DISSERTATION:

THE RELATIONSHIP BETWEEN HIGH SCHOOL MATH STUDENTS' SELF-ESTEEM AND THEIR PERCEPTIONS OF TEACHER BEHAVIORS

by

Patti Pearcy Gallagher

A Dissertation presented in Partial Fulfillment

of the Requirements for the Degree

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ABSTRACT

The purpose of this predictive, correlation study was to determine if there is a relationship between high ability high school math student's self-reported self-esteem and their perceptions of teachers' behaviors as controlling or supportive at the high school level. The criterion variable was self-esteem, and the predictor variables were student perceptions of teachers' behaviors as controlling or supportive. Research has connected the positive self-esteem in educational achievements in the classroom to a high probability of success in the workforce as well. Other research has also correlated lower academic success to lower self-esteem and less success in the workforce. Students often react to people in their lives. How important people in a student's life respond to them may determine whether their self-esteem is high or low. Although there have been studies on how self-esteem affects students' academic progress, the problem is that no research has been conducted in the United States at the high school level using the controlling and supportive instruments developed by Kususanto et al. This study was conducted at a private school in Eastern United States. The sample was from three classrooms with a possible sample size of 75 students. However, only 20 students and parents completed and returned the joint consent forms and were allowed to complete the questionnaires. There were 12 biological females and 8 biological male students. The students were from three high ability math classes including Advanced Algebra 2, Precalculus, and Calculus. The results showed that there is a positive correlation between self-esteem and student perceptions of teacher behaviors as supportive or controlling in high ability math students.

Keywords: Supportive, controlling, self-esteem, high-ability, teacher behaviors

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CHAPTER ONE: INTRODUCTION

Overview

Although females are receiving more STEM degrees from college than males, hiring practices favor males over females (Rittmayer & Beier, 2008). Research has correlated the self-efficacy of males as higher than females in STEM related careers. Rittmayer and Beier (2008) refer to this as the "confidence gap." The purpose of this predictive, correlation study was to determine if there is a relationship between high ability high school math student's self-reported self-esteem and their perceptions of teachers' behaviors as controlling or supportive at the high school level. The criterion variable was self-esteem, and the predictor variables were student perceptions of teachers' behaviors as controlling or supportive. Student perceptions of teachers' behaviors are classified as controlling or supportive according to the research by Good (1981). Chapter One explains research delineating the background of the formation of student self-esteem in addition to the consideration of students' perceptions of teachers as controlling or supportive. The purpose and significance of the study were also described. The research question (RQ) specific for this study were introduced along with definitions related to this study.

Background

Educators are pushing to get more students to pursue STEM related careers, especially females. However, many high ability students fight loneliness and low self-esteem with higher numbers being females. "The 'confidence gap' is partly responsible for the 'gender gap' in engineering and other STEM disciplines, including computer science, physics, and astronomy (Rittmayer & Beier, 2008). On December 21, 2018, it was reported that all 50 states were planting a flag for universal STEM education in recognition of the need for greater emphasis in these career pathways (Golden, 2018). Enrollment in STEM career pathways have been

declining over the last twenty years. In addition, the resignation rate of biological females hired in STEM positions is very high (Botella, Rueda, Lopez-Inesta, & Marzal, 2018). Many technology companies and academia are struggling to overcome a lack of gender diversity (Botella et al., 2018). STEM education targets the four specialties of science, technology, engineering, and mathematics (Bybee, 2010).

In some studies, student perceptions of a teacher's behavior as controlling or supportive has been shown to effect students' academics and self-esteem (Ismael & Mahjeed, 2011). Frant (2016) states that self-esteem often kindles expectations of one's abilities and builds a self-assurance that one can succeed. Research has shown in many instances that emphasizing positive instead of negative behaviors often contribute to higher self-esteem and self-confidence (Owens, 1993). Ismail and Majeed (2011) concluded that teachers' behaviors have a significant effect on students' performance in the classroom at the middle school level. "When considering that social inclusion is a basic human need, it makes sense that self-esteem is fueled by social feedback and the sense of being liked by others" (Wagner, Ludtke, Robitzsch, Gollner, & Trautwein, 2017, p. 1).

Schools are constantly looking for ways to improve the student learning process and increase high ability math scores in directing these students towards careers in STEM pathways. One investigation implies that students in the United States are far behind students in other areas of the world as China, Japan, and Singapore (Ker, 2016). This claim also relates to high ability students. Smart (2014) claims that student attitudes towards learning and academic development have been shown to have a positive correlation to positive interactions with teachers. Imran (2013) also connected behaviors of teachers with both positive and negative perceptions that have a direct impact on the students' self-esteem.

These findings are supported by Bandura's (1971) Social Learning Theory (SLT). Bandura (1971) emphasized the value of a student's observations in actions and reactions which will guide their future. Students who feel more accepted or safe in the classroom interactions will be more involved and will ask more questions that will eventually increase student performance (Smart, 2014). Mastery experience, vicarious experience, social persuasion, and physiological reaction are four main entities impacting self-efficacy beliefs (Bandura, 1997; Gist & Mitchell, 1992; Pajares, 2005; Rittmayer & Beier, 2008). A low grade, perceptions of others succeeding or failing, parents and teachers or other influencers, and nervousness or fear can all be direct impactors of self-esteem or self-efficacy. "Self-efficacy influences the choices individuals make in term of goal choice, the effort expended to reach those goals, and persistence when difficulties arise" (Rittmayer & Beier, 2008, p. 1).

Self-esteem begins development before a child ever enters school (Parameswari, 2011; Hosagi et al., 2012). The relationships formed in early childhood create the beginnings of a child's self-esteem. This social process of the self-esteem begins with the interactions and relationships formed between a child and the parents. As the child gets older, relationships with siblings and extended family members are formed which influence the self-esteem to grow or diminish (Trzesniewski, 2015). Self-esteem usually increases from fifth grade through eighth grade but no change between eighth and ninth grades (Wagner et al., 2017). Orth and Robins (2014) state that self-esteem has a predictive trajectory from about 16 years old to a high of 51 years old. Then it begins to decline. Orth, Erol, and Luciano (2018) did an analysis of longitudinal studies and found that the high peak of self-esteem was at age 60 and remained the same until age 70. From age 70 until 94, it declined slowly to age 90 and then the decline was much stronger until age 94.

Research has connected the positive self-esteem in educational achievements in the classroom to a high probability of success in the workforce as well. The opposite is also true—lower academic success is correlated to lower self-esteem and less success in the workforce (Imran, 2013). Students often react to people in their lives. Whether self-esteem is high or low is determined by how the important people in the student's life react (Lawrence, 2006). In other cultures, results often vary somewhat with cultural differences.

Chen Fwu, Wei, and Wang (2018) did a study on instructors' beliefs about intellectual ability affecting the teacher attitudes toward students. In this Confucian culture, a differentiation had to be made between obligation-oriented belief and improvement-oriented belief. Several studies have been completed determining the role of motivation and self-esteem in academic achievement in the general classroom. A recent study was done in Turkey on the role of motivation and self-esteem in the academic achievement of Turkish gifted students in the fourth, fifth, sixth, seventh, and eighth grades (Topcu & Leana-Tascilar, 2016). However, there have been very few studies done on perceived teacher behaviors with scales developed by Kususanto, Ismail, and Jamil (2010) to measure student perceptions. Two studies have been completed outside the United States and only one inside the United States at the Middle School Level (Grant, 2018).

Problem Statement

How self-esteem directs academic progress or success in high-ability groups have been areas of research for some time (Abadzi, 1984; Araujo & Lagos, 2013; Becker et al., 2015; Catsambis & Buttaro, 2012; Chessor, 2014). Over the last 35 years, men have continued to earn more STEM degrees than females even though females complete more bachelor degrees (Kombe, Carter, Che, & Bridges, 2016). Studies in Malaysia and Pakistan using student

perceptions of teachers' behaviors as supportive or controlling determined that self-esteem was significantly impacted by their perceptions of the teachers' behaviors (Ismail & Majeed, 2011; Kususanto et al., 2011). Although there have been studies on how self-esteem affects students' academic progress, there has been very little research correlating student perceptions of teacher behaviors at the high school level to self-esteem. The problem is that no research has been conducted in the United States at the high school level using the controlling and supportive instruments developed by Kususanto et al. (2011).

Purpose Statement

The purpose of this predictive, correlation study was to determine if there is a relationship between self-esteem and high-ability math student's self-esteem and their perceptions of teachers' behaviors as controlling or supportive at the high school level. The criterion variable was self-esteem, and the predictor variables were student perceptions of teachers' behaviors as controlling or supportive at one urban school's high-ability high school math classes.

Significance of the Study

STEM education classes are often designed for higher ability students to prepare them to pursue different types of STEM career pathways. However, there is a significant lack of confidence in biological females compared to biological males in STEM career pathways (Rittmayer & Beier, 2008; Botella, et al., 2018). Perry (2018) states that currently females earn more bachelor degrees in STEM related fields than males but are not receiving the same number of jobs (Perry, 2018). There is also a pay gap for males and females in STEM career fields (Fleming, 2018). Past studies have connected self-esteem of students to academic performance (Duari, 2012; Imran, 2013; Kohli & Gupta, 2013; Vialle, Heaven, & Ciarrochi, 2005), but this

does not explain the lower confidence in biological females compared to biological males with comparative grades in STEM career pathways. Females in STEM pathways have lower self-efficacy than males in the same careers (Geib, 2018; Ritmayer & Beier, 2008; Shunk & Pajares, 2002). This study may assist in identifying teacher behaviors that will support high ability student self-esteem and learning processes. This study could assist school administration in determining desirable attributes of teachers that could increase academics for any students. This study could also assist in determining possible causes of the "confidence" and "gender" gaps in STEM career pathways (Rittmayer & Beier, 2008).

Research Question

RQ: How well can a student's self-esteem be predicted by a student's perceptions of teacher behavior as controlling or supportive?

Definitions

1. *High ability* – students who rank in the top 10% of a regular non-grouped class (Schmitt & Goebel, 2015).
2. *Self-esteem* – The perceptions of one's own self-worth (Baumeister et al., 2003).
3. *Controlling behavior* – more directives on monitoring rather than teaching new material (Ismael & Mahjeed, 2011).
4. *Supportive behaviors* – more student led than classroom management including more time for student response (Ismail & Mahjeed, 2011).
5. *STEM* - STEM education refers to the four - disciplines of science, technology, engineering, and mathematics (Bybee, 2010).
6. *RSES* - Rosenberg Self-Esteem Scale

7. *SPTSBS* – Student Perceived Teacher Supporting Behavior Scale (Kususanto, 2010). This is also referred to as the Perceived Teacher Expectancy A (PTE-A)
8. *SPTCBS* – Student Perceived Teacher Controlling Behavior Scale (Kususanto, 2010). This is also referred to as the Perceived Teacher Expectancy B (PTE-B)

CHAPTER TWO: LITERATURE REVIEW

Overview

This literature review includes theoretical constructs of self-esteem in adolescents and the perceived changes as children age. This review starts with the theoretical constructs of Bandura (1971) on self-esteem or self-efficacy and reviews the different possible correlations to high school student perceptions of teachers in supporting or building self-esteem. Although this study focuses on high school students, the nature of the changing self-esteem through the developmental stages of childhood and beyond is important to understand. This changing self-esteem through the developmental stages also impacts the social structures of how students relate and fit into specific ability groups. The grouping of students into high ability groups or lower ability groups and the justification or reasoning of educators is also examined. Current literature relating to students' perceptions of teacher behaviors in relationship to students' self-esteem was also investigated.

