

ABSTRACT

Title of Thesis: GRIT AND ENGAGEMENT AS MEDIATORS OF THE RELATION BETWEEN ACADEMIC SUPPORT AND LITERACY ACHIEVEMENT IN ETHNIC MINORITY ELEMENTARY SCHOOL STUDENTS

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The relation of academic support from teachers and peers with later literacy achievement in ethnic minority elementary school students is not well defined in previous literature. Earlier theoretical models suggest that other socioemotional constructs, such as engagement and motivation, may act as mediators in this link. In this study, the model is updated with grit, a new motivational construct that has been tied to positive academic outcomes. This study uses a multi-method, longitudinal design ($N = 144$; ethnic minority 3rd-5th grade students) and mediation analyses to investigate four models where the link between academic support (from teachers or peers) and academic achievement is mediated by either engagement or grit. While earlier studies suggested that teacher academic support is positively correlated with academic achievement among students, this study did not find that correlation. However, both grit and emotional engagement acted as significant mediators between peer academic support and literacy achievement.

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ACADEMIC SUPPORT AND LITERACY ACHIEVEMENT IN ETHNIC MINORITY
ELEMENTARY SCHOOL STUDENTS

by

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Chapter 1: Introduction

Socioemotional factors that lead to ethnic minority student literacy achievement are of particular interest to educators wishing to better serve those ethnic minority groups that have had increasing rates of immigration to the U.S. in recent years. These groups lag behind White peers in standardized measures of achievement. In particular, the Hispanic population in American schools is increasing rapidly. In 1990, 6 percent of 4th graders in the United States of America were Hispanic. Roughly two decades later, in 2009, the Hispanic population of 4th graders rose to 22 percent (NCES, 2011a). Yet, even in recent years, these students have been underserved by the American education system. In 2009, the national reading White-Hispanic gap persisted as a difference of 25 scale points on the National Assessment of Educational Progress (NAEP; NCES, 2011a). Hispanic students often face unique challenges including speaking English as a second language, undergoing forced acculturation processes, poverty, the historical aftereffects of European colonization, and lasting immigration barriers and discrimination (Verdugo, 2006).

Previous studies show that, despite those challenges, Hispanic students utilize support systems to a great effect. Teacher and peer support have been linked to positive school outcomes in Hispanic youth (Brewster & Bowen, 2004). The role of socioemotional constructs such as grit (“passion and perseverance towards a long term goal;” Duckworth et al., 2007, p. 1087) and emotional engagement (how a student feels towards school; Skinner, Kindermann, & Furrer, 2009) in explaining how support leads to achievement is less clear. Recent renewed interest in

socioemotional constructs calls for more understanding of how these constructs work not only individually, but in a consequential manner upon each other, in order to improve academic outcomes. Further, previous literature is lacking in multiple ways: (a) socioemotional constructs lack a clear definition; (b) a comprehensive longitudinal model of academic support as it relates to grit, engagement, and academic achievement has never been examined; and importantly, (c) whether grit and emotional engagement act as mediators of the relation of academic support to achievement among Hispanic elementary school students deserves examination. This study tested a model with grit and emotional engagement mediating the relation of perceived academic support with later literacy achievement among largely Hispanic immigrant students. The study author acknowledges that although there were other ethnic minorities in the sample (which was 17% Black and 8% Asian), the vast majority were Hispanic. Therefore, it is appropriate to discuss both the literature and results in terms of how it would affect a majority Hispanic school. There are also, of course, limitations to discussing the Hispanic population as one uniform entity, as different subpopulations from different Latin American countries have been shown to have unique cultures and challenges in the U.S. However, there is some research precedent to examination of shared experiences and results among Hispanic people (e.g., the 2011 NCES survey of literacy and math achievement among Hispanic 4th graders).

Theoretical Model

This study contributes to the literature on socioemotional constructs and related processes with a multi-method, short-term longitudinal study design. The design allows testing of a complex model of how social support, grit, and engagement are related to achievement over time in an ethnic minority population. Although there are currently no models of how perceived academic support, grit, and emotional engagement work together, the study design is based on a unidirectional model of social support, motivation/engagement, and achievement created by Wentzel, Russell, Garza, and Merchant (2011; Figure 1).

In Wentzel and colleagues' model, social support increases classroom motivation and engagement, which, in turn, increases academic and social competence (2011). Wentzel et al. (2011) elaborated that students who perceive more social support will be more engaged in the classroom, and consequently more likely to be competent in the classroom. However, this model does not indicate specific types of social support, motivation, engagement, and academic competence, making it general for the purpose of specialized interventions. Wentzel also has not tested grit, a newer motivational construct that deserves further investigation due to its popular appeal and relation to positive academic outcomes (e.g., Del Giudice, 2014; Eskreis-Winkler, Shulman, Beal & Duckworth, 2014). Grit is highly correlated with motivation and has been considered a motivational sub-construct (Eskreis-Winkler et al., 2014).

Figure 2 shows the mediation models that will be tested in this study to answer the following questions: (a) is the relation between teacher academic support

and academic achievement mediated by grit?; (b) is the relation between teacher academic support and academic achievement mediated by emotional engagement?; (c) is the relation between peer academic support and academic achievement mediated by grit?; (d) is the relation between peer academic support and academic achievement mediated by emotional engagement? In order to answer these questions, this study examined 4 different mediation models including peer and teacher academic support tested separately as independent variables, and grit and emotional engagement as separate mediators.

Chapter 2: Literature Review

Construct Definitions

One major problem in this area of study is the lack of construct definition clarity and specificity. While there already exists a large body of research on social support and engagement in students, studies within this group differ widely how these constructs are defined and analyzed. This makes comparisons between studies difficult, and overall conclusions harder still. In order to clarify this issue, definitions of all specific constructs used in this study will be defined below, as well how those specific constructs have been studied within Hispanic school-aged populations. Table 1 includes a short summary of construct definitions, measures, and the time and method by which the specific data was collected.

Peer and Academic Teacher Support

Peer and teacher academic support is a type of social support that is directly connected to learning goals. It is a more specific type of the social support than the support Wentzel has tested in her models (2011, 1998; Figure 1); although her studies measure academic support, they combine those scales with emotional support. Academic support is operationalized as how much a student perceives that their teachers and peers help them learn and are interested in their academic goals (Johnson, Johnson, Buckman & Richards, 1985). Hispanic students may perceive and utilize peer and teacher support differently than other students. Wentzel and others (2011) found that in a study of 464 Mexican American 5th and 6th graders, they perceived higher rates of peer and teacher support than their non-Hispanic peers. This

study differs from previous studies of peer and teacher academic support because it does not combine this construct with other constructs, such as emotional support. Perceived academic support should be of particular importance for academic outcomes, and may be a more distinct target for interventions than broader support constructs.

Grit

Grit has been defined as “perseverance and passion for long term goals” (Duckworth et al., 2007, p. 1087). There are two dimensions of grit: 1) “perseverance of effort” and 2) “consistency of interests” (Duckworth et al., 2007). Grit is operationalized as the tendency of a person to work towards a long-term goal despite obstacles. Grit is highly correlated to school motivation (Eskreis-Winkler et al., 2014), and can be considered to fall under the umbrella of motivational constructs. Duckworth and colleagues did draw upon measures of perseverance, achievement motivation, and goal commitment when developing the Grit Scale (Duckworth et al., 2007). This makes grit a plausible stand-in for motivation in Wentzel’s model (2011; Figure 1). While grit has been glorified in popular media (Del Guidice, 2014), the mechanisms by which grit operates differently in Hispanic students has not been studied.

