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The Effect of Parental Involvement and Socioeconomic Status on Elementary Students' Mathematics Achievement

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Abstract

The study aims to investigate any relationships among Parental Involvement (PI), Socioeconomic Status of parents (SES), and students' Mathematics Achievement (SMA). Quantitative data collection methods were utilized to collect relevant data for the three variables. The sample included parents of male and female students in fourth, fifth, and sixth grades. The sample included 36 male students, and 31 female students. The results revealed statistically significant relationship between socioeconomic status and parental involvement, a positive relationship between parental involvement at home (PIH) and students' mathematics achievement (SMA), no relationship between parental involvement at school (PISC) and students' mathematics achievement (SMA), and a positive relationship between parents' employment status and SMA, and parents' education level and SMA, while no relationship was found between family income and SMA. The findings are thoroughly discussed and recommendations for further research and practice are introduced, specifically with regard to curriculum development and the design of parent-school communication programs.

Keywords

Parental Involvement, Mathematics Achievement, Socioeconomic Status

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1. Introduction

Parental involvement has shown a positive relationship with children's academic achievement (Barnard, 2004; Bower, 2011; Desimone, 1999; Hill & Craft, 2003; Hill & Taylor, 2004; Zellman & Waterman, 1998). Consequently, researchers have suggested that parental involvement can be used as a means to decrease achievement gaps across different groups of students (Bower, 2011; Jeynes, 2011; Zellman & Waterman, 1998). As a result, it is essential for researchers to examine the reasons behind the different stages of parental involvement so as to inform school policy reformers about all possible approaches of increasing parental involvement and, subsequently, improving student achievement and lessening achievement gaps.

Research on parental involvement revealed additional advantages beyond the benefits of improving student achievement at school (Bower, 2011). For example, parental involvement has been associated with increasing social capital and providing additional resources to students, which increases their academic achievement (Bower, 2011; Lee & Bowen, 2006). Many educational reform plans around the world are devising academic programs and curricula that are focused on encouraging parental involvement and improving student achievement in school (Al Jabery & Zumberg, 2008; Fayez, Sabah, & Rudwan, 2011). Thus, it is essential to understand all factors that may influence parents' involvement in their children's education.

Parental involvement has been regarded as a contributing

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factor to student academic achievement in schools (Desimone, 1999; Vellymalay, 2012). Additionally, socioeconomic status has been repeatedly linked with parental involvement; the higher the socioeconomic status, the higher the parental involvement level is anticipated to be (Altschul, 2011; Lau, Li, & Rao, 2011). Moreover, numerous studies have found that higher socioeconomic status is related to higher parental involvement levels and in return to higher academic achievement and success (Desimone, 1999; Eagle, 1989; Ho & Willms, 1996; Katsilis & Rubinson, 1990; McNeal Jr, 2001; Shaver & Walls, 1998). More specifically, some scholars concluded that socioeconomic status is positively correlated with higher levels of parental involvement and, consequently, higher levels of academic achievement (Vellymalay, 2012).

This study attempts to highlights the factors that may lead to higher levels of parental involvement. The findings of this study may offer support for future reform efforts to enhance parental involvement both at home and at school. The process of understanding reasons for why parents desire to be involved in their children's education is crucial when developing methods to encourage parents to show more involvement in their children's education. Therefore, the current study investigates the relationships between parental involvement and parent's socioeconomic status, as well as students' mathematical achievement.

2. Literature Review

Zedan (2012) characterizes parental involvement based on four attributes: "(a) conversations at home; (b) attention and supervision at home; (c) contact between parents and school; and (d) participation in parent-teacher meetings," (p. 162) Moreover, Henderson and Mapp (2002) offer a more descriptive definition for those four attributes. The four attributes are divided into two groups: the first two attributes are regarded as parental involvement at home, and the second two are regarded as parental involvement at school (Ho & Willms, 1996; Seginer, 2006). Ho and Willms (1996) rephrased the attributes to "Discussing school activities" and "Monitoring out-of-school activities" that are related to parental involvement at home, and "Contacts with school staff" and "Volunteering and attending parent-teacher conferences and other school events" that are related to parental involvement at school.