Introduction

Research has shown in many instances that emphasizing positive instead of negative behaviors often contributes to higher self-esteem and self-confidence (Owens, 1993). A person's self-esteem is often an indicator of one's confidence or self-belief. Self-esteem frequently stimulates expectations of one's abilities and builds confidence that one can succeed (Frant, 2016). One of the basic human needs is social inclusion. Wagner et al. (2017) states, "When considering that social inclusion is a basic human need, it makes sense that self-esteem is fueled by social feedback and the sense of being liked by others" (p. 1). Self-esteem is a subjective value or worth as a person based on an individual's own assessment (Orth & Robins, 2014; Donnellan, Trzesniewski, & Robins, 2011; MacDonald & Leary, 2012). Some research on self-

esteem suggests it is adaptive in nature based on the social inclusion theory (Menon, 2017). There is also some research on international students relating self-esteem and the academic performance of students in high-ability groups (Imran, 2013; Van Houtte, Demanet, & Stevens, 2012; Vogl & Preckel, 2014). Studies have been completed with international studies relating students' self-esteem to perceptions of teacher behaviors using the SPTCSB and the SPTSBS (Ismail & Majeed, 2011; Kususanto, Fui, & Lan, 2010). However, only one study has been done using these instruments in the United States at the middle school level relating students' self-esteem to perceptions of teacher behaviors by biological sex (Grant, 2018).

Theoretical Framework

Rosenberg (1965) states that "self-esteem involves feelings of self-acceptance and self-respect" (p. 1) in comparison to feelings of superiority. Bandura's (1971) beginning research on self-esteem or self-efficacy was based on his social learning theory (SLT) which centered on reinforcing stimuli and how the reinforcement occurs naturally in a social context. The SLT was originally introduced in 1963 to better understand human motives in influencing human behaviors. Bandura (1977) later altered his SLT claiming that psychological procedures in any form will change the strength of an individual's self-efficacy.

Bandura based his beliefs on the four processes of attention, retention, reproduction, and motivation. These processes are exhibited by classroom teachers and may have a strong effect on a student's performance academically. These behaviors could impact a student's self-esteem or self-efficacy depending on the student's perceptions of the teacher's behaviors. Three controls measuring the influence of others were intrapersonal influences, the engagement of individual behaviors, and the environment (Bandura, 2012). Environmental controls can be selected, imposed, or constructed. Since students in many high ability groups do not have a lot of control

over the placement, the environment would be imposed. Bandura (2012) states that students will try to shape one's environment or situation, so it supports them and gives them control.

William James is another proponent of the self-esteem movement (Hewitt, 2005; Leary, Tambor, Terdal, & Downs, 1995). James developed an early formula for self-esteem. This formulation purported that self-esteem was equivalent to success divided by pretensions. Success was defined as how well we really do, and pretensions were defined as feeling good about ourselves (Nayler, 2010; Seligman, 1996). Another early theorist was Stanley Coopersmith. Coopersmith held the belief that self-esteem was derived from early childhood and based on trust, unconditional love, and security. These traits were then impacted on throughout one's progression through life through both negative and positive valuations (Nayler, 2010; Seligman, 1996).

Cooley (1902) proposed a looking-glass-self theory stating that the opinions of important people in one's life had a major impact on one's self-view or self-esteem. This presented a "social mirror" in one's life which had a long-range impact. Later research presented some contradictions to this theory. During adolescence, self-other agreement between the child and the family members showed only a moderate correlation in some situations (Gollner et al., 2016; Luan, Hutteman, Denissen, Asendorpf, & van Aken, 2016). Other research has shown that differences in self-esteem may also relate to personality traits (Wagner, Ludtke, Jonkmann, & Trautwein, 2013).

In a longitudinal study, self-parent agreement for girls at age 12 and age 17 predicted sharp increases in self-esteem. However, the self-esteem development for boys was high at age 12 but even with lower self-parent agreement the boys' self-esteem was high at age 17 also

(Luan et al., 2017). Other more recent studies have correlated emotional connections with intrinsic motivations relating to self-efficacy (Gasser, Grutter, Buholzer, & Wettstein, 2018).

Related Literature

Self-Esteem

Self-esteem is a person's sense of self-worth, value, or "self-satisfaction (Baumeister, Campbell, Krueger, & Vohs, 2003; Orth & Robins, 2014: Hosagi, Okada, Fujii, Noguchi, & Watanabe, 2012). Maslow's definition of self-esteem is "a person's desire for respect, recognition and attention" (Keshky & Samak, 2017). Menon (2017) presents an idea of self-esteem as a more adaptive entity based on one's sociometer. The self-esteem a person has of his or her self-value is projected and affects social acceptance. People desire high self-esteem because of the positive effect it has on one's perceptions of life. A positive self-esteem provides a buffer against negative emotions as stress, and it will enhance a person's own adjustment to negative situations which lead to better health (Menon, 2017; Baumeister, Heatherton, & Tice, 1993; Greenberg et al., 1992; Taylor & Brown, 1988). Low self-esteem, however, increases stressful situations and will often cause people to experience a plethora of negative emotions and depression (Menon, 2017; Goswick & Jones, 1981; Leary, 1983; Taylor & Brown, 1988; White, 1981). Research on the Terror Management Theory (TMT) showed that when self-esteem was boosted, the person exhibited less anxiety. (Spielberger, Gorsuch, & Lushene, 1972). Self-esteem is also one of the predictors used in predicting perseverance and consistency of interest in college performance (Weisskirch, 2018).

Self-esteem may not be the instigator of positive activities and successes, but successes may be the cause of higher self-esteem (Baumeister et al., 2003). "The modest correlations between self-esteem and school performance do not indicate that high self-esteem leads to good

performance. Instead, high self-esteem is partly the result of good school performance" (p. 1). In a German longitudinal study over four years using seventh through tenth grades, higher academic achievement was found to predict higher self-esteem, but high self-esteem did not predict high academic achievement (Tetzner, Becker, and Maaz, 2017).

Baumeister et al. (2003) state, "Leadership does not stem directly from self-esteem, but self-esteem may have indirect effects" (p. 1). Although self-esteem and self-efficacy are related and sometimes used interchangeably, there are some theoretical distinctions between the two. Self-esteem focuses on the perceived self-value while self-efficacy relates to motivation or the self-perceived ability or action of doing something (Chen, Gully & Eden, 2004). Considering some differentials between ethnic groups, Iranian students have shown significant positive relationships between general self-efficacy, self-esteem, and academic achievement (Asakereh & Yousofi, 2018).

For many students, peer pressure has been thought to influence self-esteem. For students transitioning from middle school to high school, self-esteem and peer relationships create a social environment that will influence student behavior (Parker et al., 2006; Wentzel, 2014). Research has shown that there are reciprocal relationships in self-esteem and peer acceptance in older adolescents at the end of the seventh grade through the tenth grade (Tetzner et al., 2017). This is a major shift from parents and family being the main social influence to influence by peers increasing in importance (Brown, 2011; Harter, 2012).

Development of Self-Esteem

A child's self-esteem development begins in early childhood long before the child enters school (Parameswari, 2011; Hosagi et al., 2012). The type of relationship or interaction the child has with the parents starts the foundations of the social process of self-esteem. However, as

interactions with others outside the family environment increase, the factors influencing an individual's self-esteem also increase and change. Many times, it is very difficult to isolate school factors influencing self-esteem from those caused by family environments (Harris, Gruenenfelder-Steiger, Ferrer, Donnellan, Allemand, Fend, . . . Trzesniewski, 2015).

Using the assumption that self-esteem is propelled by social feedback as well as the sense of being like by other peers, some research results advocate an increase in average self-esteem levels from fifth through eighth grade but found no change from eighth grade to ninth grade (Wagner et al., 2017). Wagner et al. used a longitudinal study of 2,281 fifth graders and 1,766 eighth graders to study the roles of intrapersonal and interpersonal social predictors. The first major finding was that there was no consistent trend in mean levels of self-esteem for this group of students. The second major finding was that there were constant positive effects of intrapersonal social predictors between the students throughout the time studied. However, Wagner et al.'s third major finding was that there were no stable or constant effects of the interpersonal social predictors (Wagner et al., 2017). However, Wagner et al. suggest that "interindividual differences can be partly traced back to gender differences: Girls and boys differ in their absolute levels of self-esteem but not in associations between self-esteem and social components" (p. 494). Another study of seventh grade students found that self-esteem and educational achievement had a significant relationship, but eighth grade students did not show a positive correlation (Booth & Gerard, 2011).

Robins and Trzesniewski (2005) began aligning the data on self-esteem development across the lifespan and began correlating the path of lows and highs. At that time, it was noted that the "overall level of stability is comparable to that found for other personality characteristics" (Robins & Trzesniewski, 2005, p. 1). Robins and Trzesniewski discovered that

over the path of time, self-esteem is very high during childhood especially for girls, gradually rises through teenage years and into adulthood, and then falls rapidly in later years (2005). Interestingly, Robins and Trzesniewski state that individual self-esteem follow this pattern but may be higher or lower overall than another cohort of the same age (2005).

Later, Orth, Robins, & Widaman (2012) found through longitudinal data over 12 years that self-esteem had an average predictive trajectory from ages 16 to 97. According to Orth et al. (2012), self-esteem increases from 16 years old to a high at 51 years of age. From 51 to 97 years old, it declines down to a lower level than it started at 16 years of age. There are differences in the trajectories for individual ethnic groups even though most of them show a trajectory (Booth & Gerard, 2011). In another study, Orth, Erol, and Luciano (2018) did an analysis of longitudinal studies and found that the high peak of self-esteem was at age 60 and remained the same until age 70. From age 70 until 94, it declined slowly to age 90 and then the decline was much stronger until age 94. Ogihara (2019) did a study of self-esteem in adults over 50 in Japan. While other studies had found that European and American cultures rose into middle age and then declined, Ogihara found that this decline of self-esteem in adults over 50 was not supported in Japan. Japanese adults over age 50 did not decline in self-esteem. Ogihara states that it may be attributed to a humbler view of themselves which could relate to cultural upbringing in the Japanese society.

Self-Esteem Correlations

Self-esteem has been shown to be an underlying factor in many types of human manifestations with both positive and negative expressions. Self-esteem reflects the essence of how adolescents cope with stresses both in the adolescent years and throughout adult life (Parameswari, 2011). Low self-esteem has been correlated with work-related problems (Kuster,

Orth, & Meier, 2013) as well as poor mental and physical health (Erol & Orth, 2011). Low self-esteem could also be a predictor of issues as antisocial behavior, anxiety, and academic success (Harris et al., 2015).

Harman (2017) found that self-perception was linked to self-esteem, ethnic pride, and depression in Native American high school students. In a study of 132 high school students located next to a Native American Reservation, individuals who were more involved in their own cultural activities had higher rates of perceived discrimination using eight different indicators (p. 160). Native Americans were found to have higher self-esteem than the Caucasian students who were tested. Contrarily, the Native Americans also were more likely to experience depression (Harman, 2017, p. 168). In another study of academic achievement of minority and majority North American elementary school children on a Native American reservation, minority students showed lower academic self-concepts and lower achievement than the majority students even though both groups of students showed positive self-esteem (Cvencek, Fryberg, Covarrubias, & Meltzoff, 2017). Cvencek et al. (2017) based this study on self-concepts and achievement comparing minority groups versus majority groups on the "self-presentations" concept which includes the intertwining of how one sees themselves and one's personal academic achievement. This study did not differentiate between the biological genders between the two groups of minority and majority. It would have presented an interesting comparison to compare the self-esteem between the biological sex within each group.

Several studies comparing self-esteem of students to academic performance have been completed at the secondary level (Duari, 2012; Imran, 2013; Kohli & Gupta, 2013; Vialle, Heaven, & Ciarrochi, 2005). Much of this research was completed outside the United States. One study was completed in the United States at the middle school level about the correlation of

male and female students' self-esteem compared to their perceptions of their teacher's behaviors (Grant, 2018). However, this correlation has not been completed at the high school level in the United States. According to Hosagi et al. (2012), a student with healthy self-esteem will advance psychologically as well as academically.

