

Reductions in Negative Parenting Practices Mediate the Effect of a Family–School Intervention for Children With Attention Deficit Hyperactivity Disorder

Genery D. Booster
National Jewish Health

Jennifer A. Mautone
Children’s Hospital of Philadelphia/Perelman School of Medicine at University of Pennsylvania

Jenelle Nissley-Tsiopinis
Children’s Hospital of Philadelphia

Devin Van Dyke
Haverford College

Thomas J. Power
Children’s Hospital of Philadelphia/Perelman School of Medicine at University of Pennsylvania

Abstract. Accumulating research has identified family behavioral interventions as an empirically supported psychosocial treatment for students with attention deficit hyperactivity disorder (ADHD). The mechanisms behind the effectiveness of these interventions, however, have been less well studied. The current study examined possible mediators of improvement in 181 children’s homework performance as a result of a family–school intervention for children in Grades 2–6 with ADHD (Family–School Success program, FSS). Specifically, changes in parenting practices and the family–school relationship were examined as potential mediators of the relationship between FSS treatment and improvements in students’ homework performance. When we controlled for pretreatment levels of behavior and demographic variables, reductions in negative parenting practices were associated with both parent and teacher reports of homework performance at posttreatment. The relationship between treatment group and teacher reports of homework responsibility was fully mediated by reductions in negative parenting practices. Although the mediational effect for parent reports of homework

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Correspondence concerning this article should be addressed to Genery D. Booster, 1400 Jackson St, Denver, CO 80209; e-mail: booster@njhealth.org

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problems did not meet criteria for full mediation, the magnitude of the treatment effect was significantly altered by reductions in negative parenting. This study replicated findings linking reductions in negative parenting to improvements in child behavior and extended findings to homework performance.

Children with attention deficit hyperactivity disorder (ADHD) display difficulties with attention and behavior regulation (American Psychiatric Association, 2013) that are associated with significant impairment across the home and school settings. Students with ADHD have consistently been shown to exhibit academic underachievement, impaired peer relationships, disruptive classroom behavior, and increased homework difficulties (Barkley, 2006; DuPaul & Stoner, 2013; Frazier, Youngstrom, Glutting, & Watkins, 2007; Power, Werba, Watkins, Angelucci, & Eiraldi, 2006). These school difficulties in turn contribute to increased risk of school failure (Kern et al., 2007), higher risk of dropping out of school, and reduced participation in postsecondary education (Barkley, Murphy, & Fischer, 2008). Although school-based behavioral interventions have been effective in reducing ADHD symptoms, effects on academic functioning have been modest (DuPaul, Eckert, & Vilardo, 2012; DuPaul & Stoner, 2013) and interventions have not typically addressed homework difficulties.

In addition to student-related difficulties, families of children with ADHD have been shown to have increased difficulty supporting their children's education (Rogers, Wiener, Marton, & Tannock, 2009). This may be especially important as family involvement in education has been associated with children's school engagement, attitudes toward school, and academic performance (Christenson & Sheridan, 2001). For children at risk for educational difficulties, such as those with ADHD, the quality of the family–school relationship may serve as a protective factor (Christenson & Sheridan, 2001). In addition, parenting practices, which influence the quality of parent–child attachments, are known to have an effect on child self-regulation and the ability of students to succeed in school

(Pianta, 1997). As such, multimodal treatments that include a focus on strengthening the family–school relationship, forming family–school problem-solving partnerships, and improving parenting practices may be especially useful in promoting academic success among students with ADHD (Power, Karustus, & Habboushe, 2001).

A number of researchers have developed multimodal treatments in an effort to improve the functioning of children with ADHD in the home and school settings. These include the landmark Multimodal Treatment Study of Children With ADHD (MTA; Wells et al., 2000), as well as family–school interventions with multiple components including parent training (Abikoff et al., 2004; Piffner et al., 2007), daily report cards (Abikoff et al., 2004; Owens, Murphy, Richerson, Girio, & Himawan, 2008), organizational skills training (Abikoff et al., 2013), social skills training (Abikoff et al., 2004), and teacher consultation (Owens et al., 2008; Piffner et al., 2007). Although such programs have demonstrated reductions in ADHD symptoms and impairments, as well as improvements in child relationships with parents and teachers, and have provided preliminary evidence of the importance of negative parenting practices in relation to such changes, limitations include (a) a lack of focus on promoting family involvement in education and providing systematic homework interventions and (b) a lack of emphasis on promoting family–school problem-solving partnerships.

THE FAMILY-SCHOOL SUCCESS PROGRAM

The Family–School Success program (FSS) was developed to address the limitations of previous multimodal treatments through its focus on improving family involvement in education and family–school partnerships. Spe-

cifically, FSS is a 12-session family–school intervention designed to improve parenting practices, family involvement in education, family–school collaboration, and student homework and academic performance. In addition to behavioral parent training (e.g., frequent opportunities for child-directed play, use of token economy systems, strategic use of punishment), which has demonstrated strong evidence of effectiveness in treating children with ADHD (Evans, Owens, & Bunford, 2014), FSS includes three educationally focused intervention components: conjoint behavioral consultation (CBC), daily report cards, and systematic homework interventions (Power et al., 2012). Results of a randomized clinical trial of this intervention revealed that FSS had a significant effect on educational performance, specifically homework performance, as well as parenting practices and the quality of the family–school relationship (Power et al., 2012). Children in the FSS group (as compared with a support and education group) showed a significantly greater decrease in parent-reported homework inattention or task avoidance and a significant increase in teacher-reported student homework responsibility. Furthermore, participants in FSS demonstrated a decrease in parent ratings of negative or ineffective discipline and an increase in parent- and teacher-reported quality of the parent–teacher relationship in relation to the control condition (Power et al., 2012).

