

Parent Involvement and Student Academic Performance: A Multiple Mediation Analysis

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Topor, D., Keane, S.P., Shelton, T.L., & Calkins, S.D. (2010). Parent involvement and student academic performance: A multiple mediational analysis. *Journal of Prevention and Intervention in the Community*, 38(3), 183-197. doi:10.1080/10852352.2010.486297.

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Abstract:

Parent involvement in a child's education is consistently found to be positively associated with a child's academic performance. However, there has been little investigation of the mechanisms that explain this association. The present study examines two potential mechanisms of this association: the child's perception of cognitive competence and the quality of the student–teacher relationship. This study used a sample of 158 seven-year-old participants, their mothers, and their teachers. Results indicated a statistically significant association between parent involvement and a child's academic performance, over and above the impact of the child's intelligence. A multiple mediation model indicated that the child's perception of cognitive competence fully mediated the relation between parent involvement and the child's performance on a standardized achievement test. The quality of the student–teacher relationship fully mediated the relation between parent involvement and teacher ratings of the child's classroom academic performance. Limitations, future research directions, and implications for public policy initiatives are discussed.

Article:

Parent involvement in a child's early education is consistently found to be positively associated with a child's academic performance (Hara & Burke, 1998; Hill & Craft, 2003; Marcon, 1999; Stevenson & Baker, 1987). Specifically, children whose parents are more involved in their education have higher levels of academic performance than children whose parents are involved to a lesser degree. The influence of parent involvement on academic success has not only been noted among researchers, but also among policy makers who have integrated efforts aimed at increasing parent involvement into broader educational policy initiatives. Coupled with these findings of the importance of early academic success, a child's academic success has been found to be relatively stable after early elementary school (Entwisle & Hayduk, 1988; Pedersen, Faucher, & Eaton, 1978). Therefore, it is important to examine factors that contribute to early academic success and that are amenable to change.

Researchers have reported that parent–child interactions, specifically stimulating and responsive parenting practices, are important influences on a child's academic development (Christian, Morrison, & Bryant, 1998; Committee on Early Childhood Pedagogy, 2000). By examining

specific parenting practices that are amenable to change, such as parent involvement, and the mechanisms by which these practices influence academic performance, programs may be developed to increase a child's academic performance. While parent involvement has been found to be related to increased academic performance, the specific mechanisms through which parent involvement exerts its influence on a child's academic performance are not yet fully understood (Hill & Craft, 2003). Understanding these mechanisms would inform further research and policy initiatives and may lead to the development of more effective intervention programs designed to increase children's academic performance.

MODELS OF PARENT INVOLVEMENT

Parent involvement has been defined and measured in multiple ways, including activities that parents engage in at home and at school and positive attitudes parents have toward their child's education, school, and teacher (Epstein, 1996; Grolnick & Slowiaczek, 1994; Kohl, Lengua, & McMahon, 2000). The distinction between the activities parents partake in and the attitude parents have toward education was highlighted by several recent studies. Several studies found that increased frequency of activities was associated with higher levels of child misbehavior in the classroom (Izzo, Weissberg, Kaspro, & Fendrich, 1999), whereas positive attitudes toward education and school were associated with the child's increased academic performance (Rimm-Kaufman, Pianta, Cox, & Bradley, 2003). Specifically, Izzo et al. (1999) reported that an increase in the parent's school activities, such as increased number of parent-teacher contacts, was associated with worsening achievement, as increased contacts may have occurred to help the teacher manage the child's existing behavior problems. The significance of parent attitudes toward education and school is less well understood, although attitudes are believed to comprise a key dimension of the relationship between parents and school (Rimm-Kaufman et al., 2003). Parents convey attitudes about education to their children during out-of-school hours and these attitudes are reflected in the child's classroom behavior and in the teacher's relationship with the child and the parents (Kellaghan, Sloane, Alvarez, & Bloom, 1993).

ASSESSMENT OF ACADEMIC PERFORMANCE IN EARLY ELEMENTARY SCHOOL

Several methods are used to measure child academic performance, including standardized achievement test scores, teacher ratings of academic performance, and report card grades. Standardized achievement tests are objective instruments that assess skills and abilities children learn through direct instruction in a variety of subject areas including reading, mathematics, and writing (Sattler, 2001). Teacher rating scales allow teachers to rate the accuracy of the child's academic work compared to other children in the class, and allow for ratings on a wider range of academic tasks than examined on standardized achievement tests (DuPaul & Rapport, 1991). Report card grades allow teachers to report on classroom academic performance, but are used by few studies for early elementary school children due to, among other reasons, a lack of a standardized grading system and uniform subject areas children are evaluated on.