Having a high academic self-concept (ASC) has been found to influence test scores by up to four grades higher than students with the same ability but lower academic self-concept (Hansen & Henderson, 2019). This study was completed using a cohort of children in the United Kingdom that were born in 1989/1990 through a connection with the state schools in England. They used the information that had been collected when these students were 14 based on seven different variables. These variables were: how good the student thought his/her marks were, how good the student believed he/she was at school work, how good the student's teachers believed the student was at his/her schoolwork, how good the teachers thought the student was at his/her work, and how good each student thought he/she was at English, mathematics, science, and information communication technology (ICT) (Hansen & Henderson, 2019, p. 660). The final step was examining the students' scores from their cumulative test (GCSE) given at age 16 at the end of compulsory schooling. The results did show that "students with less educated parents have significantly lower levels of ASC than those whose parents have a degree" (p. 661). The study also found that black and minority ethnic groups had higher ASC than white students or mixed ethnicities. There were also biological gender differences with biological males testing higher in ASC than biological females (Hansen & Henderson, 2019).

Measuring Self-Esteem

There are several instruments that have been developed to measure self-esteem. The first questionnaire developed to measure self-esteem was by Rosenberg (1965). A modified or revised

version of Rosenberg's questionnaire is still being used today. Several studies have been completed using Rosenberg's modified questionnaire only. However, studies have been completed in Malaysia and Pakistan using Rosenberg's Self-Esteem Scale (RSES) along with the Students' Perception of Teachers' Controlling Behavior Scale (SPTCBS) and the Students' Perception of Teachers' Supportive Behavior Scale (SPTSBS) (Ismail & Majeed, 2011; Kususanto et al., 2010).

Both studies were completed on beginning high school students outside of the United States. Since then, there has been one known study completed at the middle school level in the United States using these Rosenberg's instruments to measure self-esteem and Kususanto's SPTCBS and SPTSBS Likert scales to measure students' perception of teachers' behavior (Grant, 2018).

Another instrument that was not used in the previously mentioned studies is the Global Self-Worth Scale of the Self-Perception Profile for Adolescents (Poorthuis, Thomaes, Aken, Denissen, & Castro, 2014). This instrument has also been used in other studies.

Biological Sex and Self-Esteem

In recent years, there has been a push to increase the numbers of girls graduating from STEM classes. Based on a student's current level of self-esteem, one may accept or reject another student's behavior according to their own social feedback (Porthius et al., 2014). In a seventh and eighth grade study, a talent search for the top five percent of math students was conducted. When the results came in, there was a 13:1 ratio of boys to girls (Benbow & Stanley, 1983). Later in the high school years the differences begin declining (Brody, Barnett, and Mills (1994).

The National Science Foundation [NSF] (2015) stated that females earn 57 percent of the bachelor's degrees in colleges. However, females are still falling behind males in many of the science, technology, engineering, and math (STEM) fields. Engineering, physics, and computer science had less than 20 percent of the degrees going to females (NSF, 2015). Casad, Petzel, and Ingalls (2019) presented a model of threatening academic environment that predicted female STEM majors' self-esteem and engagement in STEM. This study tested a model of threatening academic environments in a vulnerable population of 579 undergraduate female students at a Midwestern public university in the United States that were majoring in a STEM field. The grouping was comprised of 114 Asian Americans, 100 Latinas, 100 Whites, 44 Multiracial individuals, 14 African Americans, and 26 of Middle Eastern, Native American, Pacific Islander, or another racial/ethnic group (Casad et al., 2019).

In support of the model of threatening academic environments, "greater gender stigma consciousness predicted greater gender-based rejection sensitivity" (Casad et al., 2019, p. 469). Lower self-esteem was linked with lower perceived control and greater disengagement from Stem fields. The higher the negative climate was perceived, the higher the stereotypical threat and loss of control was perceived. "Women in male-dominated majors report experiencing more negative campus climate than did women in female-dominated majors" (p. 480). Casad, et al., suggest that environmental and individual interventions may help with STEM preservation and the experiences of females and racial minorities (2019).

In addition to a lower percentage of females in many STEM fields, racial minorities are also much lower that majorities (Chen & Solder, 2014). African Americans, Latino/as, and Native Americans are some of the minorities that are still underrepresented in STEM fields. In

addition, those majoring in STEM areas are more likely to change majors than other groups (Hurtado et al., 2010).

In studying student behaviors by biological sex, it was noted that female students are less likely to seek a teacher's attention or to volunteer during discussion time in the classroom (Kombe et al., 2016). The gap between the genders in higher ability classes as math and science has been closing somewhat in the last few years (Ziegler, Stoeger, Harder, Park, Portesova, & Porath, 2014). However, Ziegler et al. (2014) notes that female students are still not choosing math and science fields as frequently as male students even though the females may be scoring as well or even higher than their male counterparts who choose a math or science field.

Math anxiety refers to stress and other negative emotional reactions expressed by persons involved in some type of mathematical activity (Kennedy & Tipps, 1988). Math anxiety has been shown to have a negative correlation with male and female math performance, learning attitudes, working memory, as well as any meta-cognition relating to the math performances (Ashcraft & Krause, 2007; Devine et al., 2012; Legg & Locker, 2009). This negative effect derived from Math anxiety is not just confined to school situations, but it also effects normal life as in cash register use, financial decisions or even choosing which pathway to follow in life (Xie et al., 2019; Maloney & Beilock, 2012).

The reasoning for the differences in math anxiety between the biological sexes has been studied and debated extensively. Whatever the reason, the result is that females report higher levels of math anxiety than males report. Xie et al. (2019) states, "One view is that gender differences are the result of gender stereotypes" (p. 236). Many societies still have an underlying concept that math should be viewed as a male territory which creates negative effects for a female's perception of one's own math abilities creating much higher math anxiety (Plante et al.,

2009; Guimond & Roussel, 2001). Since females report lower self-esteem than males, the effects of self-esteem relating to math anxiety itself may indeed be very different for male students than for female students (Xie et al., 2019).

In a study of 751 junior and senior high students ages 12 – 18 years old in China, female students were found to have much higher math anxieties than males even though the biological sex made no difference in the performance (Xie, Xin, Chen, & Zhang; 2019). Xie et al. found that the pathway for the male students' self-esteem was different than the female students. This pathway was based on the student's individual control beliefs. For the male students, the self-esteem directly affected the anxiety but only as it facilitated control beliefs. The outcomes of this study found that all students' math anxieties would be lessened by the improvement of self-esteem, test anxiety, and general anxiety (Xie et al., 2019).

Poorthius et al. (2014) used the Global Self-Worth Scale in a secondary school in the Netherlands and found no differences in self-esteem scores between male and female participants. Bhamani, Jamil, and Moshin (2014) did a self-esteem study on adolescents in Pakistan. This study showed a significant difference in the self-esteem between biological sexes. This study was interesting because it was a contradiction to other studies outside of the United States with females having a slightly higher self-esteem than males. Bhamani et al. stated that female adolescents usually decrease in self-esteem when first entering high school as a correlation to the physical changes in one's body as the students go through puberty stages. As the female and male students progress through high school, his or her self-esteem then begins to increase.

Phan and Ngu (2018) studied social and psychological influences on academic learning with a focus on self-esteem, social relationships, and personal interest. The study used 283

students with 128 girls and 155 boys. One of the key findings was that both global and domain-specific self-esteem "exerted positive effects on the corresponding adaptive outcomes: (1) relationship with teachers, relationship with peers, and interest in learning tasks, and (2) academic performance." (p. 66). Although the scores were recorded by the biological sex grouping for each testing entity, the mean score of the total males and females was used to calculate the computations.

Math anxiety differences based on biological sex have been found to effect mathematics performances (Devine, Fawcett, Szucs, & Dowker; 2012). Devine et al. did a study of 433 secondary students located in rural England, United Kingdom. Students at the school were predominantly from a working class and lower-middle class grouping. Mathematics anxiety as well as test anxiety were measured and correlated to mathematics performance. The results show a significant negative correlation for Math anxiety and mathematics performance for both male and female students (p. 5). However, there was no significant difference shown between male and female math performance. In this study as well, females reported a higher level of Math anxiety than males. Devine et al. suggest that it is possible "that females may be more willing to admit to feelings of anxiety than males because the expression of emotion by females may be accepted" (p. 6).

Other researchers have found that students believed that math anxiety was more acceptable to males than females (Flessati & Jamieson, 1991). Rubinstein, Eidlin, Wohl, & Akibli (2015) used the cognitive theory to determine if math anxiety would demonstrate an attentional (negative) bias. In a study of 27 participants with 14 having very high levels of self-reported math anxiety and 13 with low levels of self-reported math anxiety, Rubinstein et al. (2015) found that "attentional bias is linked to unduly intense math anxiety symptoms" (p. 1).

Self-esteem and academic achievements are often believed to be intertwined. However, a study in Pakistan of 2560 students with 480 students from 24 secondary schools found that although there was a significant correlation between self-esteem and academic achievements for biological male students, there was no correlation between self-esteem and academic achievements for biological female students (Kahn, Mahmood, & Zaib, 2019). Kahn et al. used the Rosenberg (1965) self-esteem scale that contains 10 items the students complete. Half of the items are presented positively, and half are presented negatively. The academic part of the study was based on the Pakistan annual Board of Intermediate and Secondary Education, Mardan, examination which is considered very reliable in Pakistan (pp. 973-974).

A study in China was completed to assess the inconsistent findings of the math anxiety link to performance for behavioral research. Huang, Zhao, Li, Yang, Cui, Gao and Si (2019) used 57 college freshmen to analyze the effect of arithmetic skill on students' math anxiety. The focus of this study was "to investigate neural correlates on the math anxiety-performance link and to determine the potential roles of basic arithmetic skill in two tasks" (p. 2). Huang et al. found that a higher level of arithmetic skill could temper the effect of high math anxiety. Once again, this could still be pointing to a higher level of self-esteem for students exhibiting higher proficiency levels in arithmetic skills. This may also be a derivative of the effects of perceived teacher support at middle or high school math levels.

Gender differences and the effects of self-esteem concerning math anxiety was studied in a Chinese High School using a total of 751 high school students that were 12 to 18 years old. 450 of the students were biological females. The results showed that although the math performance did not show any significant difference by gender, the biological females had higher math anxiety than the biological males. The students reported their own math anxiety, self-

esteem, control beliefs, test anxiety, and general anxiety in a 45-minute session that was given by the teachers. Rosenberg's Self-Esteem Scale (1965) was used to measure self-esteem. Test anxiety was measured using Sarason's Test Anxiety Scale (1978). Math anxiety levels were measured using the Abbreviated Math Anxiety Scale (Hopko et al., 2003). Control beliefs were measured using the Primary-Secondary Control Scale (Chang et al., 1997) using Chinese revisions by Xin and Chi (2008). General anxiety was measured using a Chinese translation of the Revised Children's Manifest Anxiety Scale: What I Think and Feel (Reynolds & Richmond, 1978). Mathematics performance was analyzed using final math scores from the previous semester. Since students were from multiple schools, scores were translated to z-scores to better compare the data (Xie, Xin, Chen, Zhang, 2018).

Ability Grouping and Self-Esteem

Ability grouping is the practice of grouping students in the same classes who have the same abilities (Van Houtte et al., 2012). In the United States, classes with higher abilities would be able to cover more concepts, explore the topics to a deeper level, as well as use more rigorous teaching materials. Lower ability classes would be focused more on simplifying the content to the basics and teaching as simplistic as possible to help the students grasp the material better. In England, students are assigned to a track of study which affects the types of classes each student takes. Some may be high ability, and some may be lower ability classes (Ireson & Hallam, 2009). Although the classification of high ability refers to cognitive ability, it defines a student's capacity to reach the highest academic achievement levels (Dare & Nowicki, 2015). Dare, Nowicki, and Smith (2019) explain that the usage of the term high ability is a way to de-accentuate the categorization of gifted or talented and focus on developing the potential ability of the student. Educators as well as research results do not always agree in supporting ability

grouping as there is an inconsistency with the social comparison theory (Ireson & Hallam, 2009; Gamoran & Berends, 1987; Lacey, 1974; Oakes, 1984).

