Research has shown that parent-school involvement is an important contributor to student academic success and achievement. This involvement can be even more crucial for students whose families are living in poverty, as it can act as a protective factor for them. Although the importance of parental involvement has been recognized in regard to achievement, there is currently a lack of literature that uses both parent and teacher perspectives of parental involvement. There is also a lack of literature to determine if the relationship between parent-involvement and achievement is moderated by poverty level. This study’s research questions include: (1) Is there a relationship between parent-perceived parental involvement and achievement? (2) Is there a relationship between teacher-perceived parental involvement and achievement? (3) To what degree do both parent-perceived parental involvement and teacher-perceived parental involvement predict achievement, and are these relationships moderated by poverty level? Data for this study were gathered through the Butler CountySuccess Program, which provides services to economically disadvantaged students attending 36 schools in a Midwestern state. Collected data included levels of parent-perceived parental involvement, levels of teacher-perceived parental involvement, poverty level, and student achievement scores in mathematics. This study used parental-involvement indicators that assessed both the parent’s and teacher’s level of communication with each other. Analyses revealed a positive and significant correlation between both parent-perceived and teacher-perceived parental involvement and student mathematics achievement scores. Analyses also revealed that both parent- and teacher-perceived parental involvement significantly predict math achievement scores, and that relationship is not moderated by the students’ level of poverty. This suggests that parent- and teacher-perceived parental involvement and student poverty level can predict student mathematics achievement scores, but the relationship between parent involvement and achievement scores does not differ as a result of poverty level.
THE RELATIONSHIP BETWEEN PARENT-SCHOOL INVOLVEMENT AND MATH ACHIEVEMENT IN ECONOMICALLY AT-RISK STUDENTS

Master’s Thesis

Submitted to the

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Educational Specialist
Department of Educational Psychology

by

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Introduction

Parent-school involvement can be an important contributor to student academic success (Emerson, Fear, Fox, & Sanders, 2012; Hill, & Tyson, 2009; Wilder, 2014). Many researchers have examined this topic, and the findings have been important and useful for educators. Now many schools know just how important it is to encourage and create opportunities for parents to become involved in their children’s school and education, especially in the parent/teacher relationship. This involvement can be even more crucial for students whose families are considered economically disadvantaged. Although the importance of parental involvement has been recognized, there is a lack of literature that incorporates perceptions of parent involvement from both the parents’ and teachers’ perspectives. That is, it is relatively unknown whether the parent-perceived involvement and achievement relationship and teacher-perceived parental involvement and achievement relationship yield similar results, and whether these relationships are moderated by the child’s family poverty level.

To address this gap in the literature, this research will investigate three research questions: (1) Is there a relationship between parent-perceived parental involvement and achievement? (2) Is there a relationship between teacher-perceived parental involvement and achievement? (3) To what degree do both parent-perceived parental involvement and teacher-perceived parental involvement predict achievement, and are these relationships moderated by poverty level?

Literature Review

Although parent-school involvement is important for academic success, there has been limited literature regarding the differences between parent- and teacher-perceived parental school involvement. There is also a lack of literature regarding the relationship between student poverty level and either parent involvement or academic achievement.

Parental Involvement and Achievement

Parent involvement is a multidimensional construct that includes actions from the parent such as communicating with the school or teacher, volunteering for the school, learning at home, decision making, collaborating with the community, as well as many others (Epstein, 1995). As mentioned previously, parent involvement in a student’s education is an important contributor to student academic success (Emerson, Fear, Fox, & Sanders, 2012; Hill, & Tyson, 2009; Wilder, 2014). For example, a meta-analysis that analyzed 51 studies showed that an increase in parent participation was associated not only with higher test scores and grade point averages, but also with higher enrollment in more difficult academic programs, more classes passed, higher attendance, improved behavior at home and school, and improved social skills (Southwest Educational Development Laboratory, 2002). Another study discovered that within-child improvements of parent involvement were associated with a decline in problem behavior and improvement in social skills (El Nokali, Bachman, & Votruba-Drzal, 2010), which is similar to the finding from the meta-analysis above.
Because of these clear benefits, there has been a trend in encouraging parent-school involvement. For example, the Ohio Department of Education gives samples of best practices for parent involvement in the schools and provides examples of how to follow through with each. The best practices they discuss are: creating a welcoming school climate, providing families information about child development and supportive learning environments, establishing effective school-to-home and home-to-school communication, strengthening families’ knowledge and skills so they may continue their child’s learning at home, engaging families in school planning and volunteer opportunities, and connecting students and families with community resources that will support students’ learning and well-being (Ohio Department of Education, 2016).