PROPOSED EXPLANATIONS OF THE RELATION BETWEEN PARENT INVOLVEMENT AND ACADEMIC PERFORMANCE

Based on previous research, it was hypothesized that parents who have a positive attitude towards their child's education, school, and teacher are able to positively influence their child's academic performance by two mechanisms: (a) by being engaged with the child to increase the

child's self-perception of cognitive competence and (b) by being engaged with the teacher and school to promote a stronger and more positive student–teacher relationship.

Perceived Cognitive Competence

Perceived cognitive competence is defined as the extent to which children believe that they possess the necessary cognitive skills to be successful when completing academic tasks, such as reading, writing, and arithmetic (Harter & Pike, 1984). Previous research found evidence that higher parent involvement contributes to an increase in a child's perceived level of competence (Gonzalez-DeHass, Willems, & Holbein, 2005; Grolnick, Ryan, & Deci, 1991). There are theoretical pathways through which children's perceptions and expectations of their cognitive competence are influenced by others: (a) performance accomplishments/performance mastery, (b) vicarious reinforcement, (c) verbal persuasion, and (d) emotion regulation (Bandura, 1977). In addition, a child's increased perception of cognitive competence is consistently related to higher academic performance (Chapman, Skinner, & Baltes, 1990; Ladd & Price, 1986; Schunk, 1981). Based on theory and previous findings, Gonzalez-DeHass et al. (2005) suggest that perceived cognitive competence be examined to explain the relation between parent involvement and a child's academic performance.

The Student–Teacher Relationship

A positive student–teacher relationship has been defined as the teacher's perception that his or her relationship with the child is characterized by closeness and a lack of dependency and conflict (Birch & Ladd, 1997). Closeness is the degree of warmth and open communication between the student and teacher, dependency is the over-reliance on the teacher as a source of support, and conflict is the degree of friction in student–teacher interactions (Birch & Ladd, 1997). Previous research found that close, positive student–teacher relationships are positively related to a wide range of child social and academic outcomes in school (Hughes, Gleason, & Zhang, 2005). Specifically, a close student–teacher relationship is an important predictor of a child's academic performance (Birch & Ladd, 1997; Hamre & Pianta, 2001). Previous research has also found that parent involvement in a child's education positively influences the nature of the student–teacher relationship (Hill & Craft, 2003; Stevenson & Baker, 1987). Therefore, the student–teacher relationship was examined for its ability to explain the relation between parent involvement and a child's academic performance.

THE PRESENT STUDY

Parent involvement is one factor that has been consistently related to a child's increased academic performance (Hara & Burke, 1998; Hill & Craft, 2003; Marcon, 1999; Stevenson & Baker, 1987). While this relation between parent involvement and a child's academic performance is well established, studies have yet to examine *how* parent involvement increases a child's academic performance. The goal of the present study was to test two variables that may mediate, or explain how, parent involvement is related to a child's academic performance. Parent involvement was defined as the teacher's perception of the positive attitude parents have towards their child's education, teacher, and school. Academic performance was measured by two methods: standardized achievement test scores and teacher report of academic performance through rating scales. Based on previous research (Gonzalez-DeHass et al., 2005; Hughes et al., 2005), two possible mechanisms, a child's perception of cognitive competence as measured by the child's report, and the student–teacher relationship as measured by the teacher's report,

were examined for their ability to mediate the relation between parent involvement and academic performance. It was predicted that parent involvement would no longer be a significant predictor of a child's academic performance when the child's cognitive competence and the student–teacher relationship were accounted for in the analyses.