MECHANISMS OF CHANGE

Results from the FSS study demonstrated the effectiveness of a family–school behavioral intervention in improving child functioning both at home and at school, but the mechanisms through which this change occurred have not been examined. Previous intervention research has identified parenting practices as an important factor influencing child behavior. In particular, high levels of positive parenting (e.g., having clear rules and using high rates of positive reinforcement) and lower levels of negative parenting (e.g., using unclear directives and high rates of punish-

ment) have been associated with decreased child behavior problems (Aunola & Nurmi, 2005; Borden et al., 2013). In fact, reductions in negative parenting have been shown to mediate the relationship between level of maternal ADHD symptomatology and improvement in child behavior in response to a family behavioral intervention for children with ADHD (Chronis-Tuscano et al., 2011). Similarly, reductions in negative parenting were shown to mediate the relationship between behavioral treatment of ADHD and improvement in children’s social skills at school (Hinshaw et al., 2000). In addition, improvements in positive parenting have been shown to mediate the relationship between treatment (behavioral parent training versus waitlist control) and reductions in behavior problems among young children (2–9 years) with elevated conduct problems from primarily low-income families (Gardner, Burton, & Klimes, 2006).

The family–school relationship has also been identified as an important factor contributing to student success (Christenson & Sheridan, 2001; Epstein, 1995). Research suggests that family–school behavioral interventions, such as CBC (Sheridan & Kratochwill, 2010) and daily report cards, are effective in improving academic performance and school behavior (Cox, 2005; Volpe & Fabiano, 2013). Recent research by Sheridan et al. (2012) demonstrated that a key variable in these improvements is the family–school relationship, as improvements in teacher-reported relationships with parents were found to mediate the effects of CBC on improvements in child behavior.

STUDY HYPOTHESES

The current study examined possible mediators of improvement in children’s school performance, in particular homework performance, in the context of FSS. Previous research has suggested two possible mechanisms for this change: (a) changes in parenting practices (e.g., increases in positive parenting practices and decreases in negative parenting practices) and (b) improvements in the quality of parent–teacher relationships. First,

given prior research showing that decreases in negative parenting mediate the effect of ADHD behavioral interventions on child outcomes (Chronis-Tuscano et al., 2011; Hinshaw et al., 2000), it was expected that reductions in negative parenting would at least partially explain the relationship between FSS and improvements in homework performance. Given that findings about the mediating role of positive parenting have been mixed (e.g., Gardner et al., 2006; Hinshaw et al., 2000), this study explored the potential mediating role of positive parenting. Second, given research demonstrating that improvement in family–school collaboration mediates the effect of family–school intervention on child outcomes (Sheridan et al., 2012), it was expected that improvement in the quality of the parent–teacher relationship would at least partially explain the relationship between FSS and improvements in school performance.

METHOD

This study was conducted through an ADHD center within a pediatric hospital located in a large metropolitan area in the Northeastern United States. Inclusion criteria were as follows: (a) children enrolled in Grades 2–6; (b) children meeting criteria for combined-type ADHD or inattentive-type ADHD based on parent report on the Schedule for Affective Disorders and Schizophrenia for School-Age Children Present State Version (K-SADS-P IVR)–*Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV*; Ambrosini, 2000); (c) children rated at or above the 85th percentile on the Inattention or Hyperactivity–Impulsivity factor of the ADHD Rating Scale–IV–School Version (ADHD RS–IV; DuPaul, Power, Anastopoulos, & Reid, 1998) or the Attention Problems or Hyperactivity subscale of the Behavior Assessment System for Children, Second Edition–Teacher Rating Scales (BASC–2; Reynolds & Kamphaus, 2004); (d) children scoring at or above 0.75 standard deviations above the mean on the Homework Problem Checklist (HPC; Anesko, Schoiock, Ramirez, & Levine, 1987), which was considered an indicator of

educational impairment; and (e) children scoring at or above an estimated IQ of 75 on the two-subtest version of the Wechsler Abbreviated Scale of Intelligence (WASI; Psychological Corporation, 1999). For children taking medication, diagnostic decisions were based on responses to Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) items in the present or past state and responses to rating scales completed prior to the child taking medication. Children who met *DSM-IV* criteria (American Psychiatric Association, 1994) for a psychotic disorder, bipolar disorder, chronic tic disorder, Tourette’s syndrome, or an anxiety or mood disorder serious enough to warrant separate treatment were excluded from the study. Children with a history of major neurologic illness or a history of suicidal or homicidal behavior or ideation were also excluded.

Of the 181 participating children, 32% were girls; 24% were African American; and 98% of families belonged to the three highest categories (of five) on the Hollingshead (1975) scale, reflecting that the sample was primarily in the middle and upper-middle socioeconomic groups. Twenty percent of the children lived in single-parent homes. Children with inattentive-type ADHD comprised 52% of participants, whereas 48% had combined-type ADHD. The mean grade level was 3.5.

Selection Procedures

Participants were referred either from (a) the clinic within the hospital’s ADHD center, which served parents who contacted the program for services, or (b) school and community providers (e.g., primary care and school mental health professionals). Referrals from the clinic were obtained through a review of intake information for children whose parents requested a diagnostic evaluation. In addition, the medical records of children who completed diagnostic evaluations during the 6 months prior to the start of the study were reviewed to identify potential participants for the initial cohorts. Five hundred two referred families were then contacted by a research assistant who completed a telephone screening

to determine whether they were interested in study participation and to complete additional screening. In 244 of those cases, the child was eligible for the study and the study team obtained parent consent. Consenting families were offered the option of placing their children on medication prior to random assignment and initiation of the psychosocial treatment to decrease the likelihood of changes in medication status during the intervention trial. In 133 cases, the family elected to participate in a medication trial prior to randomization. Among those children, 93 still showed homework impairments (≥ 0.75 *SD* above the mean) after the medication trial, making them eligible, and the family continued to be interested in participating in the study. Details regarding screening, evaluation, treatment assignment, and medication trial procedures are available in a previously published article (Power et al., 2012).

