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The Relationship of Locus of Control and Social Learning on Academic Achievement in a Supplemental Instruction Program

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ABSTRACT

A large number of high school students entering college are arriving academically unprepared. Abilene Christian University's newly founded Bridge Scholars Program seeks to help and support academically at-risk students based upon low ACT/SAT scores and low high school GPA averages. This research utilizes the Supplemental Instruction program, (based upon *Bandura*'s social learning theory), as its academic intervention. The research questions are 1) How does Supplemental Instruction contribute to an at-risk student's college readiness (knowledge, skills, attitudes, behaviors and strategies)? And, 2) Does a student's internal or external locus of control predict academic performance? A pretest and posttest using Rotter's (1966) Internal-External Locus of Control Scale measured students' overall academic confidence. Class test scores, class final grades, and semester GPA were used to measure Supplemental Instruction program effectiveness. Although Locus of Control proved insignificant, test scores, final class grade, and overall semester GPA indicate that the Bridge Scholars program and Supplemental Instruction are highly effective interventions in better preparing at-risk students for the rigors of college level academia.

The Relationship of Locus of Control and Social Learning on Academic Achievement in a Supplemental Instruction Program

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This thesis is dedicated to my late father, Roy N. Mullinax, and my husband Tracy L. Fleet. Thank you, dad, for always encouraging me to pursue a college education. Your example of pursuing your dream of a college degree at the age of sixty-nine models that it is never too late to accomplish one's goals.

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CHAPTER I

INTRODUCTION

The National Center for Education Statistics (NCES) reported in fall 2014, 17.3 million undergraduate students attended degree-granting postsecondary institutions across the United States. The opportunities for economic stability afforded to individuals with a college degree (ACT, 2005; Mulvey, 2009; Profile of the American Freshman, 2012) prompts many individuals to pursue a college education. Yet, many of these individuals will face a challenging road toward graduation if they are unable to perform academically. Jackson and Kurlaender (2014) iterated there are many determinants to college success, but the most important component is being academically prepared. Research suggests many students are entering college unprepared and without the necessary skill set for the rigors of college work (Conley, 2010; Weimer, 2013). In a 2004-2005 survey of 40,000 faculty in two and four year California (State) institutions, 41% reported that most of the students they taught lacked the basic skills for college level work (Higher Education Research Institute, 2005).

Abilene Christian University (ACU) piloted the Bridge Scholars Program fall 2016. The University considered ACT/SAT scores along with high school grade point averages (GPA) and class ranking as part of the admission profile. Academic profiles for incoming freshmen students participating in the Bridge Program fall below regular university admission standards. In the past, the institution would admit students, who

failed to meet the criteria for admission, on a probationary status (J. Self, personal communication, October 27, 2016). The university acknowledges that Bridge students are considered at-risk for academic failure and although Bridge students have been identified at-risk, the university recognizes their projected academic potential. Therefore, to address academic concerns, Bridge students are placed in a self-contained, highly structured sequence of developmental education courses (learning strategies course, math, and English) to prepare them for subsequent entry-level courses. In addition, the students are enrolled in the required freshman Bible course (3-hour credit) for all first-time students entering the institution.

BIBL 101, *Life and Teachings of Jesus*, had a pass-rate of 93% for the 2015 freshmen cohort at this institution (L. McCarty personal communication, July 25, 2011). However, students identified as at-risk historically only have a pass-rate around 67% (J. Self, personal communication, October 27, 2016). The fall 2016 Bridge cohort is divided into two Bible sections. Supplemental instruction (SI) module is attached to provide additional academic support. Within this context, a SI leader attends course lectures, meets regularly with the professor, and provides content-related activities. Exam and quiz preparation is provided in two weekly one-hour sessions. All Bridge students are encouraged to participate in the regularly scheduled weekly SI sessions. Per Self (J. Self, personal communication, October, 27, 2016), an "operational outcome for the SI modules is to facilitate motivation among Bridge students" as key to assisting students to become successful college students.

In consideration for at-risk students under a newly piloted Bridge Program, the research questions investigated are 1) How does supplemental instruction contribute to an

at-risk student's college readiness (knowledge, skills, attitudes, behaviors and strategies)? And 2) Does a student's internal or external locus of control predict academic performance?

CHAPTER II

LITERATURE REVIEW

An EBSCOhost search was used to find literature for this review. The following key terms were used to acquire research information: supplemental instruction, college preparedness, attribution theory, learning theory, Piaget, Erickson, Rotter, Locus of Control, student-centered learning theories, self-determination, college admission criteria, at-risk students, and retention. Since the inception of Supplemental Instruction (SI), current research literature is found nationally and internationally. The research conducted found extensive studies from institutions of higher education to support the efficacy of SI programs. Minimal information to the contrary exists.

College Readiness

The general assumption for many is that college bound students have acquired the necessary academic skills in high school to adequately prepare them for the rigor of college work (Conley, 2007b). If admission to college is the determining indicator for college readiness, then the millions that enter the college setting should be prepared for the rigors of college coursework. However, *Crisis at the Core: Preparing All Students for College and Work* (ACT, 2005) presents a dismal picture of college bound students. Per the ACT 2005 report, of the 1.2 million students sitting for the ACT exam in 2004, only 22 percent established readiness for college coursework in English, mathematics, and science. Only 50 percent of this population demonstrated competency in two subject

areas and 29 percent did not meet any benchmark. Therefore, these numbers reflect a significant need to understand the components of underprepared college students.

At-Risk and Underprepared Students

For the purpose of this paper, the terms at-risk and underprepared are used interchangeably. Laskey & Hetzel (2011) explain that underprepared students are also considered at-risk students, both sharing common characteristics in literature. Research literature reveals a complexity of variables that describe underprepared and at-risk students: demographic attributes, knowledge, skills, abilities, and academic preparation (Laskey & Hetzel, 2011; Mulvey, 2009; Tinto, 2006). Underprepared and at-risk students are especially vulnerable in being academically unsuccessful and are more prone to withdraw from classes or fail courses (Pizzolato, 2003; Tinto, 2006) or failing degree completion (Laskey & Hetzel, 2011; Tinto, 2006). Pizzolato prefers the term high risk (opposed to at-risk) stating that high achieving students also have their academic success threatened by the same challenges at-risk students encounter. As a result, an at-risk label places these students in a precarious position within higher education (Mulvey, 2009). This is especially true for institutions concerned with retention (Tinto, 2006).

Problem

The issue of unprepared college freshmen has a longstanding history in literature, including the transitional issues between high school to college (Somers, 1988; Conley, 2014). The prevalent transitional issue of college readiness for freshmen dominates admission, academic, and support service journals. Weimer (2013) discusses that most freshmen lack preparation for college-level work because of poor study skills and background knowledge necessary for course work. Standardized tests such as the ACT

and SAT, in conjunction with high school grade point averages (GPA), used for admission standards should be able to measure student academic capability. However, standardized test scores are used to label students as either high achieving or low achieving students (Mulvey, 2009). Private colleges and universities tend to be more particular in selecting higher achieving students (Conley, 2010). However, with the rising numbers of high school students pursuing higher education, Mulvey (2009) expects many students will not meet current admission standards.

Academic Predictors

GPA and standardized test scores are not comprehensive predictors of academic capability. Test scores do not adequately reflect student potential, nor do they measure other factors that contribute to college readiness. The ACT 2005 reports using only standardized testing admission criteria cannot measure the metacognitive skills necessary for academic success. Astin (1998) explains that "most underprepared students turn out to be simply those who have the lowest scores on some sort of normative measurement-standardized test, school grades, and the like" (p. 13). Many of these students possess self-regulated behaviors such as "time management, study skills, help-seeking strategies, persistence, and goal focus" (Conley, 2014, p. 14), which are contributors of a successful student. Nevertheless, GPA and test scores remain the common measurements for predicting academic outcomes for college bound students (Laskey & Hetzel, 2011).

Developmental Courses or Remediation

Conley (2010) and ACT reviewers (2005) define a college ready student as one who has a "level of preparation...to be ready to enroll and succeed —without remediation —

in a credit-bearing course at a two-year or four-year institution" (ACT, 2005, p. iii). Yet many students are not placing in entry-level courses. As a result, students are remediated to developmental classes to compensate for the lack of college ready skills and knowledge. According to Conley (2014), forty percent of admitted freshmen are placed in at least one developmental course based upon standardized placement tests. National statistics report that 17% of those taking remedial reading will receive a bachelor's degree or beyond and 20% of students taking two remedial courses will receive a degree (National Center for Education Statistics, 2004). The need for remediation in combination of factors of being first-generation college and low-income families consequently increases the risk for "time-to-degree" completion (Conley, 2007b).

