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UNIVERSITY OF CALGARY

# Understanding the Successful University Student:

# Constructing the Measure of Student Success (MOSS)

by

Andrea M. Stelnicki

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE

DIVISION OF APPLIED PSYCHOLOGY

CALGARY, ALBERTA

July, 2013

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**Abstract**

The purpose of this thesis was to identify some of the more salient factors that contribute to university student success and to construct the Measure of Student Success (MOSS) as an alternative option to the instruments that are currently available to measure student success. Two manuscripts are presented. In the first, undergraduate participants at a Canadian university were recruited and asked to identify factors they believe contribute to their success while enrolled in an undergraduate program. The second manuscript uses the results from the first and a review of the literature to create and pilot test a new scale to measure university student success based on GPA. An exploratory factor analysis identified three primary factors (Future Perspectives, Student Well-Being, and Competency), with a number of subcomponents for each factor. Overall, the preliminary results evaluating the MOSS are encouraging. Finally, a model of university success is presented to assist in the conceptualization of the complex construct of student success.

**Acknowledgements**

Firstly, I would like to express the deepest appreciation to my supervisor, Dr. David Nordstokke, who has made this thesis possible. His patience, guidance and encouragement continue to be unwavering. Without his support and persistent help, this thesis would not have been possible.

I would like to thank my committee members, Dr. Randy Garrison and Dr. Kelly Schwartz, who challenged me immensely and provided recommendations for the final revision of this thesis. Additionally, I would extend gratitude to Dr. Don Saklofske who has never doubted my research projects and provided helpful suggestions throughout the entire writing process.

Finally, I would like to thank my friends, my cohort, and my family for the support and encouragement, especially over the past two years. They have stood by through the good times and the stressful times. Without you, I could never have made it this far.

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## List of Abbreviations

| Abbreviation | Definition |
|---|---|
| EFA | Exploratory Factor Analysis |
| GPA | Grade Point Average |
| MOSS | Measure of Student Success |

## Co-Authorship Statement

Chapters Two and Three of this thesis will be revised into manuscripts co-authored with Dr. David Nordstokke at the University of Calgary and Dr. Donald H. Saklofske at Western University. As the first author, I was in charge of all aspects of the project including formulating research questions, literature review, research design, and data analysis. Data for Chapter Two was collected by the co-authors prior to my entrance to the University of Calgary. I was in charge of data collection and survey design for Chapter Three. I will also be in charge of writing both manuscripts. Both co-authors contributed to the identification and design of the research projects and will assist in the preparation and revision of these manuscripts.

# Chapter One: INTRODUCTION

## 1.1 Understanding University Student Success

Understanding success amongst university students is essential for university administrators and policy makers for program development implementation. University resources are easily wasted when students who are likely to fail sit in a classroom without appropriate identification and intervention to help them succeed.

One indication of student success is institutional retention. Universities should be concerned with student retention now more than ever. Student persistence through their university program is used as a performance indicator of institutional quality (Wimhurst & Allard, 2008). This indicator is used by the funding bodies that provide the financial means for post-secondary institutions to improve their programs (Wimhurst & Allard, 2008). Alarmingly, of those who begin a university program in Canada, approximately 25% will not persist to complete a degree (Cote & Allahar, 2007). Statistics from the United States are even more disturbing: first-year student drop-out rates reach as high as 45% and on average, it takes a student six years to complete a bachelor's degree (Barefoot, 2004; Lotkowski, Robbins & Noeth, 2004). As universities and colleges experience growing cutbacks in government funding, it seems that institutions would want to aim their recruitment strategies to target students who have the best chances of success (Wimhurst & Allard, 2008). Thus, universities may benefit from the creation of a system to identify students who will be successful and students who are at risk of failing or drop-out.

Institutions could use this sort of system to identify students at two separate levels. In the first instance, students who may be successful (or conversely, at risk) could be identified prior to admission. Using this system, post-secondary institutions could isolate students who would likely not be successful at their school and decline their admission. Alternatively, students could

be identified prior to admission and be placed in a specific remediation or orientation program designed to improve a specific deficit (e.g., social integration, study skills, etc.). A promising finding is that nearly 60% of first-year students are open to receiving help that will help them succeed in university (Noel-Levitz, 2013). Thus, it seems as if the majority of incoming students would be open to additional help if their university was offering it to them.

Further, students may be identified while already undertaking their studies. That is, students who are falling behind could be provided support by academic advisors or counsellors based on their personal needs to prevent them from failing or dropping-out of their institution. Therefore, identifying students and their personal characteristics specific to their success in university is crucial for administrators and development of a system to do so is essential.

The economic consequences of post-secondary student failure are also evident. Student retention is also a priority because of increasing educational requirements for entry level positions in the workforce (Bain, Fedynich, & Knight, 2011). Institutions of higher education spend millions of dollars developing and implementing interventions and orientation programs to assist students in succeeding, yet these programs may not be helping (Robbins, Oh, Le, & Button, 2009). Reasons for these program short-comings are not clear. For example, students may only be responsive when these programs are tailored to their individual deficits (Bai & Pan, 2009). Positive consequences of identifying students at risk or with specific deficits can lead to appropriate and individualized intervention programs to meet their specific needs. Academic counsellors would also benefit from a brief, yet comprehensive screening method to pinpoint student areas of strength and weakness.

Social consequences are closely tied to the economic effects of student failure and non-completion. When students are left to fail without adequate resources, their future potential may

be limited. Because of the ever-increasing educational requirements for entry-level positions (Bain et al., 2011), students who drop-out or are asked to withdraw due to failing grades may be limited in their job prospects, income potential, and living situations. These limitations may increase stress and vulnerability to social and emotional difficulties, like depression, anxiety, and relational problems. Therefore, intervention and assistance at the beginning of a post-secondary experience (e.g., first year) can have life-long positive effects for all students. A measure of student success can assist in the identification of students at-risk of failing and provide direction for such intervention.

The format of this thesis follows the guidelines of a "manuscript-based thesis" of the Faculty of Graduate Studies at the University of Calgary. This thesis is composed of two manuscripts (Chapters Two and Three of the thesis). The first manuscript (Chapter Two) in this thesis empirically investigates the personal factors that undergraduate students believe impact their success while enrolled in an undergraduate program. The findings from this manuscript directly contribute to the second manuscript. The second manuscript (Chapter Three) uses the results of the first manuscript, in combination with the review of the literature, to create and pilot test a new scale to measure university student success. A new model of student success is presented to assist in the conceptualization of this complex construct. Finally, Chapter Four of this thesis provides an overall discussion of both findings, implications of this research, and directions for future research within the field of student success. Prior to presentation of the two manuscripts, an overall review of the student success literature is provided.

### 1.2 Literature Review

Past research in the area of student success has identified factors such as adjustment (e.g., Ostrove & Long, 2007), institutional characteristics (e.g., Lundquist, Spalding, & Landrum, 2002), personality (e.g., Bauer & Liang, 2003), self-efficacy (e.g., DeWitz, Woolsey, & Walsh,

2009), stress (e.g.,Coffman & Gilligan, 2002), alcohol use (e.g., Andersson, Johnsson, Berglund, & Ojehagen, 2009), number of classes taken (e.g., Attewell, Heil, & Reisel, 2012), and demographic characteristics as being related to the success of undergraduate students (e.g., Attewell, Heil, & Reisel, 2011). These factors, for the purpose of this thesis, are compiled into five categories (demographic and background; student behaviour; intrapersonal; interpersonal; and institutional) and will be discussed further below. Demographic and background variables refer to characteristics such as ethnicity, high school performance, gender, and financial stability. Student behaviour refers to activities related to academics, such as study skills, class attendance, and extracurricular involvement. The intrapersonal category summarizes personality factors that contribute to student success, whereas the interpersonal category examines the impact of relationships, communication, and social support on student success. Finally, institutional variables, such as resources available at the institution and teaching styles, are explored in the context of student success.

It is important to note that university, college, and post-secondary education will be used interchangeably since much of the research has been collapsed across post-secondary programs. Although this may impact interpretation from these studies as a whole (for example, by overgeneralizing across different types of institutions) it would be difficult to parse out whether the types of institutions have an impact on many of the factors under review. This is especially true when examining the personal factors involved in success, such as self-efficacy, and the reciprocal interaction between personal factors and the institution. Certain students may choose to attend specific institutions or choose specific classes. The type of institution (e.g., 2-year college, 4-year college degree program) may be better suited to specific students (Attewell et al., 2011). However, many of these factors will be invariant across the different post-secondary

contexts. Because one of the purposes of this study is to construct a model describing what makes a typical student successful, it is necessary to draw from studies involving students in all institutions. Thus, unless otherwise noted, the findings presented in this literature review may be generalized to majority of students seeking higher education.

### *1.2.1 Demographic and Background Factors*

Individual background and demographic characteristics warrant attention, since these factors have been identified in the majority of studies looking at student success. Demographic and background variables refer to individual characteristics such as ethnicity, gender, financial stability and socioeconomic level. This section also includes studies of student success that involved examining previous academic performance in high school, based on grades and college entrance exams.

Pre-college characteristics have been studied extensively. It has been demonstrated that men tend to have higher high school achievement and Scholastic Assessment Test (SAT) scores than women prior to admission into college or university (Betz, Casas, Hackett, & Rocha-Singh, 1992), scores which may later predict GPA in the first year of college directly (Gaskins, 2009; Friedman & Mandel, 2009) and indirectly (Allen, Robbins, Casillas, & Oh, 2008). High school GPA, SAT or ACT scores have failed to show a direct relationship with intent to persist in college in some studies (e.g., Pritchard & Wilson, 2003; Friedman & Mandel, 2011), but not in others (e.g., Moses et al., 2011; Friedman & Mandel, 2009). This discrepancy is not easily explainable and may stem from the different academic majors, years of study, and background variables of the participants or types of institutions under examination.

For example, in a study of a male-dominated field (i.e., engineering), women were found to have less positive outcome expectations than men (Betz et al., 1992). The same study found that high academic self-efficacy, strong past academic performance, and faculty encouragement

was predictive of GPA. The secondary finding from this study suggests that women did not feel that they received adequate support to succeed in their studies. This may be remediated with first-year programs, like the social integration program explained by Bai and Pan (2009). The purpose of this program is to increase both student-to-student and faculty-to-student interactions. This was accomplished by providing a learning community, whereby students in the program registered for a block of classes together to form a supportive peer group. Thus, students were both academically and socially connected. Female students were more responsive to this program than were male students, increasing their retention rates compared to their male comparison group (Bai & Pan, 2009). Instead, male students had higher retention rates when they attended a first year experience program, which focused on the classroom experience, including survival skills, transition issues, and personal and career development, compared to female students (Bai & Pan, 2009). Therefore, it may be important to provide tailored orientation programs for incoming students.

A recent study by Barrow, Reilly, and Woodfield (2009) found that women were less likely to fail their classes than males, and women obtained a slightly greater proportion of first class degrees than men at a four-year university. Upon closer examination of failing grades, Wimshurst and Allard (2008) found that students who received higher proportion of fails were more likely to be male, indigenous, younger, and have lower pre-college scores. In addition, men are more likely to drop out of university than women (Andersson, Johnsson, Berglund, & Ojehagen, 2009). It is unclear why males are less likely to be less successful than females. The National Survey of Student Engagement (NSSE) found that women studied 40 minutes to one hour more than men per week in preparation for their classes (NSSE, 2012). James (2002) found that girls in high school tend to look forward to their university experiences and anticipate a

supportive and fulfilling environment during their post-secondary education when compared with boys of the same age. Further, McInnis and Hartley (2002) suggested that males with lower entry scores had poorer academic outcomes and were not effective at coping with the new demands of their university courses compared to most students. More research is needed in order to determine and validate reasons, such as coping abilities, for differential success of students in higher education.

Students' financial circumstances have also been demonstrated to be predictive of retention and GPA in post-secondary education. Approximately 40% of incoming, first-generation students report that their financial problems are distracting them from their studies (Noel-Levitz, 2013). Student who receive financial support from their family and have less of a need for financial support when compared to the average financial need of students in post-secondary education tend to have higher GPAs (Gaskins, 2009). Conversely, those receiving financial aid are less likely to persist to their second year of study (Whalen, Saunders, & Shelley, 2009). Deferred fees and part-time study is also related to higher proportion of failing grades (Wimshurst & Allard, 2008). Further, students who are concerned about their finances and choose not to purchase required academic materials due to their cost believe that this concern impeded their academic performance (NSSE, 2012).

Related to financial need is socioeconomic status; however, social class background and socioeconomic status have not been found to be related to students' academic performance at college (Ostrove & Long, 2007; Gillock, 1998). Instead, socioeconomic status has been shown to be strongly related to a sense of belonging at college, which subsequently predicts social and academic adjustment to college (Ostrove & Long, 2007). Conversely, students who come from low income families often form lower expectations about their academic ability and choose to

drop out of university instead of seeking financial aid support (Stinebrickner & Stinebrickner, 2009). It may be that students who come from a lower socioeconomic background and do persist in university find a supportive environment which leads them to seek or apply for financial aid support.

Students who experience financial strain are more likely to be older, have more siblings, be married, work either full- or part-time, and less likely to live on campus (Joo, Durband, & Grable, 2008). Living on campus can enhance learning, sense of community, and engagement among students (Kezar, 2006). On-campus students, as compared to students who commute to campus, has been found to be associated with overall satisfaction of their university experience, degree attainment, and personal development (LaNasa, Olson, & Alleman, 2007; Blimling, 1989), although involvement with the campus community may be the mediating factor of this effect (Pascarella, 1984). That is, level of social integration, and not merely residing on-campus, is likely the direct influence on satisfaction with university, attaining a degree, and personal development (Pascarella, 1984).

Ethnicity and parental education have also been shown to play a role in student success in college. Interestingly, Gillock (1998) found that students of multi-generation citizenship status (that is, have been in the United States for a longer period of time) dropped out of college at a higher rate than those who were in the United States for a short amount of time. These findings may be explained by the fact that those who have come to the United States more recently may place a higher value on academics and were able to achieve a better person-environment fit. However, students who have one or both parents who have attended college persist more than those who are the first of their family to attend college (Gillock, 1998; Pritchard & Wilson, 2003; Wells, 2008; Purswell, Yazedjian, & Toews, 2008).

Other investigators have focused on specific ethnic differences. A study of educational expectations of college found the effects of perceptions of external constraints on post-secondary educational expectations while in high school may be more salient for Asian, Black and Native American students compared to Latina/Latino and White students (Museus, Harper, & Nichols, 2010). Since self-efficacy has been demonstrated to be inversely related to educational expectations (Hsieh, Sullivan, Sass, & Guerra, 2012), it follows that these students may feel less prepared to enter post-secondary education. However, students across race and ethnicities who have a strong, long-term high school peer network, with most or all of their friends intend to attend college while in high school, are more likely to persist to at least their second year of university (Wells, 2008).

Summer programs have been developed to prepare minority students for college, and have shown positive predictability in first-semester grades (Strayhorn, 2011). In addition, type of post-secondary setting may have implications on minority student success. At a two-year community college, African American and Latino students were more likely to persist than other ethnicities in the investigation conducted by Hawley and Harris (2005). However, Latino and Asian students have reported lower levels of social engagement and identification to their college (both two-year and four-year) than European-American students, indicating a possible need for programs tailored to promote engagement for certain groups of students.

### *1.2.2 Student Behaviour*

Student behaviour is strongly predictive of success in university. Student behaviour refers to activities related to academics, such as study skills, class attendance, and extracurricular involvement. Paying attention in class, procrastination, and commitment to studies are important factors to examine when understanding successful students.

One often studied student behavior, academic discipline, refers to "the extent to which students value schoolwork and approach school-related tasks conscientiously" (Allen et al., 2008, p 653). In one study, only 59% of first-year students report they have developed a system of self-discipline to keep up with school demands (Noel-Levitz, 2013). Related to this, academic optimism is defined as seeing positive academic experiences as possible and attainable (Solberg Nes et al., 2009). Academic discipline (Allen et al., 2008) and academic optimism (Solberg Nes et al., 2009) have both been shown to be positively related to having a high GPA and satisfaction with their institution. Academic optimism predicts retention indirectly through its direct effect on GPA, motivation, and adjustment (Solberg Nes et al., 2009). Those who rate themselves high in academic optimism place a high importance on goals and commitment to achievement (Segerstrom & Solberg Nes, 2006).

Students who perform well in school are most likely to stay in school and graduate (Allen et al., 2008; Zlokovich et al., 2003), and those who are highly disciplined have better first-year academic performance (Allen et al., 2008; Gillock, 1998). Thus, GPA may act as a reinforcing motivator, as GPA has found to have the largest explanatory power in student persistence (Hu, McCormick, & Gonyea, 2012) and graduation (Wintre & Bowers, 2007). Students who earn lower grades tend to overestimate their exam and course grades more than students who earn higher grades (Zlokovich et al., 2003). Further, Kennett and Reed (2009) found that students who decided not to return to university for their second year of studies have lower academic resourcefulness skills.