Although the Ohio Department of Education (2016) gives useful examples of best practices, parent involvement can look very different depending on the age group. As students age, parent involvement in the schools declines (Crosnoe, 2001; Izzo et al., 1999; Stevenson & Baker, 1987). The effectiveness of parent involvement also declines as the student ages (Muller, 1998; Singh et al., 1995). Because of these changes, this study will only look at students in kindergarten through fifth grade, which is in the elementary level. The elementary age is the age for the highest amount of parental involvement, and it is therefore important to study and narrow down on this age group (Epstein, Dauber, & Center for Research on Elementary and Middle Schools, 1989). It was also important to exclude middle school students from this sample because of all the changes they are going through during this time, which subsequently effects parent involvement. Middle school-age students experience accelerated physical development, pre-pubertal and pubertal development and psychological and social changes (Bailey, Giles, & Rogers, 2015). While all of these changes are occurring, they are also transitioning and trying to adjust to a new school, with all older students. Hill and Tyson (2009) also believe that parental involvement changes because the middle school structure does not support home and school parent involvement strategies as well as the elementary school structure does. These structural barriers in middle school are that the schools are large and complex, teachers instruct many more students which make it difficult for teachers to develop relationships with all their students’ parents, and students have many more teachers than they used to which make it more difficult for parents to maintain relationships with all of them (Hill & Tyson, 2009).

There are many types of parent involvement. Joyce Epstein (1995), for example, created a framework for six different types of parental involvement. These six types include parenting, communicating, volunteering, learning at home, decision making, and collaborating with the community. The type of parental involvement that this study will focus on is communicating, more specifically, the parent/teacher relationship. Often times teachers are not adequately trained how to communicate effectively with parents (Graham-Clay, 2005). However, to receive the benefits of parent involvement, parents not only need to have a relationship with their student’s teacher, the parents also must speak to and be heard by the teacher (Fuller & Olsen, 2003). This type of involvement can give parents insider information they may not have received otherwise, and gives them the opportunity to be involved in the problem-solving process (McNeal, 1999).

While parent-school involvement helps students succeed academically, an important question to ask is “why?”. Peng and Wright (1994) explained that parent involvement provides the supportive environment that students need to succeed. Christenson, Rounds, and Gorney (1992) suggested that students who have parents involved in their education are motivated to increase the quality and efficiency of their work, and also that parents who have high expectations for their student’s academic success indicate that they highly value education.
Teacher-Perceived Parent-School Involvement

Research has shown that from early childhood throughout high school, active involvement from the family is a very important factor of student achievement (Henderson & Berla, 1994). Parent involvement is an important influence on a student’s educational success, and there are different ways to collect data on this topic. This study will ask teachers’ opinions, as well as parents’ opinions of parental involvement. Epstein (1986) believes that there are two perspectives regarding parent involvement in the schools. The first emphasizes the competition and conflict between schools and families, and encourages the two entities to be separate. The second stresses coordination and cooperation between schools and families, and encourages communication and collaboration between the two. Epstein (1986) explains that some teachers combine these two perspectives, but most use one theory or the other in practice.

Many teachers, although they may appreciate parent involvement, may also feel vulnerable to the increasing influence and scrutiny of some parents on their professional work. To address this potential overstep, teachers may employ open communication and transparency to gain the parents’ confidence and trust in their teaching skills. It is also an effective way to avoid conflicts and let teachers keep control over their profession (Addi-Raccah, & Arviv-Elyashiv, 2008). Although teachers have developed ways to effectively involve parents, the teachers’ perspectives are important and can affect parents’ participation in the schools. Often, if teachers have a negative perception of parental involvement, it can create roadblocks toward parents’ involvement in their student’s education (Christenson, 2001). As with any type of relationship, parent involvement is a two-way street, and parents’ perceptions are just as important as the teachers. Sometimes, the feelings and emotions the parents felt while they were in school can carry over to how they feel about their children’s school. If the parents had learning difficulties, unhelpful teachers, or social issues, that can cause negative feelings to carry over to their child’s schooling. These perceptions parents have towards the school are important because these attitudes may get passed on to their children and can positively or negatively affect their feelings toward school and their education.

Although parent and teacher feelings towards parent involvement are important to understand, it is also important that they are on the same page as to what constitutes effective parental involvement. Li and Hung (2012) discovered that parents’ involvement at home with their child was the most effective factor at increasing teacher satisfaction; however, it was closely followed by teacher-parent contact. Both at-home involvement and teacher-parent contact positively and significantly influenced teacher satisfaction. Similarly, using a questionnaire, Radzi, Razak, and Sukor (2010) found that communication was one of the teacher’s most preferred forms of parent involvement, which is a good sign because that means communication is important to both parties and they are on the same page in this regard.