Jackson and Kurlaender (2014) explain many students who require remediation have limited understanding for what it takes to succeed in college and lack "content knowledge, strategies, skills, and techniques" (Conley, 2014; p. 15) to place in entry-level courses. Therefore, since a large number of students require developmental education to equalize academic gaps, it is advantageous for universities and colleges to provide additional academic support to address the admission of at-risk students. Statistics for four-year institutions reveal 71% of institutions provide some remediation with private institutions reporting at almost 68% (NCES, 2001). Universities who admit at-risk students recognize the need for remedial courses and can allocate funding to provide access to much needed academic support (Conley, 2010).

Cognitive Skills

Successful college students possess the strategies to master content and to apply knowledge across multiple disciplines (Jackson & Kurlaender, 2014; Conley,

2010). Unfortunately, students think regurgitation of class material is an effective learning strategy. Seldom are they using the basic learning and thinking skills necessary to be academically successful (Blanc, Buhr, & Martin, 1983). Jackson and Kurlaender stress the importance of helping students with learning cognitive strategies and applying integrated knowledge across different disciplines. Conley (2007b) defines key cognitive strategies as a "disciplined approach to thinking" (p. 13). In essence, students need to employ a way of thinking about how to learn. Conley (2010) suggests learning occurs when content is encompassed by "probing, consolidating, and applying [that] information by means of key cognitive strategies" (p. 35). This practice of deeper learning helps send students on an educational trajectory toward *learning how to learn*, which transcends the content of a single class.

Knowledge Acquisition

McGuire and McGuire (2015), and Weimer (2013) report students continue to enter college without the ability to think critically about course content. Knowing how to "think" about material presented in classroom lectures and how to process information requires accurate dissemination of material. Students continue learning at a surface level without trying to understand what the material is conveying (Hurley, Jacobs, & Gilbert, 2006; McGuire & McGuire, 2015; Weimer, 2013). However, education practices continue to perpetuate surface learning. Litchfield and Dempsey (2015) point out that course assessments, such as multiple choice tests, promotes ongoing surface level learning. This process continues to hinder higher thinking skills (Somers, 1988). To think critically, a student must become an engaged learner, also called an active learner (Weimer, 2013).

McGuire and McGuire (2015) discusses the importance of active learning to develop strong students. In Weimer's book, *Learner-Centered Teaching: Five Key Changes to Practice (*2013), students should participate in activities that entail "reflection, assessment, and learning tasks" (p.40) to master content. Because many college students continue to rely on faculty to explicitly direct their learning, they become passive learners. According to McGuire & McGuire (2015), the objective of active learning promotes a student to become the role of a teacher. The student can self-teach and engage further into the learning process. Ultimately, active learners become self-directed learners, which aids students in mastering difficult content in their studies.

Academic Rigor

Educational perspective is important to all college students. Weimer (2013) reports most college students lack confidence as learners. Lectures, textbook reading, and notetaking can be overwhelming to students. The delivery of course information requires students to synthesize, manage, and exhibit their understanding of content information. However, students need to be able to employ cognitive strategies and diverse learning strategies to meet the rigors of college. Activities that develop and promote academic knowledge includes the ability to formulate problems, conduct research, reconcile opposing information, and meet academic deadlines (Conley, 2010). Many assignments in college require higher-order thinking (Mulvey, 2009). Underprepared students have not academically developed these types of activities to reinforce learning. Both freshmen college students and college professors rely upon high schools to prepare students with cognitive strategies, but the research continues to report otherwise. Only a limited number of high schools have intentionally structured curriculum and designed course

elements to promote college readiness (Conley, 2007a). According to Conley (2007a, 2007b), the most two important foundational skills students need to demonstrate in college is writing and research skills. Yet, underprepared students appear to lack these skills and are unable to meet instructor expectations and course requirements.

Academic Resources

At-risk and underprepared students too often lack the ability to recognize what help seeking strategies are necessary for them to be successful (Conley, 2014). Young and Ley (2005) points out underprepared students who are enrolled in developmental courses may need additional academic support. Many academic resource centers are located within the university, such as tutoring and writing centers, to provide additional support. However, at-risk students often fail both to recognize the difficulties occurring with their studies and to seek out help with support services. Tinto (2006) states, "Regarding the nature of [academic] support, research has demonstrated that support is most effective when it is connected to, not isolated from, the environment in which students are asked to learn" (p. 7). Tinto recommends supplemental instruction as a support strategy to help students succeed.

Metacognitive Skills

Conley (2007b; 2010) further describes the necessity for college students to possess a range of academic behaviors necessary for academic success. These behaviors include "student self-awareness, self-monitoring, and self-control" skills (p. 16). Different from cognitive strategies, metacognitive skills are entirely independent from cognitive content strategies. Students' academic behaviors and attitudes towards learning should include intentionality towards mastering study skills (Mulvey, 2009). Regardless

of a student's ability to possess knowledge or utilize cognitive strategies, insufficient attention to academic behaviors is problematic especially for first-year students (Conley, 2010).

Self-awareness

The literature discusses how first-year students are often unaware of the required tasks necessary to complete course assignments. Conley (2007b) lists academic behavioral attributes necessary for students to be successful. These tasks include "study skills, time management, awareness of one's performance, persistence, and the ability to utilize study groups" (p. 5). Each of these behaviors require students to demonstrate a high-level of self-awareness and deliberate practice strategies to understand what it takes to master content. A lack of academic awareness can skew a student's behaviors to either overestimate or underestimate the length of time to complete an assignment or the amount of time required to sufficiently prepare for exams (Mulvey, 2009). Without a strong sense for knowing which strategies or behaviors contribute to success or failure in learning, the tendency for repetitive behavior continues, producing the same results. Furthermore, blame for failure may be attributed to other events or external reinforcements rather than their ability to control for successful outcomes (Pascarella, Edison, Hagedorn, Nora, & Terenzini, 1996; Rotter, 1966).

Self-monitoring

When a student can anticipate about "how to think" and determine how to direct their thinking (Conley 2007b), the student becomes an effective learner. Conley said this type of student monitors, evaluates, and actively regulates the way they learn. Academic literature identifies study skills and time-management as part of self-monitoring issues

unprepared students lack in college. More importantly, college students need to possess persistence working through difficult academic tasks or courses (Mulvey, 2009). Too often, the consideration of time allotment for studying interferes with being successful because students do not prioritize the steps to complete assignments.

Self-regulation

Significant information is found between the association of academic behaviors and student success which requires self-regulation skills (McGuire & McGuire, 2015; Somers, 1988; Zimmerman, 1989). Zimmerman (1989) reports students who take responsibility for their academic performance typically are "metacognitively, motivationally, and behaviourally active participants in their own learning" (p. 329). These types of learners possess strong self-regulation skills that enable them to perform academically well and if not well, they find alternative ways to overcome barriers. This ability to take greater responsibility for their academic achievement is an outcome of this metacognitive skill set (Zimmerman, 1989). For example, students who lack self-regulation skills underestimate the value of having their professor as a resource for help. A professor can mitigate the barriers or help inform the student why they are not mastering content in the course.

Acclimation to College Culture

Navigating college culture and acclimating to new surroundings is another determining factor for college success (Conley, 2007b). Yet, at-risk students unfamiliar with college culture become overwhelmed with newly found responsibilities (Conley, 2010). Students transitioning from high school to college find the availability of more free time and less time spent in daily classes. Additionally, Conley reports students

underestimate outside classroom study time necessary to meet academic demands. Students presented with less time constraints have more opportunity to fill open hours with socialization or work. Unfortunately, this transition catches many students off guard. In high school, most students have a well-structured daily schedule. However, the transition to college requires students to become self-managers of their own schedules requiring them to use metacognitive strategies.

Academic Self-Concept

A student's ability to succeed academically is largely founded upon what they believe about himself or herself. From a motivational science perspective, Pintrich (2003) discusses how students' perceptions of academic potential directly correlates with a student's perceived competence and self-efficacy. Researchers report that students who believe they can be academically successful will be motivated learners (Rotter, 1966, Zimmerman, 1989). The converse is true, students who perceive they lack in academic success correlates with academic self-esteem. Incoming freshmen who are at-risk often report feeling academically inadequate and feel labeled as such. They typically report three primary reasons for this academic insecurity. First, feelings of inadequacy develop with the knowledge of having fallen short of meeting university academic standards, i.e. their low ACT and SAT test scores. Second, because of low standardized test scores they are mandated to take remedial and developmental courses (which do not contribute to credit bearing hours). Lastly, they report feeling academically inadequate compared to their peers not enrolled in these remedial courses.

Low self-concept often leads to high-risk behaviors. At-risk students tend to avoid interaction with faculty in seeking necessary assistance to be academically successful.

This faculty-student interaction gap stems from a student's reluctance to address their academic deficits and issues with professors. The reasons why at-risk students may avoid faculty interaction may be due to a large class environment, feel the professor is unapproachable, or is too insecure to admit a lack of understanding course content (Arendale, 1994).

