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Publication Date

2020

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA
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Motivations for Homework Involvement: A Preliminary Investigation of Parents of
Children with Individualized Education Plans

A Thesis submitted in partial satisfaction
of the requirements for the degree of

Master of Arts

in

Education

by

Tyler Ayana Womack

March 2020

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ABSTRACT OF THE THESIS

Motivations for Homework Involvement: A Preliminary Investigation of Parents of Children with Individualized Education Plans

by

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Master of Arts, Graduate Program in Education
University of California, Riverside, March 2020
Dr. Austin Johnson, Chairperson

Students with disabilities tend to experience more challenges and have lower homework completion as compared to non-disabled peers (Epstein et al., 1993). Evidence suggests that parental involvement in homework can significantly improve children with disabilities' homework completion and achievement (Zhang, Hsu, Kwok, Benz, & Bowman-Parrot, 2001). However, there have been relatively few studies that have examined the factors that are associated with higher levels of homework involvement for parents of children with disabilities (Frew, Zhou, Duran, Kwok, & Benz, 2013). The purpose of this study was to conduct a preliminary investigation on the factors associated with homework involvement of parents of children with disabilities. To determine these factors, data were analyzed from a sample of 11,941 parents from the *Parent and Family Involvement in Education Survey* of the 2016 National Household Education Surveys Program. Using a hierarchical regression analysis, this study examined the relationship of

family characteristics, school outreach efforts, parent satisfaction, and parent beliefs in relation to homework involvement. Generally, parents of children with disabilities are significantly less satisfied with their child's school and had lower expectations for their child's postsecondary outcomes as compared to parents of children without disabilities. Preliminary results indicated that a child's disability status moderated the association between parents' satisfaction with their child's IEP services with homework involvement, as well as expectations with homework involvement. The implications of these findings and future directions will be discussed.

Homework is an important component of K-12 students' daily routine and has a significant impact on students' academic achievement. Homework is defined as "tasks assigned by school teachers that are meant to be carried out during non-instructional time" (Bembenutty, 2011, p. 185). Homework can provide students with opportunities to practice what they have learned, apply skills to new situations, and develop skills in time management and organization (Cooper, Robinson & Patall, 2006). According to a 2011 study from the National Center for Education Statistics, high school students spend an average of 7 hours per week on homework. Over the past 20 years, the amount of homework has increased in elementary levels (Gill & Schlossman, 2003). In general, research has shown that students who complete homework have higher academic achievement and better long-term outcomes (Cooper et al., 2006).

A key factor in predicting students' success with homework completion is parent involvement. Homework involvement describes the learning supports parents provide to their children outside of school and include examples such as helping children with their homework, asking about homework completion, and providing a space for the child to do their work (Green, Walker, Hoover-Dempsey, & Sandler, 2007; Hoover-Dempsey & Sandler, 1997). A plethora of research has shown that high levels of parent involvement are associated with students attaining higher academic achievement, school attendance, and positive behavior (Bryan & Burstein, 2004; Deslandes, 1999; Pattal, Cooper, & Robinson, 2008).

Pattal et al. (2008) conducted two meta-analyses on parent involvement and students' learning outcomes. The first meta-analysis examined 14 studies in which

elementary parents received training in homework help and found that parent involvement led to higher rates of homework completion and improved academic performance. The second meta-analysis examined 20 studies that studied the correlational relationship between parent involvement and academic achievement. From these studies, they found that parent homework involvement demonstrated positive associations with elementary and high school students' verbal achievement outcomes. Although there have been several studies examining the homework involvement patterns of parents of children in general education, there have been relatively few empirical studies that have examined factors of parent homework involvement in special education (Zhang et al., 2011).

Parent Involvement in Special Education

Parent involvement is arguably more crucial for children with disabilities since it is both legally mandated by special education policy and necessary for children's school achievement. The Individuals with Disabilities Education Improvement Act of 2004 (IDEA) mandates that schools incorporate parents as active participants in their child's Individualized Education Plan (IEP). IDEA encourages parents to make shared decisions regarding their child's services and accommodations, and parents are required to provide consent in order for an initial special education evaluation to occur (IDEA, 2004).

Additionally, parent involvement is important for student achievement as researchers have documented that students with disabilities tend to experience more challenges and have lower homework completion rates when compared to non-disabled peers (Epstein et al. 1993; Gajria & Salend, 1995). Research has shown that parent involvement in special education can improve the homework completion and

achievement of students with disabilities (Newman 2005; Test, 2008; Zhang et al. 2011). Newman (2005) examined the relationships of family involvement of children with disabilities to their academic and social outcomes. Using a national dataset, Newman found that more parental activity in children's schooling was associated with better grades and higher achievement in reading. Test (2008) found that parental involvement is a predictor of improved employment outcomes for youth with disabilities. When examining a national dataset of students with disabilities, Zhang et al. (2011) found that parents with high levels of home involvement demonstrated significant effects on students' academic achievement.

However, despite the legal and social significance of parent involvement in special education, there have been relatively few studies that have examined the factors that are associated with higher levels of involvement (Frew et al., 2013; Wagner, Newman, Cameto, Javitz, & Valdes, 2012). The purpose of this paper is to examine factors of homework involvement for parents of children with disabilities.

Children with Disabilities and Homework Challenges

To be eligible for special education services, federal law mandates that a child must have an educational disability that adversely affects their educational performance (IDEA, 2004). Generally, students with IEPs may experience problems in reading decoding, comprehension, spelling, and writing which makes it difficult for them to independently complete homework (Bryan et al., 2001). Additionally, children with IEPs may experience challenges associated with psychological processes that make it difficult for them to access new material without proper accommodations or modifications.

Students with disabilities are often characterized by deficits in attention, memory, receptive language, and poor organizational skills. As a result of these deficits, children with disabilities may have trouble remembering and understanding homework assignments (Bryan & Burstein, 2004; Epstein et al., 1993; Swanson, 1994). Epstein et al. (1993) conducted a study in which parents and teachers of 194 students with disabilities completed the homework behavior checklist and found that the most significant challenges were in remembering the tasks and becoming easily distracted. Swanson (1994) compared the short-term memory and working memory of children with learning disabilities to non-disabled children and found that students with learning disabilities scored significantly lower on overall working memory measures as compared to nondisabled students. Additionally, Swanson (1994) found that working memory was a significant predictor of reading performance for students with disabilities. Thus, students with disabilities tended to demonstrate lower levels of reading performance in conjunction with lower working memory. Gajria and Salend (1995) conducted a survey with middle school students with disabilities to assess their perspectives on homework and found that students rated homework as unimportant. Students reported difficulty in maintaining attention to their homework assignments, needing someone to assist them in doing their homework, and difficulty in knowing which homework to prioritize.

Difficulties with homework completion and achievement are also associated with poor postschool outcomes (Test, 2008). In 2007, the National Longitudinal Transition Study-2 showed that in a national sample of students with disabilities, less than 15% were enrolled in 2- and 4-year colleges, 45% were unemployed, and 72.6% lived at home

(NLTS2, 2007). Furthermore, young adults with disabilities are overrepresented in the criminal justice system. In 2009, 32% of adults with disabilities reported that they had been arrested and 50% reported that they had been stopped by the police (Newman et al., 2011). The challenges associated with parent homework involvement within special education are important considering these poor post-school outcomes (Test, 2008).

Factors Related to Parent Involvement

Despite the importance of family involvement for combatting these outcomes, studies have shown that parents of children with disabilities are less involved when compared to parents of children without disabilities (Martin et al. 2006; Oswald et al., 2018). The following section provides an overview of factors associated with parents' involvement with their child's homework. Generally, there are parent, child, and school characteristics that encourage or inhibit higher levels of homework involvement.

Parent Factors

Parents' available time, energy, skills and knowledge are important factors that can impact homework involvement (Hoover-Dempsey et al., 2005). Factors that may impact parents' time and energy includes being in a two-parent versus a single-parent household and having high versus low socioeconomic status. Generally, two-parent households and higher-income households have higher homework involvement as compared to single-parent and low-income households (Frew et al., 2012; Newman, 2005; Rispoli et al., 2018; Wagner et al., 2012). In two-parent households, it is likely that parents share responsibilities in work and child rearing, which can free more time for parents to assist in their child's homework (Wagner et al., 2012). Low-income parents are

more likely to work-full time, have multiple jobs, and face inflexible work hours (Weiss et al., 2003). They are less likely to volunteer at their child's school due to time scarcity and work demands (Castro, Bryant, Peisner-Feinberg, & Skinner, 2004). In addition to these factors, parents of children with disabilities are likely to have substantially more demands on their time and energy as there are higher responsibilities in caring for children with disabilities (Benson et al., 2008).

Having enough knowledge and skills in the subjects relevant to the child's schooling is likely to increase parental involvement (Walker et al., 2005). Primary caregivers who received an education beyond a high school diploma are more involved as compared to parents with less education (Oswald et al. 2018; Rispoli et al., 2018). Parents with less education may experience more challenges in assisting with their children's homework. Additional barriers may occur when the child progresses to higher grade levels as homework becomes increasingly difficult (Lareau, 1989).

In addition to time and knowledge, other demographic characteristics, such as race, are significant predictors of parents' homework involvement. Researchers found that White families have higher levels of school-based involvement as compared to Black and Latino families (Frew et al., 2013; Wagner et al., 2012), whereas Black and Latino parents generally have higher homework involvement as opposed to school involvement (Anderson & Minke, 2007; Park & Holloway, 2013; Walker et al., 2011). Part of these involvement differences may occur due to parents perceived welcoming of their involvement from their child's school. Parents from racial minority backgrounds experience greater barriers to school-based involvement than White parents (Kim, 2009).

Some of these barriers include teacher bias on the efficacy and capacity of minority parents and lack of school welcoming and communication (Kim, 2009).

Finally, parents' expectations for their child's future can impact their decision to become involved in their child's education. Typically, when parents have higher expectations for their child's achievement, they are more likely to become involved (Hoover-Dempsey et al., 2005). Hirano et al. (2016) found that this measure was particularly important for the involvement behavior of parents of high school students with disabilities.

Child Factors

In terms of child characteristics, researchers have found that for both general and special education populations parents were more involved with younger children as opposed to adolescents (Frew et al. 2012; Newman 2005). Spann, Kohler, and Soenksen (2003) found that parents' satisfaction with their child's school communication along with their level of involvement, decreased as children aged. Specifically, 83% of parents with children between the ages of 15-18 felt that their school was inadequate.

Studies have shown mixed results regarding whether the child's gender impacts levels of parent participation. Some studies have found that parents with female children had higher levels of involvement as compared to male children (Oswald et al., 2018; Hickman et al., 1995), whereas other studies did not find gender to be a significant predictor of parent involvement (Frew et al., 2013).

Parents' perceptions of their child's cognitive functioning and behavior can significantly impact their homework involvement (Wagner et al., 2012). Using data from

a national survey, Wagner et al. (2012) found that parents of children with low cognitive functioning had lower expectations for their child's postsecondary education. Having this low expectation was also associated with lower levels of school and homework involvement from the parent.

Research suggests that there is a bidirectional relationship between child behaviors and parenting (Lengua & Kovacs, 2005). For example, Lengua and Kovacs (2005) found that child irritability predicted inconsistent discipline by parents and that inconsistent discipline predicted greater child irritability. Similarly, studies have shown that when homework is a constant source of frustration for the child, it is less likely that parents will view homework as valuable for their child's well-being and success (Baumgartner et al., 1993; Lee, 1994). Parents of children with disabilities who are poor performing report higher levels of stress and fatigue, as well as the belief that homework was not important for their child's success (Levin et al., 1997).

Parent involvement is related to children's externalizing behaviors (Eisenberg et al., 1999). Depending on their diagnosis, children with disabilities may have poor self-regulation in the areas of attention, impulsivity, and inhibitory control (Goldsmith & Rothbart, 1991). Demonstrating these types of behaviors can lead to lower levels of parent involvement. For example, parents of students with emotional disturbance are less involved in home and school-related activities as compared to students of other disability categories (Newman, 2005). Severity of problem behavior of children with ASD also has a negative effect on parents' homework involvement (Benson et al., 2008). In general, studies have shown that when students with IEPs experience more suspensions and

expulsions, parents are less likely to be involved in school or home (Newman, 2005; Wagner et al., 2012).

School Factors

The extent to which schools encourage and provide opportunities for parent involvement is a significant factor of homework involvement (Hoover-Dempsey et al., 2005). Benson et al. (2008) found that school facilitation of parent engagement was the most significant predictor of school and homework involvement for mothers of children with ASD. Rispoli et al. (2018) found that parent perceptions of how well they are being supported by and receiving information from their child's head start program moderated the effect of sociodemographic variables, suggesting that parent homework involvement can increase regardless of SES with adequate school communication. Zablotsky et al. (2012) examined the involvement of parents of children with ASD and found that there was a correlation between parental satisfaction and homework involvement. In general, parents who are more satisfied with school-home communication are more likely to be involved.

Barriers to homework involvement by parents of children in special education may stem from poor communication from the school and teachers. In general, many studies have shown that parents of children with disabilities are generally dissatisfied with their school's involvement efforts (Elbaum et al., 2015; Hetherington et al., 2010). Elbaum et al. (2015) examined parents of children with disabilities' perceptions of school involvement and found that the majority of parents they surveyed had a negative experience of collaboration with their child's school. The primary reasons were that

parents did not believe that schools were receptive to their input, did not involve them in placement decisions, provided rigid choices, and had teachers that were inaccessible.

Hetherington et al. (2010) conducted several focus groups with parents of transition-aged youth with disabilities and found that most of the parents reported that the school failed to include them in their child's transition planning.

In terms of homework involvement, studies found that teachers often do not adequately communicate their expectations (Bryan & Nelson 1994; Epstein et al., 1993; Kay et al., 1994). Bryan and Nelson (1995) found that parents of students with disabilities report that they believe homework is graded based on accuracy, whereas teachers expressed that they grade assignments based on student effort. Epstein et al. (1997) found that parents of children with IEPs felt that teachers did not adequately communicate with them about their child's problems with homework, assigned too much homework, and did not provide clear expectations. Part of this issue may stem from the lack of training teachers receive during their certification programs. Specifically, less than half of special education and general education teachers reported receiving training in communicating and collaborating with parents on homework involvement (Buck et al., 1996; Epstein et al., 1997).

Parents also expressed that teachers did not individualize or accommodate assignments based on their child's specific learning needs, which can result in teachers developing assignments that are developmentally inappropriate in terms of their difficulty and length of time to complete (Bryan & Burstein, 2004). One survey found that although 80% of special education teachers assigned homework, they did not accommodate

homework, provide feedback, or provide rewards for homework completion; however, it's important to note that this survey was conducted 30 years ago (Salend & Schliff, 1989).

Gaps in the Literature

Overall, there has been limited research that has examined the factors that are associated with homework involvement for parents of children with disabilities. To date, the majority of the quantitative research on children with disabilities has focused on parent involvement within the context of IEP meetings (Frew et al., 2013). The few studies that have examined homework involvement of parents of children with disabilities have been done with small samples or have been limited to one geographical location, which limits their generalizability to other groups of children (Zablotsky et al., 2012).