Study Interventions

The Family-School Success Program (FSS) is a manualized, 12-session family-school intervention designed to improve parenting skills, family involvement in education, family-school collaboration, student behavior, and student homework and academic performance. In addition to components that are standard in behavioral parent training programs, FSS includes three educationally focused components: CBC, daily report cards, and homework interventions. FSS treatment was provided using three formats: (a) parent group meetings (six sessions) held in a clinic setting simultaneously with separate child group sessions; (b) individualized family therapy (four sessions) conducted in the clinic, including the parents and child; and (c) family-school consultation (two sessions) held at the school, including parents and teachers. An outline of program sessions is described in Table 1.

During this study, one clinician was assigned to work with each cohort of parents. Thirteen FSS cohorts were conducted, with 88 children, and the number of families per group ranged from 3 to 10, with a mean of 7. Seven

clinicians (i.e., six postdoctoral fellows in psychology and one doctoral-level, nonlicensed school psychologist with 15 years of experience) conducted FSS groups. Parents were asked to designate which parent would serve as the primary intervention participant. In 89% of cases, the child's mother was the primary participant in the intervention; 8% of cases identified the father as the primary participant; and in the remaining 3% of cases, the primary participant was a stepparent or grandparent. For approximately 50% of the sessions, two caregivers (e.g., other parent, stepparent, grandparent) were present. Eighty-four teachers participated in the intervention; four teachers were involved in FSS for two children each. Two of the children (one teacher) were involved in the same cohort. The remaining six children (three teachers) were involved in separate cohorts. In addition, graduate students were assigned to work with child participants during the child group sessions. Additional information about FSS, including integrity monitoring, session attendance, and treatment adherence, is available elsewhere (Clarke et al., 2015).

Coping With ADHD Through Relationships and Education (CARE) is a manualized, 12-session program designed to provide support and education to parents through three components: (a) discussing children's progress at home and school, (b) establishing a context within which parents can support each other in coping with their children's difficulties, and (c) providing generic education to parents about ADHD. This intervention was implemented to control for the nonspecific effects of intervention, such as obtaining therapist and peer support, as well as psychoeducation, and did not address the primary components of FSS. Although parents were informed about potentially useful intervention strategies, they were not provided training in the use of empirically supported interventions; CARE did not involve parents and teachers in the process of problem solving, nor did it include training parents in the use of behavioral strategies.

In this study, 13 CARE cohorts were conducted with a total of 93 children. The

Table 1. Description of Each Session for FSS

| Session Title | Session Type | Session Content |
|--|-------------------|---|
| 1. Introduction to Family–School Success | Group | Introduction to FSS Orientation to CBC model Using attention to change child behavior |
| 2. Preparing for Home–School Collaboration | Individual family | Preparation for first school consultation Use of homework assignment books Use of DRC |
| 3. Promoting Home–School Collaboration | School meeting | Establishing collaborative home–school relationship Establishing use of assignment book and DRC |
| 4. Understanding Basics of Behavior Management | Individual family | Review school meeting Develop understanding of positive reinforcement and punishment |
| 5. Introducing the Token Economy | Group | Group discussion of school meetings Establishing a token economy |
| 6. Understanding the Function of Behavior and Establishing the Homework Ritual | Group | Functional assessment to define homework problems (antecedents and consequences) |
| 7. Managing Time and Goal Setting | Individual family | Time-management strategies for homework completion Goal-setting approach to homework completion |
| 8. Managing Time and Goal Setting–2 | Individual family | Review goal-setting strategies with clinician modeling and feedback |
| 9. Using Punishment Successfully | Group | Group discussion of experiences with goal setting Rationale for using punishment strategically Response cost and time-out Prepare for second school consultation |
| 10. Collaborating to Refine Strategies | School meeting | Review use of DRC and modify if needed Use of goal setting in classroom |
| 11. Developing Effective Study Skills | Group | Strategies for effective study skills, including incremental rehearsal |
| 12. Integrating Skills and Planning for the Future | Group | Review and problem solve implementation difficulties Develop individual family “formulas for success” End-of-program celebration |

Note. CBC = conjoint behavioral consultation; DRC = daily report card; FSS = Family–School Success program.

number of families per group ranged from 5 to 10, with a mean of 7. Six clinicians (i.e., one predoctoral intern in psychology, one postdoctoral fellow in psychology, three licensed psychologists, and one doctoral-level school psychologist with 4 years of experience) conducted CARE groups. In 89% of cases, the child's mother was the primary intervention participant; the father was the primary participant in 9%; and 2% included another caregiver (e.g., grandparent). For approximately 50% of the sessions, another caregiver (e.g., other parent, stepparent, grandparent) was present. Ninety-one teachers participated in the intervention. Two teachers were involved in CARE for two children each; two children participated in the same cohort, and two were in separate cohorts. In addition, graduate students conducted child group sessions. Please refer to a previously published article (Clarke et al., 2015) for more detailed information about the CARE intervention, including integrity monitoring and session attendance.