Emotional Engagement

Emotional engagement is a student’s level of enthusiasm and interest in school (Skinner, Kindermann, Connell, & Wellborn , 2009). It is operationalized by how much a student likes school and feels that learning is fun. Most previous studies

have focused on behavioral engagement (how a student participates in the classroom) or have combined multiple types of engagement into one construct. In one self-report study of emotional engagement in diverse high school students, Black students were found to have significantly higher levels of engagement than Hispanic peers, but both Black and Hispanic emotional engagement means were also higher than White peers (Park, Holloway, Arendtsz, Bempechat, & Li, 2012). This study examines student emotional engagement in elementary students as reported by teachers, which may provide insight into how teacher support may relate to teacher perceptions of students' emotional state in the classroom. Emotional engagement is again, a more specific subtype of the engagement described in the Wentzel model (2011).

Literacy Achievement

The gap between the literacy outcomes of Hispanic elementary school students and their White peers, as derived from national tests, has been a persistent concern. Only 17% of Hispanic 4th graders are reading at a proficient level, compared to 42% of White 4th graders (NAEP, 2009). Twenty five percent of Hispanic students who do not read at a proficient level in elementary school do not graduate high school (Hernandez, 2011). In this study, literacy achievement is a broad term but this study operationalized it as reading decoding, comprehension, and fluency. Literacy achievement is one outcome that could be considered a component of social and academic competence described in the Wentzel model (2011, Figure 1).

Relations Among Constructs

Previous literature provides evidence for the relations among support and academic achievement, grit, and engagement. Studies have also provided evidence for the relations between grit and academic achievement, and engagement and academic achievement. These studies, as well as their limitations and distinctions from this study, will be discussed below.

Academic Support and Grit

Only one study has linked perceived teacher support and grit, as well as perceived peer support and grit (Eskreis-Winkler et al., 2014). In this study, medium cross-sectional correlations ($r = 0.38$ and 0.42 , for teacher and peer support respectively) between support and grit were found in a Chicago high school population that was 45% Hispanic. The support items used in this study were related to academic support, but were designed for high school students, rather than the elementary school students in this study. There are important developmental changes that occur between elementary school and high school, so although strong effects were seen at the high school level, we may not find the same effects at the elementary school level.

When examining grit under the broader umbrella of motivation, more relations emerge. Student who have positive relationships with their teachers and peers are more likely to be motivated to reach academic goals (Wentzel & Watkins, 2002). Teacher support, specifically, has a consistently positive relation to motivation (Noddings, 1992; Wentzel 1994). Peer support may have more varied influences,

depending the peer groups' motivational goals. Students tend to choose peer groups that have similar motivational goals and can be further influenced to restructure their goals as more negative or positive (as reviewed in Wentzel & Wigfield, 1998). It is important to also remember that in these studies both support and motivation were broadly defined, and were not studied in predominantly Hispanic elementary school populations. Grit adds a new piece, which, while strongly related to perseverance and motivation, grit has the added dimension of consistency of interest. Therefore, while grit can be considered congruent to the motivation described in Wentzel's model (2011, Figure 1), it also adds an additional element to the model by testing a novel socioemotional construct as a mediator.

Academic Support and Emotional Engagement

Although there are many studies linking support and engagement (e.g., Ceballo, Maurizi, Suarez, & Aretakis, 2014; Garcia, Reid, & Peterson, 2005; Marks, 2000; Wentzel, 1994, 1997), both constructs are often ill-defined. For example, Van Ryzin, Gravely, and Roseth (2009) found a positive correlation between support and engagement, but did so by combining academic and personal support scales of the Classroom Life Instrument (Johnson et al., 1985), as well as combining behavioral and emotional engagement scales of the Engagement vs. Disaffection with Learning Scale (Skinner, Kindermann & Furrer, 2008). These studies provide a more holistic picture of how engagement affects achievement but deserve more specific constructs for better translation into targeted interventions.

Other studies have used different measures of support and engagement and have found high correlations between teacher support and more general engagement among middle schoolers (Rosenfield, Richman, & Bowen, 2000) and Hispanic youth (Brewster & Bowen, 2004; Ceballo et al., 2014; Garcia-Reid et al., 2005). Wang and Eccles (2012) found that teacher support is more important than peer support when predicting emotion engagement. The link between peer support and engagement is less clear – some studies have found a relation (Wentzel, 1994, 1997), whereas other studies have not (Shin, Daly, & Vera, 2007). These studies differ in the demographics of students which may be factors when considering peer support. For example, in the 1994 Wentzel study, the study sample was comprised mostly of White middle schoolers (92% White, 6th through 8th grade) and in the study done by Shin and colleagues (2007), the study sample was 54.5% Latino and entirely 7th and 8th graders. These studies also differ in the longitudinal nature of the two; Wentzel resurveyed the students over the 3 years of middle school while Shin and colleagues surveyed students at only one time point.

Grit and Literacy Achievement

Previous outcomes of achievement in grit studies have been math achievement (Rojas, Usher, & Toland, 2013), GPA (Duckworth, Kirby, Gollwitzer, & Oettingen, 2013; Eskreis-Winkler et al., 2014), and standardized test scores (Strayhorn, 2013). These studies all found positive correlations. In the study with a population most similar to ours, a sample of 5th graders that was 73% Hispanic were able to improve their GPAs after a grit-related intervention promoting self-control (Duckworth et al.,

2013). While these studies provide useful information, they do not address a core issue for Hispanic immigrants – literacy achievement.

However, some more general motivational constructs have been studied in conjunction with literacy achievement. Unrau and Schlackman (2006) did not find a correlation between motivation and reading achievement in Hispanic middle school students, but most larger studies of students of other ethnicities have found correlations between motivation and reading achievement (Baker & Wigfield, 1999; Guthrie, Wigfield, Metsala, & Cox, 1996; Wigfield & Guthrie, 1997). It is important to note that all of these studies used a reading domain specific measure of motivation; grit, as measured here, is domain general. Therefore, this study examines how a domain general construct related to motivation affects reading achievement.

Emotional Engagement and Literacy Achievement

Again, the broad approach to the study of the construct of engagement makes the literature unclear on how specific subtypes of engagement may affect achievement. In fact, although there have been positive correlations between engagement and achievement, these studies have often combined both emotional and behavioral engagement into one scale (Connell, Spencer, & Aber, 1994; Skinner, Welborn, & Connell, 1990; as reviewed in Fredricks, Blumenfeld, & Paris, 2004). The combination of these sub-constructs in these studies make it difficult to parse out the unique contribution of emotional engagement to achievement. Further, the achievement measures were also domain general, rather than domain specific.

Academic Support and Literacy Achievement

Operationalization of support varies widely, with some studies combining academic forms of support with other, more emotional and social forms of support. A few studies that have used general measures of support have found that perceived teacher support may be more important than other forms of support in improving academic outcomes (Klem & Connell, 2005; Rosenfield et al., 2000; Wentzel, 1998). However, many of these studies have been done on high school and middle school students, who are older than the students in this study's sample.