Most researchers distinguish between parental involvement at home and parental involvement at school when it comes to the relationship between parental involvement and academic achievement (Altschul, 2011; Henderson & Mapp, 2002; Ho & Willms, 1996, Seginer, 2006; Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005). Research findings vary when it comes to home-based and school-based parental involvement's effect on academic achievement. Some researchers have found a difference in the effect on academic achievement between parental involvement at home and parental involvement at school (Altschul, 2011; Fantuzzo, McWayne, & Perry, 2004; Lau, Li, & Rao, 2011). In a study that involved 1609 Mexican-American students concerning the effect of parental involvement practices on their children's achievement in 8th grade and, subsequently, their achievement in 10th grade, Altschul (2011) found that only home-based parental involvement had a significant effect on the children's academic achievement, while school-based involvement had no significant effect on children's academic achievement. However, other researchers have found that school-based parental involvement does have a positive effect on children's achievement in school (Stright & Yeo, 2014). This study examined both home-based and school-based parental involvement in order to determine their relationships with children's academic achievement.

Moreover, Fantuzzo, McWayne, & Perry (2004) examined the different dimensions of parental involvement and how those dimensions predict children's outcomes in early childhood. Their findings suggested that home-based involvement strategies were the "strongest predictor of child outcomes" (p. 467). In a study that involved 431 Chinese children between the ages of five and six, Lau, Li, & Rao's (2011) findings further emphasized that home-based parental involvement served as a high predictor of children's readiness for school. Similarly, Hayes (2012) found that the strongest predictor of African-American adolescents' academic achievement is home-based parental involvement activities; the study did not find significant correlations between school-based parental involvement and the academic achievement of their children.

Several research studies have contended a positive relationship between parental involvement and students' academic achievement (Altschul, 2011; Lau, Li, & Rao, 2011; Zedan, 2012). A study on involved 400 parents found a positive correlation between parental involvement and their children's achievement in school among the Arab-Israeli minority groups living in Israel (Zedan, 2012). Also, Bradley (2010) reported a correlation between parental involvement practices and the reading achievement of fourth grade African-American males. Another study by Gest, Freeman, Domitrovich, and Welsh (2004) concluded that parental involvement with children's reading activities at home had a considerable influence not only on the reading achievement, language comprehension and expressive language skills, but also on the interest in reading. Furthermore, according to Flouri and Buchanan (2004), the most powerful factor that affects students' literacy practices is parental involvement.

Their study concluded that parental involvement was more influential than social class, family size, or parents' education level.

A study that included a sample of 239 students and investigated the relationship between parental involvement and students' success in school concluded that decreased parental involvement is linked to lower academic achievement (Oyserman, Brickman, & Rhodes, 2007). Additionally, Stright and Yeo (2014) investigated the effect of school-focused parenting practices on school behavior and achievement. The study reported that "School-focused parenting practices were significant predictors of children's achievement even after controlling for child variables, maternal education, and parenting styles" (p. 8).

Desimone (1999) studied the relationship between family income, which is a factor of socioeconomic status, and parental involvement and how those two variables affect children's academic achievement in reading and mathematics; her findings suggest a significant correlation between family income and parental involvement, which are both also correlated with students' academic achievement. Similarly, in a study of 80 Indian children and their families, Vellymalay (2012) found that socioeconomic status positively affects the level of parental involvement at home; parents with higher socioeconomic status tend to demonstrate more parental involvement strategies than parents with a lower socioeconomic status. Furthermore, Vellymalay (2012) found that "household income and parents' education level has a greater impact on parental involvement strategies than their income and the occupation status" (p.5).

Moreover, in a study about the effect of parents' socioeconomic status and parents' education level on their involvement in their children's education, Rockwell (2011) concluded that parents with lower socioeconomic status tend to focus on their children's basic human needs rather than their academic needs for success.

Some researchers, however, found that socioeconomic status (SES) does not significantly affect parental involvement or student achievement. In his study on African-American adolescents in high school, Hayes (2012) found that only parents' employment status is positively correlated with their children's grades in high school, while other demographic variables such as parent education level, marital status, or family income do not correlate significantly with their children's academic achievement. Furthermore, Stull (2013) argued that SES is usually positively correlated with the parents' expectations for their children. In fact, in the cases where SES did not correlate with the parents' expectations for their children, it was found that parents' expectations for their children's academic achievement was the stronger predictor of their achievement at school (Davis-Kean, 2005; Fan & Chen, 2001; Galindo & Sheldon, 2012; Zhan, 2006).

3. Methodology

3.1. Sample

The sample included parents of male and female students in fourth, fifth, and sixth grades in the United States of America. The sample included 36 male students, and 31 female students. Table 1 shows the numbers and percentages of the students sample distributed by gender.

Table 1. Numbers and percentages of students by gender.

Gender	Number	Percent
Male	36	53.7%
Female	31	46.3%

The sample included parents of 27 students in 4th grade, of 25 students in 5th grade, and of 15 students in 6th grade. Table 2 shows the distribution of students by grade level.

Table 2. Numbers and percentages of students by grade leve.