Parental Involvement and Socioeconomic Status

Poverty, as defined by The National Center for Children in Poverty, comes in two categories that both fall under “low income”. “Poor” families are defined as being below 100% of the federal poverty threshold, and “near poor” is 100%-199% of the federal poverty threshold (Jiang, Ekono, & Skinner, 2016). Many schools are designed with middle-class values and expectations in mind, and children living in poverty are often not taught these expected behaviors before entering school like their more affluent peers may be (Olsen & Fuller, 2003). In fact, teachers often exhibit different behavior toward students and parents according to their
Because of this, it is very important for schools to keep in mind parents’ cultural and economic differences, because misunderstandings in these areas can create a disconnect within the parent-school relationship and negatively impact parent involvement (Lopez & Stoelting, 2010).

Literature shows that socioeconomic status does impact parental involvement, and one qualitative study even found that every parental involvement constraint parents in poverty had experienced was poverty related (Alameda-Lawson, Lawson, & Lawson, 2010). Jeynes (2007) explained that disadvantaged students can benefit from parental involvement because it serves as a protective factor for them. Unfortunately, Jeynes also discovered that students who live in poverty have parents who engage less in parental involvement. The researcher also believes that parents’ amount of education is directly correlated with how involved they are with their students’ academics. Students who live in poverty often have parents who have less education, and students with higher socioeconomic status backgrounds have parents with more education (Jeynes, 2007). This suggests that students in poverty are more likely to have parents with less education themselves, and are also less likely to engage in parent-school involvement.

Another study conducted by Ndebele (2015) reported similar findings. He discovered that the higher the income and socioeconomic status of the family, the more likely parents are to be involved in helping their student with homework. On the other hand, students who came from families with lower socioeconomic status are less likely to have parents who are involved in helping with their homework.

**Effects of Poverty on Academic Achievement**

There is a great deal of research indicating that students living in poverty are more likely to have lower levels of academic achievement (Guskey, 2011; Hair et al., 2015; Herbers et al., 2012; Silvernail et al., 2014; Sirin, 2005). Smith, Brooks-Gunn, and Klebanov (1997) found that the poorest children in their study scored 6 to 13 points lower on standardized IQ, verbal ability, and achievement tests than the students in the study who were never poor.

As was stated earlier in regard to poverty and parental involvement, there are also changes in poverty and academic achievement as students age. When studying academic achievement between students of low versus high socioeconomic status while also accounting for age, Caro, McDonald, and Willms (2009) found that the average achievement gap was twice as large for students ages 12 to 15 as it was for students ages 7 to 11. This suggests that as students age, achievement is more greatly affected by socioeconomic status.

Researchers Hair et. al. (2015) conducted a longitudinal study that analyzed sociodemographic information as well as 823 magnetic resonance imaging scans. They found that gray matter volumes of students who were below the federal poverty level were 8 to 10 percentage points below the developmental norm. They also found that these differences negatively affected the students’ academic achievement, with students from low-income homes scoring 4 to 7 points lower on standardized tests. These researchers believe that part of this gap in achievement could be explained by lags in the frontal and temporal lobes of these students’ brains.

Additional research also supports the idea that students from families with low socioeconomic status have lower levels of achievement. Silvernail et al. (2014) discovered that as the percentage of students in poverty increases in a school, student academic performance declines. A meta-analysis conducted by Sirin (2005) found that when students were divided into three to seven groups based on their socioeconomic status, those experiencing higher levels of
poverty had more negative impacts on academic achievement. Sirin (2005) also examined the relationship between social capital, which involves supportive relationships with parents that promote values that are important to do well in school, and academic achievement. This study revealed that parents who provide social capital as well as basic physiological needs for their children promote their students’ academic achievement.

Although this relationship between poverty and academic achievement may seem bleak for students from families in poverty, there are other variables that can work as safeguards against this relationship. Bellibas (2016) found that students’ level of perseverance, mothers’ education, quality of home and school educational resources, class size, and total school enrollment are all predictors of higher academic achievement. This suggests that even though there is a clear positive relationship between socioeconomic status and academic achievement, there are ways that families and schools can work to buffer this risk and raise the levels of academic achievement for students in poverty.

**Butler County Success Program**

The Butler County Success Program (BCSP) is a school based program located in a midwestern state that strengthens the relationships between school, home, and community to increase student success. The BCSP provides access to health and human services, to help families in poverty fulfill basic non-cognitive needs (Wynne, n.d.; James, Bush, & Noltemeyer, 2015). Community-school liaisons are assigned to a district and specific school buildings to provide these services for families. It is the liaison that connects the parents with resources that support the family so they may give their children a better chance to achieve academically (Center for school-based mental health programs).