Another concept facing high ability students in some schools is the choice to accelerate or to remain in the general education stream (Dare, Smith, & Nowicki, 2016). Many educators are very apprehensive about acceleration in allowing students to be promoted ahead by grade levels outside of their cohort itself but acceleration by high ability grouping is often more acceptable at the secondary levels. Dare et al. (2016) state that the socioeconomic outcomes and social acceptance aspects of students being accelerated faster than their peers often comprise the crux of educators concerns with acceleration. Dare, Nowicki, and Smith (2019) researched the key considerations from the students' perspective on deciding to accelerate to determine if students had some of the same concerns as educators. This study was based in Australia and used 26 high-ability children from across Australia between 9 and 14 years old. There were 13 male and 13 female participants in the study. 17 of the high ability participants had chosen the acceleration pathway and 9 of the high ability students had chosen not to accelerate. All the students were in classes with students at least one or more years older. There were six main groups the students seemed to focus on in the interviews to consider before doing a grade-based acceleration. One of the main groups the participants focused on was the best learning environment. It was important for them to be able to find a good fit in the subjects as well as a good fit among peers. However, the social considerations were not as important to the students themselves as educators seemed to believe. Students in the study emphasized "that academic challenge is a key consideration when considering grade-based acceleration and that considering the child's emotional well-being and willingness to engage in school are also important" (p. 169).

Often, students in low ability classes find self-concept is being lowered as they go through school and continue being placed in the lower-level classes (Oakes, 1984; Hallam & Deathe, 2002). Francis, Connolly, Archer, Hodgen, Mazenod, A., Pepper, D., . . . Travers, M. (2017) suggest that attainment grouping is a self-fulfilling prophecy. Using survey data from 11,546 eleven and twelve-year-olds, Francis et al. found a significant correlation between students' general self-confidence in learning and set placement. If students perceived a label of low achiever through the explicit placement in a lower achievement group, behaviors and self-worth appeared to be modified accordingly (Francis et al., 2017).

Some research has also shown through a longitudinal study that there may be a possible link between secondary ability or attainment grouping and a student's university aspirations (Mazenod, Hodgen, Francis, Taylor, & Tereshchenko, 2019). The research appears to present the increase in self-confidence and self-concept because of grouping in higher ability classes. This higher self-concept then influences the secondary student's decision to attend university. Although most students from the United States and the United Kingdom hope to go to college, many students never attend (Berrington et al., 2016). Internationally, students from disadvantaged backgrounds are less likely to attend high school than students from advantaged backgrounds (Tomaszewski et al., 2017). Mazenod et al. (2019) did a study in England using 126 schools that did attainment grouping in English and Mathematics representing both urban and rural settings. The project started with a questionnaire in the beginning of the students' Year 7. "By the second year of setting in secondary school, placement in a top set appears to positively impact on students' university aspirations over and above the effects of prior attainment and aspirations" (p. 523). Mazenod et al. state that the study showed that the students' desire to attend university was directly related to the student's self-confidence. However, this desire was

also influenced by a mixture of the student's home environment, the educators influence, and the university outreach engagement especially through support to economically disadvantaged students to encourage aspirations to attend postsecondary college.

In a British study, Taylor, Francis, Craig, Archer, Hodgen, Mazenod, . . . and Pepper (2019), researched using specific tests to do ability grouping or as they called it "attainment" grouping trying to make the grouping more equitable instead of basing the grouping on the teacher perception alone. A control group was used as a comparison to the group that was tested and rearranged several times during the research time frame. This method was claimed to be a more equitable grouping style. However, in the United States, students often have input into the process. A student who wants to try to work at a higher level can request to be put in higher ability classes as education professionals recognize that students may not be attempting to work at one's highest potential by choice. Perhaps more study may be necessary to clarify the relationships between students' self-perceptions and ability grouping in schools.

Ireson, Hallam and Plewis (2001) found that in schools with moderate levels of ability grouping, the academic self-concept (ASC) and general self-concept were more positive. In most subjects, self-esteem was aligned with social comparison theory. However, in mathematics and science, there was no direct correlation between the ability grouping and academic self-concept (Ireson et al., 2001).

Some research has correlated classroom ability composition with academic performance and student misconduct (Palacios, Dijkstra, Villalobos, Trevino, Berger, Huisman, & Veenstra, 2019). Palacios et al. did a longitudinal study in Chile using 1474 participants from seventh to ninth graders from 35 different classrooms. The students that participated in the study were from middle to low socioeconomic backgrounds. The classrooms used in the study were classified as

high, low, or mixed ability classrooms based on the ability grouping as delineated by the principal. In this study, higher academic performance, higher socioeconomic status, and lower school misconduct all had a significant correlation to the higher ability classrooms. Also, students in the lower ability classrooms were correlated to lower academic performance and higher school misconduct than the high ability classrooms. Palacios et al. discussed two main summations from analyzing the results in this study. First, "the results indicated the existence of significant differences in the formation and maintenance of academic networks with peers between high and low ability classrooms" (p. 68). The higher ability students tried to avoid any academic relationships with students that had a high incidence of misconduct. However, students in the lower academic groups did not show any preference in building academic relationships. Secondly, Palacios et al. found many similarities "between academic and friendship relationships comparing high and low ability classrooms" (p. 68). Ultimately, the results of this study stated that "ability grouping can affect peer relations" (p. 68).

Preckel, Schmidt, Stumpf, Motschenbacher, Vogl, Scherrer, and Schneider (2019) researched the benefits of high ability grouping in secondary schools in Germany to determine if there were benefits to the achievement development of the gifted students without costs to their academic self-concept (ASC) using a longitudinal design over three years. The study included 148 students from 14 gifted classrooms with 60 percent male students and 148 students from 25 regular classes with 57 percent male students. To determine ASC, a student's academic self-concept is evaluated by comparison to the reference group. If the reference group ability decreases, the student's ASC increases. Inversely, if the reference group ability increases, the student's ASC decreases (Huguet et al., 2009). This possible negative reference group effect is one of the reasons ability grouping has received criticism (Dai, Swanson, & Chang, 2011).

The high ability classes that were studied in Preckel et al. (2019) in Germany had standard curriculum that was presented at an accelerated pace as well as being more in-depth than in the regular classes (p. 1188). “The schools offered a compacted curriculum, bilingual lessons, additional lessons in scientific subjects (e.g., computer science or experiments), and interdisciplinary projects” (p. 1188). The results of this study using a matched student sample determined no significant negative or positive reference-group effects for ASC (p. 1196). “ASC remained stable over time in both class types” (p. 1196). However, students in the higher ability classes did show a much higher development of achievement throughout the longitudinal study than the students in the regular classes as well as higher levels of ASC on the last testing which was related to the level of achievement and the superior achievement development over the time period (Preckel et al., 2019).

A study completed in South Africa on 12 students in Grade 1 classrooms contends that grouping students by what is a perceived ability leads to students learning at differentiated levels with some being able to greatly outshine others while many lower grouped students are basically disabled and are not pushed to learn at a normal rate (Du Plooy, 2019). Du Plooy even states that this changes the student’s self-concept and quotes one student as saying, “I work slow, because I’m in a slow group” (p. 10). The controversial ability grouping appears to be pronounced in early childhood levels in South Africa in mathematics and reading. Du Plooy strongly suggests that alternatives to ability grouping should be considered in early childhood learning. This contention is supported by research from Bolick and Rodowsky (2016) stating that ability grouping is only beneficial to the students who are in the higher achieving groups with the lower achieving groups having negative consequences both in academic achievement and in low self-esteem.

Teacher and Student Perceptions

Teachers and students have often perceived events in the classroom very differently. Scherzinger and Wettstein (2019) studied "classroom disruptions, the teacher-student relationship and classroom management from the perspective of teachers, students and external observers" (p. 101). Although the students in a class agreed somewhat in their scoring on classroom disruptions, there seemed to be a variance between the teachers and student ratings with no association at all on classroom management (p. 111). The teacher-student relationship has played an important role in the classroom perceived success based on the student perceptions of the teacher behaviors (Wubbels, Brekelmans, den Brok, & van Tartwijk, 2015).

In observing the low levels of academic motivation and performance that are often used to characterize some of the socially disadvantaged minority groups, a study was developed to focus on the possibility of stereotype threat effects. This threat effects "argues that in response to these negative stereotypes, members of stigmatized groups can develop response strategies to protect their self-image from the threat these negative stereotypes pose" (Nouwen & Clycq, 2019, p. 1552). The role of teacher-pupil relations in stereotype threat effects were studied in secondary students with a Moroccan/Turkish background and in lower status vocational tracks to determine if they would experience more negative relations with teachers than other students (Nouwen & Clycq, 2019). The results showed that the ethnic "stigmatized" minority groups had a more negative teacher-pupil experience and found that teacher-pupil relations were very important in delineating possible stereotype threats. Data was obtained from 6,244 students in the third or fourth year of secondary education in Antwerp, Genk, and Ghent. These were limited to the stereotype threat effects needed from 11,015 original records. Students who were in any of the special education, part-time vocational, and arts education were eliminated. The study was

also restricted to only using those who had an immigration background (pp. 1558-1559). The Academic Performance Indicators were also a main part of the analysis as was school-related beliefs and attitudes since all of these are part of the student's attitudes and beliefs relating to the threats they may feel towards education. The teacher-pupil relations were measured based on the respect and acceptance the pupil received from the teacher as well as the academic self-concept. The teacher-pupil relations were measured on a subscale from Goodenow's (1993b) Sense of Belonging in School, and the academic self-concept was measured using the Shavelson and Marsh's (1986) measurement of general academic self-concept (Nouwen & Clycq, 2019, p. 1561).

In researching motivation in the classroom, Skinner and Belmont (1993) used three constructs to correlate the reciprocal effects of teacher behavior and student engagement. The three constructs were involvement, structure, and autonomy support. Over the last 30 years, educational research has switched from psychological research to determining what motivates the student to focus on teacher behaviors that should promote motivation (Skinner & Belmont, 1993). Skinner and Belmont's research showed a strong reciprocal effect between the teacher behaviors and the student's classroom experience. However, in every case "the relationship between teacher behavior and children's engagement was mediated by children's perceptions of teacher behavior toward the child" (p. 3).

Student Perceptions of Teachers' Behaviors

Student perceptions of self-efficacy have often been shown to be related to perceived teacher support. Chong, Liem, Huan, Kit, and Ang (2018) researched student engagement based on student perceptions of how teachers supported them. This research was completed in Singapore with Seventh and Eighth grade students completing a questionnaire. Chong et al.

found “direct effects between perceived teacher support for learning and self-efficacy on competencies” (p. 68).

Research is now linking student perceptions of teacher support with student suicidal ideation (Madjar, Walsh, & Harel-Fisch, 2018). In a study with high school Israeli students, it was determined that “the school environment can play a significant role in reducing risk for suicidal ideation and behaviors” (p. 185).

Kususanto et al. (2010) did a study of between-class ability grouping in Malaysian secondary schools to try to determine if there was a correlation between students’ perception of teachers’ behavior and the student’s self-esteem. Self-esteem was measured using Rosenberg’s Self-Esteem Scale. The high ability group scored significantly higher on self-esteem compared to the low achiever group. There was also a significant difference in students’ perceptions of teacher behaviors between the two groups. The high achiever group perceived the teacher as being very supportive, while the low achiever group perceived the teacher as being very controlling.

In a study of sixteen to seventeen-year-old students, Mathew and Prema (2017) found a significant difference in the students’ perception of their teacher’s feelings between males and females. In the same study, there were no correlations between socioeconomic status and the students’ perceptions. Biological sex and socioeconomic status did not have a significant effect on academic achievement either.

Another study was completed in Pakistan using between ability grouping identifying each student by the original group. Ismail and Majeed (2011) found some significant correlations to self-esteem. Ismail and Majeed (2011) suggest that perhaps academic performance is a major factor contributing to the self-esteem of adolescents between 14 and 17. The study found that the

students who were from the higher ability group (HAC) reported much higher levels of self-esteem than those from the lower ability group (LAC).

