 3,000   O   50,001 to 100,000
   O   3,001 to 7,000   O   100,001 to 250,000
   O   7,001 to 10,000   O   250,001 to 500,000
   O   10,001 to 20,000   O   more than 500,000

27. About how far is your family home
   O   less than 10 miles   O   101 to 300 miles
   O   11 to 50 miles   O   301 to 600 miles
   O   51 to 100 miles   O   more than 600 miles

28. What is the highest level of education achieved by your
    parents? (Mark one per column)

                                                         '1
   Less than high school graduate ....   O   O
   High school graduate or GED.......................   O   O
   1 to 3 years of college or technical
       training..   O   O
   4-year college degree (BA, B5).....................   O   O
   Master's degree...   O   O
   Ph.D., Ed.D., M.D., or J.D.............................   (!) O

29. What is your estimated family income?
   ® $30,000 or less   O $70,001-$80,000
   CD $3o,oo1-$4o,ooo   O $8o,oo1-$9o,ooo
   O $40,001-$50,000   O $90,001-$100,000
   O $50,001-$60,000   O $100,001-$120,000
   O $60,001-$70,000   O   more than $120,000

Thank you for completing the survey.

Office of Institutional Research

VITA

Nichole Marie Knutson

Date of birth: August 5, 1981

Place of birth: Marinette, Wisconsin

Educational institutions attended and degrees awarded

University of Kansas, Lawrence, KS
Masters Degree, 2006

University of Wisconsin Green Bay, Green Bay, WI
Bachelors Degree, 2004

Peer Reviewed Presentations

Knutson, N., Akers, K., Ellis, K., & Bradley, K. (2011). Applying the Rasch Model to Explore New College Sorority and Fraternity Members' Perceptions of Hazing Behavior. Paper presented at 2011 Mid-Western Educational Research Association annual meeting, St Louis, MO.

Bradley, K., Cunningham, J., **Knutson, N**., and Akers, K. (2011). Middle Category or Survey Pitfall: Using Rasch Modeling to Illustrate the Middle Category Measurement Flaw. Paper presented at the 2011 American Educational Research Association Annual Meeting. New Orleans, LA.

Knutson, N., Akers, K., & Bradley, K. (2010). Applying the Rasch Model to Measure First-Year Students' Perceptions of College Academic Readiness. Paper presented at the 2010 Mid-Western Educational Research Association annual meeting, Columbus, OH.

Knutson, N., Malone, D., & Bradley, K. (2010). Understanding Motivators and Barriers in the Presence of Enhanced Support of First-Generation College Students and Their Quest for Higher Education. Paper presented at the 2010 Mid-Western Educational Research Association annual meeting, Columbus, OH.

Knutson, N., & Bradley, K. (2009). Who Succeeds in College? Evaluating the Selection Instrument for a First Generation College Access Program. Poster presented at the 2009 Mid-Western Educational Research Association annual meeting, St. Louis, MO.

Service Activities

2011   Deffendall, M., Knutson, N., & Sacks, D. (2011). White Paper written and submitted for Undergraduate Education at the University of Kentucky. A Profile on First-Generation College Students at the University of Kentucky: A Focus on Retention Efforts.

2010 – 2011   President, Educational Policy Studies and Evaluation Student Group, University of Kentucky

2010   Speaker/Professional Mentor, First Scholars Retreat for the University of Kentucky

2010   Presenter/Professional Mentor, Graduate Student College Personnel Association of Kentucky (CPAK)

2009   Session Chair, Mid-Western Educational Research Association annual meeting, St. Louis, MO

Professional Affiliations

2011 - current   Consortium for Student Retention Data Exchange (CSRDE)

2011 - current   American Educational Research Association (AERA)

2009 - current   Mid-West Educational Research Association (MWERA)