An evaluation of the BCSP has shown that the program is effective at increasing student’s positive outcomes such as reading and social competence, access to basic needs such as parents access to health care, healthy food, and transportation, and family processes such as positive parenting, and parent-perceived parental involvement in the school (Bush et al., 2014). The evaluation also found a decrease in negative outcomes such as concern regarding food insecurity. Teachers also indicated on pre- and post-surveys that 15-20% of parents involved in the BCSP improved in parental-school involvement (Bush et al., 2014). In regard to academic achievement, they found an increased growth on combined brief achievement and brief reading scores, although there was not a significant improvement on the brief math assessment (Bush, James, Noltemeyer, & Bergen, 2014).

**Rationale and Purpose**

The National Center for Children in Poverty gathered statistics in 2014 that state that 45%, or 10.8 million children living in the United States ages 6 to 11 live in low-income families. Within that, 5.4 million live in poor families. In addition, the percentage of children ages 6-11 living in families who are low-income has increased from 40% in 2008 to 45% in 2014 (Jiang, Ekono, & Skinner, 2016). These statistics are alarmingly high, especially when one considers the effects poverty can have on a student’s academic achievement as well as level of parental involvement. Although this research has discussed the effects poverty can have on these two variables, there is not much research that discusses the differences between level of poverty. That is, are there differences in these entities between students who are near poor, poor, or very poor? Learning these differences, if they exist, will give educators valuable information regarding which students are at the highest risk and may be in the most need for services. With
such high numbers of students in poverty, it is imperative that research is done to fully understand parental involvement and academic achievement, and its relationship in this population.

**Methodology**

**Participants**

All of the participants in this study were enrolled in the Butler County Success Program during the 2015-2016 school year, and their data were collected during the 2015-2016 academic school year. There were a total of 208 students between kindergarten and fifth grade, however, only 64 students had data available from teacher pre-surveys, fall achievement data, and family income values while 129 students had data available from parent pre-surveys, fall achievement data, and family income values. Therefore, fewer than 208 students were included in the analyses used to answer the research questions. Reasons participants were excluded from the analysis included if they had been enrolled more than one year in the BCSP, moved or left the program, or had missing data. The participants were in kindergarten through fifth grade and came from 36 schools in urban, suburban, and rural areas from six school districts in one state in the Midwest United States. All students whose data was used for this study came from families that qualified for Temporary Aid to Needy Families (TANF), were considered economically disadvantaged, were referred to the BCSP program, and consented to participate in the program. Refer to Tables 1-4 below for frequency information regarding grade level, ethnicity, gender, and poverty for the current sample of BCSP participants. It should be noted that not all participants included in frequency tables were used in the analyses used to answer the research questions.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>18</td>
<td>8.7%</td>
</tr>
<tr>
<td>1</td>
<td>31</td>
<td>14.9%</td>
</tr>
<tr>
<td>2</td>
<td>38</td>
<td>18.3%</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>18.3%</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
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</tr>
<tr>
<td>5</td>
<td>33</td>
<td>15.9%</td>
</tr>
<tr>
<td>Total</td>
<td>208</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>1</td>
<td>.5%</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>58</td>
<td>27.9%</td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>95</td>
<td>45.7%</td>
</tr>
</tbody>
</table>

Table 1

*Grade Level Frequency*

Table 2

*Ethnicity Frequency*
Table 3  
*Gender Frequency*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>94</td>
<td>45.2%</td>
</tr>
<tr>
<td>Male</td>
<td>114</td>
<td>54.8%</td>
</tr>
<tr>
<td>Total</td>
<td>208</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4  
*Poverty Frequency*

<table>
<thead>
<tr>
<th>Poverty</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100% (High poverty)</td>
<td>152</td>
<td>73.1%</td>
</tr>
<tr>
<td>100-200% (Low poverty)</td>
<td>55</td>
<td>26.4%</td>
</tr>
<tr>
<td>Missing Data</td>
<td>1</td>
<td>.5%</td>
</tr>
<tr>
<td>Total</td>
<td>208</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Protection of Human Subjects**

To identify each student, an ID number was used rather than the student’s name and the students were anonymous to the researcher. Institutional Review Board (IRB) approval was granted before the analysis began. Furthermore, the researcher had been added as project personnel to the existing IRB-approved project. There is only a small level of risk to participants involved in this study, because subjects cannot be reasonably identified by their ID number or demographic information. This data had been collected by the community-school liaisons in the Butler County Success Program, and had been done using ethical and accepted educational practices. This survey and achievement data is currently stored in the Butler County Success Program data system.