Furthermore, researchers have yet to examine if there are variations in homework involvement between elementary, middle, and high school parents of students with disabilities (Newman, 2005). Although findings suggest that parents become less involved as children age, parent involvement during the secondary years is particularly imperative for transition-aged youth with disabilities (Hirano et al., 2016). At both the middle and secondary levels, students have a transition plan incorporated in their IEP which specifies services related to college and career preparation, housing, and independent living skills (IDEA, 2004). Understanding the factors that motivate increased parent involvement would be informative for potentially addressing post-secondary outcomes.

Frameworks for Parent Involvement in Education

Yamaguchi et al. (2017) investigated the most influential and commonly used frameworks that were utilized by researchers between 2007-2011 in describing parent involvement. They found that out of the 153 empirical studies conducted on family-school partnerships, less than half included a theoretical framework. The studies that did utilize a framework most commonly applied the Bronfenbrenner (1974, 1986) bioecological theory, Epstein's (1987) types of family involvement, and Hoover-Dempsey and Sandler's (1995) model of parent involvement.

The Bronfenbrenner (1974, 1986) bioecological theory describes the impact that both immediate and broader environmental variables have on the development of the individual. He describes five ecological systems with the microsystem being the most immediate type of factors and the macrosystem being the broadest factors. For example, the microsystem describes the immediate environmental factors that impact children's development such as the school, and the macrosystem describes the customs, cultures, and beliefs of the society in which the child is situated (Bronfenbrenner, 1986). One challenge to Bronfenbrenner's theory is that it has been difficult for researchers to operationalize, which has resulted in inconsistencies amongst the methods used in the application of his theory (Yamaguchi et al., 2017).

Epstein's (1995) overlapping spheres of influence applies concepts from Bronfenbrenner's (1979, 1986) ecological framework to school-family partnerships, wherein there are three spheres of influence that impact a child's socialization and development: family, school, and local community. Epstein argues that educators should

actively create partnerships with children's parents and the local community to further their learning. In addition to the spheres of influence, Epstein (1987) created a conceptual framework that describes six types of family involvement: parenting, communication, volunteering, learning at home, decision making, and community collaborations. Each of these factors describes the shared responsibility between the family, school, and community towards the development of effective family-school partnerships. One advantage of this model is that researchers have been able to operationalize the constructs, which has created a useful mechanism for examining how schools can create a more welcoming environment (Yamaguchi et al., 2017) However, some scholars have argued that a limitation of Epstein's model is that it does not consider important family characteristics such as power and status (Auerbach, 2012). Another limitation is that the theory positions the school as primarily responsible for creating partnerships, which potentially removes family agency in choosing their involvement (Yamaguchi et al., 2017).

The Hoover-Dempsey and Sandler (HDS) Model for parent involvement (1995) is grounded in several psychological theories that includes Epstein's (1987, 1995) overlapping spheres of influence and typologies of parental involvement. The framework proposes several constructs for understanding the reasons parents engage in certain home and school behaviors. The model also considers how family characteristics impact involvement. This includes perceptions of time and energy and perceptions of skills and knowledge. The constructs are measurable and operationalized, which has allowed several researchers to investigate the utility of the model in predicting patterns of parent

involvement (Walker et al., 2005). Based on the comprehensiveness of the model, as well as the inclusion in the model of families' power and status, the present study has adopted aspects of the HDS model as a framework for understanding the involvement patterns of parents of children with IEPs. The following section describes the original version of the model in detail.

Hoover-Dempsey and Sandler Model

The original HDS model presented five sequential levels of psychological concepts that influence parents' motivations for involvement (Walker et al., 2005). Level 1 of the original model describes the external and personal factors that influence parents' choice to become involved in their child's education. Personal factors include the parent's belief about the role they should have in their child's learning (role construction) and that they have the ability to effectively support their child (self-efficacy). External factors include general invitations and opportunities for involvement from the school and child. Examples of general invitations include receiving notes, memos, and phone calls regarding their child's progress or general occurrences at the school. Level 2 describes the factors that influence parent's choice in involvement forms. This includes their knowledge and skills, time and energy, and specific invitations. Specific invitations involve personal contact from educational stakeholders such as the teacher or guidance counselor about their child's performance (Hoover-Dempsey & Sandler, 1997). Level 3 of the model looks at the types of strategies parents use to support their child's learning. Examples of strategies include modeling, reinforcement, and instruction (Walker et al., 2005). Level 4 describes mediating variables of involvement which include (a) parents'

use of developmentally appropriate strategies and (b) match between their involvement and the school's expectations. Finally, Level 5 describes student outcomes as a result of their parents' involvement. By becoming more involved, parents can potentially increase their child's knowledge and efficacy in school (Hoover-Dempsey & Sandler, 1997). The authors subsequently reorganized some of the constructs in the first two levels in Walker's et al. (2005) revision of the HDS model.

Revision of the Model. Walker et al. (2005) operationalized and empirically evaluated constructs from the first two levels of the original HDS model. The constructs were restructured so that Level 1 of the model incorporated parents' motivational beliefs, parent perceptions of invitations for involvement, and parents' perceived life context.

Parent Self-Efficacy and Parental Role Construction are two constructs that measure Parents Motivational Beliefs. Based on self-efficacy theory (Bandura 1986), the construct of parents' self-efficacy describes the belief that parents' involvement will lead to their children's positive learning outcomes. Role construction describes the parent's beliefs about what they should do in relation to their child's education. There are three types of role constructions: parent, school, and partnership focused. A parent-focused role construction describes the belief that the parent is ultimately responsible for the child's education. A school-focused role construction describes the belief that the school is responsible for the child's education. A partnership-focused role construction describes the parent's belief that both parents and schools are conjointly responsible for the child's education (Hoover-Dempsey & Sandler, 1997; Walker et al., 2005).

Perceptions of invitations for involvement describes when the parent believes that involvement is requested and welcomed by the child, the child's teacher, and the child's school. Parents may become involved because they perceive that their child needs their help in order to be successful. There are general invitations in which the child's attributes (e.g., age) or behaviors (e.g., trouble with homework) causes a parent to perceive that they need more support (Walker et al., 2005). Specific child invitations refer to instances when the child requests their parents' involvement (e.g., the child asks for homework help). Parents also become involved when they perceive that the child's school views their involvement as helpful and important for student learning. General school invitations include communications regarding school activities that are relevant to the child and information on their child's progress. Specific invitations occur when teacher or other personnel engage in actions that encourage parental involvement. Examples of this include inviting parents to help in the classroom, creating homework that requires parental assistance, or making direct contact about their child's progress (Walker et al., 2005).

Parents' perceived life context is the construct that considers how parents' choice of involvement may be influenced by their perception of their available time and energy and skills and knowledge. For example, factors that may impact time and energy include having large amount of work demands and an inflexible schedule, which could severely limit involvement. Factors that could impact skills and knowledge include parents' highest completed level of education. This is especially important as the child ages since

homework becomes more challenging and nuanced as children enter upper grade levels (Walker et al., 2005).

Purpose

Students with disabilities have been shown to experience greater challenges with homework and demonstrate worse post-school outcomes as compared to non-disabled peers (Gajria & Salend, 1995; 2005). While parents' involvement in homework is related to positive educational outcomes for children with disabilities (Newman, 2005), little research has examined the factors that are associated with higher levels of homework involvement with this population (Frew et al., 2013). Research with general education populations has shown that parents' race, income, and education are important factors of parents' educational involvement (Castro et al., 2004; Park & Holloway, 2013; Weiss et al., 2003). Furthermore, studies have found that parents' homework involvement is associated with specific child characteristics such as gender, grade level, and cognitive and behavioral functioning (Spann, Kohler, & Soenksen, 2003; Wagner et al., 2012). In addition to the importance of parent and child characteristics, the HDS model of parent involvement hypothesizes that school outreach and parents' beliefs about their roles and capabilities are important predictors of parent involvement.

Thus, in considering both the HDS model and previous findings of factors that are important for parents' educational involvement, the purpose of this study is to investigate the extent to which parent and child characteristics, school outreach, parent satisfaction, and parents' expectations are predictive of the homework involvement patterns of parents of children with IEPs. In line with previous research, I hypothesize that parents who have

higher incomes and more education will demonstrate higher homework involvement. I also hypothesize that parents will be more involved when the child is younger, has lower behavioral problems, and does well in school. Finally, I hypothesize that parents of children with IEPs perceptions that their school demonstrates high levels of outreach, are satisfied with the school and IEP services, and have higher expectations for their child's future will be associated with higher homework involvement.

Research Questions

Research Question 1: What are the significant predictors of homework involvement for parents at the K-12 level and are there differences in parents' homework involvement based on their child's IEP status?

Research Question 2: To what extent do parent characteristics (race, income, and education) and child characteristics (gender, grade level, performance, and behavior), together with parents' perceptions of school outreach, parents' satisfaction with the school and IEP services, and parents' expectations for their child's future predict homework involvement.

Research Question 3: Does a child's IEP status moderate the relationship between school outreach, parent satisfaction, and parents' expectations to homework involvement?

Method

Data

This study utilized data from the Parent and Family Involvement in Education Survey of the 2016 National Household Education Surveys Program (PFI; U.S.

Department of Education, National Center for Education Statistics 2016). The survey's sample was developed using household address information and questionnaires in English and Spanish were delivered through the mail. The PFI survey focused on households with school-aged children enrolled in K-12 public or private schools and children who were homeschooled. A total of 14,075 participants completed the 2016 PFI survey.

Data collection involved two-phase stratified sampling. In the first sampling phase residential addresses throughout the 50 states were randomly mailed a short screener that was used to determine eligibility. In the second phase, families that qualified in the initial screener were sent one of the topical surveys which included the PFI. The PFI included two surveys: a PFI-Enrolled questionnaire and a PFI-Homeschooled questionnaire. This study only included responses from the PFI-Enrolled questionnaire. The PFI-Enrolled questionnaire included 239 questions that covered the following topics: child characteristics, parent and guardian characteristics, household characteristics, school preference, involvement at school, the child's grades and behavior, satisfaction with the school, involvement at home, and factors that impact involvement.

The median item response rate for the PFI-Enrolled questionnaire was 96.8% and none of the item response rates were below 70.0%. Items with missing data was imputed using one of four methods: 1) logic-based imputation 2) unweighted sequential hot deck imputation 3) weighted random imputation and 4) manual imputation (NCES, 2018). The data gathered included both an unweighted rate and weighted rate. The unweighted rate was calculated using the raw number of responses and the weighted rate was calculated

by summing the numerator and denominator of the reciprocals of the probability of an individual selecting certain response units. This study used the unweighted rate responses rather than the weighted, thereby restricting conclusions from this study to those regarding this specific sample rather than one that is nationally-representative.

For the current analysis, I included participants whose children were enrolled in a public K-12 school for a total of 11,941 parents. The total number of parents with children with IEPs in this sample was 1,296 and the total number of parents of children without IEPs was 10,645. Table 1 shows the demographic characteristics of the parent sample used in this study.

Measures

Homework Involvement. The dependent measure, homework involvement, was based on two items. Parents were asked to rate the number of days per week a person within the household helped their child with their homework. The responses ranged from *less than once a week* to *five or more days a week* (FHHELP). Parents also rated how often they checked for homework completion (FHCHECKX). Responses for this item ranged from *never* to *always*.

Parent Characteristics. For each regression model, whether the parents indicated that their child has an IEP (HDIEPX) was included. This variable was measured on a dichotomous scale with one indicating that the child has an IEP and zero indicating that the child does not have an IEP. Additionally, three demographic characteristics were included based on prior research indicating that race, income, and education are important factors that impact parent involvement (Frew et al., 2012). Categories for race

included White, Black, and Latino that were dummy coded, with White parents serving as the reference group (P1WHITE, P1BLACK, P1HISPAN). The total income variable (TTLHHINC) ranged from 1 to 10. A score of one indicated that total household income ranged from \$0 to \$10,000. A score of 10 indicated that total income was \$150,001 or more. Parent's highest education (P1EDUC) was assessed on an 11-point ordinal scale which ranged from parents' completing Grade 8 to a PhD degree. For the regression analysis, income and highest level of education were treated as continuous variables.

Child Characteristics. Four child characteristics were included in the model based on prior research indicating that gender, grade level, behavior, and child's performance are significant predictors of parents' general involvement in their child's learning. The child's sex (CSEX) was a dichotomous variable that was dummy coded with males serving as the reference group. Child's grade level (GRADE) ranged on scale of a 2 to 15, with 2 representing full-time kindergarten and 15 representing twelfth grade. Child behavior was based on whether the child had ever received a suspension (SESUSOUT). This was a dichotomous variable with one indicating that the child had received a suspension and zero indicating that the child had never received a suspension. Children's grades (SEGRADES) were assessed on a 4-point ordinal scale ranging from *mostly D's or lower to mostly A's*.

School Outreach. School outreach was based on four items that asked parents how they perceived their child's school communicated on different indicators. The first indicator asked how well the school did in letting them know how their child is doing in school between report cards (FSSPPERF). The second question asked how well the

child's school does on providing information on how to help their child with homework (FSSPHW). The third question asked parents to rate how well they believed their child's school informed them of their child's placement in groups or classes (FSSPCOUR). The fourth question asked whether the school provided information on the parents' expected role (FSSPROLE).

Satisfaction with the Child's Schools. This variable was based on five questions that asked parents to rate their level of satisfaction on a scale from 1 to 4, with 1 being *very satisfied* and 4 being *very dissatisfied*. These measures were recoded so that 4 would represent higher satisfaction and 1 would represent lower satisfaction. The first question asks how satisfied or dissatisfied parents are with the school their child attends. The second question asks how satisfied or dissatisfied parents are with the teachers their child currently had. The third question asked how satisfied or dissatisfied parents are with the academic standards of the school. The fourth question asked how satisfied or dissatisfied parents with the order and discipline at their child's school (FCORDER). The fifth question asked how satisfied or dissatisfied with the way that school staff interacts with parents (FCSUPPRT).

Satisfaction with IEP services. This variable was based on four questions that asked parents to rate on a scale from 1 to 5, with 1 being *very satisfied* and 5 being *does not apply*. These measures were re-coded so that 4 reflected *very satisfied* and 0 reflected *does not apply*. The first question asked how satisfied or dissatisfied parents were with their service provider's communication (HDCOMMUX). The second question asked how satisfied or dissatisfied parents were with their child's IEP teacher (HDTCHR). The

third question asked parents to rate how satisfied or dissatisfied parents were with the service provider's ability to accommodate their child with special needs (HDACCOMX). The fourth question asked how satisfied parents were with the school's commitment to help their child learn (HDCOMMITX).

Parents' Expectations. Parents' expectations for their child's future were entered last into the model along with interaction effects. This variable (SEFUTUREX) was assessed on a 6-point scale that ranged from *completing less than a high school diploma to earn a graduate degree or a professional degree.*

Analyses

Exploratory Factor Analysis (EFA) is a statistical technique to examine the correlations among a group of variables and extract factors that best capture the most common variance among the input variables (Stanton, 2017). These factors are hypothetical constructs that represent a group of variables (Young & Pierce, 2013). For example, scores on the PFI survey about parents' satisfaction with their child's teacher, services, and classes can be placed under a factor called *parent satisfaction*. This study incorporates EFA for the purpose of data reduction so that variables included in the PFI survey can be regrouped into a limited set of clusters based on their shared variance. Specifically, EFA will be used to create factor scores for the dependent variable (homework involvement) and the independent variables (school outreach, parent satisfaction, and IEP satisfaction).