Measures of Demographic Characteristics

Information regarding a variety of demographic variables was collected from parents at baseline. This included each child's gender, school grade, single-parent status, race, and socioeconomic status. For the purpose of the current analyses, race was examined dichotomously as White or African American. This eliminated four Asian and three multiracial children from the analyses including race as a covariate. Socioeconomic status was examined using the broad social class score from the Hollingshead (1975) scale.

Measures of Potential Mediators

The Parent-Child Relationship Questionnaire (PCRQ; Furman & Giberson, 1995) assessed parent perceptions of their parenting practices. Parents responded to items using a 5-point Likert scale ranging from 1 = *hardly at all* to 5 = *extremely much*. The validity of the Positive Involvement factor (22 items;

e.g., "How much do you praise and compliment this child?") and Negative/Ineffective Discipline factor (12 items; e.g., "How much do you order this child around?") has been supported in research conducted by Hinshaw et al. (2000). The α coefficients in the present study sample at baseline were .89 for Positive Involvement and .84 for Negative/Ineffective Discipline. Parents completed the PCRQ at baseline and posttreatment.

The Parent-Teacher Involvement Questionnaire (PTIQ; Kohl, Lengua, McMahon, & Conduct Problems Prevention Research Group, 2000) was used to assess the quality of the family-school relationship from the perspective of parents and teachers. A factor analysis of this measure uncovered an 11-item (6 from parent report and 5 from teacher report) Quality of Parent-Teacher Relationship factor consisting of both parent-reported items (e.g., "you feel your child's teacher cares about your child") and teacher-reported items (e.g., "you are able to talk to this child's parents") rated on a 5-point Likert scale. In this study, parent- and teacher-rated items were analyzed both together, consistent with the approach used in the evaluation of FSS (Power et al., 2012), and separately, on the basis of a recent study demonstrating that a two-factor model with distinct factors based on informant was superior to a one-factor model that integrated items across informants (Mautone, Marcelle, Tresco, & Power, 2014). Reliability in the present sample at baseline was high for the single-factor scale ($\alpha = .88$) and for the parent-rated ($\alpha = .90$) and teacher-rated ($\alpha = .84$) scales individually. Both parents and teachers completed the PTIQ at baseline and posttreatment.

Measures of Intervention Outcomes

Child outcome measures for this study were selected based on the results of the clinical trial of FSS (Power et al., 2012). Specifically, outcome measures were included if a significant group effect ($p < .05$) was found for the child-related outcome variable at posttreatment. Two measures met this criterion:

the Inattention/Task Avoidance factor (consisting of 10 items) of the parent-reported Homework Problem Checklist (HPC; Anesko et al., 1987) and the Student Responsibility factor (consisting of 7 items) of the Homework Performance Questionnaire–Teacher Version (HPQ-T; Power, Dombrowski, Watkins, Mautone, & Eagle, 2007). The Inattention/Task Avoidance factor (e.g., child is distractible and procrastinates) of the HPC has demonstrated adequate validity (Power et al., 2006), and the α coefficient in the current study sample was .88. The Student Responsibility factor of the HPQ-T assesses teacher perceptions of students' homework behavior (e.g., students take necessary materials home and return assignments on time). The α coefficient was .91 in the current study sample. Both the HPC and HPQ-T were administered at baseline, as well as posttreatment.

Assessment Procedures

Parent-report baseline measures were collected during the first intervention session. Posttreatment ratings were obtained in person at the conclusion of the final session. Parents received a \$20 cash stipend for completing measures at each assessment period. Teacher-report measures were collected at baseline and posttreatment. Teachers received the measures in the mail during each collection period, and measures were collected by research assistants approximately one week later. Teachers received a \$20 cash stipend for completing measures at each period.

Data-Analytic Plan

Mediation analyses were conducted in accordance with the model for mediation proposed by Baron and Kenny (1986) and reviewed by Kenny (2009). Specifically, in Step 1, the predictor variable (intervention group) must be significantly associated with the outcome variable (i.e., measures of homework or academic performance); in Step 2, the predictor variable (group) must be significantly associated with the potential mediator (i.e., parenting practices and parent–teacher relationship); in Step 3, the po-

tential mediators must be significantly associated with the outcome variable; and in Step 4, the association between the predictor variable (group) and outcome is reduced when the mediator variables are entered into the models. Linear regressions were conducted to examine all four conditions of mediation, and Sobel tests were then performed to evaluate the statistical significance of any potential mediation effects (MacKinnon et al., 2002; Sobel, 1982).

To control for possible confounding effects or covariates in the regression analyses, correlations between posttreatment levels of all outcome and mediating variables and each demographic variable were examined, while we controlled for baseline levels of each outcome and mediating variable. Any demographic variables that were significantly correlated with an outcome or mediating variable were entered first in the regression analyses. Baseline scores of outcome variables were entered next in the regression models when we examined Conditions 1, 3, and 4 of mediation, and baseline scores of possible mediating variables were then entered when we examined Conditions 2, 3, and 4 of mediation. Intervention group was entered in the final step of the regression analyses when we examined Steps 1, 2, and 4 of mediation.