The story on peer support is less clear. Some studies have found no correlation between peer support and academic achievement (Wentzel, 1998; Chen, 2005), while others have found positive correlations (Furrer & Skinner, 2003), and others have found negative correlations at older ages (Cauce, Felner, & Primeravera, 1982). Again, this variability may be due to discrepancies in construct definition, measures, and age groups. Peers may influence each other differently depending on their age. Wentzel, Battle, Russell, and Looney (2010) found in one study, 80% of middle schoolers believed that their peers valued academics; in another study, 40% of high school students believed the same (Wentzel, Monzo, Williams, & Tomback, 2007). This attenuation of belief in the value of academic learning may also result in a decrease in the correlation between peer support and academic achievement.

Additionally, Wentzel et al. (2010) have found that the role of both teacher and peer support may vary, depending on not only students' ages and grades, but also their sex, teacher, and classroom environment. It is clear that support acts in a dynamic manner alongside other demographic variables.

Grit as a Mediator between Academic Support and Literacy Achievement

No previous study has examined grit as a mediator between academic support and literacy achievement. In the most similar study to our mediation study, a cross-sectional study of Dutch 7th graders found evidence for the partial mediation by motivational beliefs of the relation between general social support and academic achievement (Ahmed, Minnaert, Werf, & Kuyper, 2010). Another cross-sectional study found that within a large process model containing eight variables, support from parents and teachers correlated with perceived school competence and autonomy, which was correlated with school motivation, and predicted later grades (Guay & Vallerand, 1997). This study is unique in both its use of the specific construct of grit as a mediator and a longitudinal design, which allows for stronger causal inferences than cross-sectional mediation designs.

Emotional Engagement as a Mediator between Academic Support and Literacy Achievement

No study has looked at emotional engagement as a mediator between academic support and literacy achievement. However, other studies have examined more general social support and engagement constructs. In a mediation study with a design most similar to this one, the relation between teacher-student relationship quality (assessed in first grade) and academic achievement (assessed in third grade) was fully mediated by effortful engagement (assessed in second grade; Hughes, Luo, Kwok, & Loyd, 2008).

Study Contributions

By focusing on academic support and emotional engagement, this study hopes to build on existing literature by providing a precise model of how support and socioemotional skills relate to literacy among Hispanic immigrant children. This study applies an established theoretical model (Wentzel et al., 2011) to a very specific set of constructs and demographics. The addition of grit into the proposed models will allow for further examination of a new, fairly untested construct which falls under the motivation umbrella. Literacy achievement as an outcome informs testing of the literacy gap between Hispanic and White elementary students. Finally, this study uses a complex, longitudinal, multi-method design, allowing temporal sequencing of how support and socioemotional factors lead to achievement.

Hypotheses

The four models proposed in Figure 2 are the main research hypotheses for this study:

1. Grit will mediate the relation between teacher academic support and literacy achievement.
2. Grit will mediate the relation between peer academic support and literacy achievement.
3. Emotional engagement will mediate the relation between teacher academic support and literacy achievement.
4. Emotional engagement will mediate the relation between peer academic support and literacy achievement.

Chapter 3: Methods

Sample

Demographics of students in the study can be found in Table 2. Data was collected from the interviews of 144 students from a predominately low income (95% of students receiving free or reduced lunch meals), Hispanic elementary school in Maryland. The racial composition of the sample included 74% Hispanic, 17% Black, and 8% Asian students. Students were from 3rd through 5th grades. An estimated 61% of students spoke Spanish as a first language, an estimated 20% were first generation immigrants, and all remaining students were second generation immigrants. Reported statistics about immigration generation status are estimates given by the school administration. This is due to restrictions placed by the district on asking questions about immigration.

Study Design

The study design was a longitudinal, multimethod, mediation model in which Time 1 student-report academic support predicted Time 2 teacher-report engagement and grit. Then, Time 2 engagement and grit predicted the Time 3 literacy performance task. This design is reflected in Table 1 and Figure 2. Even though all variables were assessed at all three time points, this study was designed to test a specific model (Wentzel et al., 2011, Figure 1) which identifies support, engagement/grit, and achievement in a temporal sequence. Teacher reports of emotional engagement and grit were used rather than student reports to improve validity and strengthen this study's multimethod design.

Measures

The psychometric strength of all measures were examined (e.g., internal consistency) due to the measures not having been used with many or any ethnic minority elementary school samples.

Perceived Peer and Teacher Academic Support

The Teacher Academic Support Scale and the Peer Academic Support Scale both measure how much learning support a student perceives they receive from their teacher and peer groups respectively. The two scales include items such as “My teacher likes to help me learn” and “Other students in class want me to do my best schoolwork” (Johnson et al., 1985) and were originally subscales in a 59-item Classroom Life Instrument. This scale is one of the few to parse out academic support from peer and teacher sources, and contributed to the creation of the support variable in Wentzel’s model (1998, 2011). The scale was originally created and given to middle school students (Johnson et al., 1985). When given to 8th grade students at a Midwestern, suburban school, the 4 Peer Academic Support items had an internal consistency of $\alpha = .67$, while the 4 Teacher Academic Support items had an internal consistency of $\alpha = .78$ (Johnson et al., 1985). This was the first time that the academic support scales were separated out and given to a predominately Hispanic elementary school population.

Teacher-Report Grit-S Scale

Grit was assessed at Time 2 by students’ teachers. The Grit-S scale measures the construct of grit along two factors -- “consistency of interest” and “perseverance

of effort”. A sample item in the first factor is “I often set a goal but later choose to pursue a different one” and while a sample item in the second factor is “I am a hard worker” (Duckworth & Quinn, 2009). In the study with a high Hispanic percentage population closest to mystudyinternal reliabilities ranged from .83 to .91 (Eskreis et al., 2014). In this study, the items of the Grit-S scale were modified from self-report items to teacher-report items – for example, “The student is a hard worker in school.” No previously published studies have used teacher-report of grit.

Teacher Emotional Engagement Scale

Engagement was assessed at Time 2 by students’ teachers. The Emotional Engagement subscale of the Teacher Report Assessment was originally used by Skinner and others, (2009). This subscale contains 5 items that address students’ emotional states as they relate to class participation (e.g., “For this student, learning seems fun.”). Teacher-report of Emotional Engagement had moderately high correlations with teacher reports of Behavioral Engagement within the same study ($r(1018) = .70$). Teacher reports of emotional engagement had high internal consistency ($\alpha = .84 - .87$) and remained relatively stable over a one year period ($r(1018) = .65$; Skinner et al., 2009).

Literacy Achievement

Test of Reading Efficiency and Comprehension (TOSREC), the assessment of literacy used in this study, measures how many short sentences a student can comprehend and judge as being realistic in a 3 minute time span. Sample sentences are “Some kids eat peanut butter and jelly on crackers” and “The correct place to

wear a colorful hat is on your ankle.” The internal consistency of the TOSREC is high ($\alpha = .86 - .90$; Johnson, Pool, & Carter, 2011). In its previous use with Hispanic populations, Spanish speaking bilingual students and English speaking monolingual students had no significant mean differences on the TOSREC (Proctor, Silverman, Haring, & Monticello, 2011).