EFA is rooted in regression and partial correlation theory. The hypothesis of EFA is that there are m common latent factors within a dataset and the objective is to extract

the smallest number of factors that account for correlations among the variables (Young & Pierce, 2013). The computation of EFA is based on matrix algebra in which a correlation or covariance matrix and a diagonal matrix is calculated to determine the commonalities and unique variances among the variables. Communalities describes the proportion of variance of a particular item that is shared with other items. Unique variance is the item's total variance minus the communality. Unique variance captures both the variable's specific variance and error variance. Higher communalities and lower levels of unique variance are desirable in EFA.

The equation below shows the computation for determining which variables have a linear relationship with a specific factor. The left side of the equation shows the steps for calculating the common variance, which is computed when a correlation matrix ($R_{m \times m}$) is subtracted by a diagonal matrix ($U_{m \times m}^2$) (unique variance of each variable). After the correlation matrix has been calculated, the factor loadings (similar to correlation coefficients) are analyzed to determine which items load onto which factors.

$$R_{m \times m} - U_{m \times m}^2 = F_{m \times p} F'_{p \times m}$$

The right side of the equation ($F_{m \times p} F'_{p \times m}$) represents the common factor loadings, which are calculated through the eigenvalues and eigenvectors of the matrix. The eigenvalues represent condensed variance in a correlation matrix. Large eigenvalues represent factors with the most variance and small eigenvalues represent factors with small variance. The eigenvalues can be used to determine the optimal number of factors to extract. Once the factors have been extracted there should be an absence of partial correlations between the variables in different factors. A goal of EFA is to ensure that each factor is composed of a distinct set of interrelated variables.

Assumptions Testing. Prior to conducting an EFA, assumptions should be tested to determine the adequacy of the data for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy determines the proportion of variance among the items that may be caused by underlying factors. A KMO value closer to 1.0 indicates that a factor analysis is useful for the data. If the value is less than 0.5 then the factor analysis may not be an appropriate method of analysis. Additionally, Bartlett's test of sphericity is an important indicator of whether the variables within the correlation matrix are related and suitable for EFA. Statistically significant values ($p < 0.05$) indicate that an EFA is appropriate for the data.

Factor Loadings. Factor loadings are similar to weights in multiple regression in that a higher number shows a larger strength between the variable and the factor. In EFA, an objective is to have little to no partial correlations or cross loadings between factors so that each factor is accurately defining a distinct cluster of correlated variables. Generally, cross loading occurs when a variable has a loading of .32 or higher on more than one factor (Young & Pierce, 2013). Variables with cross loadings can either be dropped if the interpretation is too difficult or can be included with the assumption that "it is the latent nature of the variable" (Young & Pierce, 2013, p. 84). The significance of factor loadings can be determined in relation to sample size. Since this study incorporates a large sample size ($n = 11,000$), smaller loadings can be considered significant (Young & Pierce, 2013).

Number of Factors to Retain. Eigenvalues and Cattell scree plots are common methods to determine how many factors to retain. This study uses Kaiser's criterion, which states that eigenvalues above 1 should be retained (Young & Pierce, 2013). The

scree plot shows the amount of variance that each component captures from the data. The scree plot includes eigenvalues on the y-axis and components on the x-axis. On the scree plot, the number of factors to retain can be determined by looking at the data points above the point of inflection, which is any of the data points that are shown above the curve before the line flattens out to the right (Young & Pierce, 2013). The number of factors to extract should be based on both the theoretical factor structure and the number of factors predicted by the scree test. Additionally, it is not recommended for factors to be retained if the factor has less than three items, has several cross loadings, and includes variables with less than .32 loadings (Young & Pierce, 2013).

Rotation. The purpose of rotation is to simplify the model structure by having each variable load onto as few factors as possible. For example, variables related to school outreach should have a high number of loadings onto one factor and have little to no correlation with variables that load onto parents' satisfaction with IEP services. Varimax rotation is a type of orthogonal rotation, which rotates factors 90 degrees away from each other. The Varimax technique further reduces variables with small loadings and minimizes the number of variables that have high loadings on each factor (Young & Pierce, 2013).

Composites versus Factor Scores. After the EFA is conducted, new variables that represent the hypothetical constructs can be created through composites or factor scores. Composite variables are better to use when the items have similar loadings onto the factors. Typically, composites are calculated by taking the mean of the set of items, which gives each input variable equal weight in the composites (Stanton, 2017). Factor

scores are standardized values that provide an estimate of a score that an individual would receive on a given factor. Unlike composites, the items are given different weights based on how correlated the item was to the solution and has been rotated so that there is as little cross-loading between factors as possible. Factor scores can be treated as variables for a statistical analysis (Young & Pierce, 2013). The advantage of using composite variables over factor scores is that generalizes best to new samples. This is particularly useful if a researcher plans to create a composite scale to use across multiple projects (Stanton, 2017). Since this study is using secondary analysis, factor scores will be used to more accurately capture the variance each variable uniquely contributed to the factors.

Reliability. The reliability of the factor score composites will be assessed using Cronbach's alpha reliability, which is the most common method to measure the internal consistency of a multi-item scale. Cronbach's alpha assesses the extent to which a group of variables correlate with the composite. The measure is on a scale of 0.0 to 1.0, with values closer to 1.0 indicating higher reliabilities. Generally, in social science research an alpha value of 0.70 is the minimum reliability for any multi-scale variable and 0.80 is the ideal minimum reliability (Stanton, 2017).

Psych Package in R. EFA was calculated in R using the "fa" function in the psych package. This function can use five different methods for calculating the EFA: minimum residuals, principal axis factor analysis, weighted least squares factor analysis, generalized least squares factor analysis, and maximum likelihood factor analysis. For this study, minimum residual (minres) factor analysis was selected because it is one of

the best non-parametric factoring methods and produces results that is closest to maximum likelihood factor analysis (Revelle, 2019). Minres uses ordinary least squares to minimize the diagonal correlation matrix (unique variance of the variables) by adjusting the eigenvalues of the original correlation matrix (Zegers & ted Berge, 1983). Factor scores were calculated using regression based on the structure matrix, which is the default calculation method of the “fa” function in the psych package.

Hierarchical Linear Regression. Hierarchical linear regression (HLR) is a model comparison method in which several regression models are built by adding variables to each subsequent model. Models are then compared to see if newly added variables explain a statistically significant amount of the variance (R^2) in the dependent variable. Typically, demographic variables are entered into the model first and are then followed by variables that research has shown to be predictive. After research-based predictors have been entered, new variables are added to determine if they show a significant improvement in R^2 .

In HLR a linear equation is used to relate a set of regressors (independent variables) to a criterion (dependent variables).

$$Y_i = \beta_0 + \beta_1 X_{1i} + \dots + \beta_k X_{ki} + \varepsilon_i$$

β_0 represents the intercept and the grand mean on the outcome variable when the regressor variables are 0 (Field, Miles, & Field, 2012). $\beta_1 X_{1i}$ represents the regression coefficient, which is the extent to which X_{1i} and Y_i are linearly related when all other regressors in the model are held constant. In multiple regression, the omnibus effect size is the squared multiple correlation coefficient (R^2), which is a measure of the proportion of variance in the dependent variable that is accounted by the regressor variables. In this

study regression coefficients will be provided in both unstandardized and standardized forms. Standardized regression coefficients place the variables on similar scales, which can be used to compare the magnitude of effects of the regressors on the dependent variable. Error is represented by the symbol (ε_i).

Assumptions. The main assumption of multiple regression is that the relationship between the dependent variable and the independent variables are linear. To test the accuracy of the HLR, the model will be tested to see if the data meets the assumption of independence, normality, and homogeneity of variance. Independence describes the assumption that data taken from participants are independent and that the response of one participant does not influence responses from other participants. Normality describes the assumption that the errors in the model follow a normal distribution. Homogeneity of variance describes the assumption that the variance of errors is homogeneous across all values of the regressors. In addition to testing these assumptions, influential outliers will be examined using Cook's distance. Observations that are higher than 1.0 are generally considered to be influential (Field, Miles, & Field, 2012).

Descriptive Statistics. After the assumptions for linear regression have been assessed, two-sample *t*-tests will be used to determine if the differences in means between parents of children with IEPs and parents of children without IEPs are statistically significantly different: specifically, the mean differences in the constructs of homework involvement, school satisfaction, school outreach, and parent's expectations for their child's future. Correlations between the dependent and independent variables will be

assessed using Pearson's and Spearman's correlation coefficients. Pearson's correlation coefficient is scaled number between -1.0 and 1.0 that describes the extent to which two variables are linearly related (Stanton, 2017). Positive and negative values indicate the direction of the relationship of the variables with one another, and values closer to 1.0 indicate that the variable has strong association with another variable. Spearman's correlation provides a similar measurement as Pearson's correlation except that it assumes that variables are categorical rather than continuous (Field, Miles, & Field, 2012). Both of these methods will be used to determine the strength of associations between the independent variables with homework involvement.

Models. While the Hoover-Dempsey model informs aspects of the variables included in this study, the variables that can be included are limited by what is available in the dataset. Relevant HDS variables that will be included in the model are invitations from the child's school and knowledge as measured by parents' education attainment level. Constructs that are not available in the dataset include parent's motivational beliefs and role construction. The measure, parent's expectations for their child's future, will be used as a substitute for role construction.

For this study, the first model of the HLR will include child has an IEP and demographic information such as parent's race, education, and income. The second model will include all the variables of the previous model along with child characteristics such as gender, grade level, performance in school (as measured by grades received on report card), and behavior (measured by suspensions). The third model will include all

the variables of the previous model along with school outreach, parents' satisfaction with their child's school, and parents' satisfaction with their child's IEP services. The fourth model will include all the variables of the previous model along with parent's expectations for their child's future and interaction effects. Specifically, interactions between a child's IEP status with parent, child, and school variables will be tested and significant interactions at the $p < 0.05$ level will be retained.

The statistical significance of each model will be compared using analysis of variance (ANOVA). ANOVA can be used to compare the fit of the models and see if the change in variance (R^2) is significantly higher. The change in R^2 is assessed using the p -values of the F-ratio, in which values less than 0.05 indicate a statistically significant change in R^2 (Field, Miles, & Field, 2012).

Psych Package in R. The HLR analysis will be conducted using the `lm` function within the `psych` package in R. The `lm` function can be used to fit linear models and carry out a regression. Within `lm` the typical model is listed as `response~terms`, in which homework involvement would be entered in as the response and the terms would include the independent variables (Zegers & ted Berge, 1983).

Results

Exploratory Factor Analysis

For the independent variables, a total of 13 items from the School Outreach, Satisfaction with Child's School, and Satisfaction with IEP services were assessed. The 13 variables were subjected to factor analysis using minimum residuals (minres) factoring and orthogonal varimax rotation. All of the Kaiser-Meyer-Olkin (KMO) values

for the individual items (> 0.90) were well above .5 and the overall KMO measure was 0.90 indicating the data were sufficient for EFA. The results of Bartlett's test of sphericity ($\chi^2(78) = 1226.813, p < 0.001$) showed that there were patterned relationships between the items. Using an eigenvalue cut-off of 1.0, there were 3 factors that explain a cumulative variance of 72%. The scree plot in Figure 1 shows that the first three components capture most of the variance. Therefore, three factors were determined to be acceptable to extract from the data. Table 2 in Appendix B shows the factor loadings after rotation using a significant factor criterion of .30. Generally, cross-loadings that are lower than an absolute value of 0.35 can be disregarded (Stanton, 2017). Therefore, the cross-loadings on the items FSSPHW were disregarded. However, the items FSSPERF and FCSUPPRT have a cross-loading above 0.35 with school satisfaction and school outreach. Factor scores were calculated for the three independent variables and the outcome variable. Table 4 in Appendix B shows the mean, standard deviation, skew, and kurtosis of the three factor scores for the independent variables. The Cronbach alpha values for school satisfaction (0.91), school outreach (0.84), and IEP satisfaction (0.87) are above the 0.7 threshold which indicates acceptable reliability.

For the dependent variable, a total of 2 items from the Homework involvement questionnaire were assessed. The results of Bartlett's test of sphericity ($\chi^2(1) = 47.04, p < 0.001$) showed that there were patterned relationships between the items. Generally, it is recommended that a factor contains a minimum of 3 variables. For rotated factors that have 2 variables or less, sources suggest that it can only be considered reliable if there is a high correlation ($r > .70$), otherwise these factors should be

interpreted with caution (Young & Pierce, 2013). Table 3 shows that the standardized loadings for the outcome variable inputs was 0.79 which suggests reasonable factorability. The eigenvalue was 1.62 and 81% of the variance was accounted for. Table 5 shows the mean, standard deviation, skew, and kurtosis of the homework involvement factor score. The Cronbach alpha was 0.76, which is an acceptable level of reliability.

Assumptions

Independence of Errors. In linear regression, the assumption of independence is that for any “two observations the residual terms should be uncorrelated” (Field, Miles, & Field, 2012, p. 272). The assumption of independence was assessed using the Durbin-Watson test, which is used to determine if there are serial correlations between errors. The closer to 2.0 the Durbin Watson value is, the more likely that the residual terms are uncorrelated and are independent (Field, Miles, & Field, 2012). A value that is greater than 2.0 can indicate that there is a negative correlation and a value less than 2.0 indicates a positive correlation. For the model, the statistic of the Durbin-Watson test ($dw = 2.03$, $p = 0.97$) had a value close to 2.0 which indicates that the residual terms are independent. Furthermore, the p-value of 0.97 is not statistically significant, which also suggests that the assumption of independence of errors is met.

Normality. The assumption of normality assesses if the residuals are normally distributed with a mean of zero (Field, Miles, & Field, 2012). This assumption was tested through a Normal Q-Q plot which is shown in Figure 2. The points should form a line that is roughly straight on the diagonal. The plot in Figure 2 shows that the data are skewed, which indicates that the assumption of normality has been violated. To reduce

skewed data that includes negative values, sources recommended to use a cube root transformation (Hoaglin & Tukey, 2000).

The cube root transformation ($x * x^{1/3}$) is a robust transformation that can be applied to datasets that include zero and negative values and reduces right skewness. Figure 3 shows the normal Q-Q plot with the cube root transformation. When compared to Figure 2 the right skew has been reduced and the points form a line that is roughly straight along the diagonal. The outcome variable with the cube root transformation was retained for the regression analysis.

Homogeneity of Variance. Homogeneity of variance in linear regression assumes that the variance of errors is constant (homoscedastic). Error refers to how far a point deviates from the regression line. In other words, the variance of the outcome variable should be the same in each level of the predictor variable. For this assumption to be met, there must be no unequal variability of standard errors (heteroscedasticity; Field, Miles, & Field, 2012). The violation of this assumption is a concern in that heteroscedasticity suggests that the variance and standard errors of the coefficients can be above or below the true population variance (Field, Miles, & Field, 2012).

This assumption was tested visually through a plot of fitted values against residuals shown on Figure 4. For the assumption to be met, the plot should have a random array of points that are evenly dispersed around zero. In the plot of Figure 4 below, the residuals form both a heteroskedastic and curvilinear pattern, which suggests that there is an increasing variance across the residuals and that the assumption of linearity is violated.