Ismail and Majeed also found that social acceptance differed greatly from one group to another. Students from HAC may have been given a greater social acceptance than the students from the LAC which could be a contributing factor in the result of self-esteem. The students from the HAC group had a positive perception of the teachers as more supporting and less controlling. The students from the LAC group perceived the teachers as more controlling and less supporting (Isamail & Majeed, 2011). Some of the considerations were that students in the LAC had more difficulty controlling negative or off-task behaviors and the teachers would need to intervene to defuse the situation. The students perceived this constant intervention from the teacher as controlling behaviors. However, the students with more positive behaviors did not need constant interventions or admonitions to do the work. The positive behavior students were more frequently on task and did not need to be motivated by the teacher to do the work.

Teacher Perceptions of Ability Grouping

Teachers have a lot of influence on a student's behavior perceptions. As an educator, one of the main aspirations in the classroom is to enhance the learning process to help the student have greater academic success. Some studies have suggested student perceptions of one's teacher may influence self-esteem contributing to academic success or failure (Geoff, 2004). Unfortunately, Duari (2012) found that students with low self-esteem seem to focus more on the negative aspects instead of trying to move ahead and focus on their strengths. This may also contribute to the students' perceptions of a controlling teacher underwriting their failures.

Teachers often come into a classroom with some type of expectancy based on students' previous behaviors in prior classes (Cabaroglu, 2012; Smart, 2014). The management of the

classroom is often determined by student behaviors, or the expected behavior based on prior sessions (Vogl & Preckel, 2014). Many times, educators inadvertently create a tension between higher ability students and lower ability students (Worthy, 2010). Most teachers have higher expectations for higher ability classrooms than for lower ability classrooms (Kususanto et al., 2010). Good (1981) stated that lower ability students often do not receive the same feedback and praise that is given to higher ability students. Teachers were reported to be more critical of wrong answers and would spend less time answering questions of lower ability students. These are characteristics that are often attributed to controlling teachers. Educators often expect the higher achieving group to be more analytical whereas the lower-level class needs to focus more on behaviors (Worthy, 2010).

Many high schools have a system of tracking students and grouping them by ability in specific subject areas. This tracking or grouping by ability has often been criticized, claiming it has negative effects on lower ability students. It is usually much easier for teachers to teach the classes of students that have been grouped with similar abilities. This grouping also allows the higher ability classes to have more autonomous classes that may be able to cover more rigorous material (O'Rourke, 2013). O'Rourke (2013) researched teacher perceptions of heterogeneous classes. The research was completed by removing all academic tracking that would normally have separated the students by abilities. The new mixed ability presented some definite challenges for the teachers as the instruction had to be diversified to meet all students' instructional needs. O'Rourke found that the mixed ability classes offered strong social benefits, but there was little if any academic benefit (p. 1). O'Rourke recommended that schools with mixed ability classes provide academic support classes for the students as well as some extensive professional development to assist the teachers of these classes (O'Rourke, 2013, p. 1).

Teacher Behaviors

Perceived teacher behaviors. Positive perceptions and interactions are necessary for student development of motivation for self-efficacy needed in academic achievement (Madill, Gest, & Rodkin, 2014). Perception of a student is the basis for the psychological expressions of need in the classroom (Cooper & Miness, 2014). Studies have shown that even though most teachers are very committed to the relationship needs in teaching, many students believe they are receiving unfair treatment and that their needs are not being met by their teacher (Gasser & Althof, 2017; Pianta, Hamre, & Mintz, 2012; Ruck & Wortley, 2002). A poor perception of support in the academic world could also lead to major implications for a student's future. Many times, the student's perceptions become reality to them and may create other issues as depression, emotion adjustments, and other conduct or academic problems (Gasser, Grutter, Buholzer, & Wettstein, 2018; Zee, Koomen, & van der Vee, 2013; Rueger, Malecki, & Demaray, 2010; Patrick, Ryan, & Kaplan, 2007; Greene, Way, & Pahl 2006; Wentzel, 1997, 2002, 2010). One of the most challenging relationship phases in a student's education occurs in fourth and fifth grades as teachers may seem to be more focused and academic and less interrelation with the students (Spilt, Hughes, Wu, & Kwok, 2012). Even though teachers may still care as much as in earlier grades, the students begin perceiving this attitude as uncaring to them as an individual.

The development of how student perceptions of teacher care and justice was studied by following students from grade five to grade six and doing multilevel analyses (Gasser, et al., 2018). 1209 students in fifth grade were studied. Although Gasser et al. found that perceived teacher care decreased significantly as students transitioned to sixth grade, students that were placed in classrooms that continued to have high emotional supports did not perceive the teacher care as decreasing (p. 87).

A study in India found that a student's ability to adjust in the classroom had a direct correlation to the student's ability to resolve conflict (Khullar & Tyagi, 2014). In contrast, the results showed a negative correlation between adjusting in the classroom and teacher-student relationships. Khullar and Tyagi's research also showed a differential between males and females. Males had a negative correlation in comparison to self-esteem and conflict resolution whereas females had a positive correlation between self-esteem and conflict resolution.

In a study in the upper elementary grades, student perceptions were analyzed as determining if their teachers were caring and just or not (Gasser et al., 2018). The results showed that the quality of the teacher-student interactions was extremely important in the emotional area. Students with high academic disengagement usually developed negative perceptions of teacher justice and care. However, these same student perceptions were positive if the teacher had given the student much higher emotional support.

Another type of perceived behavior is autonomy supportive or controlling. In a study in elementary Physical Education classes, student perceptions for autonomy supportive or controlling depended on their perceptions of life skills development. If the student perceived that one was building life skills, the student would perceive the teacher as autonomy supportive. If the student did not perceive the activities were enhancing life developing skills, the student would perceive the teacher as controlling (Cronin et al., 2019). However, in another study on the effects of autonomy-supportive and controlling teaching behavior in biology lessons, intrinsic motivations were increased with autonomy supportive teacher behavior for students who were working with videos instead of live subject material. For students working with live subject material, there was no significant difference between autonomy-supportive and controlling teaching on intrinsic motivation. In the latter part of the study, the intrinsic motivation was only

changed based on the interest in the live subject matter (Hofferber, Basten. Grobmann, & Wilde, 2018).

Types of teacher behaviors. Evans, Butterworth, and Law (2019) studied teachers' perspectives of the relationships with students and the role it played in the responses to specific student problematic behaviors. This study found the teacher's perspectives had a significant role in how student behaviors were handled. This would affect the student perspectives of the teacher as well. There are two types of perceptions students may have of teacher behaviors based on academic performance: controlling or supportive (Kususanto et al., 2010).

Hofferber, Eckes, and Wilde's (2014) research on controlling versus supportive teacher behaviors defined specific behaviors for the teachers participating in the research. Controlling teachers were to require the students to do the work exactly as the teacher defined it and gave students feedback that it was good if the student had completed it just as the teacher specifically defined it. Supportive teachers allowed more freedom for the students to observe and to choose methods of completion once the task was explained.

Good (1981) states that lower ability students often do not receive the same feedback and praise that is given to higher ability students. Good expressed that teachers were reported to be more critical of wrong answers and would spend less time answering questions of lower ability students. These are characteristics that are often attributed to controlling teachers.

Hofferber et al. (2016) explained that controlling teachers had a positive effect on extrinsic motivation but a negative effect on intrinsic motivation. Other studies have also suggested that allowing students' more autonomy in the classroom may have a positive effect on the students' motivation (Mouratidis, Lens, & Vansteenkiste, 2010; Reeve, Bolt, & Cai, 1999). Interestingly, Hofferber et al. (2014) discovered results showing that there were no significant

differences between the knowledge measure of the two student groups of autonomy supportive and controlling teacher behavior. Because a student's previous knowledge base may influence the growth in any specific period (Hofferber et al., 2014, Krob & Lind, 2001), students were given a pretest to confirm that both student groups began with a similar knowledge level. Other studies have determined similar results in comparing controlling or supportive teacher behavior to student knowledge gained (Grolnick & Ryan; 1987).

Summary

Self-esteem is valuable to everyone as a measure of self-value or self-worth. Self-esteem begins shaping in the early years of one's life long before starting school. The interactions with parents and other family members form a foundation of one's self concept. Positive self-esteem contributes to motivation which is necessary for academic success (Bandura, 1971). Research has shown that self-esteem follows a trajectory path starting at age 16, increasing to age 51, and then declining the rest of one's life. Teachers give guidance in the classrooms which may create a necessary learning environment for students to have greater success. Teachers of high ability classes may be able to better motivate and build self-esteem through creating a motivational environment for superior achievement.

Research has shown a definite link between self-esteem, math anxiety, and math performance. As a student progresses through adolescence and into adulthood, the self-esteem patterns may also vary based on each student's biological sex. Research has shown that female students exhibit a higher level of math anxiety than male students which may be attributable to self-esteem levels. Because of the social aspect of self-esteem and individuals desiring acceptance, a student's perceptions of teacher behaviors as controlling or supportive may contribute to one's self-esteem at the high school level.

CHAPTER THREE: METHODS

Overview

Educators are pushing to get more students to pursue STEM related careers, especially females. Student perceptions of a teacher's behavior as controlling or supportive has been shown to effect students' academics and self-esteem in high school students in countries outside of the United States (Ismael & Mahjeed, 2011). Research has shown in many instances that emphasizing the positive instead of negative behaviors frequently contributes to higher self-esteem and self-confidence (Owens, 1993). Self-esteem is often an indicator of one's confidence level or success level because of one's own perceptions of ability (Frant, 2016). Teachers' behaviors have demonstrated a significant effect on student performance in the classroom (Ismail & Majeed, 2011). This relates back to Bandura's (1971) realization of the importance of a student's observations in the successive actions and reactions which direct the student's future. Students who are secure in teacher interactions will be more involved classroom activities which will ultimately increase the student's performance (Smart, 2014). The purpose of this predictive, correlation study is to determine the significance of the relationship of the criterion variable self-esteem using multiple predictor variables of student perceptions of teacher behaviors as controlling or supportive. This chapter will discuss the research design, the research questions and hypotheses, the participants and setting, the instrumentation, and the data analysis of the research.

Research Design

This study will be conducted using a predictive correlational design. This design is used to measure the relationship between two or more variables on an interval scale (Warner, 2013). Correlational research designs are used to predict the value of one variable based on the value of

a different variable (Laerd Statistics, 2018, para. 1). Linear regression will be used to determine if there is a correlational relationship between the students' self-esteem, the criterion, based on the predictor variable of teacher behaviors as supportive or controlling (Gall, Gall, & Borg, 2007). The purpose of linear regression is to determine if a significant correlation exists between the criterion variable and the predictor variables. This study was completed to determine if a relationship exists between the criterion, self-esteem, and the two predictors of controlling or supportive with high ability math students at the high school level in one area of the United States.

Research Questions

RQ: How well can a student's self-esteem be predicted by a student's perceptions of teacher behavior as controlling or supportive?

Hypotheses

$H_0 1$**:** There is no significant predictive correlation between the perceived criterion variable of students' self-esteem and the following predictor variables: student's perceptions of a teacher's behavior as controlling or supportive.

Participants and Setting

The setting for this study is high school students enrolled in high ability math classes in a private high school holding daily live sessions. The students are in ninth through twelfth grades. The participants for the study were drawn from a convenience sample of high school students located in the eastern part of the United States. The school district contains a wide range of incomes with about 32 percent free and reduced lunches at the public high school (Virginia Department of Education, 2018).

The study sample was from three classrooms with a possible sample size of 75 students. Since the minimum number of participants to produce a medium effect size with a statistical power of .7 at the .05 alpha level is 66 (Gall, Gall, & Borg, 2007), it was hoped that the classes would produce at least 66 students willing to participate in the study which would give a medium effect size as a minimum. However, only 20 students and parents completed and returned the joint consent forms in time and were allowed to complete the questionnaires. This was approved as a minimum sample size. There were 12 biological females and 8 biological male students. The students were from three high ability math classes including Advanced Algebra 2, Precalculus, and Calculus. The ethnicity of the state was 62% Non-Hispanic White, 20% Black or African American, 9.5% Hispanics or Latinos, 7% Asians, and 0.5% Alaska Native or American Indian (World Atlas, 2019), should also be reflected in the composite sample of the school.