Grade Level	Number	Percent
4th grade	27	40.3%
5th grade	25	37.3%
6th grade	15	22.4%

3.2. Questionnaire

A questionnaire that focused on demographic information, socioeconomic status, parental involvement levels, and mathematics achievement was used for data collection. The questionnaire comprised of four main sections that collected specific data on different variables such as demographic date, GPA (Grade Point Average), socioeconomic status, and parental involvement.

The first section of the questionnaire was intended to collect demographic information such as gender, age, number of adults in the home, and grade level. Also, students' mathematics grades were gathered by using the first part of the questionnaire.

The second section of the questionnaire was modified from Vellymalay's (2012) study on the correlation between parental involvement and socioeconomic status to compute variables that form the families' socioeconomic status, such as levels of parents' education, family income, and the employment status of parents.

3.3. Parental Involvement

The last section of the questionnaire was a short Likert-type scale survey consisting of a total of 20 items that were "developed as a collaborative effort between the School-Family Partnership project at the University of Illinois at

Chicago, a collaborative site of the Mid- Atlantic Laboratory of Student Success at Temple University, and personnel at the participating schools" (Patrikakou & Weissberg, 2000, p. 109). More specifically, the first 13 items of the last section measured parental involvement at home through a four level likert-type scale ranging from "Less than one day per week" to "5-7 days per week" and the last seven items measured parental involvement at school on a three level likert-type scale ranging from "Never" to Several times per year". Patrikakou and Weissberg (2000) contended that the parental involvement at home (PIH) measure had a Cronbach's alpha of 0.77, while the parental involvement at school (PISC) measure had a Cronbach's alpha of 0.71.

4. Results

Spearman correlation coefficients were calculated to determine if a relationship existed between the three variables that form socioeconomic status (parents' education, family income, and parents' employment status) and the parental involvement levels of parents, both at home and at school. Table 3 shows the results of the Spearman correlation test conducted on sample.

Table 3. Spearman rho Correlations between SES and PI.

	Socioeconomic Status (SES)		
	Parents' Education	**Family Income**	**Parents' Employment Status**
Parental Involvement at home (PIH)	.625(**)	.282(*)	.667(**)
Parental Involvement at school (PISC)	.711(**)	-.035	.031

Note. *p < .05, two-tailed. **p < .01, two-tailed. n=67.

Table 3 shows a statistically significant correlation between parental involvement at home (PIH) and the three SES variables: parents' education (p<.01), family income (p<.05), and parents' employment status (p<.01). Also, the table shows that there is a strong positive correlation between parental involvement at school (PISC) and the parents' education level was significant (p<.01), while the correlations between PISC and family income and between PISC and parents' employment status were not statistically significant (p>.05). The results show that there is a strong relationship between the following: PIH and parents' education, PIH and family income, PIH and parents' employment status, PISC and parents' education.

Spearman rho correlation coefficients were calculated between parental involvement, at home and at school, and students' mathematics achievement (i.e., Table 4).

Table 4 shows that the correlation between PIH and SMA was statistically significant (p <.01), which suggests that a strong positive relationship exists between PIH and SMA. The results also show that no significant relationship was found between PISC and SMA in the current sample (p >.05).

Table 4. Spearman rho Correlations between PI and SMA.

	Parental Involvement (PI)	
	Parental Involvement at home (PIH)	**Parental Involvement at school (PISC)**
Students' Math Achievement (SMA)	664(**)	-.120

Note. **p < .01, two-tailed. n=67.

Spearman rho correlation test was conducted to test for correlations between students' mathematics achievement and the three variables of socioeconomic status: parents' education level, family income, and parents' employment status.

Table 5. Spearman rho Correlations between SES and SMA.

	Socioeconomic Status (SES)		
	Parents' Education	**Family Income**	**Parents' Employment Status**
Students' grade in math (SMA)	.472(**)	.268(*)	-.258(*)

Note. *p < .05, two-tailed. **p < .01, two-tailed. n= 67.

Table 5 shows that there are significant correlations between SMA and the three variables of SES: parents' education (p<.01), family income (p<.05), and parents' employment status (p<.05). These results indicate a positive relationship between SMA and parents' education and family income. However, the results show a negative relationship between SMA and parents' employment status.

4.1. Findings

In this study, "at home parental involvement" was defined as home-based activities used by parents to improve the level of their children's academic achievement at school such as

discussions about school, what children are learning at school, helping children with homework and helping with time management issues outside of school (Henderson & Mapp, 2002; Ho & Willms, 1996). Also, "At school involvement" was defined as the communication between parents and schools, as well as activities that parents engage in with school staff, such as participation in school events, volunteering at school, and participating in parent-teacher conferences (Henderson & Mapp, 2002).