The Sandwich Variance Estimator for Linear Regression. When the assumption of homoscedasticity of variance (constant error variance) is violated, sandwich estimators of coefficient standard errors can be used. This method addresses the assumption that residual errors have constant variance by replacing the coefficient standard errors with consistent standard errors (Fox & Weisberg, 2011). The method was originally developed by Huber (1967) and White (1982) to develop asymptotically consistent covariance matrix estimates (Carroll et al. 1998). For this dataset, these estimates were calculated in R using a combined method of White (1980) proposed diagonal matrix with Long and Ervin (2000)'s modified version called HC3 (Fox & Weisberg, 2011).

The sandwich package in R was used to calculate the sandwich estimators of coefficient standard errors for Model 4 of the HLR. Table 6 shows the sandwich standard errors, confidence intervals, and p-values of the R output. The sandwich standard errors for each of the regression coefficients showed similar variability as the estimates calculated in the linear regression model. For example, the standard error from the lm function shown in Table 10 for the variable IEP was 0.51, with a 95% confidence interval of 0.55 to 2.56. After calculating the sandwich estimates of coefficient standard errors, the standard error for the variable IEP was 0.53, with a 95% confidence interval of 0.52 to 2.69. The variables that were statistically significant in Table 6 were the exact same as the variables that were statistically significant in model 4 of Table 10.

Influential Cases. Influential outliers were assessed using Cook's Distance, which is a method used to identify points that can negatively affect the regression model.

The measurement combines each variable leverage with the residual values (Fox & Weisberg, 2011). Figure 5 shows the cook's distance plot where there are three outliers in the dataset (94, 1311, and 10988). Generally, any Cook's distance values that are above 1.0 indicates that it is an influential outlier. In this case, all of the outliers are below 1.0 which indicates that the outliers are not a likely concern for the model (Field, Miles, & Field, 2012).

Descriptive Analysis

Table 7 presents the mean differences between parents of children with IEPs and parents of children without IEPs on 5 indicators. The statistical significance of mean differences was tested using an unpaired two-samples t-test. The mean differences in homework involvement of parents of children with IEPs ($M = -0.01$) and parents of children without IEPs ($M = 0.00$) was not statistically significant. Parents of children with IEPs had statistically significant lower satisfaction with their child's school ($M = -0.14$) than parents of children without IEPs ($M = 0.02$), $t=4.91$, $p<0.001$. Parents of children with IEPs had statistically significant lower expectations for their child's future ($M = 4.05$) than parents of children without IEPs ($M = 5.01$), $t=22.26$, $p<0.001$. Parents of children with IEPs reported statistically significant higher communication from their child's school ($M = 0.07$) than parents of children without IEPs ($M = -0.01$), $t=-3.46$, $p<0.001$.

Table 8 presents Spearman's correlations between 14 dependent categorical variables to the independent variable. Spearman's correlation is a nonparametric version of the Pearson correlation coefficient that measures the degree of correlation between two

variables on their rank (Field, Miles, & Field, 2012). The correlations between the dependent variables with homework involvement are largely small. Child's grade level has the strongest association with homework involvement ($r = -0.56$), which indicates that parents are generally less involved with their child's homework when they are in upper grade levels. Parents' education level ($r = 0.33$) and child's grades ($r = 0.50$) had the strongest associations with parents' expectations of their child's future. If the child received a suspension ($r = -0.21$) than parents generally expressed lower expectations for their child's future. Multiple Comparisons were corrected using Bonferroni's test, which is presented in Table 12.

Table 9 presents Pearson's correlations between 5 dependent continuous variables to the independent variable. All the dependent variables had small associations with the independent variable. School outreach ($r = 0.23, p < 0.001$) has a positive association with homework involvement, indicating that parents have higher homework involvement when they perceived their child's school had good communication.

Predictors of Parent Involvement

A hierarchical linear regression (HLR) analysis was conducted to examine the relationships between parent characteristics, child characteristics, school outreach, and parent's expectations to homework involvement.

Model 1. For the first block analysis, the predictor variables IEP, Black, Hispanic, Income, and Education was analyzed. The results of the first block HLR analysis revealed the model to be statistically significant $F(5, 11935)=30.37, p < 0.001$. The R^2 value indicates that 1.26% of the variance in parents' homework involvement is explained

by Model 1, which indicates that 98.74% of the variation in homework involvement cannot be explained by model 1 alone. The formula of the standardized slope coefficients is shown below:

$$y=0.00+0.03(\text{IEP})+0.05(\text{Black})+0.06(\text{Hispanic})-0.08(\text{Income})+ 0.07(\text{Education})$$

The variables IEP, Black, Hispanic, Income, and Education were all statistically significant. The variables IEP, Black, and Hispanic were entered as dummy coded variables. Since the standardized beta value of IEP ($\beta=0.03, p<0.01$) was statistically significant, the model indicates that the mean of homework involvement in the group coded as 1 is significantly different from the referent group, which was coded as 0. The positive value indicates that the change in homework involvement increases when a parent indicates that they have a child with an IEP as opposed to a child without an IEP. The standardized slope coefficient ($\beta=0.05, p<0.001$) represents the increase in homework involvement of a Black parent as compared to a White parent, while holding all other variables constant. The standardized slope coefficient ($\beta=0.06, p<0.001$) represents the increase in homework involvement of a Hispanic parent as compared to a White parent, while holding all other variables constant. The standardized slope coefficient ($\beta=-0.08, p<0.001$) indicates that homework involvement decreases by -0.08 for every one-unit increase in income while holding all other variables constant. This indicates that as parents income increases their homework involvement decreases. The standardized slope coefficient ($\beta=0.07, p<0.001$) indicates that homework involvement increases by 0.07 for every one-unit increase in the variable education while holding all

other variables constant. This indicates that parents with higher levels of education has higher homework involvement. Within this model, parents income and education were the most influential predictors of homework involvement.

Model 2. For the second block analysis, the variables child's grade levels, sex, suspension, and child's performance in school were added to the analysis. The results of the second block hierarchical linear regression analysis was a statistically significant model, $F(9, 11931)=621.4, p<0.001$. The R^2 value indicates that 31.92% of the variance in parents' homework involvement is explained by model 2. The change in the R^2 value shows that 30.66% more of the variance in was explained by the addition of the variables in model 2. The linear formula of model 2 with the standardized slope coefficients are shown below:

$$y=0.00+0.02 (\text{IEP})+0.06 (\text{Black})+0.05(\text{Hispanic})-0.04(\text{income})+0.03(\text{education})-0.55(\text{Grade})-0.01 (\text{Female})-0.03(\text{Suspension})-0.01(\text{child's performance})$$

The variables IEP, Black, Hispanic, income, education, grade, and suspension were statistically significant, while the variables female and child's performance were not statistically significant. The standardized slope coefficient ($\beta=0.02, p<0.05$) represents the increase in homework involvement if a parent has a child with an IEP as compared to parent without a child with an IEP, while holding all other variables constant. The standardized slope coefficient ($\beta=0.06, p<0.001$) represents the increase in homework involvement if a parent is Black as compared to a parent that is White, while holding all other variables constant. The standardized slope coefficient ($\beta=0.05, p<0.001$) represents

the increase in homework involvement of a Hispanic parent as compared to a White parent, while holding all other variables constant. The standardized slope coefficient ($\beta=-0.04, p<0.001$) indicates that homework involvement decreases by -0.04 for every one-unit increase in income while holding all other variables constant. The standardized slope coefficient ($\beta=0.03, p<0.001$) indicates that homework involvement increases by 0.03 for every one-unit increase in the variable education while holding all other variables constant. The standardized slope coefficient ($\beta=-0.55, p<0.01$) indicates that homework involvement decreases -0.55 for every one-unit increase in grade level while holding all other variables constant. The standardized slope coefficient ($\beta=-0.03, p<0.01$) represents the decrease in homework involvement when a parent has a child that has received a suspension as opposed to a child who has not received a suspension. Within this model, the child's grade level was the most influential predictor of homework involvement. This shows that as children enter upper level grades, parents are less likely to be involved in their homework.

Model 3. For the third block analysis, the predictor variables school outreach, IEP satisfaction, and school satisfaction were added to the analysis. The results of the third HLR analysis revealed a model to be statistically significant, $F(12, 11928)=486.1, p<0.001$. The R^2 value indicates that 32.84% of the variance in parents' homework involvement is explained by model 3. The change in the R^2 value shows that 0.92% more of the variance in was explained by the addition of the variables in model 3. The linear formula of model 3 with the standardized slope coefficients are shown below:

$$Y=0.00+0.02(\text{IEP})+0.06(\text{Black})+0.05(\text{Hispanic})-0.04(\text{income})+0.03(\text{Education})-0.53(\text{Grade})-0.01(\text{Female})-0.03(\text{suspension})-0.02(\text{child's performance})+0.10(\text{school outreach})-0.01(\text{IEP satisfaction})-0.00(\text{school satisfaction})$$

The variables Black, Hispanic, income, education, grade, suspension, child's performance, and school outreach were statistically significant predictors, whereas the variables IEP, female, IEP satisfaction, and satisfaction were not statistically significant predictors. The standardized slope coefficient ($\beta=0.06, p<0.001$) represents the increase in homework involvement if a parent is Black as compared to a parent that is White, while holding all other variables constant. The standardized slope coefficient ($\beta=0.05, p<0.001$) represents the increase in homework involvement of a Hispanic parent as compared to a White parent, while holding all other variables constant. The standardized slope coefficient ($\beta=-0.04, p<0.001$) indicates that homework involvement decreases by -0.04 for every one-unit increase in income while holding all other variables constant. The standardized slope coefficient ($\beta=0.03, p<0.001$) indicates that homework involvement increases by 0.03 for every one-unit increase in the variable education while holding all other variables constant. The standardized slope coefficient ($\beta=-0.03, p<0.01$) represents the decrease in homework involvement when a parent has a child that has received a suspension as opposed to a child who has not received a suspension. The standardized slope coefficient ($\beta=-0.02, p<0.001$) indicates that homework involvement decreases by -0.02 for every one-unit increase in child's performance while holding all other variables constant. The standardized slope coefficient ($\beta=-0.53, p<0.01$) indicates that homework involvement decreases -0.55 for every one-unit increase in grade level while holding all other variables constant. The standardized slope coefficient ($\beta=0.10,$

$p < 0.01$) indicates that homework involvement increases 0.10 for every one-unit increase in school outreach while holding all other variables constant. Within this model, the child's grade level and school outreach were the most influential predictors of homework involvement.

Model 4. For the fourth block analysis, the predictor variable parent's expectations and the interaction effects between IEP and grade, IEP and school outreach, IEP and iep satisfaction, and IEP and parent's expectations were added to the analysis. The results of the fourth block HLR analysis reveal the model to be statistically significant, $F(17, 11923) = 352.5, p < 0.01$. The R^2 value indicates that 33.45% of the variance in parents' homework involvement is explained by model 3. The change in the R^2 value shows that 0.61% more of the variance was explained by the addition of the variables in model 4. The linear formula of model 4 with the standardized slope coefficients are shown below:

$$y = 0.00 + 0.57(\text{IEP}) + 0.05(\text{Black}) + 0.04(\text{Hispanic}) - 0.04(\text{income}) + 0.02(\text{education}) - 0.53(\text{grade}) - 0.01(\text{female}) - 0.03(\text{suspension}) - 0.05(\text{child's performance}) - 0.20(\text{school outreach}) - 7.63(\text{iep satisfaction}) - 0.03(\text{school satisfaction}) + 0.04(\text{parent's expectations}) + 0.10(\text{IEP*Grade}) + 0.10(\text{IEP*School Outreach}) + 6.91(\text{IEP*IEP satisfaction}) + 0.12(\text{IEP*Parent's expectations})$$

In the final model the variables IEP, Black, Hispanic, income, grade, suspension, child's performance, school outreach, IEP satisfaction, satisfaction, and parent expectations were statistically significant. The variables parent's education and female were not statistically significant. The interaction terms for IEP and Grade, IEP and School Outreach, IEP and IEP satisfaction, and IEP and parent's expectations were all statistically significant. There was a significant interaction between the child's grade level and a parent of a student

with an IEP ($\beta=0.10, p<0.01$). This standardized coefficient ($\beta=0.10, p<0.01$) represents the change in slope of homework involvement~Grade between parents of children with IEPs and parents of children without IEPs. Figure 6 shows that a child's grade level decreases the homework involvement of both parent groups, but that grade level has a steeper slope for parents of children without IEPs as compared to children with IEPs. This result indicates that parents of children without IEPs are more unlikely to be involved in their child's homework as compared to parents of children with IEPs.

There was a significant interaction between a parent of a student with an IEP and school outreach on homework involvement ($\beta=0.10, p<0.01$). This represents the change in slope of homework involvement~school outreach between parents of children with IEPs and parents of children without IEPs. Figure 7 shows that school outreach increases the homework involvement of both parent groups, but that school outreach has a more dramatic effect (steeper slope) for parents of children without IEPs as compared to children with IEPs. Therefore, school outreach is more likely to increase the homework involvement of parents of children without IEPs as compared to parents of children with IEPs.

There was a significant interaction between a parent of a student with an IEP and IEP satisfaction on homework involvement ($\beta=6.91, p<0.001$). This represents the change in slope of homework involvement~IEP satisfaction between parents of children with IEPs and parents of children without IEPs. It is important to note that since these questions did not apply to parents of children without IEPs, all parents of children without IEPs marked 0. Figure 9 shows that IEP satisfaction has a steeper slope for

parents of children with IEPs, which indicates that IEP satisfaction is more likely to increase the homework involvement of parents of children with IEPs than parents of children without IEPs

There was a significant interaction between a parent of a student with an IEP and their expectations of their child's future on homework involvement ($\beta=0.12, p<0.001$). This represents the change in slope of homework involvement~Parent's expectations between parents of children with IEPs and parents of children without IEPs. Figure 11 shows that parent's expectations increase the homework involvement of both parent groups, but that parent's expectations has a more dramatic effect (steeper slope) for parents of children with IEPs as compared to parents of children without IEPs. Therefore, parent's expectations is more likely to increase the homework involvement of parents of children with IEPs as compared to parents of children without IEPs.

Model Comparison

Table 11 shows the results of the model comparison using Analysis of Variance. Model 1 included the variables IEP, Black, Hispanic, income, and Education. The change in the fit of model after adding the variables grade, gender, suspension, and performance in Model 2 was statistically significant $F(4, 11931)=1373.25, p<0.001$. The change in the fit of model after adding the variables school outreach, IEP satisfaction, and satisfaction in Model 3 was statistically significant $F(3, 11928)=55.46, p<0.001$. The change in the fit of model after adding the variables parent's expectations, IEPxGrade, IEPxSchool Outreach, IEPxIEP satisfaction, and IEPxParent's expectations in Model 4 was statistically significant $F(5, 11923)=21.71, p<0.001$. Overall, each model contributed

significantly to the fit of the model, with Model 2 contributing the largest change in variance.

Mean Comparisons

To understand the interaction effects further, mean differences between parents of children with IEPs and parents of children without IEPs was calculated for the variables Grade, School Outreach, IEP satisfaction, and Parent's Expectations.