**Materials/Measurements**

Parent and teacher pre-test surveys were used to collect data (see Bush & Bergen, 2011, for details). The pre-test parent survey included 81 items and used a 4-point Likert scale format. These questions address basic needs, parenting behavior, family cohesion and communication, parent involvement with their child’s education, parental optimism, and the student’s social and academic competencies. The items from parenting behavior came from 7 items on the *Parenting Behavior Measure* (Peterson, Rollins & Thomas, 1985), family cohesion and communication came from the *Family Adaptation and Cohesion Scale* (Olson, 2000), parental involvement with their child’s education questions were created by Bush and Bergen (2011), parental optimism
came from *The Life Orientation Test-Revised* (LOT-R Scheier, Carver, & Bridges, 1994), and the student’s social and academic competencies came from Harter’s (1982) *Perceived Confidence Scale*. This study examined the 4-item *parent school involvement* variable from the parent pre-survey. The items used in this study to analyze parent-perceived parent involvement include “I contact the school a lot about how _______ (insert child’s name) is doing in school”, “I know _______ (insert child’s name) teacher(s) at school”, “I talk to _______ (insert child’s name) teacher(s) a lot about how he/she is doing in school”, and “I find out from _______ (insert child’s name) teachers how I can help him/her with school work”. In the current sample, the Cronbach’s alpha for this scale was 0.67, indicating acceptable internal consistency.

The pre-test teacher survey included 25 items and used a 4-point Likert scale format that assessed the perceptions of the child and parents’ behavior and needs. The items include a modified version of Harter’s (1982) *Perceived Competence Scale* as well as other items that were created that were influenced by research-based current assessment scales. This study examined the 4-item *parent school involvement* variable from the teacher pre-survey. The items used in this study to analyze teacher-perceived parent involvement include “I know this child’s parent(s)/guardian(s)”, “The parent(s)/guardian(s) of this child talk to me a lot about how he/she is doing in school”, “The parent(s)/guardian(s) of this child talk to me a lot about how he/she can help this child with schoolwork”, and “The parent(s)/guardians of this child contact the school a lot about how this child is doing in school”. In the current sample, the Cronbach’s alpha for this scale was 0.91, indicating excellent internal consistency. These items, as well as the questions from the parent pre-survey, look at the communication aspect of parental involvement, more specifically, the parent-teacher relationship.

The demographic variable that was examined was the student’s level of poverty. This used the dollar amount of family income received on a monthly basis. Using a formula that includes the family’s income as well as number of family members, the liaison was able to determine the level of poverty for each family. These levels were divided up into four categories based on this formula (i.e. <50%, 51-100%, 101-150%, & 151-200%). Considering historical trends of unbalanced and lower sample sizes when the participants are distributed across these four categories coupled with the anticipated analysis techniques, for this study we dichotomized them into two categories, low poverty and high poverty. The higher poverty category was <50%-100% (coded as a “2”) and the lower poverty category was 101%-200% (coded as a “1”), which is the same categorization used by Jiang, Ekono, & Skinner (2016) for the National Center for Children in Poverty. Every family’s income met the criteria to be in one of these two categories.

The academic achievement measures were determined by Measure of Academic Progress (MAP) Mathematics data, which was administered to students in their schools as part of normal educational practices. The MAP test is a computer-based assessment that measures achievement in reading, mathematics, as well as other subjects and has marginal reliabilities consistently in the low to mid .90’s, and validity is in an acceptable range as well (Northwest Evaluation Association, 2011). These assessments were administered by staff within each participating school district.

**Procedures**

The data for this study was collected during the 2015-2016 school year, just after families were enrolled in the BCSP. The BCSP has multiple liaisons who work with the families, and after they were registered to receive assistance from the BCSP, they were told that they could participate in the study if they chose to. They were then given the informed consent and parent
pre-test survey. The teachers were given the same option to participate, and if they chose to do so, were given informed consent forms and the teacher pre-survey to complete. The achievement data were already collected by the school, and so the data for students enrolled in the BCSP were organized by the liaisons.

The data was organized and de-identified by the researcher. This means, that the names attached to the data were removed, and identification numbers were the only participant identifier. No one other than the researcher and the researcher’s committee has access to the data set, and measures were made to protect the confidentiality of all participants.