Additionally, students with academic low self-concepts may resist seeking help in tutoring and writing centers, participate in study groups, or utilize other academic resources. Self-reporting the need for assistance to peers, such as tutors, requires a confident student to disclose their academic struggles.

Another consequence of low self-concept is the underestimation or overestimation of the student's ability to be successful. Students who underestimate their academic abilities do not lack the capabilities to be successful in meeting university academic demands (Astin, 1998); they simply are needing to develop cognitive and metacognitive skills to achieve their goals. Students who overestimate their academic abilities base their over confidence from a relatively easier high school setting. The Higher Education Research Institute (2005) reveals 58.6% of students spent less than six hours per week on homework and earned A's or B's in their senior year. This creates an erroneous expectation that the same amount of effort in the college setting would produce the same GPA. This transition from high school to college makes a significant shift as the effort for learning becomes increasingly more difficult.

Theoretical Framework

Many behavioral theorists (e.g. Bandura, Rotter, etc.) have addressed the concerns of at-risk college students and their academic behaviors. For the purpose of this study,

social learning theory (Bandura, 1977) and Rotter's locus of control theory (Rotter, 1966) will be examined to support measurements and understanding of data analyses.

Social Learning Theory

Bandura (1977) purports the hub of effective learning is neither solely from within the individual nor rooted in environmental factors. Rather, effective learning is generated in collaborative, relational settings. In the theory he popularized, social learning theory, Bandura proposed that the acquisition of knowledge and understanding, with corresponding behavioral changes, most effectively take place through observing and imitating others (Bandura, 1977). In other words, learning is enhanced when a learner's internal cognitive processes interact within a relational environment that offers meaningful content and opportunities to observe and dialog with fellow learners.

Social learning theory was developed in the psychological historical backdrop of stimulus-response behavioral theories (Bandura, 1977). These theories state that the learning process occurs as learners interact with their environments and receive stimuli that positively or negatively reinforce those interactions and behaviors. Social theorists (e.g. Bandura, Rotter, and others) do not deny stimulus-response theories, rather argue that most learning takes place in contexts through which the vicariously modeled observations of others are witnessed, even before any significant reward or consequences have been personally experienced by the student.

Psychological theories have traditionally assumed that learning can occur only by performing responses and experiencing their effects. In actuality, virtually all learning phenomena resulting from direct experience occur on a vicarious basis by observing other people's behaviors and its consequences for them. The capacity to learn by observation

enables people to acquire large, integrated patterns of behavior without having to form them gradually by tedious trial and error (Bandura, 1977, p. 12).

Consistent with social learning theory, research supports that the most effective learning occurs in study groups; rather than in isolation (Tinto, 2006). These vicariously modeled relationships offer all group participants "symbolic" (Bandura, 1977) possibilities of academic success, without them personally having to endure the painful and laborious "trial and error" process of academic failure as their sole "teacher." Students mutually modeling academic behaviors through group interactions promote a positive effect upon academic performance

Rotter's (1966) social learning theory emphasizes that "reinforcement acts to strengthen an expectancy that a particular behavior or event will be followed by that reinforcement in the future" (p.2). Therefore, the collaborative academic efforts in a social or group setting will increase the individual's independent learning abilities.

Locus of Control (LOC)

A college student's self-perception is a key factor in their academic success or failure. This self-perception is commonly called locus of control, a continuum between the poles of internal locus of control and external locus of control (Rotter, 1966). As explained by Sagone and Caroli (2014), "The locus of control is defined as a personality trait referred to an individual's perception of the locus of events as internally determined by his or her own behavior versus fate, luck or external circumstances" (p.222). Academic success typically involves students who have a strong sense of internal locus of control. On the other hand, failing students may attribute their academic challenges to external locus of control events such as course difficulty, exams designed to use trickery,

or professor discord, an indication that students may need additional academic and emotional support.

According to Wang (2005), several recent studies indicate that relationships exist between having an internal locus of control and positive academic behaviors. For example, students categorized as having an internal locus of control were found to demonstrate more meta-cognitive behaviors such as being aware of exam schedules and faculty office hours. Other studies show that students categorized as having an external locus of control do worse than those characterized as having an internal locus of control in educational activities requiring self-direction (e.g., web-based instruction) (Wang & Newlin, 2000). Such research suggests that supplemental instruction programs designed to develop and enhance internal locus of control by facilitating self-directed learning will also facilitate academic success (Rotter, 1966).

Supplemental Instruction Program

Deanna C. Martin, Ph.D., at the University of Missouri, Kansas City (UMKC), created the Supplemental Instruction Program in 1973 to address difficult courses offered in health science professional schools (Arendale, 1997). By 1981, UMKC expanded SI services to other academic areas in the institution (Arendale, 1994). During this era, the U.S. Department of Education designated UMKC's SI Program as an Exemplary Educational Program (Martin, Arendale, & South Carolina University, 1992; Arendale, 1994). Currently, the UMKC SI model is one of two recognized nationally for positively impacting graduation rates. Since SI's inception, the program has become nationally and globally known as an academic support and retention resource. Program developers argue that effective supplemental instruction programs should be modeled after the UMKC

model by using methods that support content knowledge, skills, attitudes and behaviors (Arendale, 1997; Hurley, et al., 2006). The UMKC SI model is based on that proposition.

SI Model

SI is designed to target difficult courses, not at-risk students (Blanc, DeBuhr, & Martin, 1983; Arendale, 1994). This designation of a high-risk course removes the stigma attached to at-risk students as the designation deflects from students perceiving incompetence in the content specific course. Therefore, SI is attached to courses that have 30% or higher D, F, or withdraw rates for any given course (Blanc, DeBuhr, & Martin, 1983; Arendale, 1994, Congos & Schoeps, 1998). As a non-remedial intervention, SI is effective with underprepared students (Arendale, 1994). The SI model is a peer-facilitated academic support program to address academic performance and retention (Arendale, 1994, Blanc, DeBuhr, & Martin, 1983, Congos & Schoeps, 1998). According to Congos and Schoeps (1998), the financial benefit to universities is seen in the high rate of re-enrollment from semester to semester.

Philosophy of the SI Model

The SI model is constructed on multiple learning theories (Hurley, et al., 2006). The theories that shape the philosophy of SI take from behavioral, cognitive development, social interdependence, and interpretive-critical principles to form the "how" and "what" students learn and do in SI. Social learning is an integral component to the SI model. Students who participate in SI, have numerous opportunities to: actively engage with other students in a group setting; observe how those other students engage with course content; observe how other students are rewarded by those interactions; and receive reinforcement vicariously. Therefore, this research hypothesizes that applying

opportunities for social learning, within the context of specific content pertaining to developing academic skills and abilities, will enhance learning of those academic skills and abilities (i.e., the SI content activities).

Analysis of SI Outcomes

SI sessions are designed to encourage voluntary participation from all class participants. Typically, academically stronger students will voluntarily attend SI compared to struggling students (Arendale, 1994). Since struggling students are reluctant to admit they need academic assistance, SI provides a non-remedial environment where the "struggle" is placed on the course content and not a targeted population. Struggling learners often remain silent afraid to openly admit in the classroom their lack of understanding (Hurley, et al., 2006). In the collaborative learning environment, learning is powered through the group interaction between all students with varying learning skills (Arendale, 1994). The outcome is social interdependence where individually students "contributes to the task at hand and the students benefit from everyone in the group," (Hurley, et al., p. 12). According to Hurley, et al., when content strategies are developed and learned in a group context they can be transferred into other class or content settings. This transference of information becomes knowledge and thereby, develops a stronger academic student.

Supplemental instruction also works well because SI sessions begin early in the semester. Typically, many courses with attached SI modules begin study sessions week one (Arendale, 1994). As an early academic intervention, albeit voluntary, students immediately employ learning and study strategies (e.g. note taking strategies, organization, quiz or exam preparation) learned from SI. Whereas, most universities

"early alert" systems designed to identify struggling students often comes too late into the semester (Arendale, 1994). Too much time has passed to provide the much-needed required skills to be academically successful.

SI Sessions

SI sessions attached to difficult courses meet on an average of 3-5 times per week for approximately one to one and one-half hours outside of classroom instruction (University of Missouri-Kansas City, 2014). Each SI session focuses on course curriculum, targeting difficult concepts or information. Every SI session should have "session objectives, content to be covered, and processes to be used" (Arendale, 1994, p. 17) that covers difficult course content. An integration of group activities with course content helps students adopt effective thinking and applied learning skills (Congos & Schoeps, 1998). Therefore, the role of the SI leaders is critical to facilitating SI sessions.