RESULTS

Of the 199 families who were randomly assigned to an intervention condition, 7 withdrew prior to beginning treatment because they decided not to participate at this point in the study. An additional four families were withdrawn because the child's school declined to participate in treatment. Of families who completed the intervention, seven did not complete posttreatment measures. Prior to completion of data analyses, the dataset of 181 families (88 from FSS and 93 from CARE) was examined for missing data. The amount of missing data was low; across all of the outcome measures administered at both baseline and posttreatment, 95% of cases had no missing data or were missing no more than two units of data. An individual's score on a mea-

Table 2. Bivariate Correlations Between Demographic Variables, Possible Mediators, and Outcome Variables

| | Grade | Gender | Race | Single-Parent Status | SES |
|---------------|--------|--------|---------|----------------------|-------|
| HPC-IA | .009 | -.084 | .079 | .189** | .008 |
| HPQ-T | .003 | .050 | -.224** | -.074 | .134 |
| PCRQ-NI | -.022 | -.074 | .108 | -.028 | .063 |
| PCRQ-PI | -.150* | -.085 | -.049 | -.009 | .075 |
| PTIQ-teacher | .133 | .074 | -.063 | -.161* | -.134 |
| PTIQ-parent | -.096 | -.027 | .112 | -.054 | .030 |
| PTIQ-combined | .006 | -.009 | .067 | -.117 | -.064 |

Note. HPC-IA = Inattention/Avoidance factor on Homework Problem Checklist; HPQ-T = Student Responsibility factor on Homework Performance Questionnaire-Teacher Version; PCRQ-NI = Negative/Ineffective Discipline factor on Parent-Child Relationship Questionnaire; PCRQ-PI = Positive Involvement factor on Parent-Child Relationship Questionnaire; PTIQ = Quality of Parent-Teacher Relationship factor on Parent-Teacher Involvement Questionnaire; SES = socioeconomic status.

* $p < .05$. ** $p < .01$.

sure was included in the analyses if the respondent answered at least 75% of items on the measure. Missing items were imputed using a mean item score.

Examination of Potential Covariates

To ensure that results were not biased because of relationships between demographic variables and outcome and/or potential mediator variables, the correlation between each demographic variable and the posttreatment level of each outcome and mediator variable was calculated, while we controlled for baseline levels of each outcome and mediator variable. Correlations between demographic variables and all potential mediators and outcome variables are presented in Table 2. Whenever a covariate was significantly correlated with a specific outcome or mediating variable, that covariate was entered in Step 1 of the regression analyses examining that outcome or mediating variable. Demographic variables that were significantly correlated with an outcome or mediating variable included grade, race, and single-parent status. Because the race variable included only children who were White and African American, the four Asian and three biracial children in the sample were excluded from analyses including race as a covariate.

Treatment Outcomes

In accordance with the Baron and Kenny (1986) model, linear regressions were conducted to identify outcome variables that were significantly associated with group participation (FSS versus CARE), thus establishing the first condition for mediation. As expected on the basis of previously reported findings, group assignment significantly predicted parent reports of inattention or avoidance during homework (HPC; standardized $B = -.277$, $p < .001$, moderate effect size) after we controlled for single-parent status and baseline scores. Group also significantly predicted teacher reports of homework responsibility (HPQ-T; standardized $B = .129$, $p < .01$, small effect size) after we controlled for race and baseline scores. Results from regression analyses are presented in Table 3.

Prediction of Possible Mediators

To establish the second condition for mediation, regression analyses were conducted to determine whether treatment group was significantly related to potential mediators, assessed by measures of parenting practices and parent-teacher relationship. After we controlled for gender and baseline parenting scores, group significantly predicted negative

Table 3. Regression Analysis Results for Steps 1 and 2 of Mediation, With Intervention Group as Predictor

| Outcome Measure | β | SE β | Standard <i>B</i> | R^2 Change | <i>df</i> | <i>F</i> Change |
|---------------------------|---------|------------|-------------------|--------------|-----------|-----------------|
| HPC-IA ^a | -.303 | .067 | -.277 | .077 | 1177 | 20.37*** |
| HPQ-T ^b | .239 | .092 | .129 | .017 | 1169 | 6.69** |
| PCRQ-NI | -.281 | .061 | -.260 | .067 | 1175 | 21.20*** |
| PCRQ-PI ^c | -.020 | .041 | -.026 | .001 | 1174 | 0.24 |
| PTIQ–teacher ^a | .128 | .068 | .111 | .012 | 1176 | 3.56 |
| PTIQ–parent | .122 | .100 | .070 | .005 | 1178 | 1.50 |
| PTIQ–combined | .128 | .065 | .105 | .011 | 1175 | 3.83* |

Note. HPC-IA = Inattention/Avoidance factor on Homework Problem Checklist; HPQ-T = Student Responsibility factor on Homework Performance Questionnaire–Teacher Version; PCRQ-NI = Negative/Ineffective Discipline factor on Parent–Child Relationship Questionnaire; PCRQ-PI = Positive Involvement factor on Parent–Child Relationship Questionnaire; PTIQ = Quality of Parent–Teacher Relationship factor on Parent–Teacher Involvement Questionnaire.

^a Controlling for single-parent status.

^b Controlling for child race.

^c Controlling for grade level.

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

parenting practices (PCRQ; standardized $B = -.260$ $p < .001$, moderate effect size). After we controlled for baseline scores and grade level, group did not significantly predict positive parenting involvement (PCRQ) or parent reports of the quality of the parent–teacher relationship (PTIQ with separate informants). Group did, however, significantly predict combined reports of the quality of the parent–teacher relationship (PTIQ combined; standardized $B = .105$, $p < .05$, small effect size). Teacher reports of the quality of the parent–teacher

relationship (PTIQ-T) just failed to reach significance (standardized $B = .111$, $p = .061$, small effect size). Results from regression analyses are presented in Table 3, and descriptive statistics for the potential mediating variables at preintervention and postintervention are presented in Table 4.