Method

Participants. Participants in this cross-sectional study were 158 children who, at age seven, participated in the laboratory and school visits. Participants were obtained from three different cohorts participating in a larger ongoing longitudinal study. Four-hundred and forty-seven participants were initially recruited at two years of age through child care centers, the County Health Department, and the local Women, Infants, and Children program. Consistent with the original longitudinal sample (Smith, Calkins, Keane, Anastopoulos, & Shelton, 2004), 66.5% of the children ($n = 105$) were European American, 26.6% of the children were African American ($n = 42$), 7 children (4.4%) were biracial, and 4 children (2.5%) were of another ethnic background. Seventy-one (45%) of the participants were male and 87 (55%) were female. Socioeconomic status ranged from lower to upper class as measured by the family's Hollingshead Four Factor Index of Social Status score (Hollingshead, 1975).

Measures

Parent Involvement. The teacher version of the Parent–Teacher Involvement Questionnaire (INVOLVE) was used to assess parent involvement. The measure is a 20-item scale with a 5-point scale answer format (Webster-Stratton, Reid, & Hammond, 2001). The “Parent Involvement in Education” subscale includes six items (Webster-Stratton, 1998). It assesses the teacher's perception of the positive attitude parents have toward their child's education, teacher, and school. Examples of these items include “How much is this parent interested in getting to know you?” and “How important is education in this family?”

Student–Teacher Relationship. The Student–Teacher Relationship Scale (STRS) consists of 28 items that measure aspects of the relationship between the student and teacher (Pianta, 2001). Item responses are in a 5-point Likert-style format. Items assess the teacher's feelings about a child, the teacher's beliefs about the child's feelings toward the teacher, and the teacher's observation of the child's behavior in relation to the teacher (Pianta & Nimetz, 1991). The measure yields three subscales: “Conflict,” “Closeness,” and “Dependency.” An overall “Positive Student–Teacher Relationship Scale” is calculated by summing the items on the “Closeness” scale and the reverse-score of the items on the “Conflict” and “Dependency” scales. Examples of items include “I share an affectionate, warm relationship with this child” (Closeness), “This child easily becomes angry with me” (Conflict), and “This child is overly dependent on me” (Dependency).

Perceived Competence. The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984) consists of 24 items that measure four domains of self-concept: (a) perceived cognitive competence, (b) perceived physical competence, (c) peer social acceptance, and (d) maternal social acceptance. Children are shown pictures of a child who is successful at completing a task and one who is unsuccessful, and are asked to choose the picture most similar to them. Items include a child naming alphabet letters or running in a race. This study used the mean of the six items on the perceived cognitive competence subscale.

Previous research has used this subscale as a stand-alone measure in analyses (Grolnick & Slowiaczek, 1994).

Academic Performance. Two measures of academic performance were used. The Wechsler Individual Achievement Test-Second Edition (WIAT-II; The Psychological Corporation, 2002) is an individually administered, nationally standardized measure of academic achievement (Sattler, 2001). Children were administered the five subtests comprising the Reading and Mathematics composites. As the current study was interested in examining a more global standardized measure of academic achievement, and since the Reading and Mathematics composites were related ($r = .60, p < .001$), the mean of the combined Reading and Mathematics composites was used as the child's standardized achievement test score.

The Academic Performance Rating Scale (APRS) (DuPaul & Rapport, 1991) is a 19-item scale, where teachers rate the child's academic abilities and behaviors in the classroom on a 5-point scale. Higher scores indicate greater classroom academic performance. As the current study focused on academic performance and not other behaviors, only two items on the APRS that corresponded to the child's actual classroom academic performance were examined: “accuracy of the child's completed written math work” and “accuracy of the child's written language arts work.” These two items were highly correlated ($r = .84, p < .001$). A mean of the items was used as the measure of classroom academic performance.

Intelligence. The Wechsler Intelligence Scale for Children-Third Edition (WISC-III) is a nationally standardized and individually administered measure of general intelligence for children aged 6–16 years (Wechsler, 1991). The WISC-III provides three IQ scores (Verbal, Performance, and Full Scale), each with a mean of 100 and standard deviation of 15. The current study used the child's Full Scale IQ score.

Procedures

Data were gathered from the child and the child's mother during two visits to the laboratory and from the child's teacher during one visit to the child's school. The child's IQ, academic achievement, and perceived cognitive competence were assessed in a one-on-one session with a trained graduate student clinician during the two laboratory visits, when the child was seven years old. The child's mother provided updated demographic information. School visits began several months into the school year to allow teachers adequate time to become familiar with the child and the child's mother. Teachers completed a packet of questionnaires, including a measure on parent involvement and the child's classroom academic performance.