Procedures

Students were interviewed at 3 time points (January, March, and May of 2014). The interviews were about 25 minutes each. Each variable in the study was assessed at each of the 3 time points. To clarify, academic peer support, teacher academic support, literacy achievement, grit, and emotional engagement were assessed at all three time points. Support variables were assessed through student report, literacy achievement was assessed through the TOSREC, which will be further described below, and grit and emotional engagement were assessed by both teacher report. Interviews were largely conducted by University of Maryland school psychology graduate students during students’ lunch periods at their elementary school; a small number of interviews were conducted by trained undergraduates. Each interviewer was given a standardized set of questions to ask, they were told to make minimal deviations from those questions – only if a student did not understand the question or the interviewer needed clarification with an answer. Fidelity was assessed through observations and retraining, and each interviewer was trained by a senior graduate student until they asked questions accurately. Each interview was followed by the administration of a literacy performance task called the Test of Reading

Efficiency and Comprehension which took 3 minutes (TOSREC; Wagner, Torgesen, Rashotte, & Pearson, 2009). Teachers also reported engagement and grit of their students at each time point via an online Qualtrics survey.

There may have been class level effects due to teacher bias, especially in the 3rd grade, where a 3rd grade art teacher completed reports on all 50 3rd grade students. In comparison, four 4th grade teachers and four 5th grade teachers completed surveys for a range of 8-18 students each.

Mediation Analyses

Bootstrapped mediation analyses were performed to test all 4 hypothesized models. Bootstrapping was conducted by running the INDIRECT macro in SPSS (Preacher & Hayes, 2008), which has also been used in other studies (e.g. Harwood, Paolini, Joyce, Rubin & Arroyo, 2011; Calabrese et al., 2012). 5000 samples were obtained from the original data set ($N = 144$) as recommended by Preacher and Hayes (2008). Bootstrapping obtains these samples by resampling with replacement from the original dataset. Bootstrapping was used to find indirect, direct, and total effects between the variables in each hypothesized mediation model. According to Shrout and Bolger (2002), a direct relation between the independent and dependent variable need not be present in order for mediation to occur, especially when the effect size is small. According to Shrout and Bolger (2002), the requirement for a significant pathway between independent and dependent variables can be relaxed in order to analyze indirect pathways. This is especially true in longitudinal studies, where bootstrapping can uncover the complex effects of a mediator over time. Indirect

effects in smaller samples are often distributed non-normally. Repeated bootstrapping of a sample can create a more normal distribution for significance testing and reduce Type I error (MacKinnon, 2002; Preacher & Hayes, 2008). An indirect effect occurs when the relation between the independent and dependent variables is mediated by a third variable.

Chapter 4: Results

Psychometrics

The inter-item reliability for Teacher Academic Support at Time 1 was below what is usually considered adequate ($\alpha = .585$). Removing items did not improve the reliability. The inter-item reliability for other scales was adequate (Peer Academic Support at Time 1: $\alpha = .782$; Grit at Time 2: $\alpha = .693$; Emotional Engagement at Time 2: $\alpha = .777$).

Descriptives

Emotional engagement and grit scales both showed normal distributions. Teacher Academic Support was highly negatively skewed, with a skewness score of -2.27. Peer Academic Support, Engagement, and Grit all showed near normal distributions with a slight skew towards higher numbers. Means, ranges, and standard deviations of all studied variables can be found in Table 3.

Intercorrelations

All intercorrelations among variables can be found in Table 4. All intercorrelations were significant with four exceptions. Neither peer academic support nor teacher academic support were significantly correlated to literacy achievement. Additionally, teacher academic support was not significantly correlated to any other variable besides peer academic support. Mediation, therefore, was not tested using the teacher academic support variable. Mediation models which included peer academic

support were tested because Shrouf and Bolger (2002) recommended that the requirement for a direct relation between the independent and dependent variables can be relaxed in longitudinal studies, where more indirect relations may still be present.

Peer Academic Support Models

Two separate mediation models were tested to examine the direct, indirect, and total effects of peer academic support on literacy achievement (Table 5 and Figure 3). The first model tested Time 2 grit as a mediator between Time 1 peer academic support and Time 3 literacy achievement. The direct effect of peer academic on literacy achievement was only a trend ($p = .74$). However, Time 1 peer academic support had a direct effect on Time 2 grit ($\beta = 0.23$) and Time 2 grit significantly predicted Time 3 literacy achievement ($\beta = 4.10$). The full bootstrapped mediation model, found in Table 5 and Figure 3, included a significant indirect effect of Time 1 peer academic support ($\beta = 0.98$) on Time 3 literacy achievement, as mediated by Time 2 grit.

The second mediation model tested emotional engagement at Time 2 as a mediator of the relation between Time 1 peer academic achievement and Time 3 literacy achievement. As stated above, the direct effect of peer academic achievement on literacy achievement was not significant. However, Time 1 peer academic support had a direct effect on Time 2 emotional engagement ($\beta = 0.18$), and Time 2 emotional engagement was a significant predictor of Time 3 TOSREC scores ($\beta = 6.27$). The full bootstrapped mediation model, as described in Table 5 and Figure 4, included a

significant indirect effect of Time 1 peer academic support ($\beta = 1.19$) on Time 3 literacy achievement, as mediated by Time 1 emotional engagement.

Chapter 5: Discussion

The gap between the achievement of Hispanic students and their White peers on standardized literacy tests remains a societal concern. The results of this study contribute to the understanding of how support from school community members and socioemotional constructs work to improve later academic outcomes within a majority Hispanic population. Although the results are short-term longitudinal, correlational, and not causal, there are implications for targeted interventions around peer support, grit, and emotional engagement and their ability to close the achievement gap.

Teacher Academic Support Models

Evidence was not found supporting the two teacher academic support mediation models. This is surprising given the wealth of research that shows that teacher support is related to positive achievement (Rosenfield et al., 2000), engagement (Garcia et al., 2005) and grit (Eskreis-Winkler et al., 2014). Perhaps the lack of variability in teacher academic support may be the reason why there is no relation of teacher support with achievement in this sample. Very few students rated items across the teacher academic support scale below the maximum rating of 5.

One possible reason for this low variability is social desirability. Social desirability is the concept that people tend to endorse strongly those items that reflect more desirable traits over those that reflect more undesirable traits (Edwards, 1957).

Studies have shown that Mexican Americans tend to score higher on social desirability scales than White Americans, when controlling for other variables such as age, gender, and socioeconomic status (Warnecke et al., 1997) and that Mexican Americans also score higher on social desirability scales than Mexicans (Ross & Mirowsky, 1984). It is important to note that our Hispanic sample is not made up entirely of Mexican Americans, but rather students from a diverse group of Central American countries. However, analyses of the above results study suggest that immigrant groups, due to their lack of access to social power, tend to be more concerned with the impressions they leave and conduct themselves in a more socially desirable way (Johnson & Van De Vijver, 2003). Additionally, for some Hispanic students, the cultural concept of *respeto*, or respect towards adults, may have influenced their willingness to say anything negative about their teachers (Woolley, Kol, & Bowen, 2009).

Another reason may be developmental. Studies of teacher support suggest that elementary school students perceive more teacher support than middle school students (Klem & Connell, 2004). The teacher support scale of the Classroom Life Instrument has most frequently been used with middle school students and therefore might show more variability among those students (Johnson et al., 1985; Wentzel, 1998). In elementary school students, a ceiling effect may be present.

Peer Academic Support Models

Peer support was found to be a positive indicator of academic achievement, when mediated by grit or engagement. While peer support has been found to be

related to grit (Eskreis-Winkler et al., 2014), other literature connecting peer support to academic achievement (Wentzel, 1998; Chen, 2005; Cauce, Felner, & Primeravera, 1982; Furrer & Skinner, 2003) and engagement (Shin et al., 2007, Wentzel, 1994) is less definitive. For example, Wentzel (1998) found significant positive correlations between peer support and GPA in middle schoolers, while Chen (2005) found no relations between peer support and achievement in high schoolers. Further, Cauce et al. (1982) found that high school students who had high levels of peer support, had lower GPAs and higher numbers of absences. Similarly, some studies have found positive relations between peer support and engagement (Wentzel, 1994), while others have not (Shin et al., 2007).