SI Leader Role

Supplemental instruction leaders have several roles in and out of SI sessions. The first role is to be a model student (University of Missouri-Kansas City, 2014; Arendale, 1994). The SI leader attends classes with enrolled students, takes notes, participates in class lectures, and is expected to read course material (Arendale, 1994). Preferably, the SI leader has previously taken the course with the professor that the SI module is offered. As a model student, the SI leader can demonstrate a deep understanding of course content and the complexity of the course and has adopted learning strategies to master content (University of Missouri-Kansas City, 2014).

The second role of a SI leader is a facilitator. A SI leader is not a teacher; no new content is taught. He or she is trained to help students "formulate and answer their own

questions" (University of Missouri-Kansas City, 2014, p. 8) as a way students process and develop their learning skills. The goal of SI sessions, integrating course content, is to provide activities that teach students "*How to learn*" and "*What to learn*" (p. 8). Thereby, helping students to lessen the gap between insufficient knowledge and new information (Congo & Schoeps, 1998).

SI Student Outcomes

The effectiveness of SI as an academic program and retention program has been reported extensively in literature over thirty years (Hurley, et al., 2006). University of Missouri-Kansas City (2014), Arendale (1994), and many other SI programs nationally and globally report the same outcomes for students who participate in effective courses with SI modules, student learning excels. In comparison to non-SI participants, SI participants mean grades are one-half to one-full letter grade higher (Hurley, et al., 2006; University of Missouri-Kansas City, 2014; Congos & Schoeps, 1998).

Congo and Schoeps (1998) illustrates the impact SI has on students in an introductory Biology course. Their study compares the percentages of ABC's and DFW's of non-SI group participants (n=321) and the SI group participants (n=153). SI participants only needed to attend five SI sessions to be considered in the SI group sample. Data analysis using the Chi-square test (OSL=0.003) compared both groups' final course grades resulting a significant difference between them. The non-SI group reported 65.48% of students made ABC's and 34.52%, DFW's. In comparison, the SI group reported 86.27% earned ABC's and 13.73%, DFWs.

When Congos and Schoeps (1998) conducted an analysis of covariance (ANCOVA) using attendance (categorical variable) with predicted grade point average

(using SAT scores) on final grades, these variables tested statistically significant (OSL=0.0001). Consequently, both SI attendance and predicted grade point average significantly impacts final course grades. Congos and Schoeps (1998) conclude "SI's focus on acquiring and refining the tools essential for learning and applying them to subject matter is a successful strategy for helping students learn and understand what it takes to succeed in college" (p. 58).

CHAPTER III

METHODOLOGY

This researcher surveyed freshmen students enrolled in the newly piloted Bridge Scholars Program at Abilene Christian University. Using Bandura's social theory and Rotter's locus of control theories on academic performance, this study was designed to answer the questions: How does supplemental instruction contribute to an at-risk student's college readiness? And, does a student's locus of control predict academic performance? The study will use a quantitative design to study the impact of locus of control and social learning on students participating in supplemental instruction in a developmental education program. This study has been approved by the university's institutional review board (Appendix A).

Variables

Study variables include high school GPAs, standardized test scores (ACT/SAT), locus of control survey pretest and posttest, BIBL 101 exam scores including final course grades, supplemental instruction attendance records, demographics, and overall first-term college GPA.

Participants

Fall 2016 Abilene Christian University Bridge Scholar students (entering freshmen who are age 18 or above) were approached as participants for this study by the researcher. Students who were minors at the time of the survey instrument were not

included as part of this study. As part of their enrollment in the University, the participants initially were required to attend supplemental instruction sessions for their Bible 101, *Life and Teachings of Jesus*, course to fulfill the contractual agreement between ACU Admissions and Bridge Scholars Program.

During the study, the Supplemental Instruction Program provided a total of 22 supplemental instruction sessions. Upon program review within the first month of the fall semester, attendance in supplemental instruction was changed from compulsory participation to voluntary participation. Students participating in SI sessions after the fifth study session are considered as voluntary SI. Therefore, statistical analysis of required participation, voluntary participation, and a combination of both were tested to examine the effectiveness of the SI intervention on academic performance.

All students were considered voluntary participants in this study. All communication regarding this study expressed any participation for research purposes were voluntary. Communication (consent form and verbal discussion) explicitly informed students that participation in research would not have any bearing on their course grades.

Demographics

Of the fifty-four enrolled 2017 Bridge Scholar students, six students were minors at the time of the pre-locus of control survey and omitted from research. All participants enrolled in the study completed a consent to participate form which was approved by the university institutional research review board. Three students who participated in the pre-locus of control survey were omitted. One participant was omitted due to invalid answers, one declined to take the post-survey, and one was not present at the time the post-survey was administered. A total of forty-five participated in this study and completed the pretest

and posttest locus of control survey.

Demographic information is provided in Table 1. Of the forty-five students, 13 males and 32 females consented to participate in this study. Based on institutional reporting, 20% identified as Other, Hispanic American, 33.3% identified as White, Not of Hispanic American, 28.9% identified Black, not of Hispanic Origin, and 2.2% Mexican American, and 15.6% as Other. All participants were 18 years of age at the time of the pre-locus of control survey. All Bridge Scholar students were enrolled in BIBL 101, a 3-hour course required for all incoming freshmen and taught by the same professor in two sections.

Table 1

Characteristics of Participants (n=45)

Variable	Number	Percent
Gender		
Male	13	29.0
Female	32	71.0
Ethnicity		
Other, Hispanic American	9	20.0
White, Not of Hispanic American	15	33.3
Black, Not of Hispanic Origin	13	28.9
Mexican American	1	2.2
Other	7	15.6

High school grade point averages and composite ACT and SAT scores are provided in Table 2. Institutional data was collected and is reflective of data used for admission criteria to the university. The average GPA on a 4.0 scale for Bridge Scholar students was a 3.20. Two students averaged a 93.8 high school GPA on a 100-point scale. Comparing standardized test scores for the ACT and SAT, the Concordance Table Set (Appendix D) by the test makers was used to compare Bridge Scholars test score across

both exams (The College Board, 2015). For data analysis, an ACT composite score was set by information in Table 2 to provide coding in SPSS. As a result, the average ACT score for incoming Bridge students was a 17 composite score (SAT equivalency range was 820-850).

Table 2

High School Grade Point Averages and ACT/SAT Standardized Scores

Variable	N	Average Score
High School GPA		
	2	93.8*
	3	N/A**
	40	3.2
ACT and SAT Scores	45	17***

* GPA based on 100 scale versus 4.0 GPA scale
** GPA not available in records
***See Appendix D for Concordance Composite Scores

Consent Procedures

An invitation to participate in this study was made on two separate occasions. Students were approached in their BIBL 101 class and during their supplemental instruction session during the first week of school. An explanation describing the purpose of this study, research procedures, and voluntary participation was presented in both their BIBL 101 course or in the attached supplemental instruction session. During the second week of school, the Locus of Control Survey (Appendix C) was administered at the beginning of the SI session. Fifty-four Bridge students were in attendance. Potential participants were provided a hard copy of the Locus of Control Survey after the Waiver of Consent Forms (Appendix B) were signed.

Research Design

The research plan was a within-subjects, repeated measures study of ACU Bridge Scholar students (n>30), fall 2016. Bridge Scholar students are enrolled in BIBL 101 with two sections offered and taught by the same professor. This research project identified associations between self-perceptions of locus of control and academic outcomes using SI as a proven intervention model. The assessment process evaluated how students study group interactions measured by SI sessions attendance and possible perception change in their locus of control during the fall semester. Under the direction of University Access Programs, the Supplemental Instruction Program will use outcomes derived from this study to help shape future supplemental instruction programming and policies. Upon completion of the study, all identifiable information was removed.

Measurement

This study included institutional data retrieved from reports provided by the Office of Institutional Effectiveness. Permission to utilize data was granted by the Registrar and the Office of the Registrar (IRB approval letter is attached). Demographic data, standardized test scores (SAT and/or ACT), and BIBL 101 exam scores variables were utilized to assess academic factors that contribute to academic performance. Exams were designed, administered, and graded by the course instructor. In addition, SI attendance data was collected from either the SI leader for BIBL 101 or the SI coordinator.

Survey Instrument

Julian B. Rotter developed the Internal-External Locus of Control Scale (also referred to as the I-E Scale) in 1966 and many versions of the original scale have been

modified over the years. For this study, Rotter's original survey (Appendix C) was formatted into a manual survey for respondents. The survey consists of 29-items, forced-choice statements including 6 filler items. This scale measures an individual's perceptions and beliefs that his or her rewards or punishments are a result of internal or external control. Behaviors identified with internal control are a result of their own actions to determine outcomes. External control is outside of one's behaviors and outcomes are attributed to luck, chance, fate, or other people's behaviors. A pretest and posttest of the Locus of Control Survey was given over a four-month period to measure perception of internal or external control of reinforcement.