Mediation Analysis

A mediator is defined as a variable that allows researchers to understand the mechanism through which a predictor influences an outcome by establishing “how” or “why” an independent variable predicts an outcome variable (Baron & Kenny, 1986). In the current study, the independent variable was parent involvement and the two dependent variables were a child's standardized achievement test score and classroom academic performance. The two potential mediators were the child's perception of cognitive competence and the quality of the student–teacher relationship. Four regression analyses were performed to test each potential mediator and variables considered as co-variables were controlled for in all regression equations. A multiple

mediation model was used to examine if both potential mediators jointly reduce the direct effect of parent involvement on a child's academic performance and to better understand the unique contribution of each individual mediator when the other mediator is controlled for (Preacher & Hayes, 2006). Baron and Kenny (1986) state that to test a mediator the first regression must show that the independent variable affects the mediator, the second that the independent variable affects the dependent variable, and the third that the mediator affects the dependent variable. For full multiple mediation, the fourth regression must show that after controlling for the mediators (child's perception of cognitive competence and student–teacher relationship), the independent variable (parent involvement) no longer significantly predicts the dependent variable (standardized achievement test score/classroom academic performance). Partial mediation exists if the effect of the independent variable on the dependent variable is reduced, but still significant, when the mediators are controlled (Baron & Kenny, 1986).

The mediation was also tested by using the Sobel (1982) test to examine the reduction of the effect of the independent variable on the dependent variable, after accounting for the mediating variables. The Sobel (1982) test conservatively tests this reduction by dividing the effect of the mediator by its standard error and then comparing this term to a standard normal distribution to test for significance (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

RESULTS

The Cronbach's alpha for the six items on the INVOLVE-T “Parent Involvement in Education” subscale was $\alpha = .91$, indicating good internal consistency. The reliability of the 28 items on the Student–Teacher Relationship Scale “Positive Student–Teacher Relationship Scale” and the six items on the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children cognitive competence subscale was adequate (Cronbach's alpha $\alpha = .86$ and $.80$, respectively).

Bivariate correlations between the variables of interest and demographic variables are presented in Table 1. The child's Full-Scale IQ score was significantly related to the child's WIAT–II score ($r = .68, p < .001$), to the child's classroom academic performance ($r = .47, p < .001$), and to parent involvement ($r = .39, p < .001$). Given these significant findings, the child's Full-Scale IQ score was used as a control variable in the regression analyses addressing the research questions. As shown in Table 1, significant positive correlations existed between parent involvement and the student–teacher relationship ($r = .48, p < .001$), the child's perception of cognitive competence ($r = .31, p < .001$), the child's WIAT–II score ($r = .43, p < .001$), and the child's classroom academic performance ($r = .35, p < .001$).

Table 1: Correlations Between Variables of Interest

Variable	1	2	3	4	5	6	7
1. Socioeconomic Status (Hollingshead)	—						
2. Full Scale IQ Score (WISC–III)	.42***	—					
3. Parent Involvement (INVOLVE-T)	.26**	.39***	—				
4. Perceived Cognitive Competence (Harter)	.17*	.34***	.31***	—			
5. Positive Student–Teacher Relationship (STRS)	.04	.20*	.48***	.20*	—		
6. Standardized Achievement Test Score (WIAT–II)	.31***	.68***	.43***	.54***	.26**	—	
7. Classroom Academic Performance (APRS)	.24**	.47***	.35***	.24**	.38***	.46***	—

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

It was hypothesized that parent involvement would predict academic performance, as measured by both the WIAT–II achievement score and teacher ratings of a child's classroom academic

performance. As shown in Table 2, parent involvement was a significant predictor of the child's WIAT-II score $F(3, 154)$ change = 9.88, $p < .01$, $\beta = .20$, over and above the variance accounted for by the child's IQ. Parent involvement was a significant predictor of the child's classroom academic performance, $F(3, 154)$ change = 6.68, $p < .05$, $\beta = .20$, over and above the variance accounted for by the child's IQ. It was hypothesized that parent involvement would predict the child's perception of cognitive competence and the quality of the student-teacher relationship. As expected, parent involvement was a significant predictor of a child's perception of cognitive competence ($\beta = .21$, $p < .01$) and a positive student-teacher relationship ($\beta = .47$, $p < .001$), after controlling for IQ. Next, the two mediators (perceived cognitive competence and a positive student-teacher relationship) were independently tested as predictors of the two measures of academic performance. After controlling for IQ, perceived cognitive competence was a significant predictor of a child's WIAT-II score ($\beta = .35$, $p < .001$), but not a significant predictor of the child's classroom academic performance ($\beta = .09$, $p = .23$). After controlling for IQ, a positive student-teacher relationship positively predicted a child's WIAT-II score ($\beta = .13$, $p < .05$) and a child's classroom academic performance ($\beta = .30$, $p < .001$).