Although this study will use a sampling procedure of convenience sampling (Gall, Gall, & Borg, 2007), students in the high ability classes may often be considered grouped because of the students' higher abilities. Students in the high ability, honors, AP, and DE classes have usually exceled in his or her previous math course and often have a recommendation from the previous teacher. Teacher recommendations for high ability math classes are based on student motivation, attitude, and student ability as shown by current math work. Students recommended for DE classes are required to pass a college level math exam to be enrolled. Many schools also have prerequisites for AP or DE courses.

Instrumentation

Rosenberg's Self-Esteem Scale (RSES)

Rosenberg's Self-Esteem Scale **(**Rosenberg, 1965) will be used to assess the criterion variable of self-esteem which has been used to calibrate self-esteem in many previous education research projects and is well known (Alessandri, Vecchione, Eisenberg, & Laguna, 2015; Kususanto et al., 2010; Robins, Hendin, & Trzesniewski, 2001; Robinson, Shaver, & Wrightsman, 1991; Grant, 2018). The Rosenberg instrument is easy to use and to administer as it can be given in less than 10 minutes and is also quickly graded. The Rosenberg scale has been used so frequently that Robins et al., (2001) states that it has been used to determine more experimental data than any other instrument that measures self-esteem. The RSES is now used for any age although it was originally designed to be used with adolescents (Robins et al.).

The RSES, has selections for five positive response items and five negative response items. Supple et al. (2013) found that the responses to these items were similar when controlled for age and gender. Permission is not required to use the RSES if it is referenced and cited (Rosenberg, 1989).

Cronbach's alpha values for the RSES is in the range of 0.72 and 0.88 (Alessandri et al., 2015; Kususanto et al., 2010; Robins, Hendin, & Trzesniewski, 2001). A Cronbach's alpha of .78 was reported for the RSES by Zeng, Hu, and Ma (2016) who studied loneliness in relationship to self-esteem and pathological internet use. Tagarro and Galindha (2016) reported a Cronbach's alpha for both of their subgroups that were based on gender with an internal consistency of 0.88.

The RSES is a 10-item instrument with questions based on a 4-point Likert scale ranging from 1 = strongly disagree, 2 = disagree, 3 = agree, to 4 = strongly agree. Total scores on the

RSES range from 10 to 40. Five of the questions were designed to encourage positive responses from the answers that were provided. On questions 1, 3, 4, 7, and 10, a strongly disagree will receive 1 point, disagree will receive 2 points, agree would receive 3 points, and strongly agree would receive 4 points. The other five questions are designed to encourage negative responses from the answers that were provided. On questions 2, 5, 6, 8, and 9, a strongly disagree would receive 1 point, disagree would receive 2 points, agree would receive 3 points, and strongly agree would receive 4 points.

Perceptions of Teachers' Behaviors as Controlling or Supportive

The Student Perceptions of Teacher's Controlling Behavior Scale (SPTCBS) and Student Perceptions of Teacher's Supportive Behavior Scale (SPTSBS) were designed by Kususanto (2010) in his study on teachers' behaviors as perceived by high-ability students. Permission was granted to use these instruments. Each of these 10-question instruments were based on the research of Good (1981) and Oakes (1985) and are designed to be used together to recognize differentiated teachers' behaviors as observed by high ability students.

The supportive behaviors focus more on academics, while the controlling behaviors are focused on discipline. The questions have a 4-point Likert scale of responses ranging from 1 = strongly disagree to 4 = strongly agree. For the 10 questions on the SPTCBS, the higher numbers equate to more controlling teachers. For the 10 questions on the SPTSBS, the higher numbers designate more supportive teachers.

Both instrument scales have shown good reliability. The SPTCBS internal consistency has a Cronbach's alpha of 0.77 to 0.81 (Kususanto et al., 2010; Ismail & Majeed, 2011; Kusuanto, Fui, & Lan, 2012). Kusuanto et al., (2010) showed a Cronbach's alpha of 0.77 for internal consistency for the SPTCBS and 0.76 for the SPTSBS. When Ismail and Majeed (2011)

attempted to replicate the study using the SPTSBS and SPTCBS, Cronbach's alpha of 0.81 was reported for the SPTCBS and a 0.78 for the SPTSBS. Another study by Kusuanto, Fui, and Lan (2012) found a Cronbach's alpha of 0.77 for the SPTCBS and a 0.76 for the SPTSBS.

The SPTSBS enumerates students' perceptions of teacher behaviors using support given in class. This is a 10-question instrument using a 4-point Likert scale. The range of the Likert scale is from 1 = strongly disagree to 4 = strongly agree. The total score ranges from 10 points to 40 points. The higher the score or closer to 40, the greater the student perception that the teachers are showing supportive behaviors for academic achievement instead of using controlling behavior dealing with discipline issues. The lower the scores are or closer to 10, the stronger the students believe the teacher is more focused on dealing with disciplinary issues.

The SPTCBS calculates students' perceptions of teacher behaviors using controlling behaviors during class. The range of the Likert scale is from 1 = strongly disagree to 4 = strongly agree. This is a 10-question instrument using a 4-point Likert scale. The total score ranges from 10 points to 40 points. The higher the score or closer to 40, the greater the student perception that the teachers are showing controlling behaviors for behaviors instead of using supportive behaviors for academic pursuits. The lower the scores are or closer to 10, the stronger the students believe the teacher is more focused on academics.

All three of the instruments this study will be using records scores between 10 to 40. On the RSES, the lower scores or closer to 10 designates lower self-esteem, while higher scores or closer to 40 designates higher self-esteem. The SPTSBS, also recording scores of 10 to 40, has less supportive teacher behavior as it gets closer to 10 and greater teacher supportive behavior as it gets closer to 40. The SPTCBS also records scores of 10 to 40. However, the SPTCBS shows

lower controlling behaviors perceived as the scores get closer to 10 and higher perceived controlling behaviors as the score gets higher or closer to 40.

Procedures

Approval from the high school academy was requested first. After receiving permission to do the study at the high school, approval was requested from Liberty University's Institutional Review Board (IRB) before making any contact with any of the teachers, students, or parents that were involved in the study (Appendix A)

After approval was received from Liberty University's Institutional Review Board (IRB), administration at the school emailed the joint parent and student consent forms to parents of all students in the participating classes. The consent email described the study as well as the experimental procedure that would be used and any conditions for the students' participation (Appendix B). They were requested to read carefully, sign and return within 2 days.

Signature consent form submissions were collected by the principal and given to the researcher. The teachers were asked to allocate about 20 to 30 minutes for the research on the date arranged. Three days later, the researcher came to the classes and explained the research again answering any questions and then passed out the questionnaires to all students who had returned the consent form with the required signatures and were still willing to complete it.

The outcomes of all three instruments, the RSES, the SPTSBS, and the SPTCBS, were stored on the researcher's computer. No one else will be given access to these findings. No names or identifying data will be attached to any of the survey results. Each of the surveys were identified by gender and the name of the participating class. Students completing paper surveys selected male or female at the top of their form but did not put their name on any of the surveys. No other sources were able to access the results. No information will be shared with any of the

stakeholders as parents, principals, or teachers until final publishing of the doctorate paper if interested.

Data Analysis

Linear regression was used in this predictive correlational study since it is used to "Predict the value of a variable based on the value of another variable" (Laerd Statistics, 2018, para. 1). Correlation is used to determine both the strength and the direction in a linear relationship between two continuous variables. Linear regression may be used to analyze the correlation between one criterion and one or more predictor variables (Gall et al., 2007). The numeric value of the correlation is delineated by Pearson's correlation coefficient (r). A positive relationship will have a positive "r" value which means as one variable increase or decreases the other variable does the same. A negative relationship will have a negative "r" value which means as one variable increases or decreases, the other variable does the opposite. The best correlation will have $r = -1$ or $r = 1$ as these are perfect linear relationships. If $r = 0$, there is no correlation at all. The predictor variable (x) in this research is the controlling or supportive variable and the criterion (y) is self-esteem which was measured on a continuous scale.

The data for the correlational study was sorted to look for any unusual scores and inconsistencies. The variables were measured on the interval or ratio. Observations within each variable was independent. Since the population of the students in a school usually reflects the general population, the sample assumption is assumed to be a random sample from the population.

Assumption of Normality was determined by using Shapiro-Wilks since the sample size is less than 50 (Warner, 2013). A scatter plot between the predictor variable controlling or supportive (x) and the criterion variable self-esteem (y) will be used to look for extreme bivariate

outliers and assumption of linearity. Since the scatterplot between the predictor variable of controlling or supportive (x) and the criterion variable of self-esteem (y) is in a straight line a linear relationship was assumed. Since the x and y variable have bivariate normal distribution that is free of outliers, it was assumed that the y values come close to homogeneous variance across x and the x values will also have estimated homogeneous variance across y (Warner, 2013). If the scatter plot between the predictor variable controlling or supportive (x) and criterion variable self-esteem (y) had a classic "cigar shape," a bivariate normal distribution assumption would be determined. Pearson's correlation coefficient "r" and Spearman's rho (p) was used to report the relationship. The effect size is determined by r^2 which describes how strong a relationship is between two variables. If $r^2 = 0.10 – 0.30$, the effect size is small to medium. If $r^2 = 0.30 – 0.50$, the effect size is medium to large. However, if $r^2 > 0.50$, the effect size is large to very large. For a significant relationship to exist, Spearman's rho (p) should be less than 0.05 ($p < 0.05$).

The dependent variable was measured on the interval or ratio determination. The observations within each variable was independent. Since the population of the students in a school usually reflects the general population, the sample assumption is assumed to be a random sample from the population. Assumption of Normality was determined by using Shapiro-Wilks if the sample size is less than 50. Levene's test of equality of error variance will be used to determine assumption of equal variance with a $p > .05$. This test will be looking for the F-statistic to be less than F-critical and will be consider significant if $p < .05$ (Warner, 2013).

Each data set was checked for accuracy and data entry errors identified. Box and whisker plots were used to analyze how data are skewed as well as to check for any possible outliers. Standard deviation will be used to determine the variability of the scores (Warner, 2013).

Extreme bivariate outliers and linearity between the criterion variable and the predictor variable may be determined using multiple scatterplots (Laerd Statistics, 2018).

CHAPTER FOUR: FINDINGS

Overview

The purpose of this predictive, correlational study was to determine if there is a relationship between the criterion variable of self-reported self-esteem and high ability high school math student's self-esteem and their perceptions of teachers' behaviors as controlling or supportive at the high school level. The students participating in this study were grouped in high ability classes for Algebra 2, Precalculus, and Calculus. Chapter 4 will include a description of the sample, the results of the data analysis, a report of the results, and a summary of the results that answer the RQ.

Research Question and Hypothesis

RQ: How well can a student's self-esteem be predicted by a student's perceptions of teacher behavior as controlling or supportive?

Hypotheses

$H_0$1: There is no significant predictive correlation between the perceived criterion variable of students' self-esteem and the following predictor variables: student's perceptions of a teacher's behavior as Predictor 1 controlling or Predictor 2 supportive.

Descriptive Statistics

Initially, the total possible sample was up to approximately 75 high school students in three different grouped high ability classes at a private high school located in central Virginia. Only 20 students and parents signed the joint consent forms and were given questionnaires to complete. The final sample was made up of 20 high-ability math students (12 female and 8 male participants). Answers to all three surveys were completed using a paper copy of the research questions.

The collected data were the responses to the RSES, SPTCBS, and SPTSBS.