For the locus of control measurement, the median score (i.e., 10) was used to assign students to internal (lower than 10) versus external (10 and higher) sense of control groups. Therefore, students who measured on the continuous scale with a lower score were more prone to have a stronger sense of internal locus of control (n=27) compared to students who scored above 10 (n=18) were more inclined to have stronger external locus of control perceptions.

Data Collection

All data was password protected and personal information was de-identified for confidentiality upon completion of this study. All data was stored in secured locations and not accessible to anyone other than the researcher, thesis chair, and ACU supervisor. Such locations included a password-protected electronic file (Microsoft Excel, Google document, or other format suited for storage of such data) located on a secure device (USB or computer hard drive).

Microsoft Excel was used to store data for the Locus of Control Scales survey, institutional data pertinent to this study (e.g. demographic data, cumulative, and ACT/SAT test scores), and SI program data. All information was password protected. SPSS or another data analysis software program was utilized to generate appropriate statistical tests. Such equipment, software, and procedures are widely accepted methods for data analysis. Only the researcher and supervisor knew the username and password combinations for these locations. When the study was completed, data was destroyed.

Data Analysis

Data was analyzed using various statistical tests to determine if a significant linear relationship or predictive value exists between aforesaid data variables. A hierarchical regression was conducted to assess if ACT/SAT scores, pre-locus of control perceptions, and total SI participation predicted BIBL 101 term course grades. A comparison between students' perceptions of their locus of control, academic outcomes, and SI attendance will be analyzed using independent-sample t-tests and paired-sample t-tests models. The comparable means between data sets may anticipate predictive relationships between students' locus of control and academic outcomes. Descriptive statistics of the fall 2016 Bridge Scholar students was included. Other statistical analyses may be conducted upon further determination.

CHAPTER IV

RESULTS

Statistical Analysis

Term Course Grade Results

A hierarchal linear regression of BIBL 101 term course grades was conducted on three predictor models; composite ACT/SAT scores, pre-locus of control, and total supplemental instruction participation. Bootstrapping was used to account for the small sample size and non-normality in data. In model 1, ACT/SAT composite scores were entered and found statistically significant β = -37(-3.24, -0.16), p=.02. Model 2, with pre-locus of control entered into the regression model, the amount of explained variation in the final course grade was statistically significant β = -.36 (-3.20, -0.02), p=.03. In model 1, the standardized regression coefficient was -.37. In model 2, the standard regression coefficient was -.36. The results indicate that as the values for ACT/SAT scores increase, the course grades decrease by .37 deviations with pre-locus of control factored into the model. As the values of ACT/SAT scores increase, course grades decrease. Model 3 shows that Total SI participation was the best predictor, in the context of those three predictors, of course grade β = .43(-2.75, 0.59), p=.01. The standardized coefficient for Total SI participation was .43, while the coefficient for ACT/SAT dropped to -.23. In model 3, only Total SI had a statistically significant regression coefficient (β = .43, $t(37) = 2.69$, p = .011).

As a result, Total SI was the only variable that significantly contributed to explaining variation in final course grade. The ACT/SAT may have contributed to the ability to explain variation in the final course grade. ACT/SAT may also have some predictive validity on course grades when tested with pre-locus of control. However, when all three variables were tested together, Total SI was the only variable that significantly contributed to the ability to explain variation in the final course grade. ACT/SAT might have some predictive validity when used alone or with pre-locus of control to predict course grades.

Table 3

Regression Coefficients from Linear Regression of BIBL 101 Term Course Grade on Three Predictor Models

							95% CI	
Model	**Variable**	**B**	**SE**	**β**	***t***	***p***	**Lower**	**Upper**
1	(Constant)	114.80	13.62		9.45	0.00	88.67	140.92
	Composite ACT/SAT	-1.72	0.81	-0.37	-2.40	0.02	-3.24	-0.16
2	(Constant)	114.09	14.84		7.95	0.00	85.02	141.49
	Composite ACT/SAT	-1.70	0.82	-0.36	-2.31	0.03	-3.20	-0.02
	Pre-Locus of Control	0.05	0.49	0.02	0.10	0.92	-0.99	0.97
3	(Constant)	100.89	15.60		7.14	0.00	70.43	130.35
	Composite ACT/SAT	-1.08	0.84	-0.23	-1.50	0.14	-2.75	0.59
	Pre-Locus of Control	-0.33	0.50	-0.10	-0.65	0.52	-1.50	0.52
	Total SI Participation	0.66	0.23	0.43	2.69	0.01	0.24	1.14

Supplemental Instruction Results

T-tests were conducted to compare the attendance in supplemental instruction. The comparisons include the total SI module and voluntary SI module. A test was not

conducted to isolate the impact of the required SI module. However, the total SI module includes required and voluntary SI attendance.

Table 4

Supplemental Instruction Participation by Module

SI Module	Sessions Attended	N
Total SI	<10	27
	> =10	18
Voluntary SI	0	12
	1+	33
Required SI	4	38
	5	7

Total SI Module

Four independent-samples t-tests were conducted to compare the means between students (n=45) who attended fewer than 10 supplemental instruction (SI) sessions (n=27) and those who attended 10 or more SI sessions (n=18). The first t-test compared BIBL 101 exam 1 grades in students who attended fewer than 10 supplemental instruction sessions and those who attended 10 or more sessions. Given a violation of Levene's test for homogeneity of variances, $F(1, 42)=4.48$, p=.04, a test not assuming homogeneous variances was calculated. The results of this test indicated there was not a significant difference in BIBL 101 exam 1 test scores between the two groups, $t(43)= -1.80$, $p>.05$. The results suggest that the students attending fewer than 10 sessions ($M=79.93$, $SD=13.873$) did relatively as well on the first exam as students attending 10 or more sessions ($M=86.44$, $SD=8.016$) These results suggest that the number of SI sessions

attended before the first exam taken in BIBL 101 had no effect on the exam grade. Hedges's g (Borenstein, Hedges, Higgins, & Rothstein, 2009) was used to determine the effect size of the means in all independent-sample t-tests. The mean for those who attended fewer than 10 SI sessions was .54 standard deviations lower than the mean for those who attended more than 10 SI sessions.

A second t-test compared BIBL 101 final exam grades in students who attended fewer than 10 supplemental instruction sessions and those who attended 10 or more sessions. Given a violation of Levene's test for homogeneity of variances, $F(1,43)=1.89$, $p=1.8$, a test assuming homogeneous variances was calculated. The results of this test indicated a significant difference in BIBL 101 final exam scores between the number of supplemental instruction sessions attended, $t(43)= -2.26$, $p=.029$. The results suggest students attending fewer than 10 sessions ($M=79.37$, $SD=16.04$) did poorer on the final exam than students attending 10 or more sessions ($M=89.61$, $SD=12.97$). These results suggest that the number of SI sessions attended for the semester affected the final exam scores. The mean for those who attended fewer than 10 SI sessions was .67 standard deviations lower than was the mean for those who attended 10 or more sessions.

The third t-test compared the BIBL 101 term course grades in students who attended fewer than 10 supplemental instruction sessions and those who attended 10 or more sessions. Given a violation of Levene's test for homogeneity of variances, $F(1,43)=1.18$, $p=2.8$, a test assuming homogeneous variances was calculated. There was a significant difference in the BIBL 101 term course grades for students attending fewer than 10 sessions ($M=83.53$, $SD= 9.13$) and students attending 10 or more sessions ($M=89.73$, $SD=7.13$); $t(43)=-2.43$, $p=.019$. The results suggest the difference in SI

attendance and the term course grade is affected by the number of SI sessions attended. The mean for those who attended fewer than 10 SI sessions were .73 standard deviations lower than was the mean for those who attended 10 or more sessions.

Lastly, a t-test was conducted to compare students' cumulative GPA (fall 2016 semester) for those who attended 10 supplemental instruction sessions and those who attended 10 or more sessions. Given a violation of Levene's test for homogeneity of variances, $F(1,43)=6.39$, $p=.015$, a test not assuming homogeneous variances was calculated. The results suggest that the students attending fewer than 10 sessions ($M=2.56$, $SD=1.00$) made significantly lower overall cumulative GPAs than students attending 10 or more sessions ($M=3.41$, $SD=.67$), $t(43)= -3.40$, $p=.001$. The results of this test propose there was a highly significant difference between those who attended 10 or more SI sessions and their overall GPA for the fall semester. The mean for those who attended fewer than 10 SI sessions was .94 standard deviations lower than was the mean for those who attended 10 or more sessions.

Voluntary SI Module

Of the 45 participants enrolled in this study, 12 students did not attend *any* voluntary SI session and 33 students attended at least one voluntary SI session. In order to measure the differences in BIBL 101 exam 1 grades, final exam grades, term course grades, and cumulative GPA scores, an independent-samples t-test was conducted to determine if any attendance in voluntary SI session participation (one or more sessions) is statistically significant.