Table 2: Regression Analyses Testing Parent Involvement as a Predictor of Child Academic Performance

	B	SE B	β	R^2	R^2 Change	F Change
Regression Examining Parent Involvement as a Predictor of Child's WIAT-II Score						
Step 1. Full Scale IQ	.54	.06	.52	.46	.46	134.93***
Step 2. Parent Involvement	3.38	1.08	.20	.50	.04	9.88**
Regression Examining Parent Involvement as a Predictor of a Child's Classroom Academic Performance						
Step 1. Full Scale IQ	.03	.01	.39	.22	.22	44.19***
Step 2. Parent Involvement	.24	.09	.20	.26	.04	6.68*

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

Finally, the mediational model was tested by examining whether parent involvement continued to have a significant effect on the measures of academic performance, after controlling for the mediators and for the child's IQ. As shown in Table 3, parent involvement was no longer a significant predictor of a child's WIAT-II score when the child's cognitive competence and the student-teacher relationship were accounted for in the analyses ($\beta = .11$, $p = .08$). The multiple mediation analysis indicated that only perceived cognitive competence uniquely predicted the child's WIAT-II score ($\beta = .32$, $p < .001$). The Sobel test further confirmed the effect of perceived cognitive competence as an independent mediator (Test statistic = 2.50, $p < .05$). The hypothesis was partially supported in that the child's perceived cognitive competence mediated the relation between parent involvement and a child's WIAT-II score, but the student-teacher relationship did not. Only the student-teacher relationship was examined as a mediator of the relation between parent involvement and a child's classroom academic performance as the child's perceived cognitive competence was not a significant predictor of the child's classroom academic performance. As shown in Table 3, parent involvement was no longer a significant predictor of a child's classroom academic performance when the student-teacher relationship was accounted for in the analyses ($\beta = .07$, $p = .36$). The Sobel test further confirmed the effect of the mediator (Test statistic = 1.90, $p = .05$).

Table 3: Regression Analyses Testing Perceived Cognitive Competence and the Student–Teacher Relationship as Multiple Mediators of the Relation Between Parent Involvement and Child's Academic Performance

	B	SE B	β	R^2	R^2 Change	F Change
Regression Examining Mediation of the Relation Between Parent Involvement and Child's WIAT–II Score						
Step 1. Full Scale IQ	.54	.06	.52	.46	.46	134.93***
Step 2. Perceived Cognitive Competence	8.12	1.45	.32***	.58	.11	20.29***
Student–Teacher Relationship	.05	.07	.04			
Step 3. Parent Involvement	1.95	1.10	.11	.58	.00	3.12
Regression Examining Mediation of the Relation Between Parent Involvement and Child's Classroom Academic Performance						
Step 1. Full Scale IQ	.03	.01	.39	.22	.22	44.19***
Step 2. Student–Teacher Relationship	.02	.01	.27	.31	.09	19.20***
Step 3. Parent Involvement	.09	.10	.07	.31	.00	.84

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

DISCUSSION

The purpose of the present study was to examine the ability of the child's perceived cognitive competence and the quality of the student–teacher relationship to explain the relation between parent involvement and the child's academic performance. Findings from the present study demonstrated that increased parent involvement, defined as the teacher's perception of the positive attitude parents have toward their child's education, teacher, and school, was significantly related to increased academic performance, measured by both a standardized achievement test and teacher ratings of the child's classroom academic performance. Further, parent involvement was significantly related to academic performance above and beyond the impact of the child's intelligence (IQ), a variable not accounted for in previous research.