Analyses

First, descriptive statistics on all variables were conducted to learn more about the characteristics of the variables (e.g. frequencies, means, standard deviations, ranges, and Ns). Then, to explore a relationship between teacher-perceived parental involvement and level of achievement, a bivariate correlation was conducted. The same correlation was done for the parent-perceived parental involvement relationship with level of achievement. Finally, two separate regression analyses with a moderator variable were conducted with the two types of parental involvement as predictor variables and the level of poverty being the moderating variable in each of the analyses. A moderator variable is a variable that affects the relationship between predictor and outcome variables. Therefore, this type of analysis allowed me to examine the relationship between the two predictors and the outcome, and to determine if this relationship depends on (i.e. is moderated by) level of poverty. In the first regression analysis, parent-perceived parental involvement and poverty level were entered in Step 1, followed by the interaction term between parent-perceived parental involvement and poverty at Step 2. In the second regression analysis, teacher-perceived parental involvement and poverty level were entered in Step 1, followed by the interaction term between teacher-perceived parental involvement and poverty at Step 2. In both regression analyses, the outcome variable was the student achievement variable.

There are assumptions that are needed to run a multiple regression that will produce valid results. The first assumption is that the dependent variable will be continuous, which it is. The second is that the independent variables are continuous and one moderator variable is dichotomous. Although the independent variables are not truly continuous, Likert scale data that are aggregated are typically treated as continuous for statistical analysis. The third assumption is that I will have independence of observations. The fourth is that there will be a linear relationship between the dependent and independent variable for each group of the dichotomous moderator variable. The fifth assumption is that my data will show homoscedasticity, and the sixth is that it will not show multicollinearity. The seventh is that there will be no significant outliers, and the eighth is that I will check that the residuals are normally distributed. Each of these assumptions were tested before performing the regression analyses. Most were met, although slight multi-collinearity was revealed in the second model of the teacher-perceived parental involvement regression analysis between teacher-perceived parental involvement and poverty variables.
Results

Research Question #1 Results
A bivariate correlation was conducted to analyze the first research question regarding the relationship between parent-perceived parental involvement and achievement. There was a significant and positive correlation between parent-perceived parental involvement (M=1.86, SD=.39) and math achievement (M=204.70, SD=27.85), \( r(80) = .202, p < .05 \). These results show a positive and significant \( p=.034 \) relationship between parent-perceived parental involvement and math achievement. In other words, as parent-perceived parental involvement increased, so too did students’ math achievement scores.

Research Question #2 Results
A bivariate correlation was also conducted to analyze the second research question regarding the relationship between teacher-perceived parental involvement and achievement. There was a significant and positive correlation between teacher-perceived parental involvement (M=2.98, SD=.67) and math achievement (M=202.66, SD=27.45), \( r(108) = .248, p < .05 \). These results show a positive and significant \( p=.005 \) relationship between teacher-perceived parental involvement and math achievement.

Research Question #3 Results
The third research question was “To what degree do both parent-perceived parental involvement and teacher-perceived parental involvement predict achievement, and are these relationships moderated by poverty level?” Reviewing the regression analysis for teacher-perceived parental involvement and Spring MAP Math data, the mean for the Spring MAP Math data was 187.91 \( (N=64, SD=25.30) \), and the mean for teacher-perceived parental involvement was 2.90 \( (N=64, SD=.69) \). Reviewing the regression analysis for parent-perceived parental involvement and Spring MAP Math data, the mean for the Spring MAP Math data was 190.79 \( (N=129, SD=23.82) \), and the mean for parent-perceived parental involvement was 1.74 \( (N=129, SD=.47) \).

Regarding parent-perceived parental involvement, two predictors were entered in Model 1: parent-perceived parental involvement and student poverty level. The outcome variable was MAP scores. This model was statistically significant, \( F (2,79) = 5.847, p < .05 \) and accounted for 12.9\% of variance in MAP scores (see Table 5). Meaning, parent-perceived parental involvement significantly predicted MAP scores. In Model 2, an interaction term between poverty level and parent-perceived parental involvement was added. This model revealed a non-significant moderating effect, \( F (3,78) = 4.137; p > .05 \) and accounted for only 0.8\% additional variance in MAP scores. In other words, although parent-perceived parental involvement and poverty level predict student MAP scores, the relationship between parent-perceived parental involvement and MAP scores does not differ as a result of poverty level.

Regarding teacher-perceived parental involvement, two predictors were entered in Model 1: teacher-perceived parental involvement and student poverty level. This model was statistically significant, \( F (2,107) = 7.066, p < .05 \) and accounted for 11.7\% of variance in MAP scores. This means that teacher-perceived parental involvement and student poverty level can significantly predict MAP scores. In Model 2, an interaction term between poverty level and teacher-perceived parental involvement was added. This model revealed a non-significant moderating effect, \( F (3,106) = 4.836; p > .05 \) and accounted for only 0.4\% additional variance in MAP scores. This suggests that although teacher-perceived parental involvement and poverty level
predict student MAP scores, the relationship between teacher-perceived parental involvement and MAP scores is not different for different levels of poverty.