Given a violation of Levene's test for homogeneity of variances, all t-tests assume homogenous variances was calculated for each independent variable: BIBL 101 exam 1

$F(1, 43)=1.85$, p=.18; final exam $F(1, 43)=2.86$, p=.10; term course grade $F(1,43)=.13$, $p=.73$; and cumulative GPA $F(1,43)=2.78$, $p=.103$.

The results of the tests indicated that there was no significant difference in exam 1 scores between those who attended at least one voluntary SI session and those who never attended voluntary SI, $t(43)=-2.01$, $p=.051$. These results suggest that students' exam 1 scores for students who never attended voluntary SI ($M=76.67$, $SD=13.44$) did vary much in test scores than students who attended at least one voluntary SI session ($M=84.67$, $SD=11.19$). The mean for those who did not attend any SI session was .67 standard deviations lower than was the mean for those who attended one or more sessions.

Outcome measures also examine the difference in voluntary SI participation in final exam scores. The results suggest that students that did not participate in voluntary SI sessions ($M=75.75$, $SD=17.73$) and those who attended at least one voluntary SI session ($M=86.27$, $SD=13.98$) was statistically significant, $t(43)=-2.08$, $p=.04$. The mean for those who did not attend any SI session was .69 standard deviations lower than was the mean for those who attended one or more sessions.

The results of the tests indicated that there was a significant difference in term course grades between those who attended at least one voluntary SI session and those who never attended voluntary SI, $t(43)=-2.33$, $p=.03$. These results suggest that students' fall term course grades for students who never attended voluntary SI ($M=81.15$, $SD=7.99$) have term course grades than students who attended at least one voluntary SI session ($M=87.78$, $SD=8.59$). The mean for those who did not attend any SI session was .77 standard deviations lower than was the mean for those who attended one or more sessions.

Outcome measures also examine the difference in voluntary SI participation in cumulative GPA for fall 2016. The results suggest that students that did not participate in voluntary SI sessions (M=2.25, SD=.62) and those who attended at least one voluntary SI session (M=3.13, SD=.98) was statistically significant, $t(43)$= -2.92, p=.01. The mean for those who did not attend any SI session was .97 standard deviations lower than was the mean for those who attended one or more sessions.

Paired-Samples t-Test

A paired-samples t-test was conducted to compare the number of voluntary SI sessions attended in BIBL 101 exam 1 and final exam grades. Of the 45 students surveyed, 12 students did not participate in voluntary SI sessions and 33 participated in voluntary SI sessions. There was not a significant difference ($t(33)$, p=.61) in exam 1 (M=81.18, SD=13.09) and final exam grades (M=79.71, SD=15.87) for students who attended less than 10 voluntary SI sessions. There was a significant difference ($t(10)$, p= .03) in exam 1 (M=86.73, SD=7.50) and final exam grades (M=95.09, SD=6.38) for students who attended 10 or more voluntary SI sessions. Specifically, the results suggest attending 10 or more voluntary SI sessions positively affected exam 1 and final exam grades. The mean for those who attended fewer than 10 voluntary SI sessions was .67 standard deviations lower than the mean for those who attended 10 or more sessions.

Table 5

Paired Samples Statistics Voluntary SI Categorized < 10 = 0; 10 and more = 1

							95% CI		
Number SI Sessions	BIBL 101 Exam	N	Mean	SD	*t*	*p*	Lower	Upper	*g*
< 10	Exam 1	34	81.18	13.19					
	Final	34	79.71	15.87	0.52	0.61	-4.27	7.21	-0.67
> = 10	Exam 1	11	86.73	7.50					
	Final	11	95.09	6.38	-2.57	0.03	-15.61	-1.12	

Term Course Grades and SI Participation

A grade distribution for BIBL 101, *Life and Teachings*, was categorically analyzed to understand the impact of SI attendance on term course grades for participants in this study. Of the 45 participants, 33.3% of students (n=15) received an A, 42.2% (n=19), received a B, 15.6% (n=7) received a C, and 8.9% (n=4) received a D. The largest amount of student participation in supplemental instruction was in the six to 10 sessions range. Those who attended 11 to 15 sessions did not score less than C in the course.

Table 6

Total Supplemental Instruction Attendance Categorized by Term Course Grade

SI Attendance	D (<69)	C (70-79)	B (80-89)	A (90-100)	Total
0 to 5 SI Sessions	2 (16.7%)	2 (16.7%)	7 (58.3%)	1 (8.3%)	12
6 to 10 SI Sessions	2 (12.5%)	2 (12.5%)	6 (37.5%)	6 (37.5%)	16
11 to 15 SI Sessions	0 (0%)	3 (42.9%)	1 (14.3%)	3 (42.9%)	7
16 to 20 SI Sessions	0 (0%)	0 (0%)	4 (50%)	4 (50%)	8
More than 20 SI Sessions	0 (0%)	0 (0%)	1 (50%)	1 (50%)	2
Total	4 (8.9%)	7 (15.6%)	19 (42.2%)	15 (33.30%)	45

Locus of Control Results

Of the 45 participants enrolled in the study, 39 students were surveyed to examine perceptions of locus of control as a predictor for academic performance. A paired-samples *t*-test was conducted to compare participation in voluntary SI session in pre-locus of control and post- locus of control perceptions in academic performance. There was not a significant difference for students who did not attend any voluntary SI session in the scores for the pretest locus of control (M=9.7, SD=2.11) and posttest locus of control surveys (M=11.2, SD=3.12); $t(36)$= -1.86, p=.10). In addition, there was no significant difference for students who attended voluntary SI in the scores for pretest locus of control (M=9.96, SD=2.93) and posttest locus of control (M=9.67, SD=3.22) surveys; $t(36)$=.53, p=.60. The results suggest that voluntary SI attendance is not a predictor for students' perceptions of locus of control on academic performance.

Table 7

Paired Samples Statistics for Pretest and Posttest Locus of Control

							95% CI Diff.	
Voluntary SI	Test	N	Mean	SD	*t*	*p*	L	U
No	Pretest	10	9.70	2.11				
	Posttest	10	11.20	3.12	-1.86	0.10	-3.32	0.32
Yes	Pretest	27	9.96	2.93				
	Posttest	27	9.67	3.22	0.53	0.60	-0.85	1.44

An independent-samples *t*-test was conducted to determine if mean differences existed between high and low locus of control groups on BIBL 101 term course grades. The test on internal or external locus of control shows no predictive value on course grades; t(43)= -.44, p=.66.

Table 8

BIBL 101 Term Course Grade by Locus of Control Category

						95% Confidence Interval	
Locus of Control Category	N	Mean	SD	*t*	*p*	Lower	Upper
Less than 10	27	85.53	9.1	-0.44	0.66	-6.68	4.28
More than 10	18	86.73	8.7				

Note: Scores Reflect Low Locus of Control = Mean of 10 and Lower; High Locus of Control = Mean Greater than 10

CHAPTER V

DISCUSSION

Universities depend highly upon high school GPA and ACT/SAT scores as predictors of college readiness (Laskey & Hetzel, 2011). These data suggest ACT/SAT scores show some predictive value in term course grades for BIBL 101. However, the standardized tests were not the best predictor. Hierarchical linear regression results showed that, with three predictor variables entered, SI participation was a better predictor of the final course grade that standardized test scores were (Table 3). As Astin (1998) suggested, many underprepared students typically score low on standardized tests. Unfortunately, the ability to accurately predict college readiness using standardized test scores and high school GPAs is questionable.

In this study, composite ACT/SAT scores were not a strong predictor of test scores, or the final course grade. These results are consistent with those of others (e.g., Laskey & Hetzel, 2011) who argue that standardized test results are unreliable predictors of college readiness or college success. In fact, when Total SI Participation was entered into a regression model with ACT/SAT scores, the amount of variation in the course grade explained by ACT/SAT scores was not statistically significant. This result suggests that, for these students in this course, the number of sessions of SI participation was a much better predictor of the final course grade than was the ACT/SAT score.

At-risk and underprepared students who voluntarily participated in the SI program

performed better than non-SI participants. Because SI participation was a better predictor of success than the standardized entrance test score, evaluation of college readiness should include an examination of a student's first semester in college. Many reasons exist (e.g., poor test taking skills, language barriers, poverty and other sociocultural variables, etc.) that might account for sub threshold standardized test scores (Astin, 1998). This study indicates that, at least for those participating in this study, willingness to receive supplemental instruction, and to put extra effort into coursework, nullified the predictive validity of the standardized test score.