Tests of Mediation

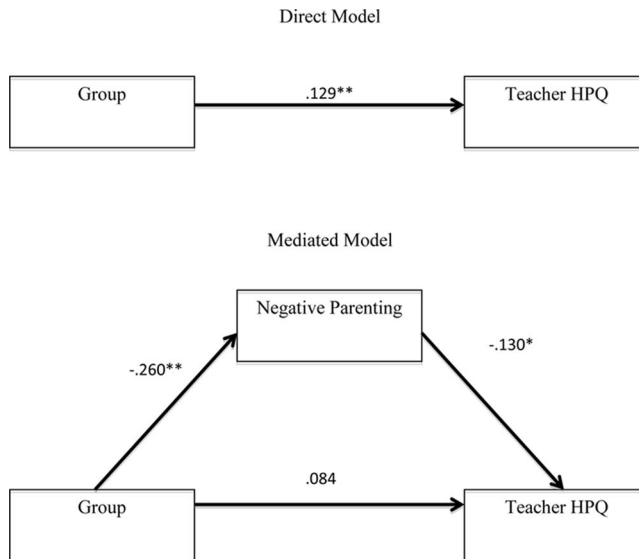
Next, Condition 3 of mediation (i.e., the mediators are significantly associated with the

Table 4. Potential Mediating Variables at Baseline and Postintervention

| | CARE, <i>M</i> (<i>SD</i>) | | FSS, <i>M</i> (<i>SD</i>) | |
|---------------|------------------------------|------------------|-----------------------------|------------------|
| | Baseline | Postintervention | Baseline | Postintervention |
| PCRQ-NI | 2.96 (0.56) | 2.72 (0.52) | 2.94 (0.51) | 2.41 (0.51) |
| PCRQ-PI | 4.01 (0.41) | 4.09 (0.36) | 3.89 (0.44) | 3.99 (0.41) |
| PTIQ–teacher | 3.07 (0.65) | 3.14 (0.63) | 3.14 (0.55) | 3.32 (0.51) |
| PTIQ–parent | 2.95 (0.73) | 2.93 (0.91) | 2.85 (0.78) | 3.00 (0.82) |
| PTIQ–combined | 3.00 (0.57) | 3.03 (0.64) | 2.98 (0.56) | 3.15 (0.59) |

Note. CARE = Coping With ADHD Through Relationships and Education; FSS = Family–School Success program; PCRQ-NI = Negative/Ineffective Discipline factor on Parent–Child Relationship Questionnaire; PCRQ-PI = Positive Involvement factor on Parent–Child Relationship Questionnaire; PTIQ = Quality of Parent–Teacher Relationship factor on Parent–Teacher Involvement Questionnaire.

Figure 1. Teacher Reports of Homework Responsibility

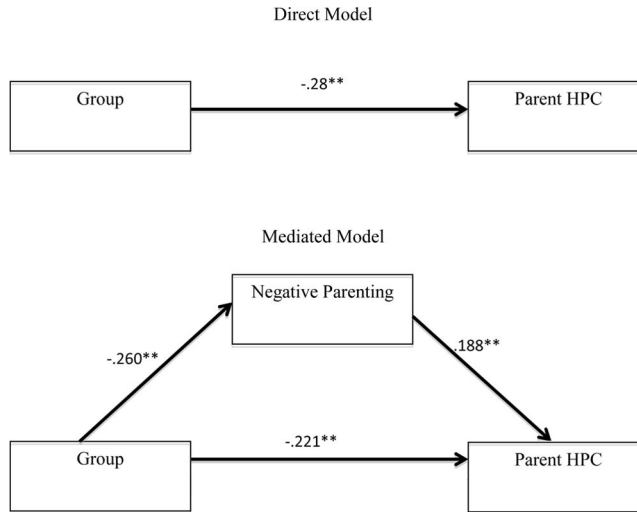


Note. The mediating effect of negative parenting practices on the relationship between group assignment and teacher reports of homework responsibility is illustrated. HPQ = Homework Performance Questionnaire. * $p < .05$. ** $p < .01$.

outcome variable) was tested. When we controlled for treatment group, single-parent status, race, baseline scores on outcome measures, and baseline scores for negative parenting, posttreatment negative parenting significantly predicted posttreatment outcomes for both teacher reports of homework responsibility (HPQ-T; $\beta = -.224$, $SE \beta = .091$, standardized $B = -.130$, R^2 change = .023, F change = 9.28, $df = 1164$, $p < .05$, small effect size) and parent reports of inattention or avoidance during homework (HPC; $\beta = .188$, $SE \beta = .066$, standardized $B = .188$, R^2 change = .061, F change = 15.06, $df = 1167$, $p < .01$, small to moderate effect size), fulfilling the third condition of mediation. Neither combined informant nor teacher reports of the quality of the parent–teacher relationship at posttreatment significantly predicted posttreatment teacher reports of homework responsibility or parent reports of inattention or avoidance during homework, when relevant covariates and baseline scores on measures of potential mediators and outcome variables were controlled. Negative parenting practices therefore emerged as the only potential medi-

ator to meet the third condition and therefore be included in further analyses.

