

CHILD DISRUPTIVE BEHAVIOR AND PARENTING EFFICACY: A COMPARISON OF THE EFFECTS OF TWO MODELS OF INSIGHTS

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In this article, we investigate the effectiveness of INSIGHTS into Children's Temperament (INSIGHTS), a temperament-based preventive intervention, in reducing the disruptive behavior problems of young children from low-income, urban families. Results indicate that children enrolled in INSIGHTS evidenced a decrease in disruptive behavior problems over the course of the intervention, with children with high maintenance temperaments evidencing the most rapid rates of decline. In addition, children in a collaborative version of the program with joint parent and teacher sessions demonstrated more rapid decreases in disruptive behavior than children in a parallel version with separate parent and teacher sessions. Furthermore, high maintenance children in the collaborative intervention evidenced lower levels of disruptive behaviors at the end of the intervention than their peers in the parallel version. Increases in parenting efficacy appeared to be the mechanism through which INSIGHTS reduced child disruptive behavior. © 2012 Wiley Periodicals, Inc.

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Disruptive behavior problems in early childhood concern practitioners and researchers because of their association with later delinquency and school failure (Moffit, 1993; Caspi, Moffit, Newman, & Silva, 1996; Fergusson, Lynskey, & Horwood, 1996; Loeber, Farrington, Stouthamer-Loeber, Moffit, & Caspi, 1998). Research has identified factors within children and families linked to early and persistent child disruptive behavior. In families, these include poverty, high levels of parental depression, and low levels of parental efficacy (Calkins, 1994; Shaw, Owens, Vondra & Keenan, 1996; Denham Workman, Cole, Weissbrod, Kendziora, & Zahn-Waxler, 2000; Rubin, Burgess, Dwyer, & Hastings, 2003; Smith, Landry, & Swank, 2000). For children, these include a challenging temperament (Chess & Thomas, 1984; Rothbart & Bates, 2006). Definitions of a challenging temperament vary, but dimensions related to disruptive behavior in school-age children include low task persistence, high motor activity, and negative reactivity (Mervielde & Asendorpf, 2000; Janson & Mathiesen, 2008).

Recent research has examined the social contexts—particularly the family—that influence the likelihood of disruptive behavior problems among at-risk children (Mesman et al., 2009). Harsh and/or emotionally distant parenting is a robust predictor of children's disruptive behavior, with magnified effects for children from low-income families and communities (Sutton, Cowen, Hugh, & Wyman, 1999), as well as children with challenging temperaments (Cole, Teti, & Zahn-Waxler, 2003; Denham, Workman, Cole, et al., 2000; Rubin et al., 2003). On the other hand, effective parenting, which includes both warmth and limit setting, is protective for all children, especially among the economically disadvantaged and for those with challenging temperaments (Karreman, de Haas, van Tuijl, van Aken, & Dekovic, 2010).

The most common interventions target parents (e.g., Dishion et al., 2008; Dretzke et al., 2009; Nowak & Heinrichs, 2008; Thomas & Zimmer-Gembeck, 2007) along with other caregivers, typically teachers. In addition to enhancing child management skills, comprehensive interventions foster collaboration, common goals, and/or consistent strategies across caregivers (e.g., Conduct Problems Prevention Research Group, 2007; Webster-Stratton, Reid & Stoolmiller, 2008). Communication and cooperation between parents and teachers have been shown to improve behavioral and academic outcomes, especially for younger and low-income children (Barnard, 2004; Epstein & Dauber, 1991; Henderson & Berla, 1994; Jeynes, 2005). Comprehensive programs that involve both schools and families often are more effective in reducing children's disruptive behaviors than those with single targets (e.g., Greenberg, Domitrovich, & Bumbarger, 2001; Webster-Stratton et al., 2008).

Yet few empirically supported intervention programs teach caregivers strategies for interacting with children of different temperaments (McClowry, Rodriguez, & Koslowitz, 2008). In the current study, we investigate the effectiveness of INSIGHTS into Children's Temperament (INSIGHTS), one of the few temperament-based, comprehensive interventions designed to enhance functioning and development of at-risk children. It teaches parents and teachers temperament-based strategies to reduce children's behavior problems and enhance self-regulation, and teaches children to enhance empathy and daily problem solving. This report compares INSIGHTS' original program, in which teachers and parents meet separately, with its revised, collaborative model, in which teachers and parents meet together.