This study aimed to examine the relationships between parental involvement (PI), socioeconomic status (SES), and students' mathematical achievement (SMA) in grades four through six. The study focused on three purposes. First, the study aimed to scrutinize whether or not a relationship exists between socioeconomic status of students' families and their parents' involvement levels. Second, the study intended to investigate whether or not a relationship exists between parental involvement and students' mathematical achievement. Last, the study examined whether or not a relationship exists between socioeconomic status and students' mathematical achievement.

With regards to the relationship between socioeconomic status of parents and their parental involvement levels, the study revealed a positive relationship among parental involvement at home (PIH) and parents' education level, family income, and parents' employment status. Moreover, the findings showed a positive relationship between PISC and parents' education level, but no relationships among PISC and family income or parents' employment status. These findings support the results of previous research studies (e.g., Desimone, 1999; Eagle, 1989; Ho & Willms, 1996; Katsilis & Rubinson, 1990; McNeal Jr, 2001; Shaver &Walls, 1998), which indicated that socioeconomic status is positively associated with parental involvement levels. Moreover, a number of studies have noted the importance of the parent's socioeconomic status (i.e., parent's education level, occupation status, and their household income) as important indicators for parental involvement that leads to academic success of a child (Desimone, 1999; Ho & Willms 1996; Lueptow 1975; Vellymalay, 2012).

One explanation for the relationship between PISC and parents' education level is that parents with higher levels of education tend to be more aware of and concerned about their children's achievement levels compared to less educated parents. That could be a reason why they emphasize school involvement in order to follow up closely with their children's academic performance and progress. On the other hand, if both parents are working long hours or are in positions that do not allow time off for volunteer efforts, then these often lower-income families may have fewer opportunities to be at their children's schools during the school day.

The investigation into the relationship between parental involvement and children's mathematical achievement revealed a positive correlation between PIH and SMA, but no relationship was detected between PISC and SMA. The findings regarding the relationship between PIH and SMA agree with the findings of previous research (Altschul, 2011; Lau, Li, & Rao, 2011, Zedan, 2012), which indicated that higher parental involvement at home leads to higher mathematics achievement. Moreover, other researchers found parental involvement to be positively predictive of a child's mathematics achievement (Gonzalez & Wolters, 2006; Reynolds, 1992; Pan, Gauvain, Liu, & Cheng, 2006). Moreover, Friedel, Cortina, Turner, and Midgley (2010) contended that parental involvement is a vital parameter for increasing children's mathematics achievement.

With regards to the relationship between socioeconomic status and students' mathematical achievement, a correlation test showed that a positive relationship exists between SMA and parents' education level, family income, and parents' employment status. These findings support research about the effects of a family's socioeconomic status on students' mathematics achievement, which revealed that parents' SES plays an important role in their children's early and later mathematics achievement (Clements & Sarama, 2007; Crosnoe & Cooper, 2010; Jordan, Kaplan, Locuniak, & Ramineni, 2007).

4.2. Recommendations for Future Research

Because the study's sample contained only parents of students in grades four, five, and six, it is recommended for future research to the relationships among parental involvement (PI), socioeconomic status (SES), and students' mathematical achievement (SMA) using different grade levels to evaluate differences or similarities in the relationships by grade level.

Also, a comparison between US institutions and other westernized institutions is recommended to pinpoint differences and/or similarities. Such comparisons will allow possible feasibility of successful curriculum development or modification which will improve school-parent communication methods or parent outreach programs. Additionally, such comparison will help in development of a successful design to increase parental involvement and improve students' achievement levels.

Last, the results of the present study with regards to the statistically significant relationship between parental involvement at home and students' mathematical achievement suggest using a qualitative research approach (i.e., focus groups or interviews) to gain deeper analysis of

such relationship. Qualitative data-collection approaches might assist in pinpointing more specific problems such as needs of teachers, parents, and students directly.

Results of the above recommended studies above and the findings of this current study might influence school policy makers and also enhance the effectiveness of school-parent communication. Results will motivate parents to gain more knowledge about the significant effects of their involvements in their children's educations and children's academic achievement levels. Also, such results will motivate parents to gain more information on the need to enhance their abilities to teach their children. Findings of such studies will enhance the developments of school academic programs and also the developments of school policies with regards to emphasizing parental involvement continuously throughout the school year. The ultimate goal is to increase students' mathematical achievement in particular and students' overall academic achievement levels in general which most likely will be achieved when gaining deeper understanding of all factors contributing to increasing parental involvement at home and at school.

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