More recent research has focused on the relationship between passive and active procrastination and their effects on exam performance. Seo (2012) found that students who postpone their studying until the last minute because of the inability to make a decision to study

earlier (passive procrastinators) obtain lower marks than those who make an intentional decision to procrastinate (active procrastinators) the day before a test. Academic procrastination is related to poor self-regulatory skills and defensive behaviours (e.g., self-handicapping strategies; Park & Sperling, 2012). Conversely, overcommitting to school work, or working harder than what is needed for a particular task, can also be detrimental to achievement and is related to certain personality factors (neuroticism, conscientiousness, and openness; Hetlan, Saksvik, Albertsen, Berntsen, & Henriksen, 2012).

Intervention programs aimed at academic skills may enhance performance and encourage retention. In a meta-analysis of university intervention programs by Robbins et al. (2009), academic skill interventions showed the strongest effects on academic performance, and self-management and socialization interventions showed a significant effect on retention. Results from another meta-analysis showed that motivation to study and study skills predict academic performance more than any other noncognitive individual difference variable examined to date (Crede & Kuncel, 2008). Specific interventions aimed at setting personal academic goals (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010) and exam preparation and study skills (Noble, Flynn, Lee, & Hilton, 2007; Strayhorn, 2011) can also contribute to higher GPAs.

In addition, attempting a higher number of credits in the first semester of college can also set a trajectory that influences the later chances of degree completion (Attewell et al., 2012). Students who delay starting college after high school and register as a part-time student in the first semester are at risk of not completing a degree (Attewell et al., 2012). Students who do not attempt a full course load typically have other involvements to attend to, lack of volition, and difficulties in time management (Haarala-Muhonen, Ruohoniemi, & Lindblom-Ylanne, 2011).

Although teaching staff encourage students to attend class and show concern when they lack attendance, new university students may be unaware of attendance expectations (Barlow & Fleischer, 2011). The prevalence of cell phones and personal laptops in class has presented a new challenge for today's post-secondary educators and students. Even while attending class, students who are distracted by texting, searching for content unrelated to class, and social websites (e.g., Facebook) are not able to sustain attention (Wei, Wang, & Klausner, 2012) negatively affecting their GPA (Junco, 2012; Junco & Cotton, 2012). Thus, students who are not engaged in class, and subsequently not attending to the lecture material, may be setting themselves up for lower grades.

### *1.2.3 Intrapersonal Factors*

Intrapersonal factors come from within the student. Intrapersonal factors refer to personality, such as extraversion and openness, and internal characteristics, such as motivation and self-efficacy. A range of these factors have been examined in the student success literature.

Self-efficacy and self-rated abilities have been found to be significantly related to academic performance in college (Brady-Amoon & Fuertes, 2011). Students with self-rated high self-efficacy scores generally achieve higher grades and persist longer in science and engineering majors than students with low self-efficacy scores (Lent, Brown, & Larkin, 1984), but this finding was not supported amongst students in nursing programs (Peterson, 2009). Self-efficacy and positive beliefs about one's academic skills are predictive of grades, retention, and range of students' perceived career options (Lent, Brown & Larkin, 1986; Strayhorn, 2011). Similarly, self-efficacy is a significant predictor of students' purpose in life (DeWitz et al., 2009) and life satisfaction (Coffman & Gilligan, 2002), which may subsequently influence intention to persist in their program of choice.

Stress is another prominent intrapersonal factor studied in student success research. Students who drop out of university have been shown to have higher levels of stress and reported mental symptoms (e.g., depression or anxious symptoms) than those who persist (Andersson et al., 2009). Similarly, students who report lower levels of perceived stress report higher levels of life satisfaction, subsequently leading to adjustment in college (Coffman & Gilligan, 2002) and short-term academic performance (Betz et al., 1992). Self-esteem has been shown to be negatively related to anxiety and perceived school stress (Stupnisky, Perry, Renaud, & Hladky, 2011). Greater social support from friends at school can help manage academic stress (Dixon Rayle & Chun, 2007). Higher levels of stress have been shown to be associated with lower emotional regulation, stronger use of emotion-focused coping, and neuroticism (Austin, Saklofske, & Mastoras, 2010). Students with low self-efficacy are more likely to use avoidant coping strategies, rather than making active attempts to tackle the stressor directly (Hsieh et al., 2012).

Andersson and colleagues (2009) found that there were no differences in drinking patterns between students who dropped out and students who persisted in university. Specifically, hazardous levels of alcohol (e.g., alcohol disorder and high levels of estimated blood alcohol content) were not associated with drop out. However, frequency of alcohol use is significantly associated with GPA (Pritchard & Wilson, 2003), suggesting that those who drink heavily and persist in university may have worse grades than those who regulate their alcohol use.

Specific personality features have been associated with other factors directly related to student success. For example, extraversion is significantly and positively related to quality of effort put forth in personal and social activities, whereas openness to experience is significantly

and positively related to quality of effort put into academic activities (Bauer & Liang, 2003). Openness and locus of control are also correlated with retention (Moses et al., 2011). Students who are more likely to drop out typically have an external locus of control, leading to distrust of peers and a reactive attitude to self-improvement (Kingston, 2008).

Neuroticism is strongly related to stress, with higher levels of neuroticism associated with higher levels of stress (Austin et al., 2010), and therefore lower quality of effort in academic activities (Bauer & Liang, 2003). Emotional instability has a significant influence on students' thoughts and decision to leave their institution (Freeman, Hall, & Bresciani, 2007; Parker, Hogan, Eastabrook, Oke, & Wood, 2006; Gerdes & Mallinckrodt, 1994). The extension of similar findings to high school students (Hogan, Parker, Wiener, Watters, Woof, & Oke, 2010) indicates a stronger importance for early intervention.

Students' level of adjustment has been used as both a predictor and an outcome variable in student success research. In their study, Brady-Amoon and Fuertes (2011) found that self-efficacy and self-rated abilities accounted for a significant amount (25%) of variance in adjustment to college. When self-efficacy, self-rated abilities and adjustment are combined, they together account for a significant amount (15%) of variance in academic performance, with adjustment contributing the most unique variance (Brady-Amoon & Fuertes, 2011). Having a strong sense of belonging at college can also predict social and academic adjustment to college, quality of experience at college, and academic performance (Ostrove & Long, 2007), although the direction of the relationship between these variables is not clear.

In general, students who score high on measures of adjustment to college are likely to continue their education at their original institution of enrolment. However, students who have to travel further from home may have trouble adjusting to college life and may experience more

stress, making them more likely to drop out of university (Andersson et al., 2009). Adjustment may be especially difficult for students who have a strong bond to their family or home community.

### *1.2.4 Interpersonal Factors*

For the purposes of this literature review, interpersonal factors refer to relationships with others, communication, and social support from peers, family, and university personnel.

Social connectedness has shown to positively contribute to undergraduate student success and satisfaction in university or college (Allen, Robbins, Casillas, & Oh, 2008; Woosley & Miller, 2009). This finding may explain why students who have participated in a socialization intervention program tend to stay with their college (Robbins et al., 2009). Students who are involved in cocurricular activities, like student clubs and organizations, tend to have higher levels of involvement in their academic activities, suggesting that being involved in cocurriculars does not distract students from their studies (Huang & Chang, 2004). Students who join sororities and fraternities in their first year are retained to their second year at significantly higher rates than their non-Greek membered peers (DeBard & Sacks, 2011).

Increased level of social support has been shown to impact students' adjustment to university tremendously (Coffman & Gilligan, 2002). Higher levels of social support have been demonstrated to positively impact students' adjustment to the university environment (Coffman & Gilligan, 2002). Support from both family and peers have been shown to be important to student success (relationships with faculty members have also been examined and will be discussed in the following section; Purswell, Yazedjian, & Toews, 2008). For female students, perceived social support from families may be more important than the financial support they provide, compared to male students (Cheng, Ickles, & Verhofstadt, 2012). This is likely do to the use of social support as a coping mechanism when dealing with stress for female students

(Tamres, Janicki, & Helgeson, 2002). In another study, perceived social support accounted for just over 5% of variance in both male and female students' cumulative GPAs, whereas financial support from parents accounted for only 1% of the variance in cumulative GPAs (Cheng et al., 2012). Although family financial support is important for student success and continuation through post-secondary education (Gaskins, 2009), it seems as if social support from the family is more important, especially when academic activities become stressful for students.

Messages sent to students from parents can effect empowerment, motivation, and satisfaction with college (Kranstuber, Carr, & Hosek, 2012). Parents would like their children to be successful at all education levels regardless of their income level and ethnic background, although they are not always sure how to best support their children (Epstein, 1986). Parents who are judgemental and set excessively high standards may impose unrealistic expectations and perfectionism on their children (Blatt, 1995). When students perceive pressure to do well from their parents, they may only be motivated to do well when they personally desire recognition for their work by others (Mills & Blankstein, 2000). When students do not care about recognition from others, pressure from parents will not motivate them to do well and instead can have a "backfire" effect where their performance is poorer in university and the student increasingly uses maladaptive learning strategies (Brehm, 1966; Mills & Blankstein, 2000).

Students perceive their peer relationships to have a strong influence on their learning and development while in college (Bowman & Siefert, 2011), and this feeling begins in high school (Wells, 2004). Having a good, supportive friend in college allows students to feel a greater sense of mattering, which subsequently predicts lower levels of academic stress (Dixon Rayle & Chun, 2007).

University friends' retention and attrition behaviours are strongly related to a student's own retention more than other background variables (e.g., high school GPA; Eckles, & Stradley, 2012). Similarly, involvement in a peer support program improves GPA and increases the likelihood of graduating within five years of beginning a program (Noble et al., 2007). It is important to note that quality of the peer relationship is central, as conflict with a new college friend is associated with lower GPA and persistence (Swenson Goguen, Hiester, & Nordstrom, 2010). Having peers with similar academic attitudes and goals contribute to academic success and adjustment (Yazedjian, Purswell, Sevin & Toews, 2007). Sharing common interests and having a small peer group can increase feelings of support and benefit personal development (Chickering & Reisser, 1993). However, insecure or unstable relationships with peers can decrease the likelihood of seeking help from a peer and may lead to lower achievement (Larose, Bernier, & Tarabulsy, 2005).

### *1.2.5 Institutional Factors*

In addition to the previously mentioned factors, examining the institution itself can provide valuable information related to student success. Institutional factors vary from the attitude that the student has towards the institution, to how faculty members and professors communicate class expectations, to attitudes of instructors towards students.

Feelings of disconnect and disengagement from one's institution can ultimately lead to students wanting to leave school (Lundquist, Spalding, & Landrum, 2002; Allen & Smith, 2008; Harms, Roberts & Winter, 2006). Satisfaction with their institution is one of the primary influences on the decision to withdraw (Freeman, Hall, & Bresciani, 2007) or transfer (Santos Laanan, Starobin, & Eggleston, 2010). When students perceive higher levels of support from their campus, they have been found to be more likely to engage in campus activities (NSSE,

2012). Higher levels of pressure from the institution can result in lower class performance and lower satisfaction (Copeland & Levesque-Bristol, 2010).

Students expect to receive important information regarding their courses in a clear, communicative fashion from their professors (Basset & Nix, 2011). Student centeredness and instructional effectiveness are important determinants of student satisfaction (Elliot, 2002). However, informal faculty and student interactions can also influence GPA and retention (Green, 2010; Bowman & Seifert, 2011), especially first-generation college students (McKay & Estrella, 2008). Faculty members must be supportive of student needs, return calls and emails quickly and be approachable (Lundquist, Spalding, & Landrum, 2002). Students will succeed with little faculty discouragement (Betz et al., 1992) and need reassurance that support will be available for them (Barlow & Fleischer, 2011).

Despite perceiving peer support as more important, the positive effects of faculty interactions have been shown to actually be stronger and more consistent than those for peer interactions (Bowman & Seifert, 2011; Stoloff, Curtis, Rodgers, Brewster & McCarthy, 2012), although student-faculty interaction may vary by field of study (NSSE, 2012). Students who are studying education have been shown to be more engaged by their professors in their classes (e.g., by asking questions and facilitating discussions) than instructors of nursing and engineering. Faculty validation strongly predicts sense of integration into the academic community and increases students' intent to persist (Barnett, 2011). Faculty and student relationships are reciprocal. When students are polite towards professors, instructors are motivated to work with them and have higher perceptions of their students' competence and potential for success (Bolkan & Holmgrenm 2012). When students are in contact with staff regularly, they interpret their care and concern as a sign of the school's commitment to them (Schreiner, Noel, Anderson,

& Cantwell, 2011). It is important to note, however, that non-institutional influences exert a moderate effect on student success and should not be ignored by administrators (Zepke, Leach, & Butler, 2011).

### *1.2.6 Previous Models of Student Success*

One way to aid in the understanding of student success is to conceptualize the construct as a model. Few conceptual models of student success that take a comprehensive approach, such as incorporating all of the factors outlined in the literature review above, are currently available. Existing models tend to focus on academic achievement or background and demographic variables. Two of these models are presented in Kappe and van der Flier (2012) and Attewell, Heil, and Reisel (2011).

Kappe and van der Flier (2012) surveyed undergraduate students from a human resource management program to identify which factors above and beyond intelligence were most predictive of several measures of academic achievement. Academic achievement was measured in seven different ways. Five of the students' achievement variables were specific to the students' program (e.g., their participation in team projects, internship, thesis, class attendance and work, and skills important in the human resources field). Cumulative GPA and time to graduation were the outcome variables used by the authors that are more congruent with the current state of research on student success. The authors presented a model suggesting that intelligence, conscientiousness, and the motivation to study were the most predictive factors of GPA and time to graduation. Although this model uniquely incorporates personality factors and motivation to predict student success, the predictors and criteria used in the study were specific to the curriculum of the single program that students were attending. Because the participants came from a single program (human resources management), the participants and results of the study are likely to be unrepresentative of typical undergraduate students. Further, the measures

of academic achievement used in the model are not representative of the majority of university undergraduate programs. Therefore, Kappe and van der Flier's (2012) model is not generalizable to the overall student population.

Attewell, Heil, and Reisel (2011) used a nationally representative set of longitudinal data to determine the factors that were related to rates of graduation from college or university. They used 36 predictors including student demographics, high school academic preparation, non-traditional status (i.e., part-time, mature), financial aid, academic and social integration, and whether they maintained a job while in school.

There were particular factors that were more important depending on whether the student was in a two-year college or least-, moderate-, or highly-selective four-year colleges. At two-year colleges, financial aid was the largest predictor of graduating within six years; high school academic preparation and remediation classes were not significant in predicting graduation (Attewell et al., 2011). However, in least-, moderate-, and highly-selective four-year colleges, high school academic preparation was the largest predictor of graduation; race and gender were not important or significantly predictive of graduation (Attewell et al., 2011). Additionally, remediation classes were not significantly related to graduation in moderately- and highly-selective colleges, and at the most selective colleges, SES and non-traditional status were also not significant predictors of graduation (Attewell et al., 2011). The authors concluded that although there are some similar predictors of degree completion across types of institution, there is not one single dominant factor that is associated with a stronger chance of graduation, and certain factors are more predictive in certain institutional contexts. The authors neglected to investigate factors that are common across all students in all institutional settings, as discussed below. Thus, further inquiry into underlying factors that are important for all students who

intend to enter post-secondary education is warranted. To date this is the first study to estimate the effects of several major predictors in one theoretical model.

Although this study was a large undertaking with important findings, there are some limitations to the model presented by Attewell and his colleagues (2011). The authors used very specific background characteristics of students that were gathered through the Beginning Postsecondary Students Longitudinal Study (BPS; Attewell et al., 2011). As the preceding literature review revealed, additional aspects of students are important aside from their background characteristics. The model ignored students' attitudes toward their institution, their personality characteristics, and specific program of study. Further, aggregate data from an unknown number of participants were used and ages of participants were not reported, clouding the ability for the reader to interpret the results for use in applied settings. Therefore, a comprehensive model is necessary to understand successful students in higher education.

The authors used the method of sheaf variables (Whitt, 1986) to maximize the prediction of graduation. A sheaf coefficient is a weighted linear sum of several measured variables (e.g., the college integration sheaf consisted of the academic integration scale score and the social integration scale score) and is specific to one particular predictive model (Attewell et al., 2011) setting it apart from the composite scale that is created by a factor analysis. Instead, the factor analysis scale is intended to function in many different regression models and can be used without regard to the other covariates present (Attewell et al., 2011). Thus, the sheaf method is appropriate for the very contrived model introduced by Attewell and his colleagues, but would not be appropriate when attempting to combine variables into a general purpose measure of an underlying construct (i.e., student success) and factor analysis, would in fact, be more appropriate (Whitt, 1986). Attewell's (2011) model is predictive of the dependent variable (i.e.,

graduation within six years) using the specific independent variables, and is not optimal to predict other dependent variables with other constructs (Whitt, 1986). Therefore, Attewell et al.'s model (2011) is not adequate for other measures of student success and additional models of student success must be proposed and investigated.

### *1.2.7 A Proposed Model*

The literature review above presented a comprehensive review of important factors contributing to student success as operationalized by university GPA, persistence past first year, and completion. Because studies vary in their outcome measures, the factors that have been shown to be predictive vary across studies.