These results make more sense when considering the dynamic ways in which peer support interacts with age and adolescent class culture. Peers shape students' attitudes towards school, and can do so in a positive or negative light. As students age, their beliefs that their peers hold positive attitudes towards school decreases (Wentzel et al., 2007; Wentzel et al., 2010). They also decrease in the liking of school subjects, achievement perceptions, and self-concepts of ability during the transition from elementary school to middle school (Wigfield, Eccles, Iver, Reuman, & Midgley, 1991). Many of the previous studies on peer support have been on students in middle or high school, so it makes sense that that these studies found correlations between peer support and negative outcomes, when students begin to hold these negative beliefs about school, themselves, and their peers. In contrast, elementary school students may still hold largely positive beliefs about school and, therefore, may influence each other to achieve academically. The significance of the

peer academic support models suggest that increasing initial peer academic support may, through other socioemotional attributes, later influence literacy achievement, specifically in predominantly Hispanic, elementary school populations. This has important implications for peer academic support as a target for interventions aiming to close the literacy achievement gap between Hispanic and White students.

Limitations

Several limitations of this study exist. Most importantly, it is unclear whether self-report is the best method to measure teacher and peer support. It is possible that a peer nomination or teacher report scale would have been a more accurate representation of how well supported a student is by their peers. On the other hand, capturing student perceptions of teacher support may be more valid than teacher report. There may also be a better set of questions that capture the construct of teacher academic support given the moderate inter-item reliability of the teacher academic support scale. Secondly, there was such low variability and a ceiling effect in item responses which may have affected both the reliability and the lack of correlations in teacher support. Third, the sample size was small and limited to a single well-resourced school in Maryland; this model of socioemotional processes in Hispanic populations may look differently in other schools and states. Fourth, no differentiation was made as to the generational status or socioeconomic status of the Hispanic students in the sample, making it problematic to overgeneralize the results to all Hispanic students. Fifth, given the short time span in between measurement points, it is possible that more different processes would have emerged over a longer

time span. Finally, this study does not examine growth trajectories in each variable. It is possible that examination of these growth patterns would allow for a more complete analysis of how academic support, grit, emotional engagement, and literacy achievement work together.

Future Studies

Future studies should parse out whether this model is specific to Hispanic elementary school students by studying these variables in comparison schools with other demographics, including those with middle schoolers and with larger populations of non-Hispanic students. It would also be ideal if low-income could be compared to higher-income Hispanics to isolate the factor of SES, which may explain more than ethnicity. Also, this study should be conducted over a longer time span to truly benefit from a longitudinal, growth-based design. Other teacher academic support scales should be developed and used to provide a better fit of the construct. Additional statistical analysis may help identify groups of students who benefit from peer academic support more than others, and others who are detrimentally effected. This would help reconcile the contradictory peer support and achievement results in previous studies.

Conclusions and Implications

This study suggests peer academic support, grit, and engagement as potential ways to close the literacy achievement gap during elementary school. These are only a few of the socioemotional supports that may contribute to literacy achievement (other types of motivation and engagement, as well as other sources and types of

support may also be influential). However, this study helps identify what roles these very specific variables may have to play, while building upon the general model created by Wentzel (2011). High peer academic support may lead to higher grit and emotional engagement in the classroom, which may subsequently lead to higher literacy achievement. This may be especially important to the predominantly Hispanic elementary school students in this study's sample, who all reported high levels of teacher academic support. The lack of variability in teacher academic support may have contributed to a lack of relations between teacher academic support and other socioemotional variables.

While the majority of Hispanic elementary students may feel supported by teachers, the ones who also feel supported by peers have an advantage. This is a possible target for intervention by educators who want to increase positive socioemotional behaviors and subsequent positive academic outcomes. Perhaps elementary school teachers, counselors, and school psychologists should work to foster positive peer interactions. One way to target peer academic support specifically would be to generate supportive peer norms within the classroom (e.g., having students visibly support struggling students through behaviors such as silent applause, encouraging group work on academic projects, and having students positively recognize each other's academic achievements). In summary, the results of this study contribute to existing research by providing two longitudinal mediation pathways for the ways in which peer academic support could affect later literacy achievement outcomes, one in which peer academic support increases grit, and another in which peer academic support increases emotional engagement.

Tables

Table 1

Construct Definitions and Measures

Construct	Definition	Measure	Source	Time Point	Reported by
Teacher Academic Social Support	Perceived help by teachers towards academic pursuits	Classroom Life Instrument	Johnson et al., 1985	T1	Student
Peer Academic Social Support	Perceived help by peers towards academic pursuits	Classroom Life Instrument	Johnson et al., 1985	T1	Student
Emotional Engagement	A student's level of enthusiasm and interest in school	Emotional Engagement Subscale of Teacher-Report Assessment	Skinner et al., 2009	T2	Teacher
Grit	"passion and perseverance towards long term goals" (Duckworth et al., 2007, p. 1087)	Grit-S Scale	Duckworth & Quinn, 2009	T2	Teacher
Literacy Achievement	Reading decoding and comprehension. Reading fluency (speed).	Test of Reading Efficiency and Comprehension	Wagner et al., 2009	T3	Student (performance task)

Table 2

Sample Demographics

Demographic Variables	%
Child Sex	
Female	53
Age	
8 years	17
9 years	35
10 years	30
11 years	16
Grade Level	
3 rd	35
4 th	30
5 th	35
Ethnicity	
Asian	8
Black	17
Latina/o	74
Other / Not Reported	1
Immigration Status ^a	
1 st Generation	20
2 nd Generation	80
Documentation Status ^a	
Total undocumented students	18
Total undocumented parents	63
Nationality ^a	
El Salvador	60
Guatemala	10
Haiti	10
Vietnam, Bangladesh, China	9
Ethiopia, Cameroon, Togo	7
Mexico	4
Primary Home Language	
Spanish	61
English	21
Enrolled in English as a Second Language (ESOL) services ^b	66
Enrolled in Free and Reduced Lunch (FARMS) program ^b	95

^aEstimate

^bSchool-level statistic

Table 3

Means, Standard Deviations, and Ranges of all Variables in Mediation Model

Variables	Sample			
	Mean	SD	Minimum	Maximum
Teacher Academic Support (Time 1)	4.76	0.38	3.00	5.00
Peer Academic Support (Time 1)	3.67	0.99	1.25	5.00
Grit (Time 2)	3.93	0.98	1.00	5.00
Emotional Engagement (Time 2)	4.06	0.89	1.60	5.00
TOSREC (Time 3)	86.3	14.0	54.0	124

Note. $n = 141-144$ for each individual variable. 138 subjects had mean scores for all variables.

Table 4

Intercorrelations among Meditation Model Variables

Variable and Time Point	1.	2.	3.	4.	5.
1. Teacher Academic Support (Time 1)	-				
2. Peer Academic Support (Time 1)	0.42***	-			
3. Grit (Time 2)	0.11	0.22**	-		
4. Emotional Engagement (Time 2)	0.11	0.17*	0.77***	-	
5. TOSREC (Time 3)	0.12	0.04	0.27**	0.38***	-

Note. $n = 141-144$ for each individual variable. 138 subjects had scores for all variables.