Voluntary SI Participation

This research suggests that voluntary SI attendance can result in greater academic benefits than required attendance. In comparing mean scores of final exam grades, students who attended 10 or more SI sessions had a significantly higher score (p=.029) than did those who attended fewer than 10 sessions. Those who attended 10 or more sessions earned a full letter grade higher (M=89.61) than those who attended less than 10 sessions (M=79.37). Additionally, those who attended 10 or more sessions, scored significantly higher on BIBL 101 term course grades (p=.019). Between the two groups, the difference in mean scores based on attendance was approximately one-half letter grade higher. Students who attended fewer than 10 sessions averaged 83.53 on the term course grade while students who attended 10 or more sessions had an average of 89.73. These results are consistent with other researchers (Hurley, et al., 2006; University of Missouri-Kansas City, 2014; Congos & Schoeps, 1998) who found that SI attendees can make up to a full letter grade higher than non-SI participants.

The strength of SI sessions are the planned activities that promote learning in the

context of course content (Tinto, 2006, UMKC, 20). Per Congos and Schoeps (1998), SI is designed to help students bridge the gap between prior and current knowledge, increase their academic skills, and ultimately master course content. As a result, students should be able to increase their critical thinking skills incorporating new academic practices to develop independent learners. The benefit to students is the ability to increase critical thinking and higher order thinking skills that contribute to deeper learning. Typically, students who develop these skills begin to transfer newly found academic practices and apply them across multiple disciplines (UMKC, 2014). Theoretically, students should be able to see an increase in their academic performance in almost all of their courses.

Therefore, one possible way to measure the impact of an SI module from BIBL 101 to other courses was to examine their first semester overall GPA. In this study, the analysis of group participants in SI, those attending 10 or more SI sessions had an overall GPA of 3.41. Students who attended less than 10 SI sessions had an overall 2.56 GPA. A mean difference of .85 represents close to a full letter grade between the two groups (p=.001). This may indicate students who participated in SI 10 or more times learned valuable skills and strategies to conquer new course material in other classes. Alternatively, the possibility of self-selection bias exists. Possibly, those who earned higher GPAs possessed higher internal motivation to succeed and chose to voluntarily participate in supplemental instruction. These students may also be self-regulated learners and have developed the strategies for academic success even though they did not test high on standardized tests (Astin, 1998).

Results showed that those who voluntarily attended 10 or more SI sessions had significantly higher means on GPA than those participating in less than 10 SI sessions.

However, self-selection cannot be ruled out as a possible confounding variable. While it is possible that knowledge, skills, and abilities learned in the SI program transferred to other courses, it is equally plausible that those who ended up with higher GPAs were different from those with lower GPAs before the semester began. For example, students who voluntarily participated in SI, and ended up with higher GPAs, could have possessed higher levels of intrinsic motivation to succeed.

Locus of control was not a significant predictor of academic performance and remained unchanged from pretest to posttest (see Table 7). However, there was a slight directional shift in locus of control between the pre and post LOC assessments. Those who attended at least one voluntary SI session had a minimal, and not statistically significant, change in mean scores from pretest (9.96) to posttest (9.67). Conversely, results show that those who did not attend a single voluntary SI session had a mean change from pretest (9.70) to posttest (11.20) LOC scores shifting toward higher external locus of control (i.e. less confident in self in the academic setting).

There are two possible reasons for these findings. First, the locus of control assessment tool may be too broad to measure academic-specific components of locus of control. Rotter's I-E Scale (1966) broadly measures the whole of a person's life. More significant locus of control results might be better revealed with a locus of control instrument specifically aimed at an academic setting. Second, the 16-week intervention with approximately 22 hours of student contact in supplemental instruction may not be sufficient to affect significant changes in locus of control. Changes to the duration and intensity (e.g., additional one-on-one mentoring and/or counseling) of the intervention could possibly lead to different results.

Implications of Findings

As the literature review indicates, at-risk high school students continue to arrive unprepared for the rigors of college academic coursework (Conley, 2007a; Conley, 2007b, McGuire & McGuire, 2015; Somers, 1988; Weimer, 2013). Based on the finding of this research, academic support such as supplemental instruction (although not designed for at-risk students) can be utilized by Abilene Christian University's Bridge Scholars Program to specifically aid at-risk students to successfully acclimate to the academic demands at the university level. This study only discussed the implications for BIBL 101 and did not take into consideration other courses students enrolled in that might have been more academically challenging for freshmen students. Therefore, offering additional supplemental instruction modules for introductory or general education courses (e.g. biology, psychology, and math) will afford all students the opportunity for academic support during the critical freshman year.

The findings of this research imply that supplemental instruction programs may be most beneficial if they are voluntary. The voluntary nature of an SI program taps into two beneficial qualities of at-risk students. First, voluntary SI teaches students to be motivated on their own behalf whereas mandated SI appears to over function for the academic needs of the student, robbing them of the self-discovery of their own academic capabilities. SI is not designed to get students through only the course at hand; rather, it is designed to teach the student how and what to learn (Arendale, 1994; UMKC, 2014). Learning how and what to learn may transcend beyond the single SI course into all other classes where SI is not offered. Secondly, releasing students from a mandated academic SI program may free them from an often-felt stigma associated with an at-risk label.

Mandated students may feel inferior than their non-mandated peers during their first exposure to university life. Attending SI on their own initiative liberates them from the fear of any sort of perceived compulsory need for "special" education.

A second implication is the need for supplemental instruction to be inserted in more difficult freshmen courses. The selected course for research, BIBL 101, *Life and Teachings of Jesus*, may not have been as academically challenging as necessary to fully test the effectiveness of the Supplemental Instruction and the Bridge Scholars Program. This course was more memory retention based versus conceptually or abstract based. Although, BIBL 101 was very beneficial to helping students create a trusting relationship with the professor as well as gaining some degree of confidence in the new world of academic university life, more conceptually based content might test the academic rigors of the Bridge students and SI program. Therefore, the university should consider attaching supplemental instruction modules to gateway courses. Increasing academic success in gateway classes will potentially increase student confidence in all classes and improve student retention rates (Tinto, 2006).

The present findings imply that standardized test scores (ACT and SAT) are not conclusive in determining academic success at the university level. As stated above, the mean score of the research population was far below the admission criterion for most universities (M=17 composite ACT score). However, with academic support programs such as SI and Bridge Scholars, at-risk students can academically perform better at levels not reflected in these test scores. The academic success of these Bridge students in BIBL 101 appears predicated upon the cohesiveness of the cohort, the competitiveness with self and others within the cohort, and the relationship with the professor.

As predicted by social learning theory, mutual vicarious modeling of academic success within the SI group setting appeared to increase students' confidence in their academic skills and abilities. Strong bonds between Bridge students provided voluntary accountability, and the simple enjoyment of being with one another was likely positively reinforcing. This cohesiveness seemed to motivate students to attend SI sessions regularly while learning the material well. The connectedness within this group also formed unstructured and fully voluntary study sub-groups outside the SI structure. One aspect of this cohesiveness that emerged was a healthy competition. Bridge students not only strongly competed with one another in learning the class material, but also serendipitously appeared to compete with themselves. Through the Bridge and SI Programs, these students seemed to raise the bar of their own academic possibilities.

Finally, an important factor in this research project was the disposition of this professor. According to social learning theory, the professor is a key social model who demonstrates that learning can be rewarding. In this research project, the professor displayed a strong desire for the students to succeed, personally engaged class utilizing vicarious stories of his own life, and made himself accessible to mentoring students that might be struggling. Given this vital role to the success of a SI class, preparatory training on modeling a positive attitude toward learning academic skills and abilities, for professors who have this module attached to their courses, would prove highly beneficial.

Limitations

This study shares limitations with other studies conducted inside of institutions that work under time pressures and have limited resources. Limited resources prevent design and implementation of large-scale experiments using sufficiently large samples to

allow generalization of findings. Because this study was of a single cohort of students, participating in a single implementation of supplemental instruction, over a single semester, confidence in the intervention, as the cause of observed group differences on outcome measures, is guarded. Likewise, generalizing these findings beyond the study group (i.e., sample) is not possible.

A significant limitation of the study is that it did not use a control group with which to compare a test group. A lack of control group calls into question the internal validity of the research outcomes. The changes in exam grades, term course grades, GPA's, and slight mean differences in the pre and posttests for locus of control following the supplemental instruction intervention could be attributed to a multitude of extraneous variables. For example, the research results could be accounted for by students who already possessed cognitive and metacognitive skills prior to the research, stronger external relational support, or academic tutoring outside of SI. Therefore, a more robust experimental study would help verify whether SI actually improves academic outcomes and locus of control.