Given the role of a challenging temperament in disruptive behaviors, we were interested in whether INSIGHTS' effects on disruptive behaviors were stronger for children with temperaments characterized by low task persistence and high negative reactivity and activity. In light of empirical research on parent-teacher interactions, we were also

interested in whether the collaborative model was more effective than the parallel program. Lastly, because little is known about how parenting interventions work (see Stolk et al., 2008, for a meta-analysis), we explored the mechanisms through which INSIGHTS influences children's disruptive behavior. Understanding these mechanisms could help to improve existing interventions or to develop new ones (Bernazzani, Cote, & Tremblay, 2001; Cicchetti & Hinshaw, 2002; Rossi, Lipsey, & Freeman, 2004).

Behavior Problems in Childhood: Trajectories and Influences

Several previous studies suggest disruptive behavior in later childhood and adolescence is stable (NICHD ECCRN, 2004), but recent longitudinal studies indicate disruptive behavior is relatively volatile through middle childhood (Campbell, 2002; NICHD ECCRN, 2004). Research indicates that several factors place children at-risk for stable elevated levels of disruptive behavior (e.g., Belsky, 1984; Bronfenbrenner, 1979; Mesman et al., 2009): challenging temperaments (Calkins, 1994; Campbell, 2002; Denham et al., 2000; Rubin et al., 2003); a depressed parent; and a parent with low levels of parenting efficacy, who does not believe he or she can manage their children's behavior (MacPhee, Fritz, & Miller-Heyl, 1996; Shumow & Lomax, 2002). Interestingly, parenting efficacy has been found to mediate associations between family income and children's socioemotional adjustment. For example, results from a short-term longitudinal study of low-income African American mothers and their preschool children found that the negative effects of a low family income on children's socioemotional and behavioral development were attributable to low levels of maternal parenting efficacy (Jackson, Choi, & Benter, 2009). Low levels of parenting efficacy are associated with negative parental affect and coercive and harsh disciplinary practices, which themselves are associated with disruptive behavior problems (Bugental, Johnston, New, & Sylvester, 1998; Sigel, McCillicuddy-Delisi, & Goodnow, 1992).

Parental depression and parenting efficacy appear to operate relatively independently, especially in the current study's target population. Although some previous studies have shown modest correlations between maternal depression and self-efficacy (Cutrona & Troutman, 1986; Halper & McLean, 1997; Teti & Gelfand, 1991), one recent study indicates such associations are not found among low-income, African American and Latino mothers (O'Neil, Wilson, Shaw, & Dishion, 2009).

Interactions between Child Temperament and Parent Characteristics

Theoretical and empirical work indicates that children are differentially susceptible to their family environment, depending on temperament (Alink et al., 2009; Belsky, 2005; Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007; Hemphill & Sanson, 2001; Patterson & Sanson, 1999; Rothbart & Bates, 2006; Van Zeijl et al., 2007). In previous studies, children with challenging temperaments who experienced harsh parenting were at particular risk of maintaining high, stable trajectories of externalizing behaviors in early to middle childhood (Kingston & Prior, 1995), and their parents reported lower levels of parenting efficacy and parenting practices (Bell, 1968; Lytton, 1990; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006). Meanwhile, interventions that increase parental sensitivity and appropriate discipline have more of an influence on reducing externalizing behaviors among children with challenging temperaments than other children (Mesman et al., 2009; Van Zeijl et al., 2007).

INSIGHTS Into Children's Temperament

INSIGHTS is a comprehensive, preventive intervention that integrates theory, research, and clinical applications regarding temperament, parenting, and student/teacher relationships (McClowry, Snow, & Tamis-LeMonda, 2005). Broadly speaking, INSIGHTS provides adult caregivers with a framework for supporting the individual differences of children and teaches them strategies for behavior management that match a child's temperament. In addition, the kindergarten and early elementary age students participate in classroom curricula designed to enhance empathy for others with different temperaments and teach daily problem-solving techniques (see McClowry et al., 2005; McClowry, Snow, Tamis-LeMonda, & Rodriguez, 2010).