To summarize, past academic performance (e.g., high school average, SAT scores) has been shown to be predictive of GPA, which in turn is predictive of persistence and completion of degree. Low levels of stress have been shown to be related to life satisfaction, persistence to second year, and adjustment to college. Likely a related construct, lesser need for financial support or adequate financial resources from family have also been found to be related to GPA. In addition, positive attitudes towards academics and academic self-efficacy may predict persistence indirectly through GPA, motivation, and adjustment.

Adjustment has been used both as a predictor variable and an outcome variable in previous student success research. The literature review revealed that adjustment to life at university or college is predicted by low stress, social support from peers and families, financial support from families, life satisfaction, and self-efficacy. In turn, adjustment predicts GPA and persistence into second year. However, the variables that contribute to adjustment also directly predict GPA and persistence, so the role of adjustment in student success is still unclear. It may be that adjustment is necessary to succeed in university, or it may be that adjustment is a by-product of other important factors for success.

Connection and engagement to the school, satisfaction with the institution and support from faculty have been found to be predictive of grades and persistence, whereas social support from parents and peers has been found to be more important for persistence and adjustment in college. However, a better level of adjustment to college has been found to be directly related to higher grades in university. Finally, personality characteristics of students have also been investigated in relation to successful students. Internal sense of control, emotional stability, lower rates of procrastination and self-discipline have been shown to be predictive of higher grades and persistence.

Figure 1.1 illustrates the proposed conceptual model based on previous empirical work found in the literature. As shown in the model and explained in the previous section, a number of factors are important for student success. While this attempts to show a pictorial representation of important factors and outcome measures, this model is in no way exhaustive or complete but represents a theoretical framework for studying student success. The literature review presented above directly informed this model. Although the literature is widespread, the factors that were included have been studied extensively and appear frequently.

In this model there are three central outcome variables: (1) GPA or performance, (2) persistence past first year, (3) and graduation or completion of program as they are the most used outcome variables in the student success literature. A student's attitude towards school (e.g., academic optimism, satisfaction with institution) is an important indicator of that student's performance. Interestingly, the literature reveals that academic skills (e.g., studying, exam preparation, time management) directly contributes to a student's grades and graduation, but is not directly related to persistence past the first year of study. However, a strong performance in first year is directly related to continuing studies to the first year as well as completing the

student's program of choice. Since GPA is predictive of persistence and later graduation, it appears to be the most important variable to use as an outcome measure.

The model acknowledges many factors are important for students to be successful. Additionally, GPA appears to be the most informative outcome variable in student success research because of its relationship to other commonly measured outcomes (i.e., persistence and graduation). A model such as the one presented above synthesizes the extensive literature on student success and provides a framework for future research.

**1.3 Thesis Objectives**

The aim of this thesis is to develop a questionnaire that measures the most salient personal factors related to how a student succeeds. That is, the questionnaire will investigate what personal resources and supports students rely on during their university tenure. A review of the literature shows that past research has used many different questionnaires and measures only a few factors at a time. Further, these studies attempt to dissect the results to find the most important factor contributing to student success. This methodology leads to a lack of comparability of findings and a fragmentation in the overall understanding of student success. Subsequently, an overarching model of student success is unattainable. As Attewell, Heil and Reisel (2011) noted, there is no single dominant factor that is associated with better chances of success. Thus, the proceeding studies attempt to create a comprehensive explanation of student success using variables identified previously through structured questionnaires and undergraduate student reports of what makes them succeed in university. Further, a scale capable of measuring student performance in university students is presented.

The study presented in the first manuscript began by collecting content-related data regarding successful university experiences from the population of interest. Specifically, undergraduate student participants at a large, research-focused university were asked to provide

responses in reference to how they reach their goals and what keeps them from reaching their goals. The responses were explored using a frequency analysis. Words were analyzed for frequency and categorized into overarching themes based on conceptual relationships within each group. This approach has an advantage in that it directly examined into the population of interest and informed the next piece of the study.

The second manuscript utilizes the results of the first, a review of the literature, and the model presented above to create and pilot test a new self-report scale to measure university student success. The most frequent themes that were provided by the participants utilized in the first manuscript, in addition to prominently studied variables in the extant literature, were transformed into statements to be included in the Measure of Student Success. This scale was then administered to undergraduate students from the same institution. The purpose of developing this scale was to cluster previously identified (i.e., through the literature) and personally identified (i.e., directly from the students) variables together to understand what are the most important factors that are related to a successful university experience.

After pilot testing, the data collected from participants was analyzed using exploratory factor analysis (EFA). This investigation exposed three primary factors, with a number of important subfactors that summarize the most important variables relating to student success. In turn, a revised model of student success is presented that provides a more specific conceptualization of student success. Further, a revision of the tested scale is presented.

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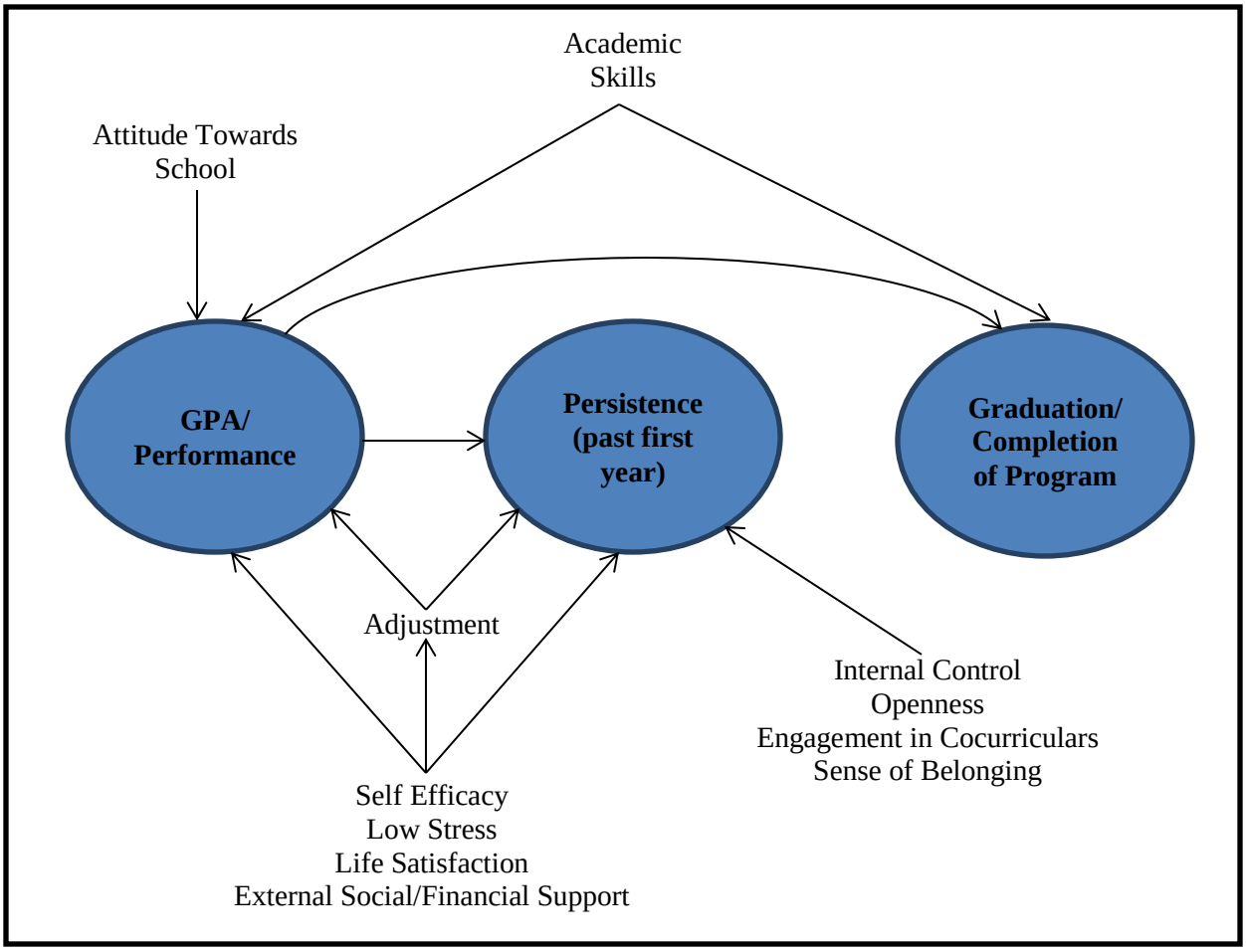


*Figure 1.1.* Conceptual model of student success; the shaded circles represent common outcome measures used in previous studies. Plain text and arrows represent factors that have been found to account for success in each outcome area.

# Chapter Two: FIRST MANUSCRIPT CHAPTER

## 2.1 What Makes a Successful University Student?

### *2.1.1 Introduction*

In today's society, there is an increasing pressure for young adults to attain post-secondary and higher levels of education. This is due in part to the ever-increasing educational requirements for entry-level positions and promotional opportunities (Parker, Saklofske, Wood, & Collin, 2009). In light of these educational demands, only about three-quarters of students attempting university in Canada follow through to completion, and only one-quarter of Canadians between the ages of 25 and 54 have university degrees (Cote & Allahar, 2007).

Transitioning from high school to college places significant, novel demands on young people (Tinto, 1993), and adjustment can be stressful for new students (Noel, Levitz, & Saluri, 1985). The necessity of higher levels of independence, initiative and self-regulation (Bryde & Milburn, 1990) can be especially difficult for those who start their new journey into university life.

University administrators and policy-makers are in need of an efficient way to identify students at risk of failing. Student persistence is frequently used as an indicator of institutional quality that is used by government bodies to provide financial means for institutions to improve their programs (Wimhurst & Allard, 2008). A system to identify of students in need of extra supports would be beneficial for program development and improvement of institutional quality ratings. For example, appropriately identifying students can lead to individualized and specific intervention programs with life-long positive consequences for all students.

The need to effectively assist students is additionally evident at the personal level. The economic and social consequences of post-secondary student failure are undeniable. Educational requirements for entry level job positions are steadily increasing (Bain et al., 2011) and

orientation programs may not be preparing students for their future university tenure (Robbins et al., 2009). Subsequently, students who withdraw from university are limited in their job prospects, income potential, and living situations. Further, by understanding the personal characteristics of success and failures of university students, academic advisors and counsellors can use an individualized approach to pinpoint student areas of strength and weakness.

Pre-college characteristics, such as high school averages and SAT scores, have been linked to college GPA (e.g., Friedman & Mandel, 2009; Gaskins, 2009) and intent to persist in post-secondary education (e.g., Moses et al., 2011). It seems obvious that student academic behaviour, such as attending class and developing effective study skills, would be strongly predictive of success in university. Academic discipline (Allen, Robbins, Casillas, & Oh, 2008), academic optimism (Selber Nes, Evans, & Segerstrom, 2009), performance (Zlokovich et al., 2003), and attempting a full-course load (Attewell, Heil, & Reisel, 2012) contribute to higher GPAs and completing a degree. Those who decide not to persist into their second year of studies and subsequently complete their programs have been shown to possess lower academic resourcefulness skills (Kennett & Reed, 2009). Those who procrastinate (Seo, 2012), have poor time management skills (Haarala-Muhonen, Ruohoniemi, & Lindblom-Ylanne, 2011) and are distracted in class (Junco & Cotton, 2012) tend to have lower grades. Specific interventions aimed at setting personal academic goals (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010) and exam preparation and study skills (Noble, Flynn, Lee, & Hilton, 2007; Strayhorn, 2011) can remediate academic behaviour and contribute to higher GPAs. Further, the interaction of each of these factors is complex and difficult to tease apart.

Institutional factors are also important to consider. Feelings of disconnect and disengagement can ultimately lead to students wanting to leave school (Allen & Smith, 2008;

Harms, Roberts & Winter, 2006; Lundquist, Spalding, & Landrum, 2002). Dissatisfaction with their institution is one of the primary influences on the decision to withdraw (Freeman, Hall, & Bresciani, 2007) or transfer (Santos Laanan, Starobin, & Eggleston, 2010). Faculty validation (i.e., when students are recognized, respected, and seen as valued by their instructors) strongly predicts sense of integration into the academic community and increases students' intent to persist (Barnett, 2011).

Internal characteristics of students are also important to post-secondary success. Self-efficacy and self-rated abilities have been shown to be significantly related to academic performance in college (Brady-Amoon & Fuertes, 2011). Many studies have focused on personality factors contributing to success. Extraversion has been shown to be significantly and positively related to quality of effort put forth in personal and social activities, whereas openness to experience has been demonstrated to be significantly and positively related to quality of effort put into academic activities (Bauer & Liang, 2003). Openness and locus of control have also been found to be correlated with retention (Moses et al., 2011). Students who are more likely to drop out typically have been shown to have an external locus of control, leading to distrust in peers and a reactive attitude toward self-improvement (Kingston, 2008). Emotional instability has also been found to be a significant influence on students' thoughts and decision to leave their institution (Freeman et al., 2007; Parker, Hogan, Eastabrook, Oke, & Wood, 2006; Gerdes & Mallinckrodt, 1994).

Another important factor related to student success has to do with the social and family support that a student receives. Higher levels of social support impact students' adjustment to university tremendously (Coffman & Gilligan, 2002). Support from both family and peers are important to student success (Purswell, Yazedjian, & Toews, 2008), and the social support from

families may be more important than the financial support they provide, especially for female students (Cheng, Ickles, & Verhofstadt, 2012).

A number of factors have been identified in the literature as being important for success in university, yet the rather large body of literature on student success has not given students the opportunity to directly report what they feel contributes to their success as an undergraduate student. Further, with all of the factors currently under examination by researchers, still much of the understanding of academic success remains unknown. Therefore, it is important to ask students directly why they are successful in an attempt to understand what is missing in the explanation of student success. This approach strengthens the validity of the results of this study and allows a more thorough understanding of the factors important for success in university for researchers in the field.

The primary purpose of this study is to explore the meanings of the personal resources students feel they use to succeed when reaching their goals and what personal characteristics or obstacles keep them from reaching their goals. Much of the literature on goal setting and university success have neglected to ask students directly what aspects allow them to achieve their goals and succeed while in university. This study is unique in that it gathers the content data directly from the population of interest. Therefore, subsequent use of the results from this study will assist researchers and post-secondary administrators in better understanding the important factors for student success.

## 2.2 Method

### *2.2.1 Participants*

Data were collected as part of a multi-year project investigating social and psychological factors that are related to university student success. The final data set used for the analyses was collected and pooled from four separate collections between 2009 and 2011. Participants were

recruited from the University of Calgary across many years of study and a variety of programs. The sample consisted of 421 male and 1006 female undergraduate students enrolled at the University of Calgary. The mean age of participants was 20.98 years old (range = 17-62 years old). The majority of the students were in their first (33.4%) or second (22.8%) year of study, with the rest of the participants in their third (15.6%), fourth (14.2%) or fifth or more (13.2%) year of study. Participants were recruited from undergraduate programs in various faculties at the university: Arts (33.2%); Science (31.3%); Business (7.4%); Kinesiology (6.9%); Nursing (6.2%); Engineering (4.8%); Medicine (4.6%); Education (1.6%); and undeclared major or no response (3.9%).

### *2.2.2 Procedure*

With permission from the instructor, research assistants presented an invitation to the study during regularly scheduled undergraduate lectures across various programs and years of study. Interested participants were asked to provide their email address to the research assistant and the online link to the survey was emailed to the student.

Self-response data from the participants was collected using an online survey host (SurveyMonkey™). Once informed consent was given by the participant, they completed a survey of background and demographic variables. They were then asked to provide five words that described themselves reaching their goals and five words that described what kept them from reaching their goals while in university. No examples or guidelines were given to the participants. They were free to provide responses as long or as short as they preferred.

### *2.2.3 Data Analysis*

To determine the number of participants who provided the same word, a frequency analysis was carried out. Counting the frequency of specific responses or words is used in qualitative methods when the frequency is important to directly answering the research question

(Krippendorff, 2013). This step provided an indication of the most important and the most common factors across participants that they felt were related to their success and failures in university. Prior to commencing analysis, data used in the frequency analysis were checked for spelling mistakes, and variations of the same word (e.g., singular and plural versions). For example, "procrastinator," "procrastination," "procrastinate," "procrastinating," "procrastinater," "procastinator," "percrastinator," "proacrastinate," "procastination," and nine other versions of "procrastinate" were grouped together. After combining misspellings and variations of words, they were analyzed for frequency using Nvivo 9 qualitative analysis software (QSR International, 2010).

The words generated by the frequency analysis were sorted into categories based on their conceptual relationships to each other by the researcher. For the current study, the words analysed by frequency were clustered into groups of relatively similar items (i.e., closely related behaviours), based on similar categories that emerge in the literature. For example, discipline, study skills and attending class were noted by some participants as important to their success. These concepts have been studied together (e.g., Allen et al., 2008; Noble, Flynn, Lee & Hilton, 2007; Strayhorn, 2011) and therefore were grouped into a general category of positive student behaviour. Setting goals, drive, and persistence were grouped together in a general category of planning for the future, similar to Solberg Nes et al. (2009) concept of academic optimism.