* $p < .05.$, ** $p < .01.$, *** $p < .001.$

Table 5

Grit as a Mediator of the Relation of Academic Support to Literacy

Path		Source of Support		
		Peer		
		β	<i>SE</i>	<i>p</i>
Total Effect				
c	Academic Support → Literacy	0.55	1.23	0.66
Direct Effects				
a	Academic Support → Grit	0.23	0.09	**
b	Grit → Literacy Achievement	4.10	1.20	***
c'	Academic Support → Literacy	-0.41	1.22	0.74
Indirect Effects (via Grit as mediator)				
ab	Academic Support → Literacy			
	Bootstrap Estimate	0.97	0.50	*
	95% Confidence Interval	[0.22 , 2.21]		*

Note. Mediation models were conducted through bias-corrected bootstrapping procedures in SPSS. Using bootstrapping, the important test of significance is of the indirect effect. Path labels are standard bootstrapped mediation nomenclature (Fritz & MacKinnon, 2007) and are used in Figure 3; c reflects the path between Academic Support and Literacy Achievement before accounting for Grit as a mediator, c' reflects the path between Academic Support and Literacy Achievement after accounting for Grit as a mediator. Bootstrapped mediation models are considered significant if zero does not fall within the 95% confidence interval.

* $p < .05.$, ** $p < .01.$, *** $p < .001$

Table 6

Emotional Engagement as a Mediator on the Relation of Academic Support to Literacy

Path		Source of Support		
		Peer		
		β	<i>SE</i>	<i>p</i>
Total Effect				
c	Academic Support → Literacy	0.56	1.24	0.65
Direct Effects				
a	Academic Support → Emo. Engagement	0.18	0.08	*
b	Emo. Engagement → Literacy	6.27	1.26	***
c'	Academic Support → Literacy	-0.60	1.16	0.61
Indirect Effects (via Emo. Engagement as mediator)				
ab	Academic Support → Emo. Engagement			
	Bootstrap Estimate	1.19	0.61	*
	95% Confidence Interval	[0.17, 2.53]		*

Note. Mediation models were conducted through bias-corrected bootstrapping procedures in SPSS. Using bootstrapping, the important test of significance is of the indirect effect. Path labels are standard bootstrapped mediation nomenclature (Fritz & MacKinnon, 2007) and are used in Figure 4; c reflects the path between Academic Support and Literacy Achievement before accounting for Emotional Engagement as a mediator, c' reflects the path between Academic Support and Literacy Achievement after accounting for Emotional Engagement as a mediator. Bootstrapped mediation models are considered significant if zero does not fall within the 95% confidence interval; therefore, the model above where emotional engagement mediates the relation between peer academic support and literacy achievement is significant. **p* < .05., ***p* < .01., ****p* < .001.

Figures

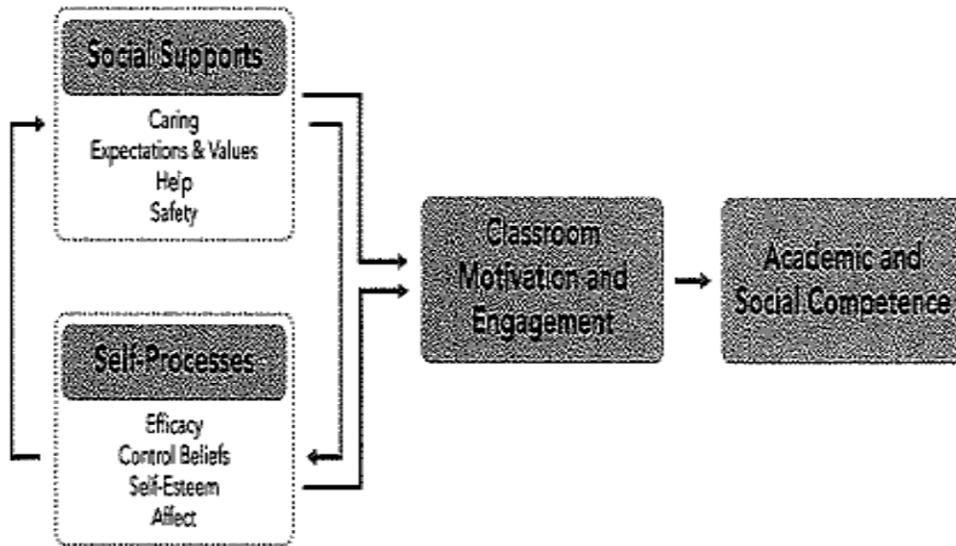
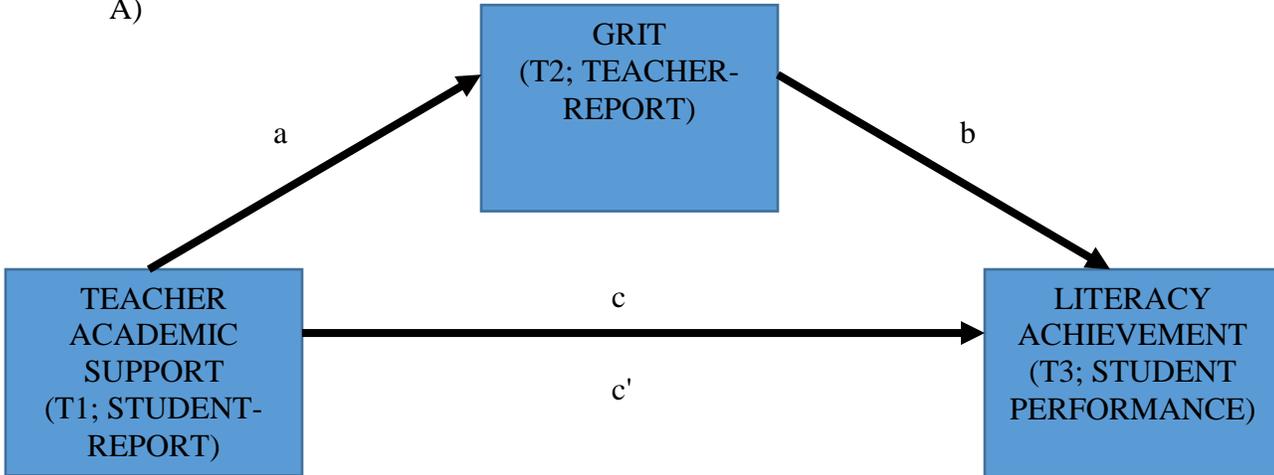
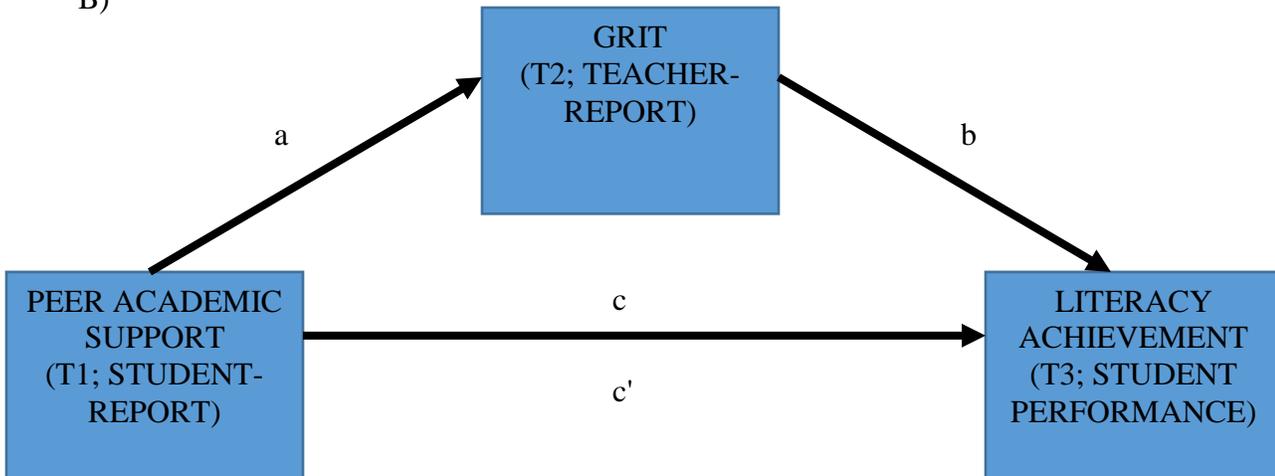