Table 1

Means and Standard Deviations

Variable	Mean	Standard Deviation	N
Self-esteem	19.2	5.54	20
Supportive	25.3	3.54	20
Controlling	27.5	2.50	20

Results

Data Screening

To identify any outliers on the criterion and predictor variables, box and whisker plots were used. No outliers were noted for the criterion variable of self-esteem and all z scores were between +1.77 and -1.66. No outliers were noted for the predictor variable of supportive with all z scores between +1.93 and -1.79. No outliers were noted for the predictor variable of controlling with all z scores between +2.20 and -1.8.

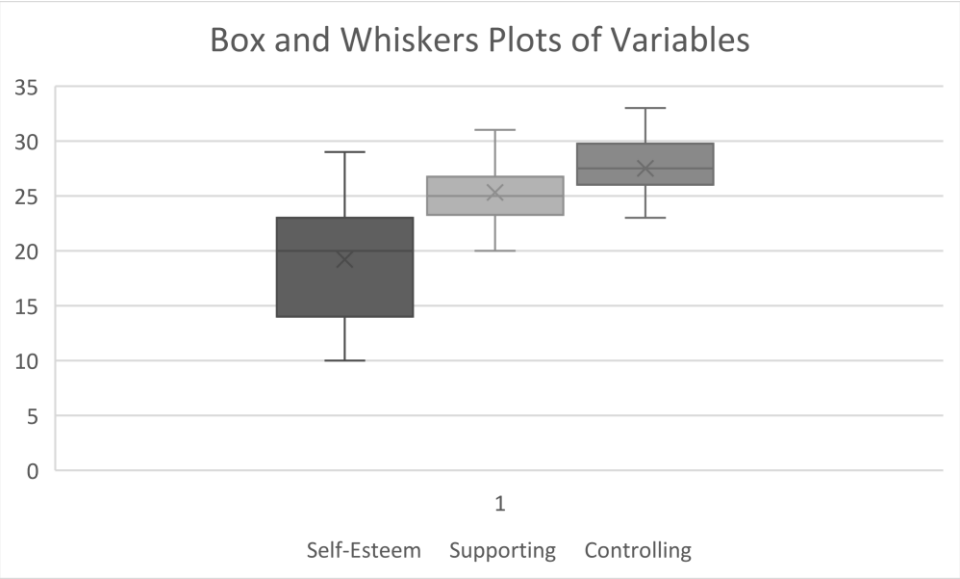

Figure 1. Box and whiskers plot of criterion and predictor variables. No outliers were noted.

To ascertain if any of the participants were unreasonably influential on the results, leverage points were evaluated. Any leverage value below 0.2 is considered safe. Values that are between 0.2 to 0.5 will be considered threatening. Any value that is above 0.5 is considered hazardous and will be removed (Laerd Statistics, 2015). The leverage points were all below 0.2 and would be considered safe for assumption.

To verify statistical significance, the assumption of normality of the residuals were verified using histograms. All standardized residuals showed approximately normal distributions (Figures 2 – 5).

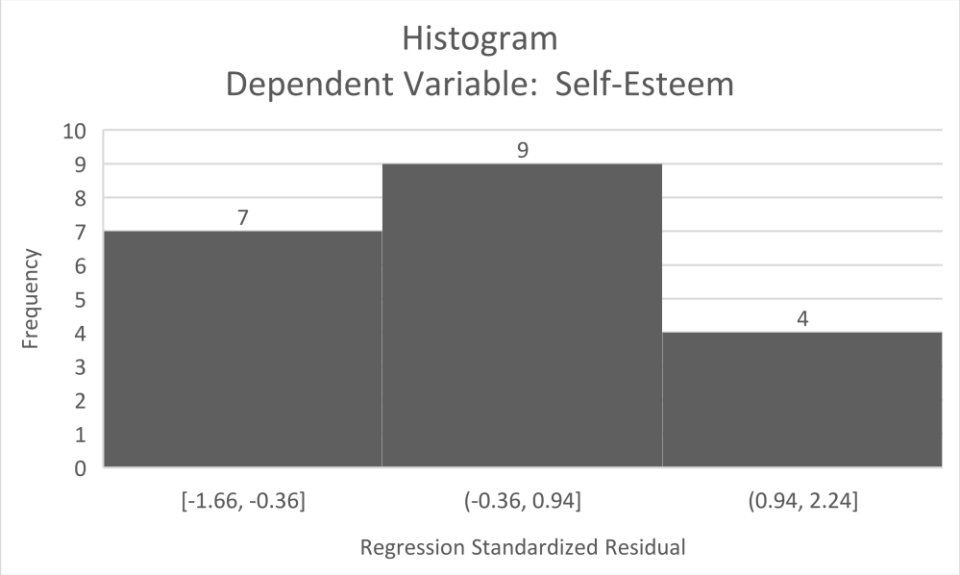

Figure 2. This shows a close to normal distribution of the standardized residual values for Self-Esteem. A mean score of -1.33E-16 with a standard deviation of 1.00 and N=20 is shown on the histogram.

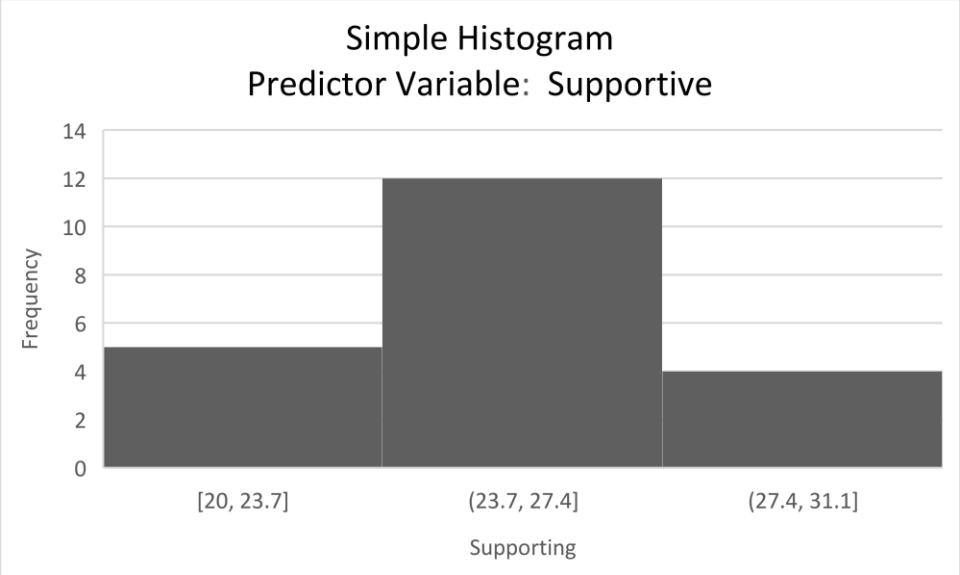

Figure 3. The Predictor Variable of Supportive distribution has an approximately normal distribution. A mean score of 25.3 with a standard deviation of 3.54 and N=20 is characterized on this histogram.

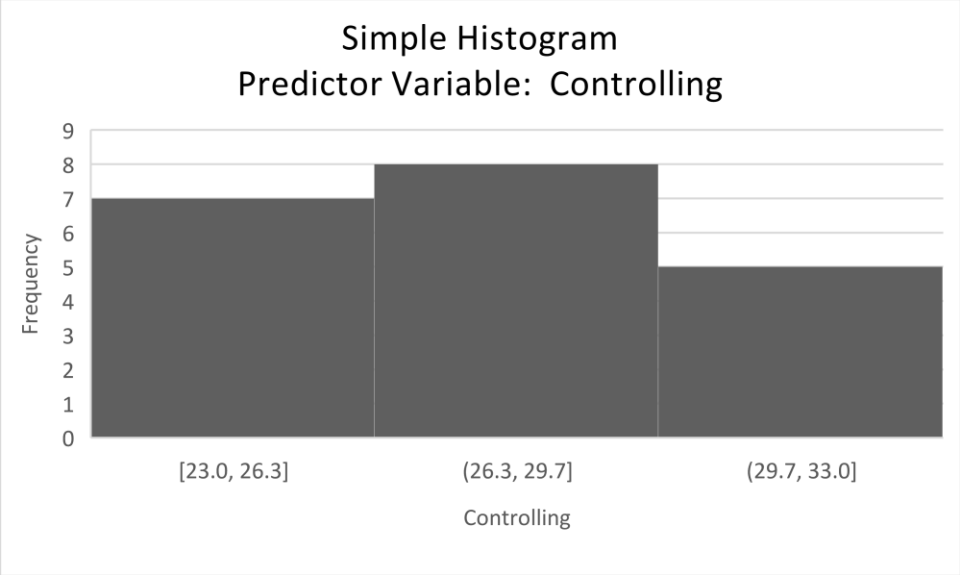

Figure 4. The Predictor Variable of Controlling distribution has an approximately normal distribution. A mean score of 27.5 with a standard deviation of 2.50 and N=20 is characterized on this histogram.

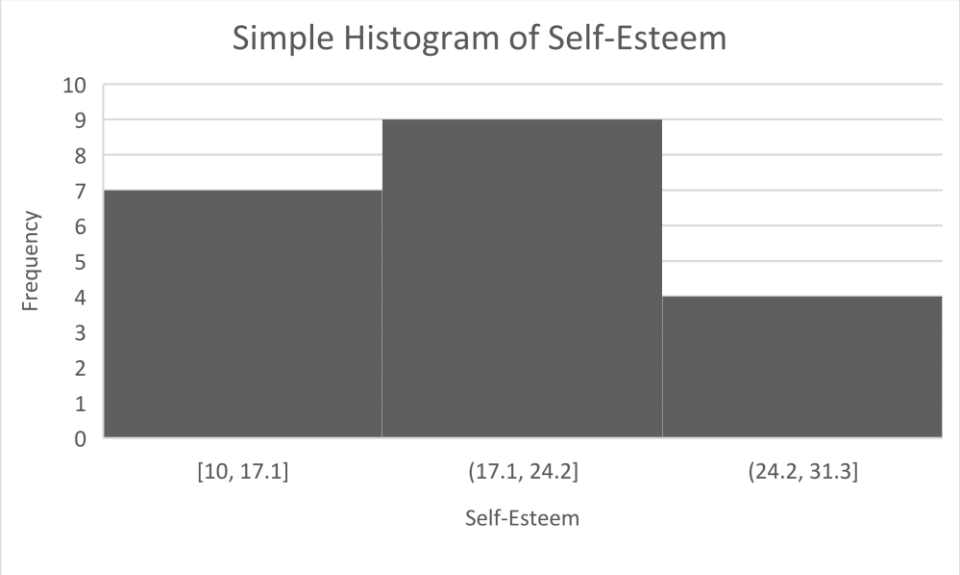

Figure 5. The Criterion Variable of Self-Esteem distribution has an approximately normal distribution with a slight skew to the left. A mean score of 19.2 with a standard deviation of 5.54 and N=20 is characterized on this histogram.

Assumption Testing

The assumptions that must be met for multiple linear regression analysis to be valid are linearity between the dependent variable (self-esteem) and the two predictor variables (supporting behaviors and controlling behaviors). The first assumption for linearity tested was between the criterion variable (self-esteem) and the combined predictor variables of supportive and controlling.

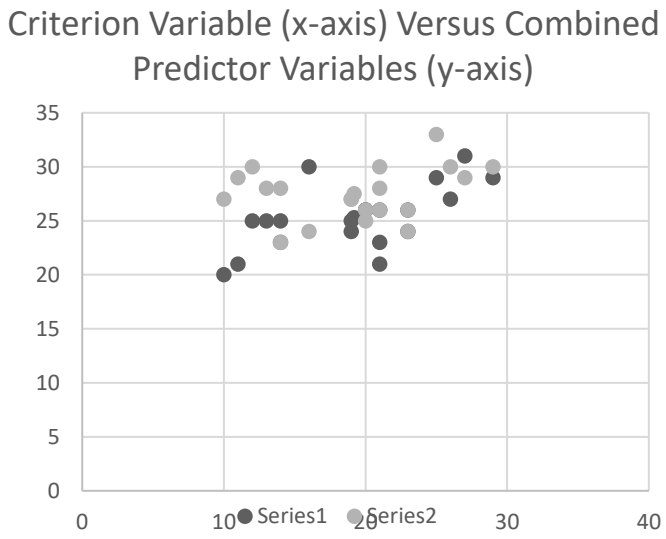

Figure 6. This scatterplot shows a moderately strong, positive linear relationship between Self-Esteem (Criterion) and the Supporting Behavior (Predictor 1) and the Controlling Behavior (Predictor 2).