Q-sort methodology is a scaling technique popularized by Stephenson (1953) and is used to understand subjective phenomena from the participant's perspective (McKeown & Thomas, 1988). In using this method, a set of statements are sorted to reflect significance within a number of categories (Block, 1961). Q-sort participants were asked to review each of the word groups and produce a name for the category of words. Nineteen graduate psychology students

(16 females; 3 males) reviewed the preliminary word lists, sorted by categories, and generated a title for each. They also identified any words they thought didn't fit within the category, and whether any additional words should be included. Instructions to participants and word groups can be found in Appendix A.

**2.3 Results**

The words provided by the participants were analysed first by frequency and subsequently by category to identify patterns of responses in determining what students felt were the most important factors for reaching their goals and what factors kept them from reaching their goals.

The frequency analysis provided a number of words for each category. In total, 6446 responses were obtained when participants were asked to provide five words that help them reach their goals, and 6124 responses when asked to provide five words that kept them from reaching their goals. Participants provided 158 words that described them reaching their goals and 121 words that described keeping them from their goals.

The Q-sort resulted in 20 word clusters for ways that students reach their goals, and 19 clusters for ways that students are kept from reaching their goals. Qualitative themes and frequencies are shown in Tables 2.1 and 2.2. The frequencies provided are based on the content provided by the participants. The third column provides the percentage of Q-sort participants who clustered and labeled each category of words provided by the study participants. Not all Q-sort participants provided a name for every cluster, thus some percentages are lower than others.

The most highly endorsed words by participants in the "reach your goals" category had a future orientation focus. For example, words that belong to this theme included "determination," "focus," and "drive." The most prominent theme in the "keep you from reaching goals" category was general stress. This included items such as "no energy," "depression," and "too tired."

Generally, words that described participants keeping them from their goals were negative. However, a small number of students stated that stress (*f* = 13) and isolation from others (*f* = 4) did help them reach their goals. This is in contrast to the majority of students who stated that stress (*f* = 1182) and isolation (*f* = 176) kept them from reaching their goals.

To reach goals, participants focused on and reported more internal characteristics, with the exception of one category, external support. However, non-internal characteristics were more likely to be endorsed when asked what kept participants from their goals. These included distraction (e.g., job, other commitments; *f* = 890) and external support (e.g., pressure from parents; *f* = 197). Thus, the participants from this sample recognized their own contribution to their success and, less so, their failures.

**2.4 Discussion**

The purpose of this study was to better understand what helps and what hinders students reaching their goals while in university and to inform the comprehensive model of student success. Students were asked to indicate what helped them reach their goals and what kept them from reaching their goals. This study is unique in that it directly asked students what made them successful and what hindered their successes, something that is neglected in the student success literature. By asking university students to report what they need help with and what they currently use to help themselves, university advisors and academic counsellors can provide the directed support and assistance that at least a portion of this population requires to be successful.

Results of this study indicate that factors such as having a future orientation, persistence, and strong executive functioning skills were listed as the most important for undergraduate students to reach their goals. Stress, poor academic skills (e.g., not attending class and procrastinating), and distraction were the most salient factors that kept undergraduate students from reaching their goals.

Ideas of future orientation and persistence were supported by many of the participants, accounting for the two highest factors that students believe help them reach their goals. Students who set goals for their undergraduate experience are have a higher probability of maintaining a full course load (Morisano et al., 2010), subsequently leading to a higher likelihood of graduating with a degree.

General stress was noted by majority of the participants in the study as keeping them from reaching their goals. Stress has been shown to be negatively related to regulating emotions and focus on tasks (Austin et al., 2010), which may lead to the student neglecting to consider or revisit the goals they had originally set for themselves. In fact, students who set and reflect on their goals tend to have higher GPAs and are more likely to maintain a full course load (Morisano et al., 2010). Stress and distraction are likely to be closely related and elicit effects on each other, which likely leads to poor academic skills, such as missing classes and leaving studying or assignments to the last minute. This may explain why these three items were endorsed so highly.

Interestingly, in each set, participants provided similar themes, but words were commonly phrased in the opposite when comparing the sets. For example, some students indicated that no support from their families and too much pressure from their families impeded their success, while a healthy level of support facilitated their success. Generally, support from family and peers is related to higher levels of life satisfaction (Coffman & Gilligan, 2002), persistence (Wells, 2008), and GPA in college (Swenson Goguen et al., 2010). However, various levels of support have not been adequately explored in the literature. The findings from this study suggest that different levels of social support may have different implications for university students, especially from family. It could be that students who have no support from

their family have to find part-time or full-time employment during their education or feel alone. Alternatively, students who feel like their families are over-involved could feel pressure to take classes to satisfy their parents, are constantly reminded about their school, and work at a level that is detrimental to their success in an attempt to appease. Students who have a healthy level of support from their family likely feel autonomous, but still have someone to turn to in times of emotional and/or financial need, therefore increasing their chances of success.

Results also indicate that some of the factors that kept students from reaching their goals are negative dimensions of the same factor that helped them reach their goal. For example, participants endorsed motivation, ability, and interest in their studies as helping them reach their goals, whereas being unmotivated, being average (or less intelligent) and disinterested in their studies kept them from reaching their goals.

The factors identified by the students in this study do not fully overlap with the factors in the literature. For example, the category most endorsed by students contributing to reaching their goals was having a future orientation, which included factors such as determination and focus. These factors have not specifically been identified in previous studies. However, the literature tends to focus on more general categories like motivation, attitude, academic skills, and external support, which were endorsed by the participants of this study. Thus, there appears to be room to expand what is currently being measured in the field of student success.

The results of this study catalyze a number of directions to better understand how students reach their goals, and subsequently succeed during their university studies. These categories can be used as a guideline by academic advisors and counsellors to pinpoint the area of difficulty when students present academic concerns to them. Further research should compare

university administrators' and advisors' perceptions of how students are successful in university. If disconnect is apparent, student services could be ineffective and costly for institutions.

The results of this study have implications for researchers, policy makers, educators, advisors, and university administrators. The results of this study will inform researchers with valuable information about the nature of the constructs related to student success. Some differences, such as level of support by parents (i.e., no support, healthy levels of autonomy, control), have not yet been studied in the literature. The results provide direction for researchers with a level of ecological validity that has been neglected in previous research.

The information obtained in students' own words can provide academic support staff (e.g., counsellors and advisors) with appropriate knowledge to adequately support students in university. Further, gaining this knowledge will assist academic advisors and counsellors in assisting students by focusing on the students' greatest challenges and utilizing their identified strengths to build capacity. University administrators can benefit from these results by moving toward a better understanding of student success, which will subsequently increase student retention. The results of this study present a contextual understanding in that students provided responses to reaching their goals and failing to reach their goals within the post-secondary education setting.

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Table 2.1

*Themes compiled from participants when asked to list five words that described them reaching their goals.*

| **Reach Your Goals** | *f* | Endorsed by Q-sort participants (%) |
|---|---|---|
| Future orientation *(e.g., determination, focus, financial security)* | 1325 | 47.4 |
| Persistence *(e.g., hardwork, dedication, effort)* | 1085 | 47.4 |
| Executive functioning *(e.g., time management, planning, preparation)* | 605 | 73.7 |
| Motivation *(e.g., eagerness, initiative, risk-taking)* | 517 | 57.9 |
| Ability *(e.g., intelligence, good memory)* | 561 | 63.2 |
| Attitude *(e.g., optimism, enthusiasm, happiness)* | 335 | 31.6 |
| Positive characteristics *(e.g., trustworthy, friendly, kind)* | 315 | 31.6 |
| Academic skills *(e.g., studying, attending class, detail-oriented)* | 291 | 21.1 |
| External support *(e.g., encouragement, receiving help)* | 289 | 52.6 |
| Self-care *(e.g., healthy, low stress, sleep)* | 238 | 47.4 |
| Interest *(e.g., curiosity, inquisitive)* | 211 | 10.5 |
| Internal control *(e.g., confidence, belief, pride)* | 157 | 31.6 |
| Adaptability *(e.g., flexibility, resiliency)* | 138 | 47.4 |
| Anxiety *(e.g., responsibility, guilt, fear)* | 136 | 21.1 |
| Community *(e.g., engagement, involvement, leadership)* | 87 | 42.1 |
| Effective communication *(e.g., good listener, assertive)* | 72 | 47.4 |
| Awareness *(e.g., observant, aware, reflective)* | 40 | 15.8 |
| General stress *(e.g., no sleep, high stress, concern)* | 26 | 15.8 |
| Luck | 13 | 26.3 |
| Withdrawal *(e.g., isolation)* | 4 | 47.4 |

Table 2.2

*Themes compiled from participants when asked to list five words that described keeping them from their goals.*

| **Keep You From Goals** | *f* | Endorsed by Q-sort participants (%) |
|---|---|---|
| General stress *(e.g., stress, tired, no energy, depression)* | 1182 | 26.3 |
| Academic skills *(e.g., low grades, procrastination, late)* | 935 | 21.1 |
| Distraction *(e.g., other commitments, distraction, job)* | 890 | 36.8 |
| Executive functioning *(e.g., overworked, time management, inefficient)* | 526 | 31.6 |
| Persistence *(e.g., lacking effort, lazy, quitter)* | 470 | 21.1 |
| Anxiety *(e.g., uncertain, holding back)* | 351 | 10.5 |
| Self-deprecation *(e.g., self-doubt, self-defeating, overconfident)* | 269 | 47.4 |
| Negative characteristics *(e.g., judgemental, conflict, impatient)* | 261 | 36.8 |
| Interest *(e.g., dislike, broad interests)* | 247 | 15.8 |
| Future orientation *(e.g., no direction, no focus, high expectations)* | 214 | 26.3 |
| External support *(e.g., no support, pressure, dependent)* | 197 | 31.6 |
| Withdrawal *(e.g., isolation)* | 176 | 36.8 |
| Motivation *(e.g., unmotivated, unwilling)* | 158 | 57.9 |
| Ability *(e.g., bad memory, average student, overthinking)* | 152 | 52.6 |
| Attitude *(e.g., negative, easygoing)* | 137 | 31.6 |
| Self-care *(e.g., balanced life)* | 44 | 26.3 |
| Communication skills *(e.g., passive, communication)* | 30 | 26.3 |
| Novelty *(e.g., inexperience, immature)* | 29 | 31.6 |
| Rigidity *(e.g., unadaptive, uncreative)* | 25 | 47.4 |

# Chapter Three: SECOND MANUSCRIPT CHAPTER

## 3.1 Constructing the Measure of Student Success (MOSS)

### *3.1.1 Introduction*

Factors contributing to student success have been explored and measured in a number of different ways. Past research has identified adjustment (Andersson, Johnsson, Berglund, & Ojehagen, 2009), social connectedness (Allen, Robbins, Casillas, & Oh, 2008), self-efficacy (DeWitz, Woolsey, & Walsh, 2009), academic optimism (Solberg Nes, Evans, & Segerstrom, 2009), stress and alcohol use (Andersson et al., 2009), personality characteristics (Bauer & Liang, 2003), along with demographic characteristics (Attewell, Heil, & Reisel, 2011) as important factors related to success of undergraduate students. One prominent feature absent from current student success literature is the use of a single tool to measure and conceptualize an overarching model of student success. The purpose of this study is to develop a questionnaire that can be used to measure factors related to university success.

Individual background and demographic characteristics have been studied extensively. Betz, Casas, Hackett, and Rocha-Singh (1992) demonstrated that men have higher high school achievement and Scholastic Assessment Test (SAT) scores than woman prior to university admission. These scores may later predict GPA in first year of college both directly (Gaskins, 2009) and indirectly (Allen et al., 2008). Once in a post-secondary institution, however, it has been found that women are less likely to fail their classes than males and obtain a slightly greater proportion of first class degrees than men (Barrow, Reilly, & Woodfield, 2009).

Social class and socioeconomic status have not been found to be related to academic performance in college (Ostrove & Long, 2007). However, sense of belonging at college, and subsequently social and academic adjustment to college are significantly related to socioeconomic status (Ostrove & Long, 2007). Similarly, students from low income families

often form lower expectations about their own academic ability and choose to drop out of university instead of seeking financial aid (Stinebrickner & Stinebrickner, 2009). Students across race and ethnicities who have strong, long-term high school peer networks, with most or all of their friends intending to go to college, are likely to persist in university (Wells, 2008).

Students who are academically disciplined (Allen et al., 2008), place high importance on goals and commitment to achievement (Segerstrom & Solberg Nes, 2006), and have higher academic resourcefulness skills (Kennett and Reed, 2009) are likely to persist in university and attain higher grades. Similarly, intervention programs aimed at academic skill improvement have been shown to enhance performance and encourage retention (Robbins, Oh, Le, & Button, 2009).

Specific personality features have also been studied in relation to success in university. Students who rate themselves high in extraversion and openness are likely to put forth more effort into personal, social, and academic activities (Bauer & Liang, 2003). However, neuroticism has been found to be strongly related to stress, with higher levels of neuroticism associated with higher levels of stress (Austin, Saklofske, & Mastoras, 2010), and therefore lower quality of effort in academic activities (Bauer & Liang, 2003). Further, students who rate high on openness and have an internal locus of control have been shown to have higher retention rates (Moses et al., 2011).

Students can also be successful in higher education when they have adequate social support from their families and peers (Coffman & Gilligan, 2002; Purswell, Yazedjian, & Toews, 2008). Improvement in a peer support program improves GPA and the likelihood of graduation within five years of beginning a program (Noble, Flynn, Lee, & Hilton, 2007). Specifically, sharing common interests and having a small peer group has been shown to

increase feelings of support and benefit personal development while in university (Chickering & Reisser, 1993). Female students' perceptions of social support from their family has been shown to be more important than the financial support they provide, compared to male students (Cheng, Ickles, & Verhofstadt, 2012). Further, in a study by Cheng et al. (2012), perceived social support accounted for just over 5% of variance in both male and female students' cumulative GPAs.

Over 1500 universities and colleges in Canada and the United States have used a large-scale measure, the National Survey of Student Engagement (NSSE) to assess the amount of time and effort students put into their studies and how their institution provides resources and learning opportunities to their students (NSSE, 2013). The results provided by the NSSE to the institution indicate how undergraduates are spending their time and what they gain while attending the institution (NSSE, 2013). A survey of this magnitude can provide valuable information to administrators about where to best spend limited resources, what policy changes need to be made, and how to improve teaching and engagement in the classroom. However, information at the individual student level is neglected. That is, a survey of this type cannot identify individual students who are at risk of failing and who might benefit from additional supports. Alternatively, post-secondary institutions could employ professional consulting companies, such as Noel-Levitz, to investigate individual student strengths and weaknesses and provide reports on how best to assist these students. In spite of the availability of such services, institutional administrators would need to spend a significant amount of financial resources in order to get these types of services (see https://www.noellevitz.com). Administrators would benefit from a more cost-effective, wide-scale screening method to address students at risk of failing.

Studies to date have utilized many different questionnaires, often focusing on only a few factors at a time. For example, self-efficacy has been measured using the College Self-Efficacy

Inventory (CSEI; Solberg, O'Brien, Villareal, Kennel & Davis, 1993) in many studies of student success (e.g., Gore, 2006; Boswell, 2012). Similarly, adjustment to university has been measured using the Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1989) in Schnuck & Handal (2011) and Brady-Amoon & Fuertes (2011) among others. Although these studies examine different moderating or mediating variables (i.e., self-efficacy and adjustment), they are attempting to measure the same underlying concept or outcome (i.e., student success).

Alternatively, researchers sometimes create their own scales for the factors they are attempting to measure. For example, Bowman and Seifert (2011) asked students to identify how important it was for them to be involved politically and socially in their communities, their openness to cultural diversity, and the extent to which they enjoy being challenged to measure what they call "values and attitudes toward life" (VATL). The 14-item scale VATL had an internal consistency of $\alpha = .84$ (Bowman & Seifert, 2011), but no other psychometric properties of the scale were reported. The lack of reported psychometric evidence limits the utility of this scale in future studies and does not allow consistency in measuring values and attitudes across researchers.

Using different questionnaires and focusing on a few factors at a time will limit any progress toward a more broad explanation of success to inform appropriate intervention programs and identify students at-risk on a grand level. Identification of the most salient factors and creation of a scale measuring only the most important factors to identify students who are the most at risk for failure and who are likely to be successful is imperative to meet the increasing demands of the skilled workforce. A scale of this nature would have immediate utility within academic counselling or advising offices and admissions offices. Students who are at risk of failing could be provided with tailored supports based on their strengths and weaknesses to

prevent them from failing or dropping-out of their institution. Admissions offices could also use such a scale to place students in specific intervention or orientation programs, or as a system to identify and decline admission to students who will not be successful at their institution.

Therefore, the purpose of this study is to develop a questionnaire that can be used to measure factors related to university success. Using the responses provided previously by university student participants and factors studied in the literature, items were developed to measure and predict GPA, resulting in the Measure of Student Success (MOSS).