Figure 1. Model of social supports, motivation and engagement, and academic and social competence (reprinted from Wentzel et al., 2011)

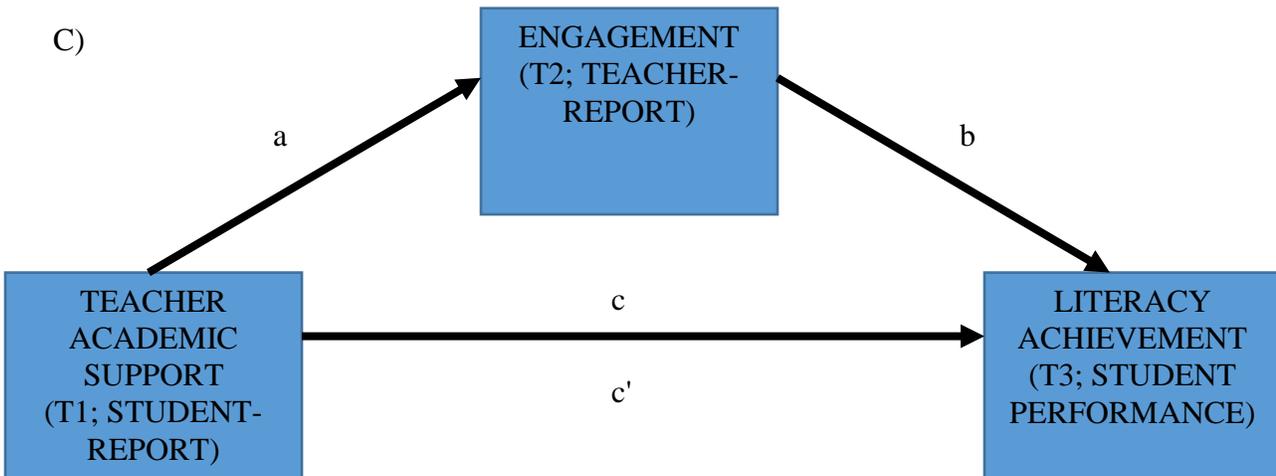
A)



B)



C)



D)

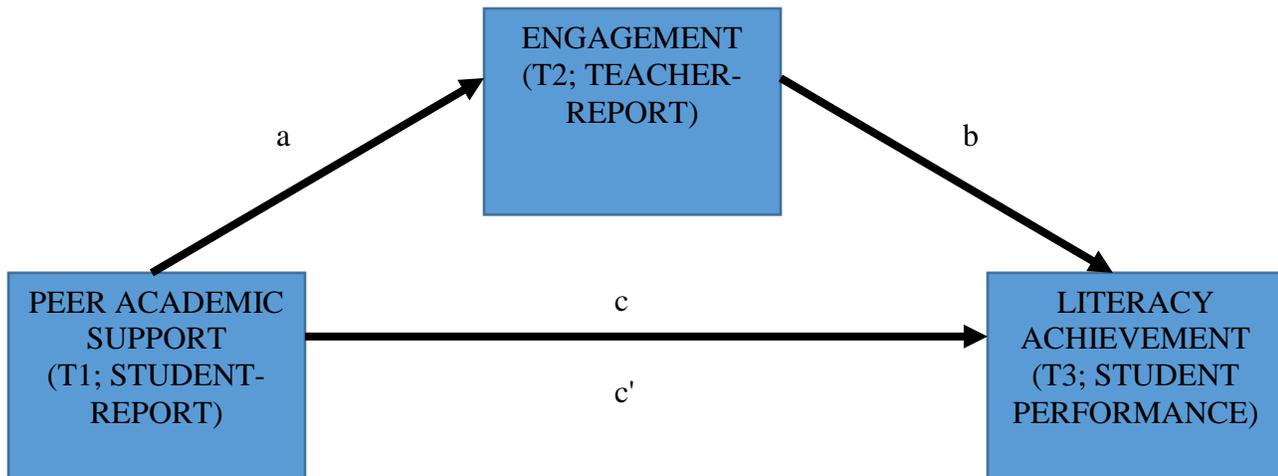
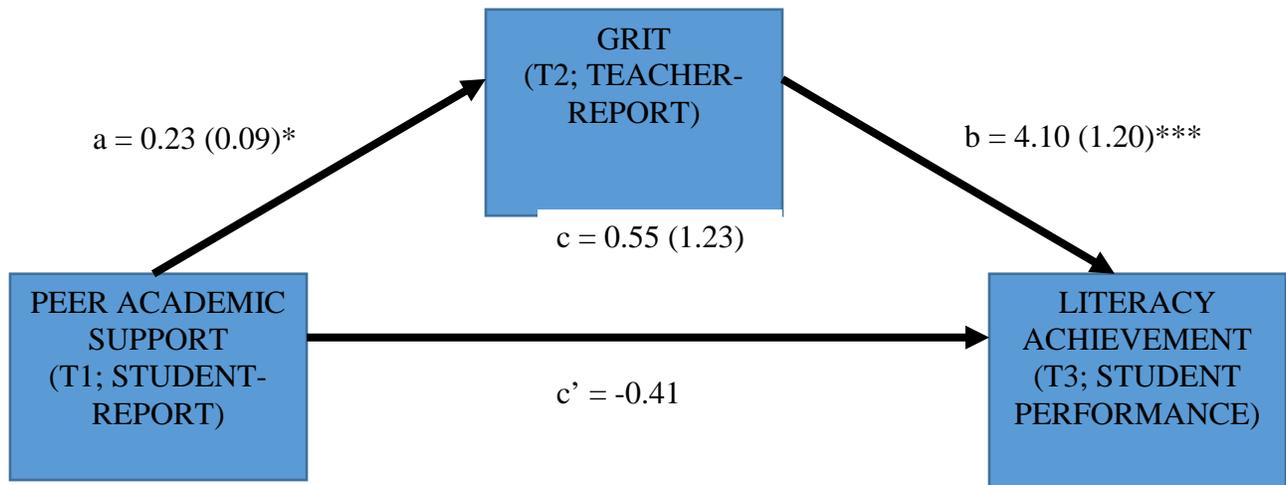
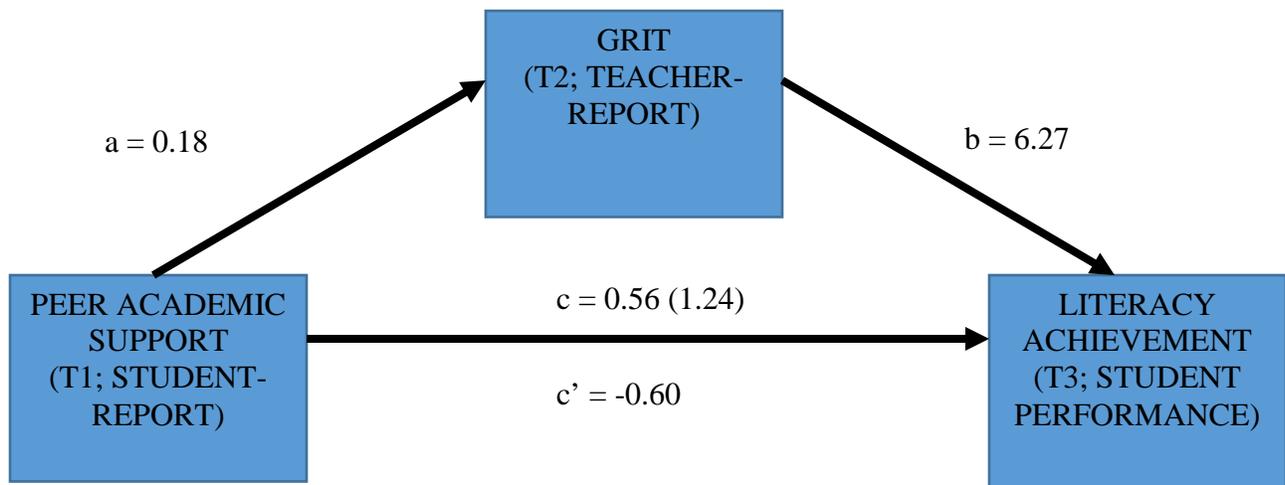