Conclusion

As this research and the literature reveal, at-risk incoming freshmen face unique challenges transitioning from a high school academic setting to the far more rigorous academic setting of the university. In order for these students to succeed, universities should be intentional about applying academic interventions such supplemental instruction. At-risk students must not only learn the content for freshmen classes, but, more importantly, they must grow in their academic confidence by being taught how to learn. This research suggests that the depth of these chosen interventions by universities

must incorporate deeply relational models (social learning theory applied in collaborative learning environments). University chosen models must meet the students "where they are" academically and foster a relational environment that accentuates their growth potential. In this relational milieu, at-risk students must be freed from negative labels created by low test scores on standardized admissions tests. Furthermore, a chosen intervention for at-risk students must be simultaneously encouraging highly structured, and provide an atmosphere for voluntary academic accountability.

Higher education literature as well as this research project reveal the supplemental instruction model is an effective intervention as an academic support program. As this research indicates, utilizing a supplemental instruction model with ACU's Bridge program can effectively target the at-risk student population. The utilization of the combination of Bridge and supplemental instruction in this research can be a platform for further research to increase academic success of at-risk students and as well as benefit a university's overall retention efforts.

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APPENDIX A

IRB Approval Letter

ABILENE CHRISTIAN UNIVERSITY
Educating Students for Christian Service and Leadership Throughout the World

Office of Research and Sponsored Programs
320 Hardin Administration Building, ACU Box 29103, Abilene, Texas 79699-9103
325-674-2885

August 24, 2016

Mrs. Tina Fleet
School of Social Work
ACU Box 27866
Abilene Christian University

Dear Mrs. Fleet,

On behalf of the Institutional Review Board, I am pleased to inform you that your project titled The Impact of Supplemental Instruction on Levels of Locus of Control for Participants in the Abilene Christian University Bridge Program was approved by expedited review (46.110(b)(1) category 7) on 8/24/16 for a period of one year (IRB # 16064). The expiration date for this study is 8/24/2017 . If you intend to continue the study beyond this date, please submit the Continuing Review Form at least 30 days, but no more than 45 days, prior to the expiration date. Upon completion of this study, please submit the Inactivation Request Form within 30 days of study completion.

If you wish to make **any** changes to this study, including but not limited to changes in study personnel, number of participants recruited, changes to the consent form or process, and/or changes in overall methodology, please complete the Study Amendment Request Form.

If any problems develop with the study, including any unanticipated events that may change the risk profile of your study or if there were any unapproved changes in your protocol, please inform the Office of Research and Sponsored Programs and the IRB promptly using the Unanticipated Events/Noncompliance Form.

I wish you well with your work.

Sincerely,

Megan Roth

Megan Roth, Ph.D.
Director of Research and Sponsored Programs

APPENDIX B

Consent Form for Participation in Research Study

Title of Study: The Impact of Supplemental Instruction on Levels of Locus of Control for Participants in the Abilene Christian University Bridge Program

You may be eligible to take part in a research study. This form provides important information about that study, including the risks and benefits to you, the potential participant. Please read this form carefully and ask any questions that you may have regarding the procedures, your involvement, and any risks or benefits you may experience. You may also wish to discuss your participation with other people.

Your participation is entirely voluntary. You may decline to participate or withdraw from the study at any time and for any reason without any penalty.

Please contact Tina Fleet if you have any questions or concerns regarding this study or if at any time you wish to withdraw. This contact information may be found at the end of this form.

Purpose and Procedures

As pioneering Bridge Scholar students, you are invited to participate in a research study that will monitor your academic progress during your freshmen fall semester. Specifically, this research will measure the effectiveness of the Supplemental Instruction program on increasing your control of meeting your own academic goals. The research will be conducted by Tina Fleet, a social work graduate student and staff member in the University Access Programs at Abilene Christian University. The data you provide will be utilized to evaluate the Supplemental Instruction programming and improving future academic support to Bridge Scholar students.

Once you consent to participation in the study, you will be asked to participate in the following procedures:

- A brief questionnaire will be sent to your ACU email inbox. The questionnaire is written in English.
- Your participation will remain anonymous. No information identifying you as a participant will be disclosed to your professors, supplemental instruction leader, or other participants in this study.
- A supplemental instruction survey will be conducted to obtain your perception of current programming.
- You will be offered a follow up interview via email spring 2017 if you wish to know the outcome of your questionnaire. This interview is voluntary. If you chose to participate in the interview, the visit is expected to take 30 minutes.

Risks

A breach of confidentiality of personal information has been identified as a minimal risk in taking part in this research study. The researcher has taken steps to minimize the risks associated with this study. However, if you experience any problems, you may contact Tina Fleet, Dr. Alan Lipps in Social Work, or Mr. Scott Self in University Access Programs.

Potential Benefits

There are potential benefits to participating in this study. Such benefits may include a better understanding of academic outcomes influenced by one's perception of events leading to academic goals. The researcher cannot guarantee that you will experience any personal benefits from participating in this study. However, the researcher hopes that the information learned from this study will help future Bridge Scholar students.

Provisions for Confidentiality

Information collected about you will be handled in a confidential manner in accordance with the law. To ensure confidentiality, the questionnaire will be sent blind carbon copy to all participants. Your email address will be stored in a password protected document and will be discarded once research is complete. Some identifiable data may have to be shared with individuals outside of the study team, such as members of the ACU Institutional Review Board. Aside from these required disclosures, your confidentiality will be protected with password protected on research documents, removing identifiable information, and assigning a case number to personal information.

Contacts

You may ask any questions that you have at this time. However, if you have additional questions, concerns, or complaints in the future, you may contact the Principal Investigator of this study. The Principal Investigator is Tina Fleet, Supplemental Instruction Coordinator and MSSW Candidate, and may be contacted at (325) 674-2919. If you are unable to reach the Principal Investigator or wish to speak to someone other than the Principal Investigator, you may contact:

Dr. Alan Lipps, Social Work Professor

Phone: 325-674-2072

Email: **alan.lipps@acu.edu**

Mr. Scott Self, Director

University Access Programs

Phone: 325-674-2699

Email: jss00c@acu.edu

If you have concerns about this study or general questions about your rights as a research participant, you may contact ACU's Chair of the Institutional Review Board and Director of the Office of Research and Sponsored Programs, Megan Roth, Ph.D. Dr. Roth may be reached at

(325) 674-2885
megan.roth@acu.edu
320 Hardin Administration Bldg, ACU Box 29103
Abilene, TX 79699

Consent Signature Section

Please sign this form if you voluntarily agree to participate in this study. Sign only after you have read all of the information provided and your questions have been answered to your satisfaction. You should receive a copy of this signed consent form. You do not waive any legal rights by signing this form.

_____	_____	_____
Printed Name of Participant	Signature of Participant	Date
_____	_____	_____
Printed Name of Person Obtaining Consent	Signature of Person Obtaining Consent	Date

APPENDIX C

Internal-External Locus of Control Questionnaire

For each question select the statement that you agree with the most.

1. a. Children get into trouble because their parents punish them too much.

   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.

   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.

   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.

   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.

   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.

   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try some people just don't like you.

   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.

   b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.

   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well-prepared student there is rarely if ever such a thing as an unfair test.

    b. Many times exam questions tend to be so unrelated to course work that studying in really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

    b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.

    b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.

    b. It is not always wise to plan too far ahead because many things turn out to- be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.

    b. There is some good in everybody.

15. a. In my case getting what I want has little or nothing to do with luck.

    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    b. Getting people to do the right thing depends upon ability. Luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

    b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

    b. There really is no such thing as "luck."

19. a. One should always be willing to admit mistakes.

    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.

    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.

    b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.

    b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.

    b. There is a direct connection between how hard 1 study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.

    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.

    b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.

    b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.

    b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.

    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.

    b. In the long run the people are responsible for bad government on a national as well as on a local level.

Score one point for each of the following:

2. a, 3.b, 4.b, 5.b, 6.a, 7.a, 9.a, 10.b, 11.b, 12.b, 13.b, 15.b, 16.a, 17.a, 18.a, 20.a, 21. a, 22.b, 23.a, 25.a, 26.b, 28.b, 29.a.

A high score = External Locus of Control

A low score = Internal Locus of Control

Rotter, JB. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, 80(1), 1-28.).

APPENDIX D

Concordance Comparative ACT and SAT Scores

SAT CR+M (Score Range)	ACT Composite Score	SAT CR+M (Single Score)
1600	36	1600
1540-1590	35	1560
1490-1530	34	1510
1440-1480	33	1460
1400-1430	32	1420
1360-1390	31	1380
1330-1350	30	1340
1290-1320	29	1300
1250-1280	28	1260
1210-1240	27	1220
1170-1200	26	1190
1130-1160	25	1150
1090-1120	24	1110
1050-1080	23	1070
1020-1040	22	1030
980-1010	21	990
940-970	20	950
900-930	19	910
860-890	18	870
820-850	17	830
770-810	16	790
720-760	15	740
670-710	14	690
620-660	13	640
560-610	12	590
510-550	11	530