According to Warner (2013) if the points are spread randomly and do not indicate a specific pattern, it is homeostatic and meets the assumption of homogeneity of variance.

Hypothesis

*$H_0 1$***:** There is no significant predictive correlation between the perceived criterion variable of students' self-esteem and the following predictor variables: student's perceptions of a teacher's behavior as controlling or supportive.

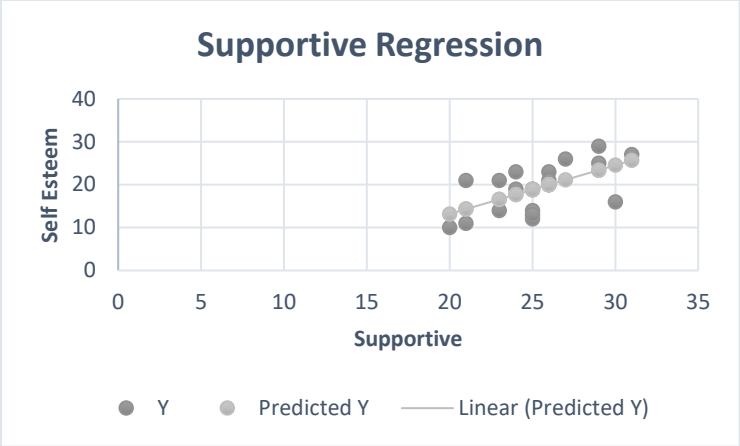

Figure 7. Linear Regression for Supportive Data showing a positive r (correlation) value.

Regression Statistics - Supportive	
Multiple R	0.606425874
R Square	0.36775234
Standard Error	4.526016369
Observations	20

Figure 8. Linear Regression Statistics for Supportive showing a medium to large effect size since r^2 = .37 calculated at the 95% confidence level.

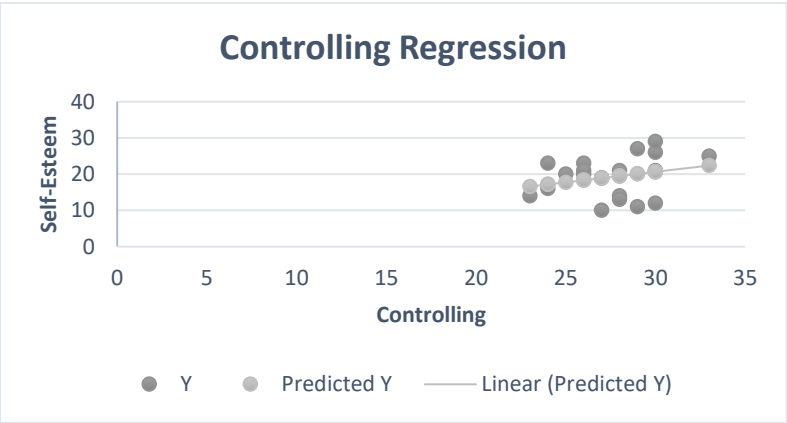

Figure 9. Linear Regression for Controlling Data showing positive r (correlation) value.

Regression Statistics - Controlling	
Multiple R	0.261918909
R Square	0.068601515
Standard Error	5.493387928
Observations	20

Figure 10. Linear Regression Statistics for Supportive showing a small to medium effect size since $r^2 = 0.07$ calculated at the 95% confidence level.

F-Test Two-Sample for Variances - Supportive

	10	*25*
Mean	19.68421053	25.61111111
Variance	27.4502924	8.016339869
Observations	19	18
df	18	17
F	3.424292488	
P(F<=f) one-tail	0.007211868	
F Critical one-tail	2.256670965	

Figure 11. F-test for Supportive showing $p < 0.05$.

F-Test Two-Sample for Variances - Controlling

	10	*27*
Mean	19.68421053	27.52631579
Variance	27.4502924	6.596491228
Observations	19	19
df	18	18
F	4.161347518	
P(F<=f) one-tail	0.002046477	
F Critical one-tail	2.217197134	

Figure 12. F-test for Controlling showing $p < 0.05$.

The significance of these tests is that the correlation between self-esteem and students' perceptions of teacher behaviors had a positive correlation for both supportive and controlling predictor variables since the r was positive for both tests. This was determined to be significant since the p values were less than 0.05. This means that students' self-esteem increased when teachers were perceived to emphasize academics and performance over student behavior and decreased when teachers focused more on discipline issues. However, the correlation was much stronger for the supportive predictor variable than the controlling predictor variable.

CHAPTER FIVE: CONCLUSIONS

This study examined the correlation between self-esteem (criterion) and the students' perceptions of teachers' behaviors as supportive (predictor variable) or controlling (predictor variable). The results of the study and the connection with previously discussed literature are focused on in this chapter. Discussion, implications, limitations, and recommendations for further studies are also presented.

Discussion

The purpose of this predictive, correlation study was to determine if there is a relationship between high ability high school math student's self-reported self-esteem and their perceptions of teachers' behaviors as controlling or supportive at the high school level. The SPTCBS, the SPTSBS, and the RSES were the three data source instruments. The SPTCBS and the SPTSBS had never been used before in the United States at the high school level. The RQ and its hypothesis that guided this study were:

RQ: How well can a student's self-esteem be predicted by a student's perceptions of teacher behavior as controlling or supportive?

$H_0$1: There is no significant predictive correlation between the perceived criterion variable of students' self-esteem and the following predictor variables: student's perceptions of a teacher's behavior as Predictor 1 controlling or Predictor 2 supportive.

The null hypothesis was rejected since $p<0.05$ which means that there is a significant predictive correlation between the perceived criterion variable of students' self-esteem and the predictor variables of student perceptions of a teacher's behavior as controlling or supportive. This study also aligned with the findings in a high-school study in Malaysia (Kususanto, 2010) as well as one in Pakistan (Ismail and Majeed (2011). Both studies showed that students had

higher self-esteem when they perceived their teachers were more supportive than controlling. Other studies have also shown that whether students are placed in high ability classrooms or regular classrooms, they respond better in classrooms with teachers that exhibit more supportive behaviors than with teachers that exhibit more controlling behaviors that focus on discipline over academics (Grant, 2018; Hofferber et al., 2016; Ismail & Majeed, 2011; Kususanto et al., 2010). Some studies suggested that positive feedback and more support may also contribute to a student asking for assistance which concurs with Bandura's (2012) studies as well (Wu, Hughes, & Kwok, 2010).

Implications

Results show that the students' self-esteem did increase as the perceived teacher supportive behaviors increased. Other high school studies outside the United States (Ismail & Majeed, 2011; Kususanto et al., 2010) as well as one middle school study in the United States (Grant, 2018) have also had similar results.

More positive teacher-student interactions that students see as supportive could help students become more creative and build more confidence in their academics which would also increase their self-esteem.

Limitations

This study was based on only one private school in central Virginia. There were three high-ability classrooms selected with approximately 20 - 25 students in each so the sample size of the study was limited to a maximum of approximately 75 high ability high school math students. These honors classes were Calculus, Precalculus, and Algebra 2. This small sample size restricted being able to draw conclusions for all high school high-ability students in all schools.

Time constraint was also a limiting factor in the study since both parent and student had to sign the consent form. Only 20 students returned the signed consent form and were allowed to complete the form which limited the sample population.

Recommendations for Further Studies

Additional research at the high school level would be recommended:

1. This research could be completed at the high school level in another area of the United States. This was the first study using these instruments that was completed in the United States at the high school level.
2. Another study could be done with a much larger sample to compare data and get a better representation of the correlation between students' self-esteem and their perceptions of teachers' behaviors using these instruments.
3. Studies between students of male and female biological sex are also recommended to determine if there is still a difference in the self-esteem levels as our culture changes.

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APPENDICES

APPENDIX A

Re: IRB Approval - IRB-FY22-23-270 THE RELATIONSHIP BETWEEN SELF-ESTEEM AND HIGH SCHOOL MATH STUDENTS' PERCEPTIONS OF TEACHER BEHAVIORS

Dear Patricia Gallagher, Margaret Ackerman,

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the following date: November 21, 2022. If you need to make changes to the methodology as it pertains to human subjects, you must submit a modification to the IRB. Modifications can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your

stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP

Administrative Chair of Institutional Research

Research Ethics Office

APPENDIX B

Parental/Student Consent Form

Title of the Project: The Relationship Between Self-Esteem and High School Math Students' Perceptions of Teacher Behaviors

Principal Investigator: Patti Gallagher, Doctoral Candidate, Liberty University

Invitation to be Part of a Research Study

Your child is invited to participate in a research study. Participants must be high school students enrolled in an advanced math class including Statistics, AP Statistics, Precalculus Honors, AP Precalculus, Precalculus, Algebra 3/Trigonometry, Calculus, or AP Calculus. Taking part in this research project is requested but voluntary.

Please take time to read this entire form and ask questions before deciding whether to allow your child to take part in this research project.

What is the study about and why are we doing it?

The purpose of the study is to determine if there is a relationship between self-esteem and high-ability math student's self-esteem and their perceptions of teachers' behaviors as controlling or supportive at the high school level.

This research may assist schools in better understanding self-esteem issues and possible teaching skills needed to cultivate and motivate stronger student applicants towards Science, Technology, Engineering, and Mathematics (STEM) related fields. Some of the current issues relate to the self-esteem of some employees with high qualifications in STEM related fields. The rationale is to better understand student self-esteem and perceptions of teacher behaviors in students taking advanced math courses who could be heading into a STEM career. This will possibly help STEM teachers in better preparing students.

What will participants be asked to do in this study?

If you agree to allow your child to be in this study, I will ask him or her to do the following things:

1. Please sign at the end of the form and return it to your school principal. Both parent and student signatures are required.
2. All students returning the signed consent form will be given a questionnaire to complete. It will ask them to identify their current math class and their biological sex to determine if there is a correlation of self-esteem based on biological sex. The questionnaire has 10 questions from 3 different surveys. Each question consists of 4 choices like a multiple-choice question. The participant will be asked to select one of the following: strongly agree, agree, disagree, and strongly disagree for each of the questions.

How could participants or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

What risks might participants experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life. All information will be kept confidential. No identifiable information will be collected or shared with anyone.

If any information triggers mandatory reporting obligations, the researcher is required by law to report child abuse, child neglect, elder abuse, or intent to harm self or others.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identity a subject. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be anonymous and assigned codes. The only identifiable information collected will be the math course and the biological gender.
- Data will be stored on a password-locked computer and may be used in future presentations.
- Only the researcher will have access to the findings from the questionnaires. The results from the questionnaires will be used for educational purposes. \
- Limits to confidentiality. Only the researcher will have access to the results. No one else will be given access to the questionnaires completed by participants. The only limitation that may arise would be any discussions the participants have with others.

What conflicts of interest exist in this study?

The researcher serves as a teacher at Virtual Virginia and does not have direct access to any of the classes of the students being requested to participate. To limit potential or perceived conflicts the study will be anonymous, so the researcher will not be able to correlate participants with the survey they completed. No identifying information except biological sex will be attached to the survey. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate in this study.

Is study participation voluntary?

Participation in this study is voluntary. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should be done if a participant wishes to withdraw from the study?

If you choose to withdraw from the study, please email the researcher at pgallagher2@liberty.edu that you wish to discontinue your participation, and do not submit your questionnaire. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Mrs. Gallagher. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at pgallagher2@liberty.edu.

Whom do you contact if you have questions about rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Your Consent

By signing this document, you are agreeing to allow your child to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your

records. The researcher will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to allow my child to participate in the study.

_____
Printed Student's Name

_____
Parent's Signature Date

_____
Minor's Signature Date