## 3.2 Method

### *3.2.1 Participants*

One hundred and seventy four University of Calgary undergraduate students participated in this study (71.3% female, 28.7% male). Respondents had a mean age of 20.08 years old (*SD* = 3.39 years) and the majority were full-time students (96.1%), in their first (33.1%) or second (32.6%) year of studies, and in the Faculty of Arts (48.3%; see Tables 3.1 and 3.2). Almost all of the participants reported their primary language spoken was English (94.4%). Other primary languages of participants were Chinese/Cantonese (1.7%), Spanish (1.2%), Korean (1.1%), Bangali, Malayalam, or Punjabi (.6% each).

Participants indicated their partnership status and current living situation. Approximately 75% of participants indicated they were single (75.3%), 2.8% indicated they were married, 5.6% of respondents indicated they were in a domestic partnership, and 16.3% of participants did not respond. Majority of participants indicated they live at home with their parents (66.3%). The remaining participants reported that they live with roommates (19.1%), alone (5.1%), or did not provide a response (9.6%).

Further, participants were asked to report their parents' highest level of education. Participants indicated that their mothers had a university degree (37.6%), high school diploma or

GED (17.4%), some college or university (14.0%), graduate degree (e.g., Master's, PhD; 11.2%), two-year diploma (9.0%), less than high school (5.6%), trade school (2.8%), or a professional degree (e.g., MD, LLB; 1.7%). Participants indicated that their fathers had a university degree (29.8%), high school diploma or GED (20.8%), a graduate degree (14.6%), less than high school (9.0%), two-year diploma (7.9%), some college or university (6.7%), trade school (6.2%), or a professional degree (5.1%).

### *3.2.2 Measures*

#### 3.2.2.1 Demographic and Background Variables

Participants were asked to report their gender, age, partnership status (e.g., single, married), current living situation, and languages spoken. Consistent with other studies examining student success, participants were asked to report their parents' highest levels of education. Participants were further asked to report their current GPA, if they believe they will graduate with a degree, and whether they will graduate with that degree "on time" (i.e., in four years for most programs or five years for combined degrees or degrees with a cooperative learning component). For classification purposes, students were asked to state their student status (e.g., full-time or part-time), their year of study, and their current faculty of study.

#### 3.2.2.2 Test construction

The scale that was constructed to measure student success has an advantage in that it has both an empirical and a theoretical basis. The construction of the scale began with the results of Stelnicki, Nordstokke, and Saklofske (manuscript in preparation; see Chapter Two). The most frequent categories and items based on the content analysis were included as latent factors to be measured in the scale. Participants in Stelnicki et al (manuscript in preparation) were asked to provide words that described them reaching their goals. Most frequently, participants stated that factors such as having a future orientation, persistence, and strong executive functioning skills

(e.g., time management, organization) were important in reaching their goals during university. In contrast, students indicated that stress, poor academic skills (e.g., not attending class and procrastinating), and distraction were the most important factors that kept them from reaching their goals.

In addition, a literature review of the factors contributing to and the conceptualization of student success was conducted to provide more information and ensure that significant contributors or competencies were not excluded from the final scale. Therefore, this study strategically and valuably utilized empirical data from the population of interest and combined it with existing literature to inform the resulting model.

Items for the scale were written based on Stelnicki and colleagues (manuscript in preparation) and the model developed from the literature review. Words that were most frequently used by participants, and therefore included in the scale, were: determined, hard worker, intelligence, motivation, organized, perseverant, focused, support from family and/or friends, dedication, driven, optimistic, passionate, persistence, ambition, interest in studies, attending class and study skills, good professors, religion or spirituality, pressure, perfectionism, balancing life and school, getting sleep or being tired, laziness, distraction, time management and staying organized, anxiety, social isolation (e.g., keeping to self), being overwhelmed or overworked, uncertainty or being scared about future, having high expectations, putting in effort, being critical or too hard on oneself, working a job in addition to going to school, maturity, responsibility, disciplined, and challenged. The following additional factors were chosen from the literature review for inclusion into the scale: setting goals, institutional resources, stress, financial concerns (e.g., debt or student loans), and self-esteem.

The word list generated by the empirical study (Stelnicki et al., manuscript in preparation) and theoretical review were transformed into short phrases that would be rated on a five-point Likert scale. To accomplish this, a list of the adjectives generated in Stelnicki et al. (manuscript in preparation) was compiled. To transform adjectives into statements, items were generally written so that phrases began with "I am…" or "I have…" as opposed to "I feel…". This strong wording was used intentionally to avoid ambiguous interpretation by participants and encourage participants to avoid neutral responding (Pett, Lackey & Sullivan, 2003). It was thought that using robust language would prevent students from choosing the neutral option in their response and increase variability of responses (DeVellis, 1991). Following Pett et al.'s (2003) guidelines for developing items, all statements were kept simple, clear, direct, in the present tense, and unambiguous. In addition, constructs that were deemed important and relevant in the previous student success literature, but not included in the list of participant-provided adjectives, were included. For example, self-esteem has been previously researched as important for managing stress (e.g., Stupnisky et al., 2011), but was not specifically endorsed by participants in Part I. Therefore, it was included and was transformed into the statement "I have high self-esteem." In total, 50 items were generated (Appendix B).

Participants were instructed to choose one of the following responses: 1 (Not At All Like Me/Never True); 2 (Not Really Like Me/Seldom True); 3 (Neutral); 4 (Somewhat Like Me/Often True); and 5 (Very Much Like Me/Always True). Likert scales are commonly used to measure attitudes and agreement of respondents to declarative statements (Clark & Watson, 1995). The anchors (i.e., Not At All Like Me/Never True and Very Much Like Me/Always True) were chosen because of their absolute wording. The labels for the scale steps in between the anchor points were worded such that there were equal intervals between each response option, as

suggested by DeVellis (1991). As being forced to make a choice regarding their attitudes can cause frustration for participants (Pett et al., 2003), a neutral midpoint response was included in the even that participants were truly undecided. Although including a midpoint can provide an "easy way out" for unmotivated or passive respondents, a midpoint can enhance the psychological accuracy of scales when respondents are genuinely-neutral regarding a specific item (Furr, 2011).

### *3.2.3 Procedure*

Professors in various faculties at the University of Calgary were contacted by email to see if they would allow the primary researcher to invite students to the study during the first few minutes of their regular lecture time. After a brief introduction to the study, potential participants were invited to provide their email addresses on a sign-up sheet and were sent the link to the online survey later the same day. After the invitation was sent, the list of email addresses was destroyed to protect the privacy of the participants.

All participants indicated their consent to participate in the study by reading the letter of information at the beginning of the online survey and proceeding to the survey questions (see Appendix B). Participation by students was completely voluntary and students were able to withdraw from the study at any time by ending the survey. Participants were required to enter their email address at the beginning of survey if they wished to be entered into a draw to win a $25 gift card from the University of Calgary bookstore. However, participants' email addresses were not linked to their survey data and were destroyed immediately after the draw.

### *3.2.4 Data Analysis*

To determine whether significant differences emerged on the MOSS items between male and female participants, a series of independent samples t-tests were conducted. A series of one-way analyses of variance (ANOVA) were used to determine whether there were significant

response differences across years of study (1st year, 2nd year, 3rd year, 4th year, and 5th year or higher) on the MOSS items. Both sets of tests used a Bonferroni adjusted alpha level of .001 per test to account for multiple comparisons.

Exploratory factor analysis (EFA) was used to identify the factor structure of the MOSS. No specific factor structure was hypothesized based on the previous literature. Principle axis factoring extraction with direct oblimin rotation was performed through SPSS, using a delta value of -.15, on the 50 items of the MOSS. A direct oblimin rotation was chosen because of the nature of the constructs making up the proposed scale. This rotation allows for correlation among the factors and it is likely that the items that were included in the scale have an underlying correlation with each other. This method of rotation allows simplification of factors by minimizing the cross-products of factor loadings and presents a clearer understanding of the items that make up each factor (Tabachnick & Fidell, 2013).

Delta values are typically chosen by trial-and-error and there are no definite guidelines to choosing how large a delta value should be in the literature (Pett et al., 2003). As positive delta values increase, so does the magnitude of correlation among the factors; conversely, magnitude of correlation decreases as delta values become more negative (Pett et al., 2003). A delta value of -.15 was chosen to decrease the magnitude of correlation between the factors of this scale. Factor correlations between extracted factors are shown in Table 3.3.

Based on the results of the EFA, items that had weak factor loadings were to be removed from the MOSS or reworded to be more specific or pertain only to the school setting. Items on the MOSS were considered to be poor when they had factor loadings of less than approximately |.40| or because they loaded very low across multiple factors, indicating they are highly correlated to a number of constructs. These items were omitted from the revised version of the

scale. Some items were reworded to have a school focus and direct future participants to be in a school mindset while answering the items. Further, some items were reworded positively or negatively to fit better within their subfactors and eliminate the need for reverse coding within scales. Removal and revision of these items resulted in a revised version of the MOSS that will be analyzed for its psychometric properties in a future study. Specific examples of the revision process are discussed below.

Finally, reliability analysis was conducted on the MOSS. Internal consistency using Coefficient alpha is the most commonly used method for assessing the reliability of a scale (Price & Mueller, 1986). Nunnally (1978) suggested a Coefficient Alpha of .70 or higher in exploratory measures is indicative of strong item covariance. Internal consistency was calculated for the overall scale and each subscale in the MOSS.

## 3.3 Results

### *3.3.1 Descriptive Statistics*

Participants reported a mean GPA in their previous semester of 3.245 (*SD* = .719; range = 0.0-4.0). They were further asked to report whether they believe that they will graduate from university with a degree and whether they believe they will graduate with a degree on time (i.e., four years). Almost all of the participants indicated they thought they would graduate with a degree (*n* = 176, 98.9%). However, only 51.7% of students indicated that they thought they would obtain their degree within four years (*n* = 92).

A Spearman's Rank Order correlation was run to determine the relationship between the MOSS total and scale scores and participants' reported GPA on a 4.0 scale. GPA was not found to be significantly correlated to any of the MOSS total and scale scores. Correlations are found in Table 3.4.

### *3.3.2 Independent Samples t-Tests and One-Way ANOVA*

Independent samples t-tests were conducted to compare the responses on the MOSS items between male and female participants. Results of the t-tests indicated that none of the MOSS items had significantly different mean responses between genders using the Bonferroni adjusted alpha of .001. A series of one-way ANOVA were conducted on participants' ratings of the MOSS to determine if differences existed in their responses depending on which year of university of study they were in. Again, none of the responses on the MOSS differed significantly across year of study using the Bonferroni adjusted alpha of .001. Means for each MOSS item by gender and year of study are shown in Table 3.5.

### *3.3.3 Exploratory Factor Analysis*

With no restrictions on the number of extractions, ten factors with eigenvalues larger than 1 were initially extracted in the exploratory factor analysis. Upon closer examination of the scree plot and table of eigenvalues, it was shown that items loaded onto three primary factors with four subfactors under Factor 1, three subfactors each under Factor 2 and Factor 3. The three factors on the MOSS for this sample are (1) Future Perspectives (Internal Drive; Enthusiasm; Actively Working Towards Future; Uncertainty); (2) Student Well-Being (Negative Reaction; Critical Self-Appraisal; School-Life Balance); and (3) Competency (Academic Efficacy; Readiness; Engagement).

Factor 1 (Future Perspectives) explained 26.39% of the variance in the factor structure ($\lambda$=13.194). Factor 2 (Student Well-Being) explained 10.98% of the variance ($\lambda$ =5.482) and Factor 3 (Competency) accounted for an additional 6.31% of the variance ($\lambda$=3.154). Items and factor loadings are shown by factor and subfactor in Table 3.6. Absolute factor loadings less than .30 are hidden in the table.

### *3.3.4 Reliability*

The MOSS as a whole had an acceptable level of internal consistency, with a Coefficient Alpha of .85. When poorly performing items (discussed below) were removed from the reliability analysis, Coefficient Alpha increased to .86. The reliability coefficients for the total scale and subscales are shown in Table 3.7. The mean inter-item correlations ranged from r = |.00| to r = |.73|. Item-total correlations are shown in Table 3.8.

## 3.4 Discussion

The purpose of this study was to construct a scale intended to measure and predict student success in university students. The scale items were both theoretically and empirically based, drawing from both factors identified as important for a successful university experience in previous literature and from qualitative responses directly from current undergraduate students, as reported in Stelnicki, Nordstokke, and Saklofske (manuscript in preparation; see Chapter Two).

The preliminary version of the MOSS did not produce significant correlations between the MOSS total and scale scores and student's reported GPA from the previous semester with the current sample, although the Competency scale was marginally negatively correlated with GPA. Therefore, the MOSS may be predicting something other than GPA, such as persistence or graduation, as will be discussed in the Limitations section below and will be explored in future studies.

The preliminary version of the MOSS provided a basis to examine and predict what characteristics make students successful in university. Following the pilot testing, the MOSS was revised to eliminate nonsignificant items and include reworded items to be more specific to the school setting, presumably eliciting the respondent to think only about school in their responses.

Interestingly, factors that are prominently studied and that have been demonstrated to be significantly predictive of student success in the existing literature did not have high loadings on any of the factors. These items were social support ("I have support from my friends and family"), institutional factors ("My university provides me with adequate support and resources"), and financial resources ("I have too much debt" and "I have a job that requires me to work many hours outside of schoolwork").

In addition, support from parents, friends, and the university did not contribute to any of the extracted factors. Students who have social support from their friends and family can manage the stresses of university (Dixon Rayle & Chun, 2007; Purswell et al., 2008), leading to adjustment in college (Coffman & Gilligan, 2001) and better academic performance (Betz et al., 1992). Similarly, faculty interactions with students (Bowman & Seifert, 2011) and supportive institutions can influence GPA and retention for institutions (Green, 2010). However, it may be that the relationship between these factors and success is indirect and therefore social support from friends and family and a resourceful university were not large contributors to the MOSS factor structure.

Students who possess a large amount of debt, receive financial aid, or come from lower income families are less likely to have higher GPAs and persist past their first year of study (Gaskins, 2009; Whalen, Saunders, & Shelley, 2009). It was expected that financial concerns or financial stability would have loaded on the Competency factor, likely under the Readiness subfactor, or on a factor of its own because of its implication for continuing in post-secondary education; that is, finances must be available to persist past second year. Students who defer fees or undertake part-time study are likely to have a higher proportion of failing grades (Wimshurst & Allard, 2008), therefore it was expected that students who rated themselves high on this item

(i.e., they are in debt or have to work a part- or full-time job while going to university) would have had explained reasons for not succeeding in university. An alternative explanation could be that the sample of participants included in this study does not view financial constraints as detrimental to their ability to achieve higher grades. The following section of the discussion will summarize the revisions that were made to the MOSS based on the findings of this study.

### *3.4.1 Scale Revision*

It should be noted that items making up Factor 1 loaded onto the main factor and were subsequently placed into subfactors based on their theoretical relationships with each other. For example, Factor 1 had a number of strongly loaded items. However, "I am motivated," and "I am driven," are more conceptually related to each other than "I am uncertain," and "I am scared." The latter two statements were conceptualized into an "Uncertainty" subfactor, whereas the former two statements were placed into the "Internal Drive" subfactor. In contrast, three of the initially extracted factors were combined into Factor 2 and an additional three extracted factors were combined into Factor 3. Items that were determined to be poor items (shown in Table 3.5) and subsequently eliminated from the scale are noted in the table, but their loadings are not included.

Items were deemed to be poor if they loaded across many factors or had factor loadings of less than |.40|. The poor items were items 8 (I have support from my friends and family), 11 (I am optimistic), 17 (I have strong academic skills), 20 (My university provides me with adequate support and resources), 21 (I am religious and/or spiritual), 28 (I consider myself to be lucky), 31 (I am lazy), 32 (I am distracted), 35 (I have too much debt), and 46 (I have a job that requires me to work many hours outside of schoolwork). By deleting these items, the scale becomes more focused on the internal characteristics of the students in the sample and avoids measuring the

external supports that students believe are available to them. However, as discussed below, this may have lead to construct underrepresentation.

Some of the items were reworded to focus specifically on school or their future studies. For example, item 1 was reworded from "I am determined" to "I am determined to do well in my studies." Rewording to include a specific situation for each item allows the scale to be more sensitive to the students' ideas towards school. Other items that were reworded for more specificity were items 4, 7, 9, 10, 12, 14, 22, 30, 36, 40, 41, 42, 43, 45, and 50. In addition, item 6 (I am perseverant) was rewritten to include a qualifying example (i.e., I don't give up easily, even when things are difficult) to assist in understanding of the statement.

Finally, to fit within their subfactors and eliminate the need for reverse coding of items, five of the items in the scale were reverse worded; that is, they were reworded from a positive statement (e.g., I live a balanced life) to a negative statement (e.g., I do not live a balanced life) or vice versa. Items that were reverse-worded were items 24, 25, 33, 38, and 39.