To determine whether the final condition for mediation was met, we examined whether the relationship between group assignment and the outcome variables was significant when the mediator was entered into the model. The findings indicated that treatment group was no longer significantly related to teacher reports of homework responsibility (HPQ-T) when negative or ineffective discipline (PCRQ) was entered into the regression model, while we controlled for relevant covariates and baseline scores on the potential mediator and outcome variables ($\beta = .155$, $SE \beta = .097$, standardized $B = .084$, R^2 change = .006, F change = 2.56, $df = 1163$, $p = .112$). The findings support the presence of full mediation (standardized B without mediator = .129, $p < .01$; standardized B with mediator = .084, $p > .05$; Figure 1). For the prediction of parent-reported inattention or avoidance of homework (HPC), group assignment remained significant when entered together with negative or ineffective discipline, when we controlled for relevant covariates and baseline

Figure 2. Parent Reports of Inattention or Avoidance During Homework

Note. The mediating effect of negative parenting practices on the relationship between group assignment and parent reports of inattention or avoidance during homework is illustrated. HPC = Homework Problem Checklist. ** $p < .01$.

scores on the potential mediator and outcome variable ($\beta = -.242$, $SE \beta = .716$, standardized $B = -.221$, R^2 change = .044, F change = 11.547, $df = 1166$, $p < .001$). However, the magnitude of the relationship between treatment group and homework performance was reduced, suggesting partial mediation (standardized B without mediator = $-.280$, $p < .001$; standardized B with mediator = $-.221$, $p < .01$; Figure 2). Sobel tests were performed to evaluate the statistical significance of the mediation effects to further evaluate Condition 4 of the Baron and Kenny model (MacKinnon et al., 2002; Sobel, 1982). Sobel test results indicated that negative or ineffective discipline was a significant mediator of the relationship between treatment group and teacher-reported student responsibility with homework ($z = 2.17$, $p < .05$), as well as parent-reported homework problems ($z = -2.42$, $p < .05$).

DISCUSSION

This study provides additional evidence supporting the mediating role of parenting practices related to the effects of behavioral interventions on child behavior and extends

previous research to include a focus on educational outcomes (i.e., homework performance). Specifically, reductions in negative parenting were shown to mediate the relationship between the FSS intervention effect and improvements in both parent and teacher reports of homework performance. Although the mediational effect for parent reports of homework performance did not meet criteria for full mediation, the magnitude of the FSS treatment effect was significantly altered (explained) by reductions in negative or ineffective parenting.

Mediating Role of Parenting Practices

The results are consistent with previous research demonstrating the mediating role of parenting practices in family behavioral interventions. Similar to other studies investigating behavioral interventions for families of children diagnosed with ADHD, reductions in negative or ineffective parenting in this study, but not improvements in positive parenting involvement, demonstrated a mediating effect on child behavior (Chronis-Tuscano et al., 2011; Hinshaw et al., 2000). Although a major purpose of family behavioral interventions is

to increase parental use of positive reinforcement strategies relative to punishment, the impact of behavioral interventions appears to be reflected more clearly in reductions in negative parenting than improvements in positive parenting, and it is this pathway that accounted at least partially for behavioral treatment effects on homework performance in this study. It should be noted that parenting practices in this study were assessed using a parent self-report measure; research in the future needs to examine whether a similar pattern emerges when parenting is assessed using direct observation methods. Furthermore, the findings of this study differ from those of Gardner et al. (2006), who demonstrated the mediating effects of positive parenting. There are clear differences between their study and our study (e.g., children in their study were generally younger, from poorer families, and undifferentiated regarding ADHD status), which may have accounted for the different pattern of findings. Future research is needed to clarify whether variables such as child age, diagnostic status, and family socioeconomic status moderate the mediating effects of behavioral parent training on child outcomes.

Role of Family–School Relationship

The hypothesis that improvements in the family–school relationship would mediate intervention effects was not supported because the quality of the parent–teacher relationship did not have a significant effect on either parent or teacher reports of homework performance. This finding contrasts with research by Sheridan et al. (2012) that found that improvements in the parent–teacher relationship mediated the effects of CBC on improvements in student behavior. One clear difference between studies is that FSS was primarily a clinic-based treatment that was linked with the school whereas CBC was implemented primarily in a school setting. It is possible that the school-based aspect of CBC contributed to its greater effect on the family–school relationship relative to FSS, thereby creating the conditions for mediation. It is notable, how-

ever, that the clinical trial of FSS used an active comparison group to control for the nonspecific effects of intervention, which included one family–school meeting. In contrast, the study by Sheridan et al. used a business-as-usual control condition that did not involve an additional family–school meeting. The active control condition in the FSS study appeared to have been quite effective (Power et al., 2012) and may have reduced the magnitude of the intervention effect on the quality of the parent–teacher relationship and changes in homework performance. Alternatively, it is possible that differences in findings between these studies may be due in part to the measures used to assess the parent–teacher relationship; the measure used in this study provided a global assessment of relationship quality, whereas the measure used in the study by Sheridan et al. assessed relationship quality as well as communication effectiveness. Future research examining the specific dimensions of family–school relationships and how these dimensions are measured may elucidate the mediating role of the family–school relationship on outcomes of family–school interventions. In addition, research is needed to explore other potential mediators of family–school intervention for students with ADHD, such as quantity and quality of family involvement in education in the home setting (e.g., strategies parents use to support their children with homework).

Implications for Practice

Results from the current study have several important implications for school mental health providers. Previous research has identified homework as an important area for intervention. Homework, for example, has been shown to relate to academic performance, especially in the upper grades (Cooper, Robinson, & Patall, 2006), and provides opportunities to learn organization, time management, and planning skills (Abikoff et al., 2013; Langberg et al., 2010). Furthermore, homework can contribute to parent–child conflict (Power et al., 2001), which may exacerbate problems with child self-regulation (Pianta,

1997). Results from the current study, as well as the prior clinical trial, identify FSS as a promising way to improve homework performance, which may have an effect on students' academic performance. As demonstrated in this study, improvements in homework were due at least in part to reductions in negative parenting (e.g., spanking, yelling, shaming, ordering the child around, and using unclear directives).