Grade. At the elementary level, parents of children without IEPs have a higher level of homework involvement ($M = 0.61, N = 4062$) as compared to parents with IEPs ($M = 0.57, N = 528$). At the middle school level parents of children without IEPs have lower homework involvement ($M = -0.02, N = 2435$) as compared to parents of children with IEPs ($M = 0.07, N = 298$). At the high school level parents of children without IEPs have lower homework involvement ($M = -0.49, N = 4148$) as compared to parents of children with IEPs ($M = -0.39, N = 470$). While parent's homework involvement is generally lower as their children enter the upper grade levels, parents of children with IEPs have higher mean homework involvement of children in middle and secondary school as compared to parents of children without IEPs.

School Outreach. For easier interpretation, Figure 8 shows four interaction plots with the four questions on the PFI survey about parents' perceptions of school outreach. Each question was measured on a 4-point ordinal scale with 1 representing strongly disagree and 4 representing strongly agree. Plot A of Figure 8 shows parents beliefs of how well their child's school does providing updates on their child's progress in between report cards (FSSPPERF). Parents of children without IEPs that answered a 1 on this

measure had higher mean homework involvement ($M = -0.23, N = 730$) as compared to parents of children with IEPs ($M = -0.25, N = 66$). Parents of children without IEPs that answered a 4 on this measure had lower mean homework involvement ($M = 0.12, N = 5855$) as compared to parents of children with IEPs ($M = 0.19, N = 727$). Plot B of Figure 8 shows parents levels of agreement or disagreement with the school provision of information on how parents' can help their child with homework (FSSPHW). Parents of children without IEPs that answered a 1 on this measure had lower homework involvement ($M = -0.37, N = 1,651$) as compared to parents of children with IEPs ($M = -0.23, N = 167$). Parents of children without IEPs that answered a 4 on this measure had higher homework involvement ($M = 0.28, N = 4,057$) as compared to parents of children with IEPs ($M = 0.25, N = 515$). Plot C of Figure 8 shows parents beliefs of how well their child's school provides information on class placement (FSSPCOUR). Parents of children without IEPs that answered a 1 on this measure had lower homework involvement ($M = -0.18, N = 2,223$) as compared to parents of children with IEPs ($M = -0.01, N = 122$). Parents of children without IEPs that answered a 4 on this measure had higher homework involvement ($M = 0.20, N = 3,812$) as compared to parents of children with IEPs ($M = 0.12, N = 683$). Plot D of Figure 8 shows parents beliefs of how well their child's school provides information on their expected role (FSSPROLE). Parents of children without IEPs that answered a 1 on this measure had lower homework involvement ($M = -0.25, N = 1,444$) as compared to parents of children with IEPs ($M = -0.05, N = 126$). Parents of children without IEPs that answered a 4 on this measure had higher homework involvement ($M = 0.21, N = 4,394$) as compared to parents of children

with IEPs ($M = 0.15$, $N = 627$). Generally, these plots show that for both parent groups homework involvement was higher when they perceived that their child's school had high levels of outreach.

IEP Satisfaction. Variables that formed the IEP satisfaction composite were plotted separately and shown in Figure 10. Each variable was measured on a likert scale from 0 to 4. With 0 representing the answer "does not apply," 1 representing the answer "very dissatisfied," 2 representing "somewhat dissatisfied", 3 representing "somewhat satisfied," and 4 representing "very satisfied." Since these questions did not apply to parents of children without IEPs, all parents of children without IEPs marked 0.

Plot A shows the variable (HDCOMMUX) which asked parents to rate how satisfied or dissatisfied they were with their service provider's communication. Parents of children with IEPs that answered a 4 on this measure had a higher homework involvement ($M = 0.15$, $N = 702$) as compared to parents of children without IEPs ($M = 0.04$, $N = 10,645$). Parents of children with IEPs that answered 1 on this measure had a lower level of involvement ($M = -0.28$, $N = 15$) as compared to parents of children without IEPs ($M = 0.04$, $N = 10,645$). Plot B shows the variable (HDTCHR) which asked parents to rate how satisfied or dissatisfied they were with their child's IEP teacher. Parents of children with IEPs that answered a 4 on this measure had a higher homework involvement ($M = 0.18$, $N = 688$) as compared to parents of children without IEPs ($M = 0.04$, $N = 10,645$). Parents of children with IEPs that answered 1 on this measure had a lower level of involvement ($M = -0.08$, $N = 49$) as compared to parents of children without IEPs ($M = 0.04$, $N = 10,645$). Plot C shows the variable HDACCOMX, which

asked parents to rate how satisfied or dissatisfied they were with their child's accommodations. Parents of children with IEPs that answered a 4 on this measure had a higher homework involvement ($M = 0.16, N = 689$) as compared to parents of children without IEPs ($M = 0.04, N = 10,645$). Parents of children with IEPs that answered 1 on this measure had a lower level of involvement ($M = -0.22, N = 50$) as compared to parents of children without IEPs ($M = 0.04, N = 10,645$). Plot D shows the variable (HDCOMMITX), which asked parents to rate how satisfied or dissatisfied they were with their child's school commitment to help their child. Parents of children with IEPs that answered a 4 on this measure had a higher homework involvement ($M = 0.19, N = 757$) as compared to parents of children without IEPs ($M = 0.04, N = 10,645$). Parents of children with IEPs that answered 1 on this measure had a lower level of involvement ($M = -0.42, N = 25$) as compared to parents of children without IEPs ($M = 0.04, N = 10,645$). Overall, parents that had higher levels of satisfaction with their child's IEP services demonstrated higher levels of homework involvement as compared to mean homework involvement of parents of children without IEPs. Parents that were very dissatisfied with their child's IEP services had lower mean homework involvement as compared to parents of children without IEPs.

Parents' Expectations. Parent's Expectations (SEFUTUREX) was measured on a Likert-type scale from 1- 6, with 1 indicating that the parent expects their child to complete less than a high school diploma and 6 indicating that the parent expects their child to earn a graduate degree. Parents of children without IEPs that marked a 1 on this measure ($M = -0.27, N = 53$) had higher mean homework involvement as compared to

parents of children with IEPs ($M = -0.50$, $N = 37$). Parents of children without IEPs that marked a 2 on this measure (graduate high school) ($M = -0.11$, $N = 564$) had higher average homework involvement as compared to parents of children with IEPs ($M = -0.15$, $N = 235$). Parents of children without IEPs that marked a 3 on this measure (attend a vocational or technical school) ($M = -0.09$, $N = 578$) had lower average homework involvement as compared to parents of children with IEPs ($M = 0.03$, $N = 224$). Parents of children without IEPs that marked a 4 on this measure (attend two or more years of college) ($M = 0.01$, $N = 1,464$) had lower average homework involvement as compared to parents of children with IEPs ($M = 0.03$, $N = 213$). Parents of children without IEPs that marked a 5 on this measure (earn a bachelor's degree) ($M = 0.01$, $N = 3,322$) had lower average homework involvement as compared to parents of children with IEPs ($M = 0.25$, $N = 304$). Parents of children without IEPs that marked a 6 on this measure ($M = 0.10$, $N = 4,664$) had lower average homework involvement as compared to parents of children with IEPs ($M = 0.38$, $N = 283$). For both groups higher average homework involvement is associated with higher expectations for their child's future. Parents of children with IEPs who did not expect their child to complete an education beyond high school had lower involvement as compared to parents of children without IEPs. However, parents of children with IEPs who expected their children to complete an education beyond high school had higher average homework involvement than parents of children without IEPs.

Discussion

Parents of students with disabilities face greater barriers to homework involvement than parents of children without disabilities (Coots, 1998). These barriers are important considering the significantly poor post-school outcome experienced by children with disabilities (Test, 2008). Thus far, there has been little research that has documented the factors that impact the likelihood of homework involvement of parents of children with disabilities (Rispoli et al. 2018; Fishman & Nickerson, 2015). This study was designed to address this gap by investigating the factors that motivate parents' homework involvement for children with disabilities as compared to children without disabilities.

Variables were selected based on importance from previous research findings, as well as from the conceptual framework of the HDS model (Walker et al., 2005). First, parent and child characteristics were tested to examine how differences in attributes impacted homework involvement. Next, this study tested the hypothesis that school outreach, satisfaction, and parent's expectations were significant predictors of homework involvement. Finally, this study investigated the ways in which a child's IEP status moderated the relationship of school outreach, satisfaction, and parent's expectations to homework involvement.

Parent Characteristics

Generally, research has shown that involvement varies based on certain key parent characteristics such as race, income, and education. It was hypothesized that Black and Latino parents would have higher homework involvement as compared to White

parents. Similar to previous findings (Anderson & Minke, 2007; Park & Holloway, 2013; Walker et al., 2011), this study found that Black and Latino parents reported higher levels of homework involvement than White parents did. It was also hypothesized that parents with higher incomes would be more involved in their child's homework. Contrary to expectations, parents' income was negatively associated with homework involvement. However, this finding may indicate that parents' involvement forms may vary based on income. While previous research has shown that parents with higher incomes have higher levels of school-based involvement (Frew et al. 2012; Wagner et al. 2012), a study from Park & Holloway (2013) also found that parents with higher incomes were less likely to be involved in their child's homework. These findings may indicate that parents with higher incomes are more likely to be involved at school than at home. Future research should test this by examining the interaction of income with school and home-based involvement.

Previous research has shown that parents' highest educational attainment is a significant predictor of parents' involvement for children with and without disabilities. For instance, Rispoli et al. (2018) found that parents of children with disabilities that had higher education were more involved at home than parents with less education. Thus, it was hypothesized that primary caregivers with higher educational attainment would have higher homework involvement. Similar to previous findings (Frew et al., 2012; Wagner et al., 2012; Rispoli et al., 2018), the first three models showed that parents' highest level of education attainment was statistically significant and positively associated with

homework involvement. However, in the final model the effects of parents' level of education was no longer significant.

Child Characteristics

Research has shown that a child's gender, cognitive and behavioral functioning, and grade level are associated with parental involvement. Studies have shown mixed findings regarding parent involvement and gender with some finding gender to be an insignificant predictor (Frew et al., 2012) of parent involvement and others showing that parents had higher involvement if their child was female (Oswald et al. 2018). This study found that the child's gender was not a statistically significant predictor of parents' homework involvement.

A child's cognitive and behavioral functioning was represented through measures of the child's performance in school and if the child had received a suspension. Wagner et al. (2012) found that low cognitive functioning of children with disabilities was associated with low school and homework involvement. Contrary to this finding, children with higher performance in school was negatively associated with parents' homework involvement. According to the HDS model parents are more likely to be involved if they perceive that their child needs help to do well in school (Walker et al., 2005). Therefore, a possible explanation for this result is that parents perceive a higher performing student as able to successfully complete homework independently without help. Previous studies have shown that a child with behavioral challenges is negatively associated with parental involvement (Benson et al., 2008; Goldsmith & Rothbart, 1991; Levin et al., 1997; Newman, 2005). This study confirms previous findings that a parent of a child who has

received a suspension is less likely to be involved in their homework as compared to a parent of a child who has not received a suspension.

From all the child characteristics variables included in this study, grade level is arguably the most important predictor of parents' homework involvement. In line with previous findings (Frew et al. 2012; Newman 2005) parents of children with and without IEPs are more likely to be involved with children in elementary grade levels as opposed to middle and secondary grade levels. Child's grade level had the highest correlation with homework involvement ($r = -0.56$) and was the most significant predictor of model 2 in the HLR, which explained the largest change in variance from the original model. The final model indicated that a child's IEP status moderated the association of grade level with parents' homework involvement.

Interaction Effects

Generally, parents of children in elementary grade levels are more involved in homework than parents of children in middle or secondary grade levels. Figure 6 shows that the slope representing the relationship of the child's grade level to homework involvement is steeper for parents of children without IEPs than parents of children with IEPs. This suggests that parents of children without IEPs are less likely to be involved in their child's homework when they enter middle and secondary grade levels as compared to parents of children with IEPs. This finding is expected considering both the legal expectations of parental involvement and the learning difficulties experienced by many children with IEPs. The secondary level is an important time for parental involvement of children with IEPs as parents are encouraged to be involved in their child's transition

planning which includes considering post-secondary education and career options (Hirano et al., 2016). Furthermore, students with IEPs may exhibit more significant learning challenges as compared to students in general education and may need more support to complete assignments (Epstein et al., 1993; Swanson, 1994).

School Outreach. The HDS model hypothesizes that high parent involvement is associated with parents' perceptions that their child's school encourages involvement (Hoover-Dempsey et al., 2005). In line with this theory, several studies have shown that parent perceptions of effective school communication are associated with higher education involvement and that school outreach can mitigate barriers experienced by parents who are low-income or have less education (Benson 2008; Frew et al., 2012; Rispoli et al., 2018). Benson et al. (2008) found that mother's perceptions that their child's school encouraged involvement was the most powerful predictor of mother's educational involvement. Similarly, Frew et al. (2012) examined the involvement of parents of children with disabilities within the context of *parents'* attendance at school events. They found that parent outreach was the most significant predictor of *parents'* school-based involvement. Rispoli et al. (2018) found that parents' perceptions of teacher support moderated the association of education and parent involvement. Specifically, they found that parents of children with IEPs who completed less than a bachelor's degree were more likely to become involved when they perceived higher teacher support. These findings show that school outreach and communication can be a crucial factor in facilitating parent involvement in their child's learning.

The results of this study indicated that a child's IEP status impacted the association between school outreach and parents' homework involvement. For both groups, higher average homework involvement was associated with parents' perceptions of higher school outreach. However, Figure 8 shows that school outreach more effectively increased the homework involvement for parents of children without IEPs than parents of children with IEPs. This result may be due to the type of communication that composed the school outreach factor scores. Parents' perceptions that their child's school effectively provides information on child progress, homework help, class placement, and expected role was more effective in increasing the homework involvement of parents of children without IEPs (refer to Figure 8) Considering the differences in roles and involvement that parents are expected to have with children with IEPs, these forms of school communication may not be as effective for this group in facilitating higher homework involvement.

IEP satisfaction. The statistically significant interaction between a child's IEP status with IEP satisfaction indicated that parents of children with IEPs were more active in their child's homework when they were satisfied with their child's special education services. Figure 10 shows that when parents were satisfied with their child's service provider communication, IEP teacher, accommodations, and the school's commitment to their average level of homework involvement was near or above the average homework involvement of parents of children without IEPs. This is similar to results from a study by Law & Millward (2001) who found that parents of children with disabilities were more likely to be involved in their child's learning when they were satisfied with the education

services provided by their child's school. When parents of children with IEPs are satisfied with the IEP team and provision of services they are more likely to be involved in their child's homework.

Parents' Expectations. Hoover-Dempsey & Sandler (1997) argued that the construct of parental role construction is the most important predictor of parent involvement. Since the PFI dataset did not include measures on role construction, this construct was substituted with the measure of parents' expectations for their child's future. Hirano et al. (2016) was one of the few studies to examine the utility of the HDS model in predicting the involvement patterns of parents of transition-aged youth with IEPs. They found that parents' involvement was dependent on their expectations for their child's future and argued that this was an important construct missing from the HDS model. The findings of this study further confirm that parents' expectations for their child's future is an important parental belief in predicting patterns of homework involvement of parents of children with IEPs.

Figure 11 shows that the slope representing the relationship of parents' expectations to parents' homework involvement was steeper for parents of children with IEPs than for parents of children without IEPs, suggesting that parents of children with IEPs are relatively more likely to increase their homework involvement when they believe that their child can attain a higher postsecondary education. Arguably, parents' expectations as a representation of their motivational beliefs is a particularly important construct for parents of children with IEPs. Furthermore, previous research has indicated that high expectations for the child's future is associated with better postsecondary

outcomes for children with IEPs in that they are more likely to graduate high school (Doren, Gau & Lindstrom, 2012) and more likely to obtain employment (Carter, Austin, & Trainor, 2012). Thus, parents' expectations is particularly important when assessing the homework involvement of parents of children with IEPs.