Table 5  
Hierarchical Regression Analysis for Variables Predicting Teacher-Perceived Parental Involvement \((N = 110)\)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(B)</td>
<td>(SE)</td>
<td>(\beta)</td>
<td>(B)</td>
<td>(SE)</td>
<td>(\beta)</td>
</tr>
<tr>
<td>Constant</td>
<td>157.3</td>
<td>12.78</td>
<td>.24*</td>
<td>178.89</td>
<td>34.65</td>
<td>.24*</td>
</tr>
<tr>
<td>High (&lt;100%) and Low Poverty</td>
<td>14.23</td>
<td>5.5</td>
<td>-.39</td>
<td>-2.59</td>
<td>25.69</td>
<td>-0.04</td>
</tr>
<tr>
<td>TPntInv</td>
<td>9.06</td>
<td>3.75</td>
<td>.22*</td>
<td>1.91</td>
<td>11.31</td>
<td>.05</td>
</tr>
<tr>
<td>Teach × Pov</td>
<td></td>
<td></td>
<td></td>
<td>5.52</td>
<td>8.24</td>
<td>.35</td>
</tr>
<tr>
<td>(R^2)</td>
<td></td>
<td></td>
<td></td>
<td>.117</td>
<td>.120</td>
<td></td>
</tr>
<tr>
<td>(F) for change in (R^2)</td>
<td></td>
<td></td>
<td></td>
<td>7.07</td>
<td>.45</td>
<td></td>
</tr>
</tbody>
</table>

*\(p<.05\). **\(p<.01\).

Table 6  
Hierarchical Regression Analysis for Variables Predicting Parent-Perceived Parental Involvement \((N = 82)\)

<table>
<thead>
<tr>
<th>Variable</th>
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<th></th>
<th>Model 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>(SE)</td>
<td>(\beta)</td>
<td>(B)</td>
<td>(SE)</td>
<td>(\beta)</td>
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<tr>
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<td>17.88</td>
<td>.32**</td>
<td>148.63</td>
<td>17.95</td>
<td>.29**</td>
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<tr>
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<td>6.26</td>
<td>.32**</td>
<td>16.84</td>
<td>6.35</td>
<td>.29**</td>
</tr>
<tr>
<td>PntInv</td>
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<td>.25*</td>
<td>11.78</td>
<td>10.51</td>
<td>.16</td>
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<td>Prnt × Teach</td>
<td></td>
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<td></td>
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<td>.13</td>
</tr>
<tr>
<td>(R^2)</td>
<td></td>
<td></td>
<td></td>
<td>.129</td>
<td>.137</td>
<td></td>
</tr>
<tr>
<td>(F) for change in (R^2)</td>
<td></td>
<td></td>
<td></td>
<td>5.85</td>
<td>.75</td>
<td></td>
</tr>
</tbody>
</table>

*\(p<.05\). **\(p<.01\).

**Discussion**

The purpose of this study was to examine parent-school involvement, its relationship with academic achievement, and determine if that relationship is moderated by poverty level. The first research question asked, “Is there a relationship between parent-perceived parental
involvement and achievement?” and the second research question asked, “Is there a relationship between teacher-perceived parental involvement and achievement?” Results supported both of these hypotheses with positive and significant correlations. So, this study supports the assertion that the more parent and teacher-perceived parental involvement in the student’s education, the higher the student’s math achievement scores. These findings are consistent with the research stating that parent-school involvement is an important contributor to student academic success (Emerson, Fear, Fox, & Sanders, 2012; Hill, & Tyson, 2009; Wilder, 2014).

The third research question asked, “To what degree do both parent-perceived parental involvement and teacher-perceived parental involvement predict achievement, and are these relationships moderated by poverty level?” For both parent- and teacher-perceived parental involvement, the models were significant, meaning parent- and teacher-perceived parental involvement both significantly predict math achievement scores, which supports the first part of the third research question. This is consistent with the existing literature on the topic, which shows that parent involvement is associated with higher academic success (Emerson, Fear, Fox, & Sanders, 2012; Hill, & Tyson, 2009; Wilder, 2014) as well as higher test scores and grade point averages (Southwest Educational Development Laboratory, 2002). In this first model for teacher-perceived parental involvement, the model accounted for 11.7% of variance in MAP scores. In Model 1 for parent-perceived parental involvement, the model accounted for 12.9% of variance in MAP scores. A comparison of the findings from these two models suggests that parent- and teacher-perceived parental involvement explained roughly similar amounts of variance in MAP scores. In other words, parent involvement may explain similar amounts of variation in MAP mathematics achievement scores across parent and teacher reports.