Overall, the study confirms the growing body of research demonstrating the effect of parenting practices on educational performance. This study affirms the importance of school professionals engaging in practices that strengthen parenting skills and the quality of the parent–child relationship. If feasible, providing parent training in the school setting, by implementing programs such as Family Checkup (Stormshak, Connell, & Dishion, 2009), may be one strategy to improve educational outcomes for children. A particular advantage of FSS is that it provides behavioral parent training in the context of a comprehensive intervention that also targets family involvement in education and family–school problem solving, which may enhance the effects of family-mediated treatment on academic performance. Although FSS in its current form is a clinic-based, school-linked program, the major components of this intervention (daily report card, CBC, homework interventions, behavioral parent training) have been shown to be applicable for use in school settings (Evans et al., 2014; Piffner et al., 2007; Sheridan et al., 2012).

Limitations

Several limitations to the generalizability of the current study should be noted. First, families participating in this study were likely highly motivated. The majority of families were self-referred to the study or to our ADHD clinic. Furthermore, families who were randomly assigned to treatment arms consisted of those who followed through with recruitment procedures by returning questionnaires, completing a diagnostic evaluation, and completing a medication trial when indicated.

Families who are difficult to engage in treatment are likely to be underrepresented in this study. Second, the majority of participants in this study were White families from middle and upper-middle socioeconomic status. Although generally representative of the geographic area, results may not be generalizable to families from other ethnicities and socioeconomic backgrounds. Finally, the study was conducted with students in Grades 2–6. This is particularly notable as grade level was significantly correlated with positive parental involvement and parent-reported homework problems. Although we controlled for these relationships in our analyses, it is possible that mediational effects of parenting may vary over the course of a child's schooling (including grade levels below Grade 2 and above Grade 6). Future research should examine the role of parenting practices and school relationships in preschool-aged children and in adolescents.

A number of limitations related to measurement and design must also be acknowledged. Potential mediators (parenting practices and the parent–teacher relationship) were assessed by parent and teacher report only. Similarly, child behavior and performance were assessed using informant reports rather than direct observation. Given that some of the significant results were based on relationships among parent-report measures (homework problems and negative parenting practices), these findings may have been influenced by source variance. The use of alternative measures of data collection, such as the direct observation of parenting practices and child behavior, would strengthen the credibility of the findings. Finally, the FSS intervention used in this study was applied primarily in a clinic setting, although components were applied in schools. There are clear advantages to offering family behavioral treatments in schools, including improved access to care and increased opportunities for classroom interventions. The use of a tertiary, clinic setting may also offer limited opportunities to further develop a positive family–school relationship. Future research is needed to adapt this inter-

vention for use in school settings. Subsequently, research could compare the impact of setting on family and teacher engagement in the intervention, the effectiveness of the intervention across a range of child outcomes, and the effect of potential mediating and moderating variables.

CONCLUSIONS

Despite the aforementioned limitations, the present study provides further evidence about how family behavioral interventions have an effect on child outcomes. The impact of these interventions can be explained at least partially by improvements they produce in parenting practices. In particular, family behavioral interventions, including FSS, are effective in part because of their ability to reduce negative and ineffective parenting. This study affirms the critical role of negative or ineffective parenting as a mediator and demonstrates its impact on educationally related child outcomes, such as homework performance. Although more research is clearly needed, this investigation extends the current literature regarding the relationship between parenting practices and family-school interventions for students with ADHD and suggests several possible avenues for further study and intervention.

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Critical Issues in Design and Implementation. *Journal of Abnormal Child Psychology, 28*, 483–505.

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Genery D. Booster, PhD, is an assistant professor in the Department of Pediatrics at National Jewish Health in Denver, Colorado. She received a PhD in school psychology from Lehigh University, where she completed the Leadership Training Project in Pediatric School Psychology. Dr. Booster's research interests include the assessment and treatment of attention deficit hyperactivity disorder (ADHD) and emotional-behavioral functioning in children with chronic illness.

Jennifer A. Mautone, PhD, is Assistant Professor of School Psychology in Psychiatry at the Perelman School of Medicine at the University of Pennsylvania and a clinical and research psychologist in the Center for Management of ADHD at the Children's Hospital of Philadelphia. Dr. Mautone's research interests include multisystemic interventions for children and adolescents with ADHD, increasing access to evidence-based care for underserved communities, school mental health services, and integration of behavioral health in primary care.

Jenelle Nissley-Tsiopinis, PhD, is a research and clinical psychologist in the Department of Child & Adolescent Psychiatry and Behavioral Sciences at the Children's Hospital of Philadelphia. Her research focuses on assessing and treating ADHD across the lifespan, with a particular focus on developing effective skills training interventions for children and adolescents with ADHD, as well as interventions that help adolescents transition to independence. She also has a particular research interest in understanding the social skills deficits associated with ADHD and understanding how they differ from the deficits associated with autism spectrum disorder (ASD), as well as developing effective assessments and treatments for comorbid ADHD and ASD.

Devin Van Dyke is an alumnus of the Children's Hospital of Philadelphia Research Institute Summer Scholars Program. He graduated from Haverford College in 2014 with a degree in religion and is currently employed at McLean Hospital in Belmont, Massachusetts, as a residence counselor for the adolescent residential therapy program. He will attend medical school beginning in the fall of 2016 and plans to pursue psychiatry and psychiatric research, especially in the areas of personality disorder and post-traumatic stress disorder.

Thomas J. Power, PhD, is Professor of School Psychology in Pediatrics and Psychiatry at the Perelman School of Medicine at the University of Pennsylvania, as well as Director of the Center for Management of ADHD at the Children's Hospital of Philadelphia. Dr. Power's research interests include the assessment and treatment of ADHD, school mental health, behavioral health in primary care, and health promotion in the community. He is a former editor of *School Psychology Review*.