Limitations

Since this project used secondary analysis, the study design was limited to the items available to the dataset. To test the utility of the HDS model in predicting the involvement patterns of parents of children with IEPs the motivational belief measures role construction and self-efficacy, as well as invitations from teacher and child would need to be included (Walker et al., 2005). Furthermore, the items included in this study were based on parents self-reported measures of involvement, which can be an inaccurate representation of actual involvement due to bias (Park & Holloway, 2013)

In general, the results of this study should be interpreted with caution. The use of unweighted responses and factors scores limits the generalizability of these results (Stanton, 2017). The NHES 2016 survey included household-level and personal-level weighting so that researchers can make inferences about the general US. population. Weighting reduces bias due to nonresponse and differential population coverage by accounting for differential probabilities (NCES, 2018). By not incorporating the weighted responses, the results of this study can only be considered within the context of the sample incorporated in this study. Furthermore, another limitation is that the use of factor scores makes it difficult for research replication and interpretation. It should be noted that the factor names for the independent variables parent satisfaction and school outreach

may not be accurate for interpretation as variables within school satisfaction and school outreach composites loaded onto more than one factor (Young & Pierce, 2013).

Furthermore, the use of Cattell's scree test has been criticized for being too subjective when the plot of the eigenvalues has no clear cutoff point (Frazier & Youngstrom, 2007).

However, Figure 1 shows a clear cutoff point of the eigenvalues and the use of three factors were supported by the theoretical design of the PFI survey.

Most importantly, the violations in assumptions of normality and homoscedasticity of variance suggest that there may be a non-linear relationship between the homework involvement outcome variable with the independent variables. Therefore, other non-parametric methods of analysis should be considered for this study such as generalized linear modeling and ordinal logistic regression (Field, Miles, & Field, 2012). Thus, rather than drawing generalized conclusions from this study, it is recommended that the findings are used as a starting point for future research on understanding the factors that impact the homework involvement patterns of parents of children with disabilities

Future Directions

While this study can serve as a starting point, there are several future directions that researchers can explore to further understand involvement patterns of parents of children with disabilities. It would be informative for researchers to compare factors of motivation for parents' involvement in school, home, and at IEP meetings. Previous research has indicated that certain factors are more predictive of specific types of involvement (Fishman & Nickerson, 2015; Park & Holloway, 2013). For example, Park &

Holloway (2013) found that parents' self-efficacy was a significant predictor for parents' homework involvement and not their school-based involvement. Thus, it would be important to consider which factors are more likely to impact specific types of educational involvement for parents of children with IEPs.

Another important consideration is how parents' homework involvement may be dependent on the child's IEP eligibility category. Thus far research on parent involvement has either included samples of children with disabilities without an eligibility distinction (Fishman & Nickerson, 2015) or the study has examined one eligibility category in isolation (Zablotsky, 2012; Benson et al. 2008). However, it is likely that homework involvement is different depending on the eligibility of the child. For example, due to the high behavioral demands of children who are eligible under emotional and behavioral disturbances (EBDs), it is likely that parents of children with EBDs are less involved as compared to other disability categories.

Finally, it is recommended that studies further investigate the differences in educational involvement for parents of students with disabilities in elementary grades as opposed to secondary grades. While the results of this study showed that parents of children without IEPs are less likely to be involved with homework at the secondary level as compared to parents of children with IEPs, both parent groups had significantly lower involvement in their children's homework as their child entered middle and secondary levels. Considering that the difficulty and demands of homework increase substantially at the middle and secondary levels, research should further examine parents' homework involvement at the secondary level with children with IEPs. Since children with IEPs

experience more homework difficulties and worse post-school outcomes as compared to children without IEPs, it would be important to examine how parents' homework involvement can combat poor postschool outcomes (Test, 2008, Newman et al., 2011).

Conclusion

Overall, the findings from this study have important implications that should be further investigated. The significant association in school outreach and homework involvement suggests that the actions of a child's school can increase parents' involvement in their child's homework. However, IEP satisfaction as opposed to school outreach was shown to be more effective in increasing parents' of children with IEPs homework involvement in comparison to parents of children without IEPs. This may indicate that parents' perceptions of effective services and communication provided by their child's IEP team is particularly important for facilitating their involvement. Furthermore, the significance of a child's IEP status in moderating the relationship between parents' expectations and homework involvement shows the importance of parental beliefs in motivating their involvement in their child's learning. When a parent of a child with a disability believes that their child can achieve an education beyond high school they are more likely to be involved in their homework. On the other hand, parents who believed that their child would complete high school or less were far less likely to be involved. Overall, this study shows that a child's disability status can affect the factors of motivation that explain which parents are more involved in homework and why. Thus, it is important for education stakeholders to consider the distinct needs and challenges

experienced by parents of children with IEPs when facilitating their involvement in their child's learning.

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Tables

Table 1-Parent's Demographic Characteristics based on their child's placement

Variable		All Parents		General Education		Special Education	
		n	%	n	%	n	%
Focal Child's Grade							
	Elementary	4590	38%	4062	38%	528	41%
	Middle	2733	23%	2435	23%	298	23%
	High School	4618	39%	4148	39%	470	36%
Parent's Race							
	White	9034	76%	7979	75%	1055	81%
	Black	1375	12%	1219	11%	156	12%
	Hispanic	2227	19%	2053	19%	174	13%
Income							
	Below 50,00	4396	37%	3830	36%	566	44%
	50,000 to 100,000	3736	31%	3338	31%	398	31%
	More than 100,000	3809	32%	3477	33%	332	26%
Education							
	Less than High School	978	8%	884	8%	94	7%
	High School Graduate	1774	15%	1554	15%	220	17%
	Some College	3895	33%	3411	32%	484	37%
	College Graduate	2741	23%	2477	23%	264	20%
	Graduate	2553	21%	2319	22%	234	18%

Table 2-Factor loadings and communalities based on an exploratory factor analysis

Item	Item Description	School Satisfaction	School Outreach	IEP Satisfaction
FCSCHOO	Satisfaction with the School the Child Attends	0.840		
FCTEACHR	Satisfaction with Child's Teachers	0.672		
FCSTDS	Satisfaction with Academic Standards	0.784		
FCORDER	Satisfaction with Discipline	0.735		
FCSUPPRT	Satisfaction with school staff/parent interaction	0.673	0.409	
FSSPPERF	School provides progress between report cards	0.345	0.589	
FSSPHW	School provides information on homework help	0.313	0.732	
FSSPROLE	School provides information on your expected role		0.771	
FSSPCOUR	School provides information on class placement		0.742	
HDCOMMUX	Satisfied with service provider communication			0.983
HDTCHR	Satisfied with special needs teacher			0.939
HDACCOMX	Satisfied with ability to accommodate child's needs			0.983
HDCOMMITX	Satisfied with commitment to help child			0.985

Note. Factor Loadings <0.3 are suppressed. 3 factors explained 72% of the cumulative variance.

Table 3-Factor loadings and communalities based on an exploratory factor analysis with varimax rotation for 2 items from the Parent and Involvement Survey (N = 11,941).

Item	Item Description	Homework Involvement
FHCHECKX	Check for homework completion	0.79
FHHELP	Days help with homework	0.79

Table 4-Descriptive Statistics for the Three Satisfaction and Outreach Factor Scores

	M (SD)	Skewness	Kurtosis	Cronbach's alpha
School Satisfaction	0 (0.92)	-1.3	1.88	0.91
School Outreach	0 (0.89)	-0.74	-0.24	0.84
IEP Satisfaction	0 (1)	2.77	5.97	0.87

Table 5-Descriptive Statistics for the Homework Involvement Factor Score (N = 11,941)

	Number of Items	M (SD)	Skewness	Kurtosis	Cronbach's alpha
Homework Involvement	2	0 (0.87)	-0.77	-0.01	0.76

Table 6-Sandwich Estimators of Coefficient Standard Errors for Model 4

	Sandwich SE	Confidence Interval (-1.96)	Confidence Interval (+1.96)	p-values
Intercept	0.52	-1.98	0.08	0.07
IEP	0.53	0.52	2.60	0.003
Black	0.02	0.09	0.17	0.000
Hispanic	0.02	0.05	0.11	0.000
Income	0.00	-0.02	-0.01	0.000
Education	0.01	-0.00	0.03	0.06
Grade	0.00	-0.12	-0.11	0.000
Female	0.01	-0.05	0.00	0.093
Suspension	0.03	-0.14	-0.03	0.002
Performance	0.01	-0.06	-0.03	0.000
School Outreach	0.07	-0.32	-0.05	0.007
IEP satisfaction	1.57	-9.55	-3.43	0.000
Satisfaction	0.01	-0.05	-0.01	0.002
Parent's Expectations	0.01	0.02	0.04	0.000
IEP*Grade	0.01	0.01	0.04	0.000
IEP*School Outreach	0.08	0.08	0.38	0.002
IEP*IEP satisfaction	1.57	3.46	9.60	0.000
IEP*Parent's Expectations	0.02	0.04	0.12	0.000

Table 7-Comparing Mean Differences of Parents of Children with IEPs to Parents of Children without IEPs Using Two-Way T-Tests (N = 11,941)

	Homework Involvement		School Satisfaction		School Outreach		Expectations of Child' Future
	M	SD	M	SD	M	SD	M
Without IEP	0.00	0.85	0.02*	0.9	-0.01*	0.91	5.01*
With IEP	-0.01	1.02	-0.14*	1.07	0.07*	0.76	4.05*

*Notes t-test value is significant at the $p < 0.001$ threshold

Table 8-Spearman's Correlation (N = 11,941)

	1	2	3	4	5	6	7	8	9	10
1. homework	-	-	-	-	-	-	-	-	-	-
2. IEP	0.03***	-	-	-	-	-	-	-	-	-
3. Black	0.05***	0.02*	-	-	-	-	-	-	-	-
4. Hispanic	0.06***	-0.04***	-0.12***	-	-	-	-	-	-	-
5. Female	-0.02	-0.09***	0.01	0.01	-	-	-	-	-	-
6. Suspend	-0.08***	0.11***	0.16***	-0.03***	-0.10***	-	-	-	-	-
7. Grade	-0.56***	-0.01	0.00	-0.02*	0.01	0.12***	-	-	-	-
8. Education	0.01	-0.03***	-0.06***	-0.27***	0.01	-0.09***	-0.03***	-	-	-
9. Child's Performance	0.00	-0.27***	-0.07***	-0.03***	0.18***	-0.22***	-0.04***	0.18***	-	-
10. Parent's expectations	0.09***	-0.24***	-0.04***	0.04***	0.13***	-0.21***	-0.11***	0.33***	0.50***	-

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 9-Pearson's Correlation with four Independent Variables and one Dependent

	1	2	3	4	5
1. Homework	-	-	-	-	-
2. Communication	0.23***	-	-	-	-
3. Satisfaction	0.04***	0.12***	-	-	-
4. IEP satisfaction	0.02**	0.01	0.00	-	-
5. Income	-0.07***	-0.02*	0.11***	-0.05***	-

Table 10-Hierarchical Linear Regression Results

	Model 1			Model 2			Model 3			Model 4		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Intercept	-0.04	0.03	0.00	1.24***	0.04	0.00	1.22***	0.04	0.00	-0.95	0.51	
IEP	0.07**	0.02	0.03	0.05*	0.02	0.02	0.06	0.08	.02	1.56**	0.51	0.57
Black	0.12***	0.02	0.05	0.14***	0.02	0.06	0.14***	0.02	0.06	0.13***	0.02	0.05
Hispanic	0.13***	0.02	0.06	0.10***	0.02	0.05	0.10***	0.02	0.05	0.08***	0.02	0.04
Income	-0.02***	0.00	-0.08	-0.01***	0.003	-0.04	-0.01***	0.00	-0.04	-0.01***	0.00	-0.04
Education	0.05***	0.01	0.07	0.02**	0.01	0.03	0.02**	0.01	0.03	0.01	0.01	0.02
Grade				-0.12***	0.00	-0.55	-0.12***	0.00	-0.53	-0.12***	0.00	-0.53
Female				-0.02	0.01	-0.01	-0.02	0.01	-0.01	-0.02	0.01	-0.01
Suspension				-0.10***	0.03	-0.03	-0.10***	0.03	-0.03	-0.09***	0.03	-0.03
Performance				-0.01	0.01	-0.01	-0.02**	0.01	-0.02	-0.04***	0.01	-0.05
School Outreach							0.09***	0.01	0.10	-0.18**	0.07	-0.20
IEP Satisfaction							-0.01	0.02	-0.01	-6.49 ***	1.54	-7.63
Satisfaction Expectations							-0.00	0.01	-0.00	-0.03**	0.01	-0.03
IEP*Grade										0.03***	0.01	0.04
IEP* Outreach										0.03***	0.01	0.10
IEP* IEP Satisfaction										0.23**	0.07	0.10
IEP* Expectations										6.53***	1.54	6.91
IEP* Satisfaction										0.07***	0.01	0.12
R^2	1.00			31.92			32.84			33.45		
ΔR^2				30.66			0.92			0.61		
ΔF				1373.25			55.46***			21.71***		

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 11-Model Comparisons using ANOVA (N = 11,941)

Model	R^2	ΔR^2	Sum of Squares	F Change	DF1	DF2	P-Value
1	0.01				5	11935	0.000
2	0.32	0.31	2620.97	1373.25	4	11931	0.000
3	0.33	0.01	79.39	55.46	3	11928	0.000
4	0.34	0.01	51.80	21.71	5	11923	0.000

Table 12-Bonferroni P-Value Adjustments

	1	2	3	4	5	6	7
1.homework	-	-	-	-	-	-	-
2. IEP	0.002	-	-	-	-	-	-
3. Black	0.000	0.58	-	-	-	-	-
4. Hispanic	0.000	0.000	0.000	-	-	-	-
5. Female	0.054	0.000	0.14	0.26	-	-	-
6. Suspend	0.000	0.000	0.000	0.000	0.000	-	-
7. Grade	0.000	0.170	0.960	0.031	0.25	-	-

Table 13-Bonferroni P-Value Adjustment for Parents' Education and Homework Involvement

	1	2	3	4
2	0.000	-	-	-
3	0.000	0.000	-	-
4	0.000	0.000	1.000	-
5	0.000	0.000	0.522	0.00227

Figures

Figure 1.