Findings from the present study demonstrated that increased parent involvement is significantly related to a child's increased perception of cognitive competence. This finding is consistent with previous studies (Gonzalez-DeHass, Willems, & Holbein, 2005; Grolnick, Ryan, & Deci, 1991). While outside the scope of the present study, it is conceivable that parent involvement may influence the child's perception of cognitive competence by means described by Bandura (1977). Findings demonstrated that increased parent involvement was significantly related to increased quality of the student–teacher relationship. Findings also demonstrated that increased perceived cognitive competence was related to higher achievement test scores and that the quality of the student–teacher relationship was significantly related to the child's academic performance, measured by both standardized achievement test scores and the child's classroom academic performance. These findings are consistent with previous research and theory (Chapman et al., 1990; Ladd & Price, 1986; Schunk, 1981). Contrary to what was hypothesized, increased perception of cognitive competence was not significantly related to teacher ratings of academic performance. There may be several reasons for this finding. It may be the tasks children perceive they are competent to complete are not related to actual classroom tasks or that teacher ratings of academic performance are in part based on other variables, such as the child's abilities in other domains independent of the child's academic abilities.

This study examined the ability of perceived cognitive competence and the student–teacher relationship to jointly mediate the relation between parent involvement and academic performance. Both variables jointly were *full mediators* of the relation between parent involvement and WIAT–II scores. Examined as multiple mediators, perceived cognitive competence *fully mediated* the relation between parent involvement and the child's WIAT–II

score, over and above the influence of the quality of the student–teacher relationship. It may be the case that the variance of the relation between parent involvement and WIAT–II score is already explained by the child's perception of cognitive competence. In addition, the student–teacher relationship was a *full mediator* of the relation between parent involvement and teacher ratings of the child's classroom academic performance. This is one of the first studies to examine a mechanism by which parent involvement is related to a child's academic performance. Two statistical techniques to test for mediation were used, further confirming the findings.

Although this study had many strengths, results of the present study are tempered by a consideration of several methodological limitations. One limitation was that cross-sectional data were used. A second limitation was that data were collected over several time points and settings, which increased opportunities for families and teachers to not complete measures and participate in visits. Finally, the child's teacher was the reporter for several of the measures, which may have led to artificially high relations between these teacher-report measures. Specifically, it may be that some teachers were unduly influenced by outside factors, such as the parent being involved in the school's PTA and were unable to determine the parent's actual attitude toward the child's education.

Despite these limitations, study findings generate several directions for future research. First, future investigation of the relation between parent involvement and perceived cognitive competence and the student–teacher relationship is needed to better understand how these relations exist. Second, longitudinal studies are needed to understand how these variables interact over time and to examine the possibility of bidirectional relations among the variables. Third, measuring parent involvement at a time prior to assessing academic performance and mediating variables would allow for a better understanding of the relation among these variables. Finally, given the importance of IQ when predicting a child's academic performance, IQ should continue to be accounted for in future studies examining academic performance.

Several public policy recommendations and initiatives follow from the results of the present study. School administrators and policy makers should continue to investigate ways to increase a parent's positive attitude about their child's education and demonstrate to parents that their attitude is related to their child's academic performance. Future policy should focus on developing and promoting school programs that enable parents to increase a child's perception of cognitive competence, and fund future research to better understand the mechanisms by which this occurs. School administrators should consider ways to improve the student–teacher relationship, given its important relation with the child's academic performance. For instance, school administrators may set aside time in the curriculum for team building exercises between students, teachers, and parents. Taken together, the present study identified mechanisms by which parent involvement is related to a child's academic performance, over and above the impact of the child's IQ, and it is the hope that these findings lead to further research and new policies to increase a child's academic performance.

We thank the parents and children who have repeatedly given their time and effort to participate in this research. Additionally, we are grateful to the entire RIGHT Track staff for their help in data collection, entry, and coding, particularly Louise Berdan, Kathryn Degnan, Elizabeth Shuey, Caitlin Stone, Paulo Graziano, Rachael Reavis, Robin Howse, and Jeffrey Gredlein. This

research was supported by a National Institute of Mental Health (NIMH) Behavioral Science Track Award for Rapid Transition (MH 55625), an NIMH FIRST Award (MH 55584) and an NIMH K-award (MH 74077) to Susan D. Calkins, and by NIMH Grant (MH 58144A) awarded to Susan D. Calkins, Susan P. Keane, and Marion O'Brien.

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