Items 2, 3, 5, 13, 15, 16, 18, 19, 23, 26, 27, 34, 44, 47, 48, and 49 were unchanged. Item 37 was split into two items ("I like to keep to myself," and "I am not very social"), but the original wording remained intact. With the addition of newly reworded items and the omission of poor items, the revised scale consists of 48 items. The entire revised scale can be found in Appendix B.

The poor items (8, 11, 17, 20, 21, 28, 31, 32, 35, and 46) that were removed seemingly remove external supports and resources out of the model of student success. Although it is likely that these are factors that do affect a student's success in some way, the resulting items focus on the internal characteristics of the students in the sample and avoids measuring their available external supports. However, the removal of these items may lead to what Messick (1989) terms

"construct underrepresentation." This term refers to the inability of tests to access every attribute of a particular construct. It is likely that some important features are left out. Although these items were thought to assess important factors as demonstrated through the content analysis, in this part of the study they did not strongly load onto a factor representing the overall construct of student success as measured by the MOSS. Therefore, it could be that they are not important to or only have indirect effects on the construct of student success.

Some of the reasons for success that were provided by participants in Stelnicki et al. (manuscript in preparation; see Chapter Two) were also not found to contribute to the overall factor structure of the MOSS. For example, a small amount of students indicated that luck and their spiritual or religious beliefs helped them reach their goals in university. When these items were examined in the factor analysis, they loaded very low across many extracted factors. Although they were not endorsed frequently by many students in Stelnicki et al. (see Chapter Two), the investigator thought they were important to include because of their relationship to an external locus of control way of thinking. As previously stated, a sense of internal control is predictive of persistence to second year of studies (Moses et al., 2011; Kingston, 2008). Thus, it was expected that the items examining luck and spiritual or religious as contributors to success would have loaded negatively onto either the Internal Drive or Readiness subfactors. These items were subsequently eliminated from the MOSS revision which will undergo a confirmatory factor analysis in a future study.

### *3.4.2 Model of Student Success*

A new conceptual understanding of success can be introduced based on the results of the factor structure extracted from the exploratory factor analysis. This model is shown in Figure 3.1. It should be noted that the conceptual model focuses on GPA as an outcome measure. A strong emphasis is placed on achievement (as measured by GPA) in existing literature and

longitudinal examination of persistence and graduation rates was not possible for this study. Thus, the model is limited in its focus of factors that contribute to a higher GPA and likely subsequent success in university. However, the MOSS may be used to predict persistence past first year. The predictive validity of the MOSS on GPA and persistence will be examined in future studies.

Notably, the model is less comprehensive than would be expected after reviewing the extensive literature on success in university. Although this model focuses only on participants' personal definitions of success as an outcome measure, the factor analysis revealed that student success is related more to internal characteristics of the student. That is, external supports and institutional characteristics were less important to the students sampled for this EFA. For example, university resources and social support from family and friends did not appear to be important in the factor structure of the MOSS. It may be that these factors are not directly related to achieving a higher GPA in this sample of students or that they are truly not important in predicting GPA in university. However, previous research shows that they are important in predicting persistence to second year (e.g., Bowman & Seifert, 2011). Since GPA is directly related to persistence (e.g., Hu, McCormick, & Gonyea, 2012), it appears that external supports from family, friends, and the institution are more important for students' persistence than grades.

### 3.5 References


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Table 3.1

*Participants' Year of Study*

| Year of Study | N (%) |
|---|---|
| 1 | 59 (33%) |
| 2 | 58 (32.6%) |
| 3 | 31 (17.4%) |
| 4 | 20 (11.2%) |
| 5+ | 7 (3.9%) |
| No Response | 3 (1.7%) |

Table 3.2

*Participants' Faculty of Study*

| Faculty/Area of Study | N (%) |
|---|---|
| Faculty of Arts | 86 (48.3%) |
| Faculty of Science | 57 (32%) |
| Faculty of Business | 9 (5.1%) |
| Faculty of Kinesiology | 6 (3.4%) |
| Faculty of Nursing | 6 (3.4%) |
| Faculty of Education | 3 (1.7%) |
| Faculty of Engineering | 3 (1.7%) |
| Faculty of Medicine – Undergraduate Program | 3 (1.7%) |
| No Response/Undeclared Major | 5 (2.8%) |

Table 3.3

*Exploratory Factor Analysis Factor Correlations for the MOSS*

| Factor | Factor 1: Future Perspectives* | Factor 2: Student Well-Being | | | Factor 3: Competency | | |
|---|---|---|---|---|---|---|---|
| | | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 |
| 1 | 1.00 | | | | | | |
| 2.1 | -.191 | 1.00 | | | | | |
| 2.2 | -.128 | -.220 | 1.00 | | | | |
| 2.3 | .134 | -.309 | .252 | 1.00 | | | |
| 3.1 | .122 | -.033 | .047 | .047 | 1.00 | | |
| 3.2 | .374 | -.235 | -.067 | .151 | .102 | 1.00 | |
| 3.3 | .042 | .088 | -.088 | -.153 | -.111 | .074 | 1.00 |

*All Future Perspectives subscales were derived from one extracted factor. Therefore, correlations between factors cannot be determined for the subscales of this factor.

Note. Factor 1: Future Perspectives (1.1: Internal Drive; 1.2: Enthusiasm; 1.3: Actively Working Towards Future; 1.4: Uncertainty)

Factor 2: Student Well-Being (2.1: Negative Reaction; 2.2: Critical Self-Appraisal; 2.3: School-Life Balance)

Factor 3: Competency (3.1: Academic Efficacy; 3.2: Readiness; 3.3: Engagement)

Table 3.4

*Spearman rho correlation between the MOSS total and scale scores and GPA.*

| **Scale** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| 1. MOSS Total | 1.0 | | | | |
| 2. Future Perspective | .800* | 1.0 | | | |
| 3. Student Well-Being | .466* | .069 | 1.0 | | |
| 4. Competency | .719* | .753* | -.052 | 1.0 | |
| 5. GPA | -.037 | .056 | -.111 | .170 | 1.0 |

Note. GPA was measured on a 4.0 scale, where 0.0 = F and 4.0 = A/A+. *Significant at the 0.01 level.

Table 3.5

*MOSS Item Means by Gender and Year of Study*

| MOSS Item[a] | Gender | | Year of Study | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Male (*n*=51) | Female (*n*=127) | 1 (*n*=59) | 2 (*n*=58) | 3 (*n*=31) | 4 (*n*=20) | 5+ (*n*=7) | |
| 1 | 4.06 | 4.22 | 4.15 | 4.17 | 4.29 | 4.15 | 4.00 | 4.17 |
| (*n*=178) | (.732) | (.776) | (.715) | (.752) | (.783) | (.813) | (1.15) | (.765) |
| 2 | 3.96 | 4.25 | 4.10 | 4.22 | 4.32 | 4.05 | 3.86 | 4.18 |
| (*n*=177) | (.947) | (.756) | (.765) | (.839) | (.702) | (.999) | (1.07) | (.822) |
| 3 | 4.33 | 4.06 | 4.19 | 4.09 | 4.19 | 3.95 | 4.14 | 4.13 |
| (*n*=178) | (.792) | (.839) | (.798) | (.923) | (.749) | (.887) | (.690) | (.833) |
| 4 | 3.84 | 3.80 | 3.86 | 3.86 | 3.71 | 3.55 | 3.71 | 3.81 |
| (*n*=178) | (.880) | (.946) | (.860) | (1.02) | (.902) | (.887) | (.951) | (.925) |
| 5 | 3.49 | 3.75 | 3.37 | 3.95 | 3.87 | 3.50 | 3.29 | 3.67 |
| (*n*=178) | (1.14) | (.992) | (1.07) | (1.08) | (.806) | (1.00) | (.756) | (1.04) |
| 6 | 3.86 | 3.92 | 3.97 | 3.95 | 3.74 | 3.80 | 4.00 | 3.90 |
| (*n*=178) | (.895) | (.803) | (.765) | (.926) | (.855) | (.696) | (.817) | (.828) |
| 7 | 3.41 | 3.54 | 3.36 | 3.67 | 3.68 | 3.30 | 3.29 | 3.51 |
| (*n*=178) | (.920) | (1.03) | (.943) | (1.02) | (.945) | (1.22) | (.951) | (.999) |
| 8 | 4.02 | 4.29 | 4.31 | 4.16 | 4.30 | 4.15 | 4.00 | 4.22 |
| (*n*=176) | (1.19) | (.964) | (.987) | (.978) | (1.12) | (1.14) | (.817) | (1.04) |
| 9 | 3.98 | 4.22 | 4.24 | 4.14 | 4.06 | 4.00 | 4.43 | 4.15 |
| (*n*=178) | (.836) | (.744) | (.678) | (.805) | (.854) | (.795) | (.976) | (.777) |
| 10 | 3.90 | 4.00 | 4.03 | 3.91 | 3.94 | 3.95 | 4.00 | 3.97 |
| (*n*=178) | (.831) | (.845) | (.787) | (.923) | (.814) | (.759) | (1.15) | (.840) |
| 11 | 3.90 | 3.80 | 4.02 | 3.76 | 3.65 | 3.65 | 4.00 | 3.83 |
| (*n*=178) | (.964) | (1.06) | (.974) | (1.05) | (.950) | (1.14) | (1.29) | (1.03) |
| 12 | 3.86 | 4.04 | 4.19 | 3.98 | 3.97 | 3.55 | 4.14 | 3.99 |
| (*n*=178) | (.849) | (.938) | (.853) | (.927) | (.875) | (.999) | (1.07) | (.914) |
| 13 | 3.67 | 3.87 | 3.80 | 4.02 | 3.68 | 3.60 | 3.43 | 3.81 |
| (*n*=178) | (1.13) | (.968) | (1.11) | (.964) | (.979) | (.995) | (.976) | (1.02) |
| 14 | 3.80 | 3.94 | 3.93 | 3.88 | 3.77 | 4.05 | 4.00 | 3.90 |
| (*n*=178) | (.775) | (.778) | (.740) | (.751) | (.884) | (.686) | (1.15) | (.779) |
| 15 | 3.78 | 3.94 | 3.97 | 3.98 | 3.68 | 3.70 | 3.85 | 3.89 |
| (*n*=177) | (.966) | (.892) | (.955) | (.848) | (.979) | (.923) | (.900) | (.913) |
| 16 | 4.24 | 4.14 | 4.29 | 4.10 | 4.26 | 3.85 | 4.14 | 4.17 |
| (*n*=178) | (.737) | (.814) | (.720) | (.912) | (.682) | (.745) | (.900) | (.791) |
| 17 | 4.10 | 3.97 | 4.07 | 4.02 | 4.10 | 3.85 | 3.57 | 4.01 |
| (*n*=178) | (.728) | (.942) | (.807) | (.946) | (.978) | (.745) | (.976) | (.886) |
| 18 | 4.20 | 3.83 | 4.12 | 3.97 | 3.77 | 3.70 | 3.86 | 3.94 |
| (*n*=178) | (.872) | (.871) | (.811) | (.858) | (.884) | (.923) | (.900) | (.884) |
| 19 | 3.75 | 3.54 | 3.59 | 3.62 | 3.65 | 3.50 | 3.57 | 3.61 |
| (*n*=178) | (.956) | (1.09) | (1.07) | (1.04) | (1.11) | (1.05) | (.976) | (1.05) |
| 20 | 3.76 | 3.53 | 3.75 | 3.57 | 3.65 | 3.40 | 3.33 | 3.60 |
| (*n*=177) | (1.07) | (.985) | (.902) | (1.09) | (.877) | (1.14) | (.817) | (1.01) |
| 21 | 2.02 | 2.59 | 2.25 | 2.69 | 2.26 | 2.55 | 1.43 | 2.43 |
| (*n*=178) | (1.44) | (1.54) | (1.36) | (1.61) | (1.71) | (1.54) | (.535) | (1.53) |
| 22 | 3.22 | 3.38 | 3.24 | 3.29 | 3.55 | 3.50 | 2.86 | 3.33 |
| (*n*=178) | (1.08) | (1.18) | (1.10) | (1.24) | (1.18) | (1.00) | (1.35) | (1.15) |
| 23 | 3.25 | 3.50 | 3.51 | 3.45 | 3.55 | 3.20 | 2.71 | 3.43 |
| (*n*=178) | (1.15) | (1.13) | (1.17) | (1.19) | (.925) | (1.06) | (1.11) | (1.13) |
| 24 | 3.49 | 3.30 | 3.36 | 3.53 | 3.13 | 3.15 | 3.14 | 3.35 |
| (*n*=178) | (.967) | (.962) | (1.05) | (.903) | (.846) | (.988) | (1.07) | (.964) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25 | 3.02 | 3.04 | 3.05 | 3.24 | 2.80 | 2.89 | 2.43 | 3.03 |
| (*n*=176) | (1.19) | (1.17) | (1.04) | (1.25) | (1.21) | (1.20) | (1.27) | (1.17) |
| 26 | 3.59 | 3.46 | 3.44 | 3.38 | 3.61 | 3.60 | 3.86 | 3.49 |
| (*n*=178) | (1.08) | (1.16) | (1.18) | (1.21) | (1.02) | (1.10) | (.900) | (1.14) |
| 27 | 3.29 | 3.36 | 3.36 | 3.22 | 3.55 | 3.30 | 3.29 | 3.34 |
| (*n*=178) | (.923) | (1.09) | (.996) | (1.11) | (.961) | (1.13) | (1.11) | (1.04) |
| 28 | 3.73 | 3.68 | 3.68 | 3.83 | 3.68 | 3.65 | 2.86 | 3.69 |
| (*n*=178) | (1.11) | (1.13) | (1.07) | (1.03) | (1.17) | (1.23) | (1.34) | (1.12) |
| 29 | 3.63 | 3.59 | 3.78 | 3.48 | 3.48 | 3.45 | 4.43 | 3.60 |
| (*n*=178) | (.979) | (1.05) | (.966) | (.941) | (1.15) | (1.15) | (.535) | (1.03) |
| 30 | 3.18 | 3.72 | 3.46 | 3.40 | 3.94 | 3.85 | 3.43 | 3.56 |
| (*n*=178) | (1.12) | (1.05) | (1.15) | (1.04) | (1.06) | (1.09) | (.976) | (1.09) |
| 31 | 2.63 | 2.61 | 2.62 | 2.62 | 2.35 | 2.75 | 3.43 | 2.62 |
| (*n*=177) | (.958) | (1.06) | (1.06) | (1.04) | (.839) | (1.16) | (.976) | (1.03) |
| 32 | 3.04 | 2.94 | 3.03 | 2.79 | 3.00 | 3.00 | 4.00 | 2.97 |
| (*n*=178) | (1.04) | (1.08) | (.964) | (1.12) | (1.06) | (1.08) | (1.15) | (1.07) |
| 33 | 3.16 | 3.38 | 3.45 | 3.11 | 3.55 | 3.10 | 3.57 | 3.32 |
| (*n*=176) | (1.14) | (1.22) | (1.14) | (1.22) | (1.09) | (1.29) | (1.62) | (1.20) |
| 34 | 3.10 | 3.24 | 3.20 | 3.40 | 3.06 | 3.15 | 2.14 | 3.19 |
| (*n*=178) | (1.12) | (.980) | (.979) | (.917) | (1.15) | (.933) | (1.46) | (1.02) |
| 35 | 2.25 | 2.19 | 2.15 | 2.16 | 2.52 | 2.15 | 1.86 | 2.21 |
| (*n*=178) | (1.55) | (1.34) | (1.30) | (1.36) | (1.55) | (1.57) | (1.21) | (1.40) |
| 36 | 2.78 | 3.05 | 2.83 | 2.84 | 3.19 | 3.25 | 3.29 | 2.97 |
| (*n*=177) | (1.21) | (1.23) | (1.26) | (1.22) | (1.14) | (1.29) | (1.25) | (1.22) |
| 37 | 2.80 | 2.49 | 2.55 | 2.69 | 2.29 | 2.70 | 2.57 | 2.58 |
| (*n*=177) | (1.37) | (1.08) | (1.33) | (1.11) | (1.07) | (1.08) | (1.40) | (1.18) |
| 38 | 2.73 | 2.89 | 2.73 | 2.81 | 3.03 | 3.00 | 2.71 | 2.84 |
| (*n*=178) | (.981) | (1.14) | (1.06) | (1.16) | (1.17) | (.858) | (1.25) | (1.09) |
| 39 | 3.57 | 3.27 | 3.41 | 3.35 | 3.29 | 3.30 | 3.29 | 3.36 |
| (*n*=177) | (1.24) | (1.14) | (1.16) | (1.09) | (1.35) | (1.17) | (1.38) | (1.17) |
| 40 | 2.75 | 2.79 | 3.78 | 2.72 | 2.84 | 2.80 | 3.29 | 2.78 |
| (*n*=177) | (1.20) | (1.10) | (1.12) | (1.10) | (1.13) | (1.24) | (1.25) | (1.12) |
| 41 | 2.39 | 2.40 | 2.29 | 2.39 | 2.61 | 2.45 | 2.43 | 2.40 |
| (*n*=177) | (1.18) | (1.19) | (1.16) | (1.13) | (1.28) | (1.28) | (1.40) | (1.18) |
| 42 | 4.22 | 4.17 | 4.24 | 4.12 | 4.16 | 4.25 | 4.00 | 4.19 |
| (*n*=178) | (.856) | (.883) | (.878) | (.938) | (.860) | (.716) | (1.00) | (.873) |
| 43 | 4.04 | 4.17 | 4.12 | 4.16 | 4.32 | 4.15 | 3.57 | 4.14 |
| (*n*=177) | (.832) | (.725) | (.751) | (.768) | (.653) | (.671) | (.976) | (.757) |
| 44 | 3.94 | 4.02 | 4.05 | 3.84 | 4.10 | 4.35 | 3.86 | 3.99 |
| (*n*=177) | (1.08) | (1.01) | (.936) | (1.01) | (1.08) | (.875) | (1.21) | (1.03) |
| 45 | 3.96 | 3.81 | 4.00 | 3.70 | 3.87 | 3.95 | 3.86 | 3.85 |
| (*n*=176) | (.903) | (.977) | (.891) | (1.04) | (.922) | (.826) | (.900) | (.957) |
| 46 | 2.37 | 2.21 | 2.12 | 2.24 | 2.29 | 2.00 | 3.29 | 2.26 |
| (*n*=178) | (1.44) | (1.34) | (1.26) | (1.44) | (1.32) | (1.30) | (1.38) | (1.37) |
| 47 | 4.08 | 4.24 | 4.34 | 4.21 | 4.26 | 4.00 | 3.43 | 4.19 |
| (*n*=178) | (.977) | (.684) | (.710) | (.789) | (.631) | (.795) | (1.13) | (.779) |
| 48 | 4.18 | 4.27 | 4.34 | 4.31 | 4.22 | 4.05 | 3.86 | 4.24 |
| (*n*=178) | (.817) | (.718) | (.659) | (.730) | (.617) | (.826) | (.900) | (.746) |
| 49 | 3.75 | 3.88 | 3.88 | 3.97 | 3.81 | 3.75 | 3.29 | 3.84 |
| (*n*=178) | (.935) | (.822) | (.768) | (.955) | (.833) | (.716) | (.951) | (.856) |
| 50 | 3.61 | 3.71 | 3.81 | 3.63 | 3.50 | 3.74 | 4.14 | 3.68 |
| (*n*=174) | (.918) | (.964) | (.868) | (1.01) | (.861) | (.991) | (.690) | (.950) |