Parallel Analysis Plot of the Independent Variables

Non Graphical Solutions to Scree Test

18

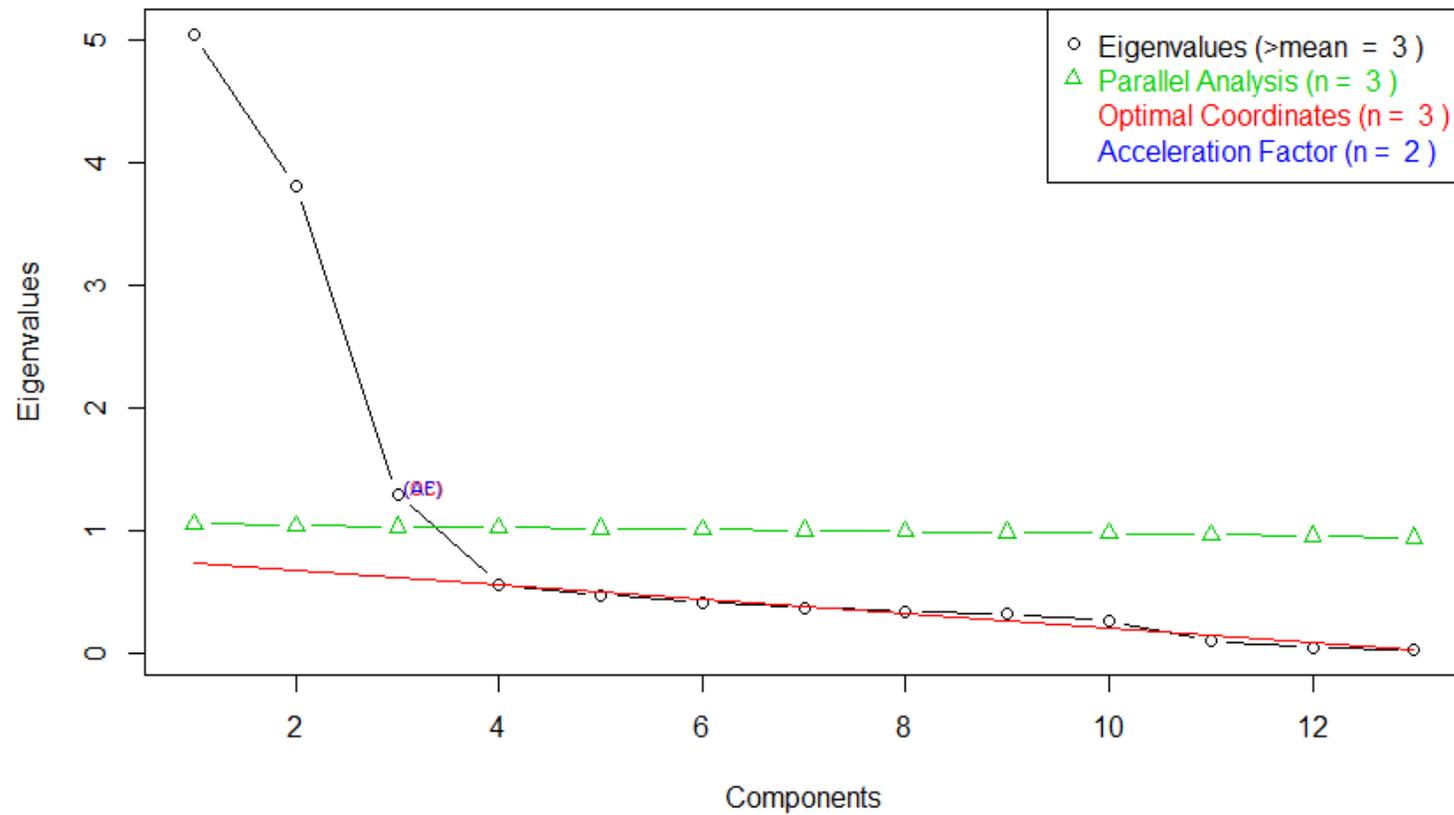


Figure 2.

Normal Q-Q plot of the Homework Involvement model

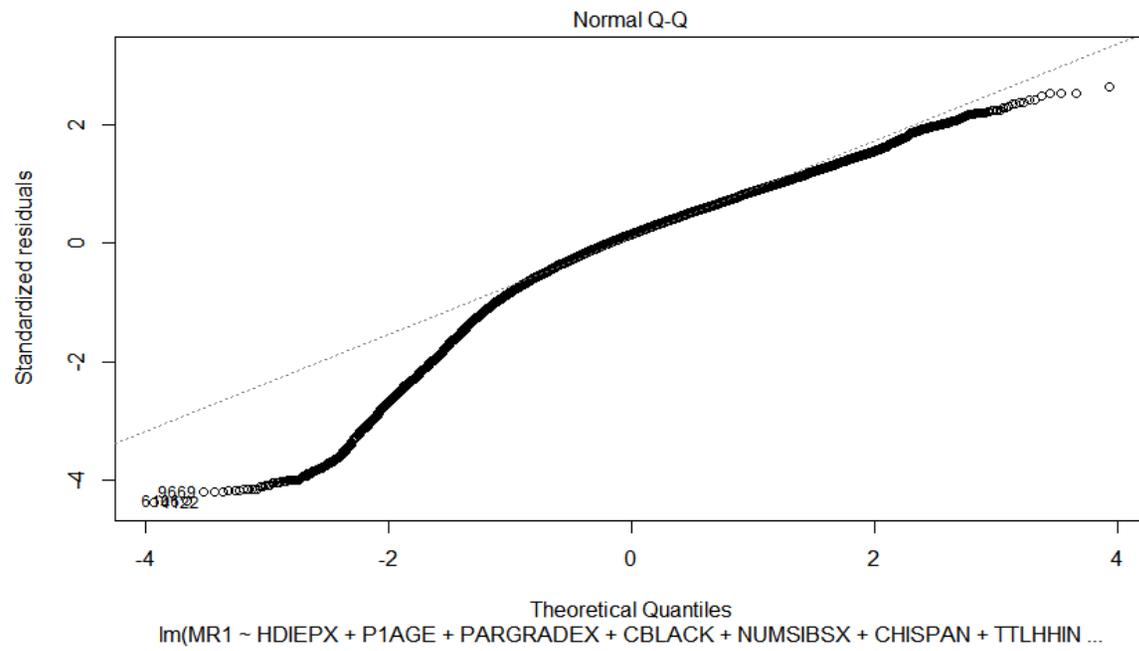


Figure 3.

Normal Q-Q plot with cube root transformation

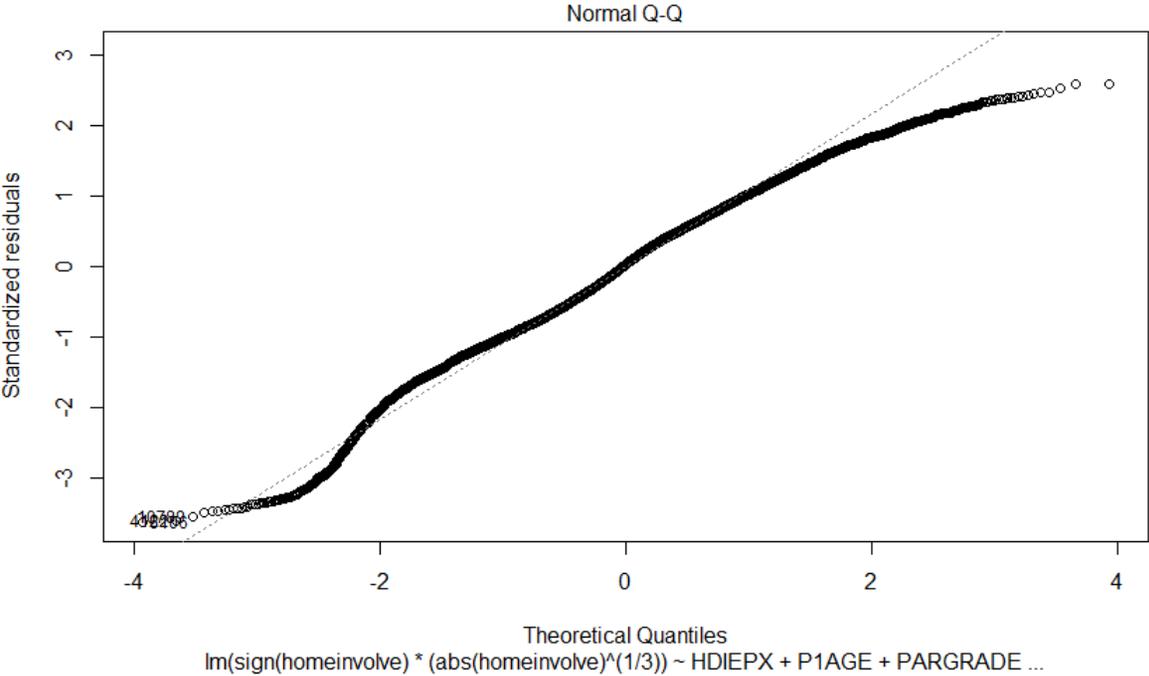


Figure 4.
Scale-Location Plot to Assess Homogeneity of Variance

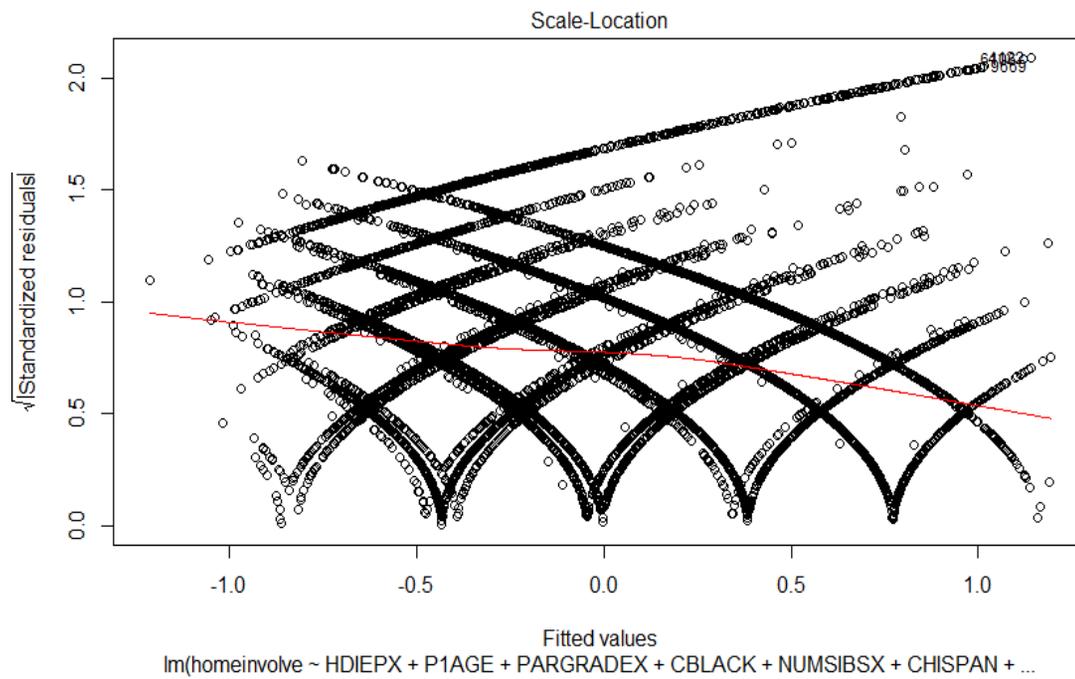


Figure 5.

Assessing Influential Outliers using Cook's Distance Plot

58

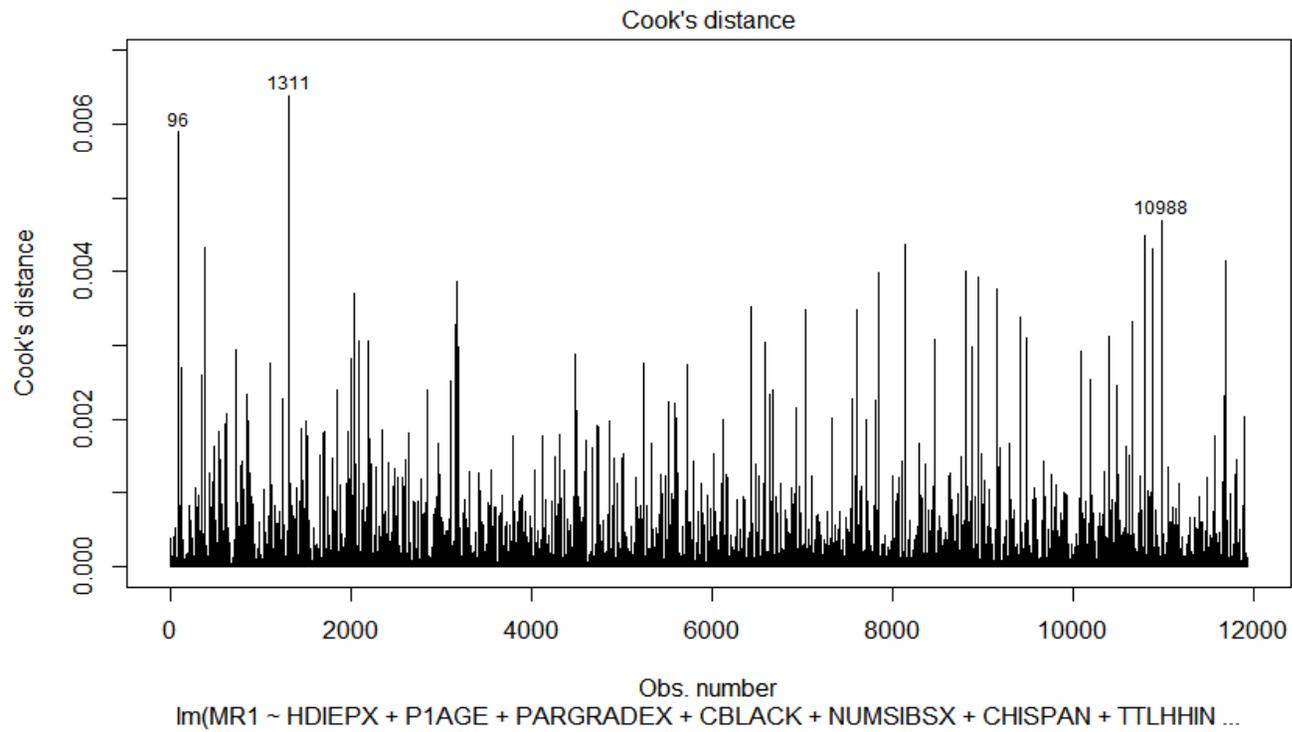
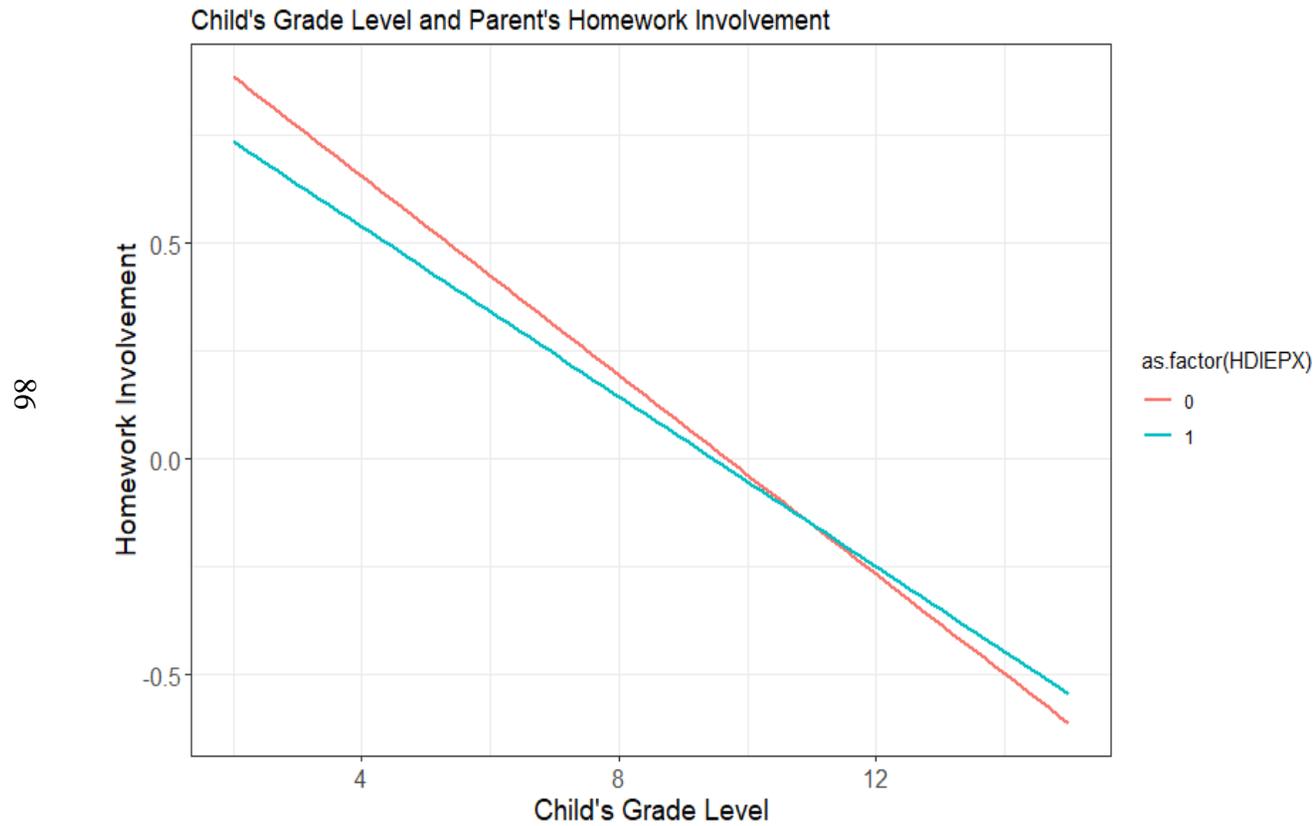


Figure. 6

Interaction Plot of Homework Involvement based on the Child's grade level



Note. 1 indicates that the child has an IEP and 0 indicates that child does not have an IEP.