Figure 2. Four hypothesized mediation models where the effect of academic support from either peers or teachers on literacy achievement is mediated by grit or engagement. a = the direct effect of the independent variable on the mediator; b = the direct effect of the mediator on the dependent variable; c = the direct effect of the independent variable on the dependent variable; c' = the indirect effect of the independent variable on the dependent variable when accounting for the mediator.



Bootstrap Estimate	SE	95% Confidence Interval
0.98*	0.50	[0.20, 2.14]

Figure 3. Bootstrapped mediation analysis of grit as a mediator of the effect of peer academic support on literacy achievement. *a* = the direct effect of peer academic support on grit; *b* = the direct effect of grit on literacy achievement; *c* = the direct effect of peer academic support on literacy achievement; *c'* = the indirect effect of peer academic support on literacy achievement when accounting for grit as a mediator. The mediation model is considered significant if zero is not included in the 95% confidence interval.



Bootstrap Estimate	SE	95% Confidence Interval
1.19*	0.61	[0.17, 2.53]

Figure 4. Bootstrapped mediation analysis of emotional engagement as a mediator of the effect of peer academic support on literacy achievement. a = the direct effect of peer academic support on emotional engagement; b = the direct effect of emotional engagement on literacy achievement; c = the direct effect of peer academic support on literacy achievement; c' = the direct effect of peer academic support on literacy achievement when accounting for emotional engagement as a mediator. The mediation model is considered significant if zero is not included in the 95% confidence interval.

Appendix: Measures

Peer and Teacher Academic Support

Questions #1-8 modified from the Peer Academic Support and Teacher Academic Support subscales of the Classroom Life Instrument (Johnson, Johnson, Buckman, & Richards, 1985):

Johnson, D. W., Johnson, R. T., Buckman, L. A., & Richards, P. S. (1985). The effect of prolonged implementation of cooperative learning on social support within the classroom. *The Journal of Psychology, 119*, 405-411.

These next questions ask about *how* your teachers and your classmates treat you:

1. My teacher cares about how much I learn.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

2. My teacher likes to see my work.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

3. My teacher likes to help me learn.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

4. My teacher wants me to do my best in school work.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

5. My classmates care about how much I learn.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

6. My classmates like to help me learn. [*Even if you don't need their help*].

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

7. My classmates want me to come to class every day.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

8. My classmates want me to do my best school work.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

Grit-S Scale

Questions # 1-8 modified from the informant version of the Short Grit Scale (Grit-S; Duckworth & Quinn, 2009):

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment, 91*, 166-174.

1. The student's school work is difficult and makes him or her want to give up.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

2. The student gets very interested in a new topic in school, but then quickly gets bored with it.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

3. The student is a hard worker in school.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

4. The student often sets a goal in school but later gives up and chooses a different goal.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

5. It's hard for the student to focus on schoolwork that takes a long time to complete.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

6. The student finishes whatever he or she begins in school.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

7. Other things sometimes distract the student from what he or she is already working on in school.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

8. The student works steadily in school without giving up.

Not at all. A little. Somewhat. Mostly. Very much.
1 2 3 4 5

Teacher Report Engagement Scale

Questions # 13-17 are from the emotional engagement subscale of the Engagement versus Disaffection with Learning: Teacher Report (Skinner, Kindermann, and Furrer, 2009):

Skinner, E. A., Kindermann, T. A., & Furrer, C. A. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom.

Educational and Psychological Measurement, 69, 493-525.

1. In my class, this student is enthusiastic.

Not at all.	A little.	Somewhat.	Mostly.	Very much.
1	2	3	4	5

2. In class, this student appears happy.

Not at all.	A little.	Somewhat.	Mostly.	Very much.
1	2	3	4	5

3. When we start something new in class, this student is interested.

Not at all.	A little.	Somewhat.	Mostly.	Very much.
1	2	3	4	5

4. When working on classwork, this student seems to enjoy it.

Not at all.	A little.	Somewhat.	Mostly.	Very much.
1	2	3	4	5

5. For this student, learning seems to be fun.

Not at all.	A little.	Somewhat.	Mostly.	Very much.
1	2	3	4	5

4th Grade TOSREC Sample

21. yes no An astronaut is a man or woman whose job it is to catch fish.
22. yes no Going to a store during a sale might result in a good bargain.
23. yes no If you bump into a friend on purpose it would be an accident.
24. yes no An anchor is used to keep a boat from floating away.
25. yes no A telescope is commonly used to view the stars in the sky.
26. yes no A mother may not approve of her daughter's boyfriend.
27. yes no The correct place to wear a colorful hat is on your ankle.
28. yes no Something that is easy for you to do is a challenge.
29. yes no Giving your old clothes to charity is a way to help others.
30. yes no A bashful person is someone who loves to talk to large groups.
31. yes no A person who gets lost might try to use a compass to get home safely.
32. yes no You might be anxious if you are about to take a spelling test.
33. yes no Most modern women attempt to grow very long beards.
34. yes no A teacher will be mad if one of her students wins a spelling contest.
35. yes no Broccoli refers to a kind of dog that has been used for years to guard sheep.
36. yes no Some kids eat peanut butter and jelly on crackers.
37. yes no A buzzard might build a cabinet in a cafe.
38. yes no Water balloons that kids throw at each other are made out of concrete.
39. yes no A recipe tells the cook which ingredients to use for baking a cake.
40. yes no A person who has been on a diet and has lost a lot of weight may be slender.
41. yes no A leaky balloon will expand. 

Number Correct - Number Incorrect = Raw Score Subtotal (p. 3)

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