Notes. [a]Refer to Appendix B for item statements. *N* = 178

Table 3.6

*MOSS Items and Their Associated Factor Loadings After EFA*

| | Factor 1 | | | | Factor 2 | | | Factor 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1.1 | 1.2 | 1.3 | 1.4 | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 |
| 1. I am determined. | **.732** | | | | | | | | | .363 |
| 2. I am a hard worker. | .476 | | | | .319 | | | **.523** | .323 | |
| 3. I am intelligent. | .406 | | | | -.337 | | .319 | **.534** | | .437 |
| 4. I am motivated. | **.676** | | | | | | | .314 | .378 | |
| 5. I am organized. | .323 | | | | | | | **.792** | | |
| 6. I am perseverant. | | | **.658** | | | | | | | .404 |
| 7. I am focused. | **.489** | | | | | | .361 | .619 | .340 | |
| 8. I have support from my friends and family. | Poor item | | | | | | | | | |
| 9. I am dedicated. | **.745** | | | | | | | .353 | .549 | .318 |
| 10. I am driven. | **.856** | | | | | | | | .404 | .426 |
| 11. I am optimistic. | Poor item | | | | | | | | | |

| | Factor 1 | | | | Factor 2 | | | Factor 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1.1 | 1.2 | 1.3 | 1.4 | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 |
| 12. I am passionate. | | **.671** | | | | | | | .513 | .416 |
| 13. I set goals for myself. | | | **.681** | | .327 | | | .400 | | |
| 14. I am persistent. | | | **.781** | | | | | .333 | | .441 |
| 15. I am ambitious. | | **.794** | | | | | | | | .312 |
| 16. I am interested in my studies. | | | | | | | | | | **.590** |
| 17. I have strong academic skills (e.g., attending class, studying, etc.). | Poor item | | | | | | | | | |
| 18. I can adapt to new situations. | .415 | | | | -.425 | | | | .315 | **.489** |
| 19. I am a confident person. | .345 | | | | -.574 | | .328 | | **.546** | .561 |
| 20. My university provides me with adequate support and resources (e.g., from advisors, professors, TAs, etc.). | Poor item | | | | | | | | | |

| | Factor 1 | | | | Factor 2 | | | Factor 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1.1 | 1.2 | 1.3 | 1.4 | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 |
| 21. I am religious and/or spiritual. | Poor item | | | | | | | | | |
| 22. I feel pressured. | | | | | **.535** | -.385 | -.444 | | | |
| 23. I am a perfectionist. | | | | | | **-.518** | | .458 | | |
| 24. I live a balanced life. | | | | | -.342 | | **.453** | | .355 | .470 |
| 25. I get an adequate amount of sleep. | | | | | | | **.822** | | | .324 |
| 26. I am a leader. | .431 | | | | -.300 | | | | | **.714** |
| 27. I am involved. | .347 | | | | | | | | | **.842** |
| 28. I consider myself to be lucky. | Poor item | | | | | | | | | |
| 29. I procrastinate. | | | | | | | | **-.384** | | |
| 30. I am stressed. | | | | | **.509** | -.457 | -.532 | | | |
| 31. I am lazy. | Poor item | | | | | | | | | |
| 32. I am distracted. | Poor item | | | | | | | | | |
| 33. I am tired. | | | | | .370 | | **-.702** | | | |

| | Factor 1 | | | | Factor 2 | | | Factor 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1.1 | 1.2 | 1.3 | 1.4 | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 |
| 34. I am good at managing my time. | .377 | | | | | | .396 | **.596** | .402 | |
| 35. I have too much debt (e.g., student loans, financial problems, etc.). | Poor item | | | | | | | | | |
| 36. I am anxious. | | | | | **.682** | -.342 | | | -.308 | |
| 37. I like to keep to myself and am not very social. | | | | | **.596** | | | | | |
| 38. I am overwhelmed/overworked. | | | | | .540 | -.476 | **-.580** | | -.326 | |
| 39. I have high self-esteem. | .365 | | | | **-.542** | | .306 | | .450 | |
| 40. I am uncertain. | | | | **.681** | | -.335 | -.409 | | -.312 | |
| 41. I am scared. | | | | **.697** | | | | | | |
| 42. I have high expectations for my life. | .456 | | | | | **-.368** | | | | |

| | Factor 1 | | | | Factor 2 | | | Factor 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1.1 | 1.2 | 1.3 | 1.4 | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 |
| 43. I put in effort. | .420 | | | | .301 | | | **.332** | | |
| 44. I am hard on myself. | | | | | .344 | **-.900** | | | | |
| 45. I am critical. | | | | | .311 | **-.748** | | | | |
| 46. I have a job that requires me to work many hours outside of schoolwork. | Poor item | | | | | | | | | |
| 47. I am mature. | .357 | | | | | | | | **.819** | |
| 48. I am responsible. | .337 | | | | | | | | **.903** | |
| 49. I am disciplined. | .394 | | | | | | | | **.631** | |
| 50. I am challenged. | | **.647** | | | | | | | | |

*Note.* Bolded loadings indicate the scale that the item was selected for. Absolute factor loadings less than .30 are hidden in the table.

Factor 1: Future Perspectives (1.1: Internal Drive; 1.2: Enthusiasm; 1.3: Actively Working Towards Future; 1.4: Uncertainty)

Factor 2: Student Well-Being (2.1: Negative Reaction; 2.2: Critical Self-Appraisal; 2.3: School-Life Balance)

Factor 3: Competency (3.1: Academic Efficacy; 3.2: Readiness; 3.3: Engagement)

Table 3.7

*Reliability coefficients for the MOSS and its subscales*

| MOSS | Coefficient Alpha |
|---|---|
| Total | .86 |
| Future Perspectives | .82 |
| Student Well-Being | .56 |
| Competency | .80 |

Table 3.8

*Corrected Item-Total Correlations*

| Item | Corrected Item-Total Correlation |
|---|---|
| 1. I am determined. | .59 |
| 2. I am a hard worker. | .51 |
| 3. I am intelligent. | .43 |
| 4. I am motivated. | .56 |
| 5. I am organized. | .38 |
| 6. I am perseverant. | .52 |
| 7. I am focused. | .40 |
| 8. I have support from my friends and family. | .36 |
| 9. I am dedicated. | .63 |
| 10. I am driven. | .63 |
| 11. I am optimistic. | .37 |
| 12. I am passionate. | .58 |
| 13. I set goals for myself. | .57 |
| 14. I am persistent. | .64 |
| 15. I am ambitious. | .51 |
| 16. I am interested in my studies. | .26 |
| 17. I have strong academic skills (e.g., attending class, studying, etc.). | .47 |
| 18. I can adapt to new situations. | .35 |

| | |
|---|---|
| 19. I am a confident person. | .38 |
| 20. My university provides me with adequate support and resources (e.g., from advisors, professors, teaching assistants, etc.). | .25 |
| 21. I am religious and/or spiritual. | .11 |
| 22. I feel pressured. | .20 |
| 23. I am a perfectionist. | .35 |
| 24. I live a balanced life. | .26 |
| 25. I get an adequate amount of sleep. | .20 |
| 26. I am a leader. | .44 |
| 27. I am involved. | .47 |
| 28. I consider myself to be lucky. | .32 |
| 29. I procrastinate. | -.08 |
| 30. I am stressed. | .19 |
| 31. I am lazy. | -.21 |
| 32. I am distracted. | -.09 |
| 33. I am tired. | .03 |
| 34. I am good at managing my time. | .33 |
| 35. I have too much debt (e.g., student loans, financial problems, etc.). | -.01 |
| 36. I am anxious. | .07 |
| 37. I like to keep to myself and am not very social. | -.06 |
| 38. I am overwhelmed/overworked. | .10 |
| 39. I have high self-esteem. | .30 |

| | |
|---|---|
| 40. I am uncertain. | -.02 |
| 41. I am scared. | .03 |
| 42. I have high expectations for my life. | .45 |
| 43. I put in effort. | .53 |
| 44. I am hard on myself. | .31 |
| 45. I am critical. | .36 |
| 46. I have a job that requires me to work many hours outside of schoolwork. | .06 |
| 47. I am mature. | .54 |
| 48. I am responsible. | .57 |
| 49. I am disciplined. | .49 |
| 50. I am challenged. | .40 |

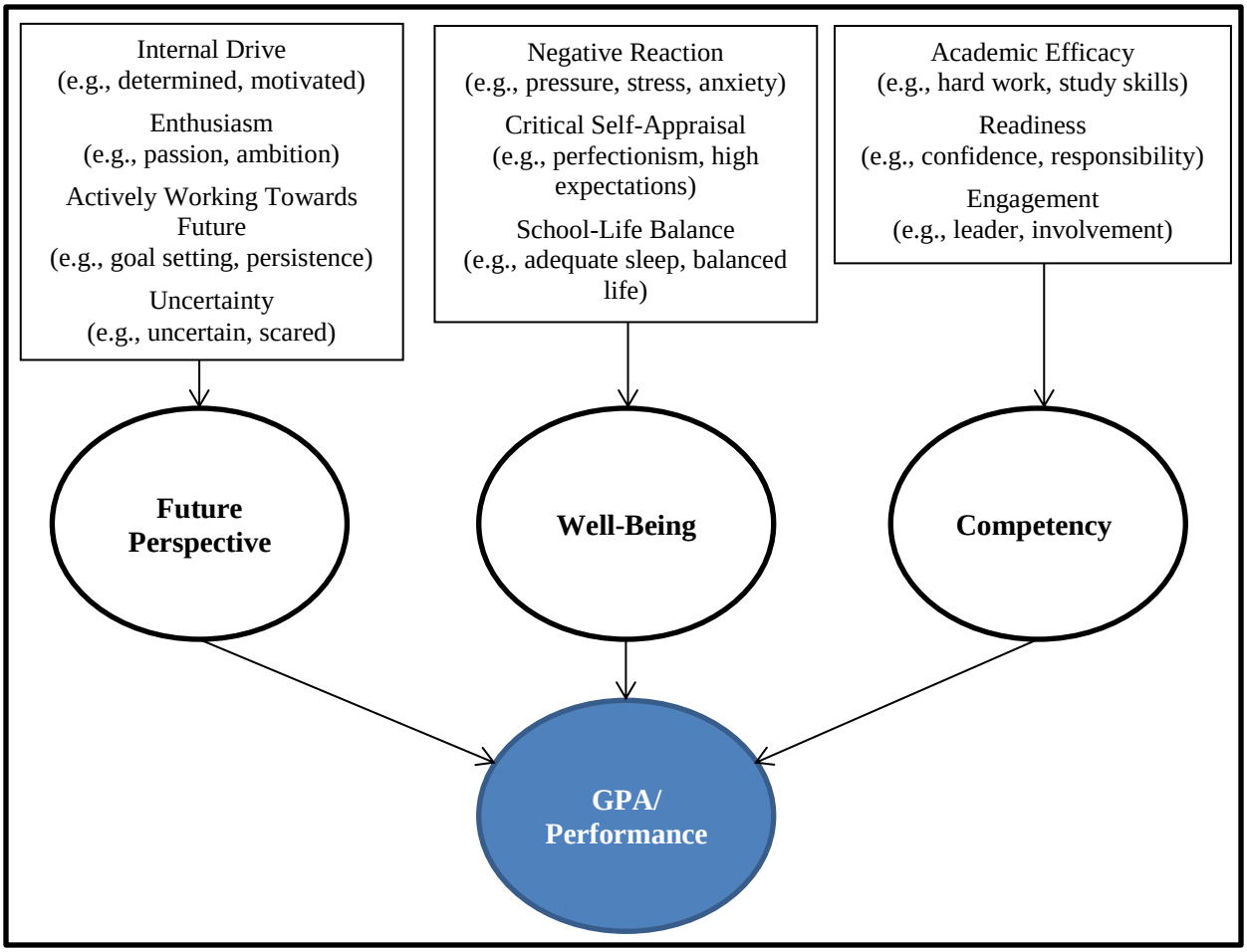


*Figure 3.1.* Revised conceptual model of student success. The unshaded circles represent the three primary factors extracted from the MOSS scale. The boxes represent subfactors for each of the primary factors and examples of factors that contribute to the factor structure predicting student success as defined by GPA and academic performance (shaded circle).

# Chapter Four: General Discussion

The purpose of this thesis was to understand and develop an instrument that can be used to measure and predict student success in university. With decreasing government funding, post-secondary institutions need to focus on admitting student who have the best chances of succeeding (Wimhurst & Allard, 2008). Institutional resources are readily wasted by the 25% of the Canadian students who do not persist to complete their program (Cote & Allahar, 2007). Understanding which students are in need of additional, individualized assistance is essential for administrators and policy makers to develop and implement effective programs. Identification of students at risk of failing or non-completion of post-secondary education is crucial. A system for identify the strengths that students possess and the challenges or weaknesses that they face can direct academic advisors and counsellors in assisting students before they are forced to drop out of their program. Post-secondary staff can use the student's strengths to overcome and manage the challenges that they are facing during their studies.

In this thesis, the development and evaluation of the Measure of Student Success (MOSS) was described. To briefly review, the MOSS was constructed in three stages. The first stage included a review of the literature identified important factors that have significantly contributed to university students' successes (Chapter One). Second, personal attributes that students believe contribute to their success were explored and presented in the first manuscript (Chapter Two). Finally, a scale was created using factors from each of the previous stages that was evaluated for its factor structure and reliability to measure student success (Chapter Three). Thus, the scale items were derived using both a theoretical (i.e., previous literature) and an empirical (i.e., adjectives provided by students in the first manuscript of the thesis) approach.

Overall, the preliminary results evaluating the MOSS were encouraging. An exploratory factor analysis identified three primary factors, with a number of subcomponents for each factor. First, the Future Perspectives factor consisted of four subfactors: Internal Drive, Enthusiasm, Actively Working Towards Future, and Uncertainty. The Future Perspectives Scale contains items that examine the student's commitment and future outlook, such as goal setting, interest in studies, and persistence. Second, the Student Well-Being factor consisted of three subfactors: Reaction, Critical Self-Appraisal, and School-Life Balance. The Student Well-Being Scale consisted of items examining stress, anxiety, pressure, and living a balanced life. Finally, three subfactors made up the Competency factor: Academic Efficacy, Readiness, and Engagement. The Competence Scale consisted of items examining confidence, maturity, responsibility, and involvement.

### 4.1 Significance and Implications

This research has the potential to have tremendous implications for future studies examining student success. A comprehensive way to measure student success will be available and a broad explanation of success will be able to inform administrators where they should delegate their resources in relation to intervention programs for post-secondary students. The research will also extend to high school students for predicting and identifying what (if any) specific interventions will be necessary *before* entering university in order to make their transition and university studies successful.