Figure 7.

Interaction Plot of Homework Involvement and School Outreach

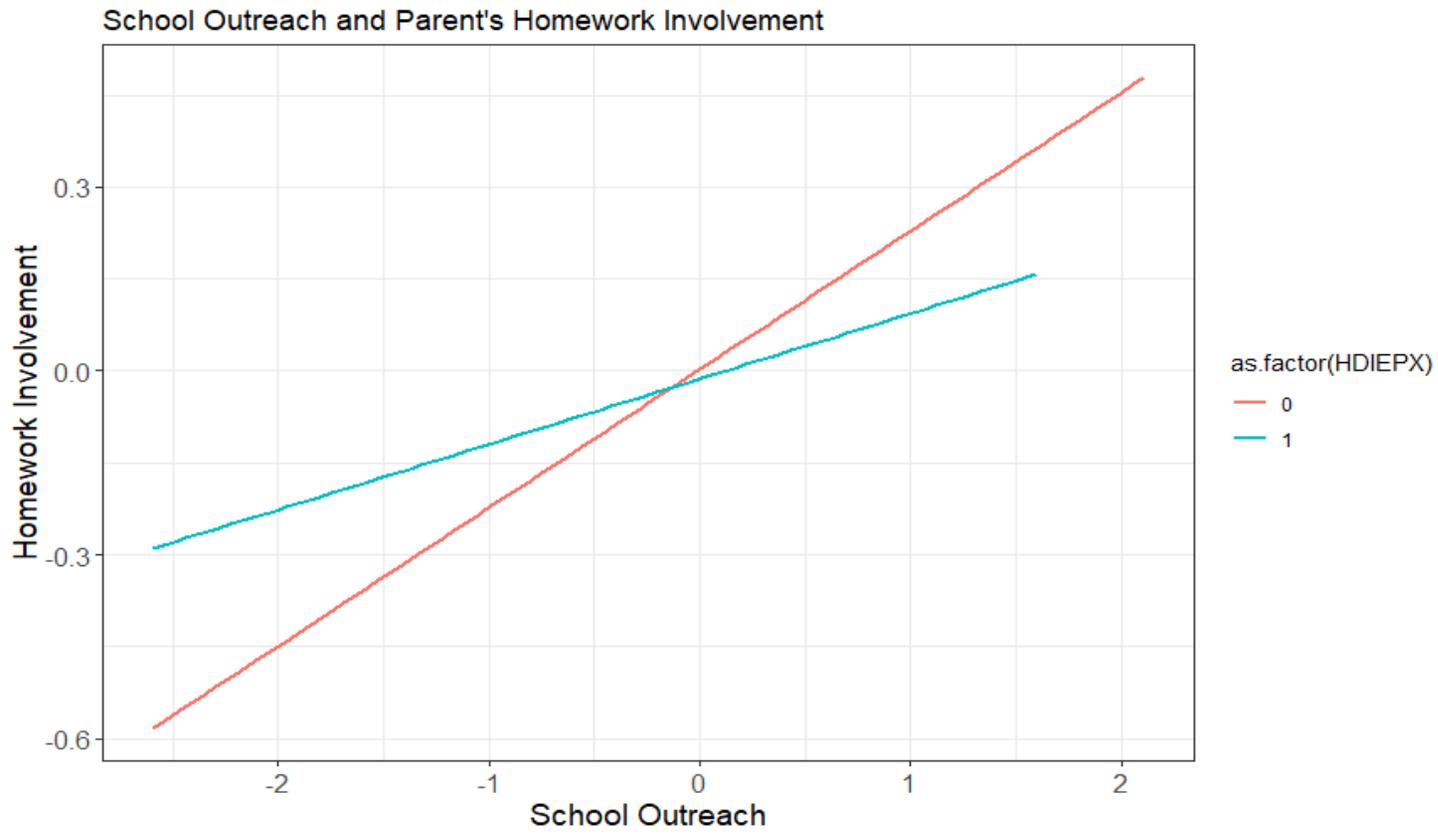


Figure 8.

Interaction Plots of School Outreach (A-D)

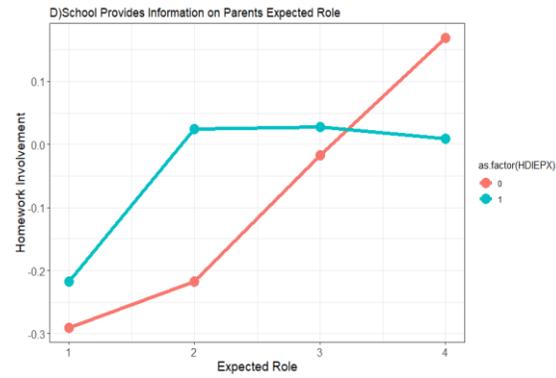
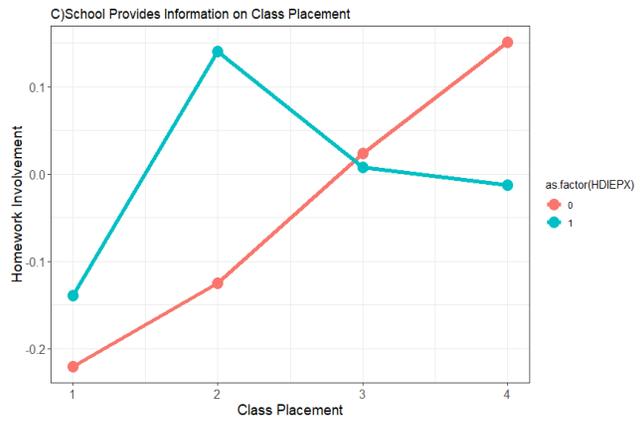
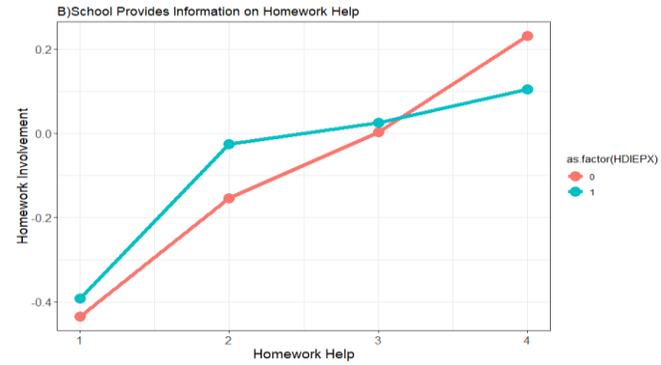


Figure 9.

Interaction Plot of Homework Involvement and Parent's Satisfaction

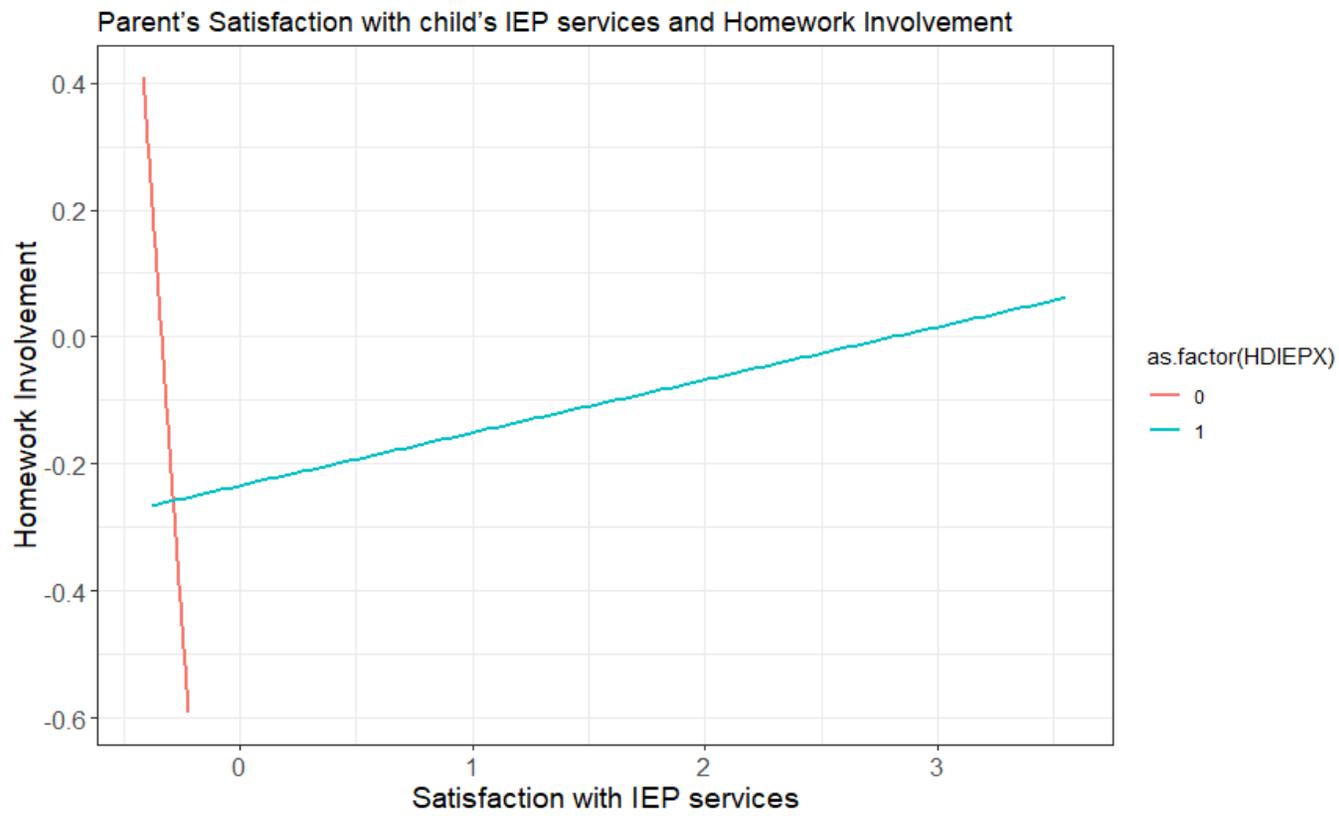


Figure 10.

Interaction Plots of Satisfaction with IEP Services (A-D)

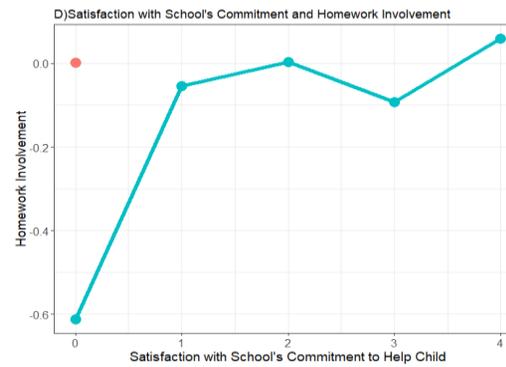
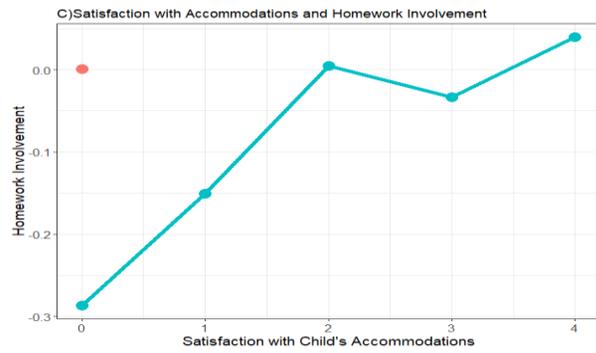
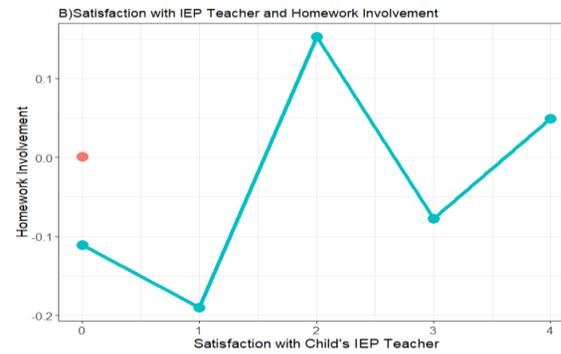
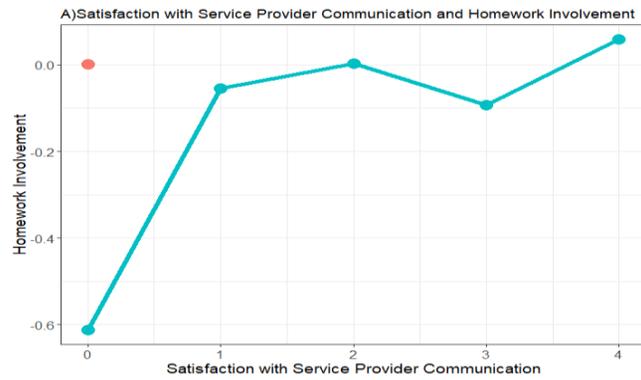


Figure 11.

Interaction Plot of Parent's Expectations for their Child's Future and IEP Status

Parent's Expectations and Homework Involvement