However, Model 2 for both analyses revealed a non-significant moderating effect, meaning that this data did not support the second part of the third research question stating that these relationships are moderated by poverty level. This suggests that parent- and teacher-perceived parental involvement and student poverty level can predict student math achievement scores, but the relationship between parental involvement and achievement scores does not differ as a result of poverty level. While there is no way to be certain, one reason the moderating results may not have been significant is a result of only comparing students in poverty. Most research compares students in poverty with students who are not in poverty, and they often find significant results when analyzing poverty and lower levels of parent-school involvement (Ndebele, 2015), and poverty and lower levels of academic achievement (Fuskey, 2011; Hair et al., 2015; Herbers et al., 2012; Silvernail et al., 2014; Sirin, 2005). As stated above in the rationale and purpose section, there is a lack of literature comparing students in poverty based on their level of poverty. So, this may mean that students in poverty compared to students not in poverty may matter when looking at parent-involvement and academic achievement, but it may not matter when looking at the degree of poverty.

Limitations
This study contained limitations that may have had an impact on its results. The first limitation was the decline in sample size. While there was an original large pool of data, the number significantly declined when filters were put in place to only use data from participants who were in the first year of the program, enrolled in kindergarten through fifth grade, had teacher or parent surveys, poverty data, and achievement data via MAP Mathematics scores. Another limitation connected with the participants of the study, are that the demographics of the exact sample used for the analyses is unknown to the researcher.
The second limitation was that only self-report data from parents and teachers were used to determine level of perceived parental involvement. Depending on perceptions, parents may indicate inflated levels of parental involvement while teachers may indicate deflated levels. These self-report measures may create limitations in regard to fidelity of the true level of parental involvement. While this is a concern, both parent and teacher perspectives were collected and analyzed in order to determine a holistic picture of parental involvement.

The third limitation was there may have been a slight degree of multicollinearity in the second model of the teacher-perceived parental involvement regression analysis. One of eight assumptions that are needed to run a multiple regression that will produce valid results is that the data will not show multicollinearity. My data having a slight degree of multicollinearity means that the predictors in the regression analysis with teacher-perceived parental involvement were moderately correlated.

The fourth and final limitation was concerning the specific questions asked to determine parental involvement. The questions are listed in the Materials/Measurements section and only ask about parent/teacher communication. When discussing parental involvement in this study, it is only in the context of parent-teacher communication and cannot be mistaken as overarching parental involvement. Epstein (1995) explains that parental involvement is a multidimensional construct that incorporates communication with the school or teacher, volunteering for the school, learning at home, decision making, collaborating with the community, etc. While communication between the teacher and parent is a common form of parental involvement, it is important to remember that it is only one piece of the puzzle.

Future Direction

The results of the current study add to the existing literature that indicates parental involvement is positively correlated with academic achievement. This study specifically shows a significant relationship with parent-teacher communication and mathematics achievement scores from the Measure of Academic Progress (MAP) computer-based assessment. The survey tool used has acceptable levels of validity for both parent and teacher surveys, however, it only measures parent-teacher communication. As stated above in Epstein’s (1995) research, parent-teacher communication is only one part of the multidimensional construct that is parental involvement. Within the literature, there is also not a consistent definition of what exactly parental involvement is, and is therefore measured in many different ways. Creating a single tool to measure parental involvement would add consistency throughout the literature. It would potentially be beneficial to the field to have measures for each of Epstein’s (1995) sub-categories so research can be done to determine the effects of each type of parental involvement.

Implications for practice

The main conclusions of this research are 1) there is a positive and significant correlation between parent-teacher communication and mathematics achievement scores and 2) teacher- and parent-perceived parental involvement as well as the student’s level of poverty both predict student’s mathematics scores. Practicing school psychologists can use this information by encouraging parents to have an open line of communication with their student’s teachers. On that same note, they should encourage teachers to always keep an open line of communication with all of their students’ parents. They also can encourage their school and/or district to support other protective factors for all of their students, but especially for students in poverty. Protective factors can include increasing the students’ level of perseverance, quality home and school
educational resources, smaller class sizes, and number of students enrolled at the school (Bellibas, 2016). The percentage of students ages 6-11 who are living in families who are low income has increased from 40% in 2008 to 45% in 2014 (Jiang, Ekono, & Skinner, 2016). The number of students living in poverty is increasing, and it is imperative to set these students up for success, and the use of parental involvement seems to be a promising channel.
References