The MOSS has utility in a number of areas. First, and likely most importantly, the MOSS has potential utility in academic advising and counselling offices. The items that were included in the MOSS and its subsequent revision were primarily intrapersonal factors. Students who find that they are struggling in school can quickly and easily fill out this self-report

measure. The results of the report can be used by the academic counsellor or advisor to pinpoint specific areas of concern and/or develop an individualized intervention program for them. For example, a student who rates themselves to be low in confidence may need vastly different strategies to succeed than a student who has more difficulty with study or organization skills. The findings from this study support the use of the MOSS to identify specific deficits of a student who needs extra assistance.

Second, the MOSS could potentially be used by admissions offices in post-secondary education. To avoid wasted resources on students who do not persist through their programs, enrollment offices can use the MOSS in their admissions procedures. The MOSS could very easily be submitted with an application for students applying to the institution. The MOSS could be used in the admission decision or it could be used to place the student in a specialized orientation program. For example, Bai and Pan (2009) present evidence that certain students respond better to certain orientation intervention programs. Programs can be specific to advising, academic help, social integration, or a comprehensive program incorporating a number of competencies important for a successful first year experience. Because of the comprehensive and specific nature of the MOSS, students can be provided with appropriate interventions for their individual needs and learning.

The MOSS could also be used by researchers who are interested in furthering the field of success in higher education. The MOSS contains the majority of previously studied intrapersonal attributes within one measure. In addition, the MOSS represents a part of the overall model for student success. Some factors, such as social support, likely have indirect effects on success and therefore have to be explored using advanced modeling strategies (e.g.,

structural equation modeling [SEM]). Thus, the MOSS is the first step in consolidating a huge body of research that currently has little consistency.

**4.2 Limitations**

Although the first evaluation of the MOSS is promising, this study has some notable limitations. The question posed to the students in the first manuscript involved the personal resources they feel contribute to their successes in reaching their goals and failures in not reaching their goals. However, the extant literature on student success primarily focuses on defining success as academic achievement or grade point average (GPA) and persistence to the following year or graduation rates. This study was unable to confirm that students' goals are equivalent to high GPAs or graduating from their degree programs. It is possible that their goals are not related to any of the constructs that are currently measured in the student success literature. Thus, further examination into students' goals and conceptualizations of success while in university is warranted.

The data collection in the content analysis used a fairly subjective method. Participants were able to provide as many or as few words as they wished that were personally meaningful for them. There is a definite possibility that the words or short phrases that they provided were not interpreted by the researcher in the same way the participant intended for it to be. Additionally, how the categories were defined may not be exactly the same as those identified in the literature. The inability to follow up and clarify with the participants is a definite limitation to this study. Further, it may be that the graduate students who worked to categorize the factors during the Q-sort overgeneralized the adjectives and missed the importance of what the participant was trying to get across.

Due to the recruitment strategy used in the second manuscript of this thesis, the results may be limited in part because of the use of self-selected participants. Participants were asked to provide their contact information to the investigator if they were interested in participating in the survey. Compared with the enrolment totals listed for the class, only between 20 and 35% of the students in the classes provided their contact information for the invitation to the survey. This low number of interested and willing participants could indicate that the individuals who chose to complete the survey may be more motivated, have more spare time, or are interested in the topic of research. There is a slight possibility that those who participated in validating the scale are not a true representation of the typical undergraduate population.

The validity of the MOSS is strengthened by its creation from both a theoretical and empirical orientation. One of the intentions in creating the scale was to predict GPA, a commonly used indicator of student potential in the literature. However, the scale was not significantly correlated with GPA in the current sample. It is possible that students define their university success in many ways, such as engagement, participation in student leadership opportunities (e.g., student government), or making connections for future employment or post-graduate studies. Other outcome variables commonly used to measure student success (i.e., persistence and graduation) will be explored. Further, students who intend to complete a graduate degree may differ substantially from the undergraduate population who finishes their degree with only the intention to find permanent employment. Research into these two groups of undergraduate students deserves special attention.

### 4.3 Conclusions and Considerations for Future Research

The results presented in this study represent the preliminary steps in the development of the MOSS. The next step in the development of the MOSS is to evaluate the revised items and

confirm the factor structure of the measure. The 48-item revised version of the MOSS (Appendix B) is currently undergoing this testing. The revision included a number of items that were reworded for more specificity to the university setting, which will likely increase the reliability of the total scale and the subscales.

Further, the construct validity of the MOSS will need to be assessed. Although there are no comprehensive measures of student success currently available, some instruments will be available to examine the construct validity of the subscales of the MOSS. The Satisfaction With Life Scale (SWLS; Diener, Emmons, Larson & Griffin, 1985) and the Personality Mini-Markers scale (Saucier, 1994) are two examples of scales that will be used to assess the construct validity of the MOSS. The SWLS is a five-item scale measuring global life satisfaction (Diener et al., 1985). It is likely that this scale will be related to the Student Well-Being scale of the MOSS. The Personality Mini-Markers scale is a shortened version of Goldberg's (1992) Big-Five personality adjective markers consisting of 40 adjectives that correspond closely to the factor structure found in the longer 100-item scale (Saucier, 1994). The Big-Five factors (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellect or Openness) include many of the adjectives that were identified by participants in Chapter Two. Specifically, Conscientiousness is likely to be related to the Future Perspectives scale of the MOSS. Thus, it is important to assess the similarities and dissimilarities between the MOSS and other scales.

Generally speaking, men and women may differ in how they define success. For example, women place high importance on relationships and a balanced-life, whereas men use a material concept when describing what they value most (Dyke & Murphy, 2006). Thus, in addition to degrees and high grades, women may seek out additional opportunities through service learning, clubs or organizations while in college to get the most of their experience. If

women define success differently while in post-secondary studies, a different factor structure may exist for each gender. Further research should address whether gender differences do in fact exist in the proposed factor structure.

In conclusion, the results of this study are preliminary and provide evidence to continue investigation and testing of the MOSS scale. The initial findings support the use of the MOSS in post-secondary admissions departments, academic advising and counselling, and with researchers to help define and conceptualize university student success.

## 4.4 References


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## APPENDIX A: Q-SORT INSTRUCTIONS AND WORD GROUPS

***Instructions:*** In each of the boxes of words below is a group of words. You are asked to review the words and produce a name for the category of words. In addition, please indicate if any of the words within each category do not belong, or other words should be added or moved into the category.

**Group 1:** The groups of words below were words that participants provided when asked to indicate "Words that describe reaching your goals"

A)
determination
drive
focus
ambition
future oriented
dreams
financial security
succeeding
hope
desire
passion
expectations
gratification
fulfillment
assurance

B)
hardwork
dedication
persistence
commitment
discipline
perseverance
diligence
effort
endurance

C)
motivation
eagerness
initiative
willingness
open
competition
challenge
take risks

D)
inspiration
interest
curiosity
inquisitive

E)
intelligence
learning
achievement
understanding
good memory
academic skills
skills
critical thinking
analytical
concentration
talent

| |
|---|
| F)<br>organization<br>time management<br>setting goals<br>planning<br>prioritizing<br>preparation<br>consistency<br>being realistic |
| G)<br>optimism<br>enthusiasm<br>happiness<br>attitude<br>enjoyment<br>humour<br>having fun<br>easygoing<br>good-natured |
| H)<br>creativity<br>flexibility<br>resiliency<br>adaptable |
| I)<br>confidence<br>being awesome<br>self-esteem<br>courage<br>belief<br>pride in work<br>unique |
| J)<br>support from family and friends<br>encouragement<br>resourceful<br>university support: advisors, teachers, class<br>faculty<br>physical supports<br>receiving help<br>religious<br>comfort |

| |
|---|
| K)<br>responsibility<br>guilt<br>pressure<br>fear<br>necessity<br>sacrifice |
| L)<br>being friendly<br>honesty<br>compassion<br>personable<br>character<br>work well in teams<br>agreeable<br>obeying<br>social<br>trustworthy<br>kind<br>respectful<br>patience<br>reliable<br>loyalty<br>accepting<br>considerate<br>modesty<br>integrity |
| M)<br>aggressive<br>reserved |
| N)<br>good listener<br>communication skills<br>networking<br>paying attention<br>assertive<br>clarity<br>persuasive |
| Q)<br>avoiding work<br>confusion |

| |
|---|
| R)<br>energy<br>strength<br>keeping stress levels low<br>balanced life<br>sleep<br>physically healthy<br>music<br>physical attractiveness<br>no sleep<br>high stress<br>drugs<br>concern |
| S)<br>leadership<br>engagement<br>involvement |
| T) being alone |

| |
|---|
| U)<br>intuition<br>observant<br>awareness<br>reflective<br>emotional |
| V)<br>luck |
| W)<br>self-focused<br>independence<br>value |

**Group 2: The groups of words below were words that participants provided when asked to indicate "Words that describe keeping you from your goals"**

| |
|---|
| A)<br>lack of direction<br>no focus<br>shortsighted<br>ambition<br>no passion<br>goals<br>not opportunistic<br>dreamer<br>hopeless<br>high expectations<br>impulsive |
| B)<br>no dedication<br>lack of effort<br>lazy<br>quitter<br>slow<br>too difficult<br>lack of discipline<br>careless |

| |
|---|
| C)<br>unmotivated<br>not competitive<br>challenge<br>unchallenged<br>unwilling<br>risktaker |
| D)<br>no interest<br>dislike<br>broad interests |
| E)<br>cognitive abilities<br>bad memory<br>average<br>no concentration<br>attention problems<br>overthinking |

F)
time management
overwhelmed/overworked
poor organization
inefficient
not prepared
unrealistic

G)
negative attitude
enthusiasm
content
optimistic
outgoing
easygoing

H)
change
unadaptable
uncreative

I)
self-limiting
self-doubt
self-esteem
selfish
narcissistic
too hard on self
self-defeating
overconfident
critical
pride
different

J)
no support
religious/lack of faith
university factors: bad profs, no help
discouraged
unsupportive friends/family
pressure
familiarity
influenced by others
pleasing others
dependent
independent

K)
distraction
other priorities
commitments to others
working while in school
relationships
home life
social life
obstacles
compulsive
financial problems
technology: facebook, youtube

L)
negative interactions with others
judgemental
conflict
control
nonconforming
impatience
angry
naïve
frustration
dramatic

M)
communication
passive
friendly
considerate

N)
academic skills (studying, reading)
low grades
failing
obsessed
attention to detail
not detailed
misunderstanding
procrastinator
avoidance
late
perfectionism

| |
|---|
| O)<br>healthy lifestyle (exercise, leisure time)<br>balanced life<br>stress<br>unhealthy (eat bad, no exercise)<br>tired<br>no energy<br>anxiety<br>depression<br>fear |
| P)<br>unsocial |
| Q)<br>luck |
| R)<br>holding back<br>uncertainty<br>indecision |
| S)<br>immature<br>inexperience<br>irresponsibility |

## APPENDIX B: LETTER OF INFORMATION TO PARTICIPANTS

Dear Student,

You are receiving this information because you have expressed interest in participating in a study examining the experiences of university student, both in and outside of the school setting. The purpose of this study is explore the factors that contribute to student success during university. This research is an important piece to why students perform the way they do and to discover how students can be supported during their undergraduate studies.

The data collected in this study will be used to inform two Master's degree projects: "Investigating factors related to university student success and well-being" and "The effects of mentoring Canadian university students transitioning to adulthood."

**What will students be asked to do?**

As a voluntary participant in this study, you will fill out a questionnaire asking you about your academic habits, and personality characteristics. The study will be completed entirely online. This study will take approximately 30 minutes. Your participation in this study is completely voluntary and you may refuse to participate at any time if you feel uncomfortable continuing with the study. You may withdraw at any time without penalty or explanation.

At the end of the study, you will be asked if you would like to take part in a follow-up study on mentorship. If you would like to be contacted for this follow-up, you will be asked to enter your email address. You are in no way required to complete this extra study.

Should you choose to participate, you will have the opportunity to be entered into a draw for one of three $25 University of Calgary Bookstore gift cards.

**Will students' identity be revealed?**

No personal identifying information will be collected in this study, and all participants shall remain anonymous. Should you agree to participate, you will be asked to provide your gender, age, ethnicity, year of study, and academic major. Your email address, if provided to be entered into the draw or to be contacted for the follow-up study, will not be connected to your survey data.

Only the investigators and their supervisor will have access to the data collected for this study. The online data will be downloaded and stored in a locked filing cabinet and will be retained indefinitely for possible future use. Data will be put into a database and only group information will be summarized for presentation or publication of results. You are free to discontinue participation at any time during the study. If you choose to withdraw from the study, all data collected up to the point of withdrawal may be retained indefinitely for possible future use.

Please note that the online survey is hosted by "Survey Monkey" which is a web survey company located in the USA. All responses to the survey will be stored and accessed in the USA. This company is subject to U.S. laws, in particular, to the US Patriot Act that allows authorities access to the records of internet service providers. If you choose to participate in the survey you understand that your responses to the questions will be stored and accessed in the USA. The security and privacy policy for Survey Monkey can be viewed at http://www.surveymonkey.com/.

**What do I do if I want more information?**

For more information, please contact the University of Calgary researchers who are working on this project: Andrea Stelnicki (amstelni@ucalgary.ca, 403-801-1934), Roxanne

Dowd (rrdowd@ucalgary.ca, 306-717-4615), and Dr. David Nordstokke (dnordsto@ucalgary.ca, 403-220-4212).

If you have any questions, concerns or comments regarding your treatment within the study, please contact Russell Burrows, Ethics Resource Officer at the University of Calgary (rburrows@ucalgary.ca or 403-220-3782).

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

## APPENDIX C: THE MOSS

### (Initial Measure of Student Success Prior Testing)

Read each statement carefully, and select the response that describes you best using the following scale:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not at all like me/ Never true | Not really like me/ Seldom true | Neutral | Somewhat like me/ Often true | Very much like me/ Always true |

1. I am determined.
2. I am a hard worker.
3. I am intelligent.
4. I am motivated.
5. I am organized.
6. I am perseverant.
7. I am focused.
8. I have support from my friends and family.
9. I am dedicated.
10. I am driven.
11. I am optimistic.
12. I am passionate.
13. I set goals for myself.
14. I am persistent.
15. I am ambitious.
16. I am interested in my studies.
17. I have strong academic skills (e.g., attending class, studying, etc.).
18. I can adapt to new situations.
19. I am a confident person.
20. My university provides me with adequate support and resources (e.g., from advisors, professors, teaching assistants, etc.).
21. I am religious and/or spiritual.
22. I feel pressured.
23. I am a perfectionist.
24. I live a balanced life.
25. I get an adequate amount of sleep.
26. I am a leader.
27. I am involved.
28. I consider myself to be lucky.
29. I procrastinate.
30. I am stressed.
31. I am lazy.
32. I am distracted.
33. I am tired.

34. I am good at managing my time.
35. I have too much debt (e.g., student loans, financial problems, etc.).
36. I am anxious.
37. I like to keep to myself and am not very social.
38. I am overwhelmed/overworked.
39. I have high self-esteem
40. I am uncertain.
41. I am scared.
42. I have high expectations for my life.
43. I put in effort.
44. I am hard on myself.
45. I am critical.
46. I have a job that requires me to work many hours outside of schoolwork.
47. I am mature.
48. I am responsible.
49. I am disciplined.
50. I am challenged.

**The Measure of Student Success (Revised Version)**

Read each statement carefully, and select the response that describes you best using the following scale:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not at all like me/ Never true | Not really like me/ Seldom true | Neutral | Somewhat like me/ Often true | Very much like me/ Always true |

1. I am determined to do well in my studies.
2. I am intelligent.
3. I am motivated to succeed in university.
4. I am not very social.
5. I am organized.
6. I set myself up for failure.
7. I am perseverant. (e.g., I don't give up easily when school is difficult.)
8. My grades are impacted by my stress.
9. I am focused on my studies.
10. I am dedicated to my studies.
11. I am uncertain about my future.
12. I am driven to succeed.
13. I have low self-esteem.
14. I set goals for myself in school.
15. I am persistent in reaching my goals.
16. I am ambitious when it comes to my schoolwork.
17. I am interested in my studies.
18. I can adapt to new situations.
19. I feel an internal pressure to do well in school.
20. My perfectionism interferes with me completing my work.
21. I do not live a balanced life.
22. I do not get an adequate amount of sleep.
23. I take the lead in group projects.
24. I get involved during class.
25. I am stressed because of school.
26. I am constantly tired.
27. I am good at managing my time.
28. My school workload makes me anxious.
29. I like to keep to myself.
30. I am overworked/overwhelmed by school.
31. I am a hard worker.
32. I am afraid about my future.
33. I set too high expectations for myself.
34. I put effort into my work.
35. I am hard on myself.

36. I am overly critical of my work.
37. I am mature.
38. I am responsible.
39. I am self-disciplined.
40. I enjoy the challenge of school.
41. I get involved at school outside of class activities.
42. I am stressed because of things other than school.
43. When I get a bad grade, I can’t think about anything else.
44. I regularly attend class.
45. I have good study skills.
46. I leave things to the last minute.
47. I am passionate about my studies.
48. I am a confident person.