Although INSIGHTS is based in temperament theory, the original trial (McClowry et al., 2005) did not examine differential program effectiveness by temperament, a gap that this quasi-experimental study fills. Challenging temperament is operationalized in INSIGHTS by a temperament profile with low task persistence and high negative reactivity and motor activity. INSIGHTS describes the temperament of children with this typology as "high maintenance," while children high in task persistence and low in negative reactivity and activity are "industrious," and those who are neither are "intermediate."

Collaborative model. After the first prevention trial, the collaborative model was developed based on suggestions by stakeholders for improving the intervention to better meet the needs of the community. The partnering community leaders, parents, and teachers recommended additional content to increase communication and connectedness among caregivers to resolve child behavioral problems and enhance social competencies. In addition, community partners suggested changes to INSIGHTS' protocol so that parents and teachers meet together.

Parenting mechanism. One of the primary goals of INSIGHTS is to improve parenting competency, including parenting efficacy, and to reduce child disruptive behaviors. Studies show parents feel less efficacious when they see children's actions as hostile (e.g., Dix, Ruble, Grusec, & Nixon, 1986; Fincham & Roberts, 1985), and more efficacious when they know more about child development and have more social support (Swick, 1988). Therefore, in both versions of INSIGHTS, parents learn to recognize their child's temperament, understand how temperament influences children's behavior, and discuss strategies specific to their child's temperament to optimize interactions with their children and gain their compliance. Parents in both versions also participate in facilitated mutual support workshops.

Studies show that parents of school children report greater levels of parenting efficacy when they feel a partnership with their children's teachers and school (Marcon, 1999; Norwood, Atkinson, Tellez, & Saldana, 1997; Cheung, Lam, & Ngai, 2008). Unfortunately, urban ethnic minority parents often report feeling less accepted by, and more alienated from, their children's school than do their suburban, White counterparts (Norwood et al., 1997). Given these findings, we anticipated that the content and protocol changes to INSIGHTS would increase the effectiveness of INSIGHTS for the urban families for whom, and with whom, the collaborative program was developed.

METHOD

Participants

Eleven elementary schools in a large urban school district partnered in this study. Participants included 202 children and families and 82 general education kindergarten, first-grade, and second-grade teachers. Six schools hosted the collaborative program, with approximately half of the study families ($n = 103$). The other five schools hosted the parallel program, with similar numbers of families enrolled ($n = 99$). Child demographics were similar across schools.

Children were aged 4-9 years (mean [M] = 6.07, standard deviation [SD] = 1.01), with 98% of the children between ages five and eight. Fifty-six percent of the children were male. Thirty-six percent were in kindergarten, 34% were in first grade, and 30% were in second grade. Approximately 85% of the children qualified for free or reduced lunch. Most respondents were mothers (85%); the rest fathers (8%) and kinship guardians (7%). Adult respondents were aged 20-65 years ($M = 34.57$ $SD = 8.55$), and 54% reported their race/ethnicity as African American, non-Hispanic ($n = 106$), 44% Hispanic/Latino non-Black, ($n = 87$), 1% White ($n = 2$), and 1% other ($n = 2$). Study children had similar demographic characteristics to other children at the participating schools. Public school records show about 56% of children were African American, 42% Hispanic/Latino, 1% White, and 1% other.

Consented teachers included 29 kindergarten, 31 first-grade, and 22 second-grade teachers (96% of whom were female). Twenty-five percent reported their race/ethnicity as African American, non-Hispanic, 38% as Hispanic/Latino non-Black, 34% as White, and 3% as Asian. The demographic characteristics of teachers who declined to participate were similar to those who agreed.

Measures

Parenting efficacy was measured immediately before and after the intervention on the 7-item efficacy subscale from the Parenting Sense of Competence Scale (PSOC; Johnston & Mash, 1989). The PSOC assesses feelings of efficacy, including the ability to problem solve and manage their child's behavior. Items are rated along a 6-point Likert-type scale, ranging from 1 (strongly disagree) to 6 (strongly agree), with higher scores indicating a higher sense of self-efficacy. In prior studies, Cronbach's α ranged from .70 to .76 (Gilmore & Cuskelly, 2008; Johnston & Mash, 1989). Internal consistency reliability in the present study was .70.

Child disruptive behavior was reported on the Parent Daily Report (PDR; Chamberlain & Reid, 1987), a 31-item checklist asking parents if each behavior was exhibited by their child in the home setting during the past 7 days. Test-retest reliability of the PDR has been reported by its developers as .60 to .84 (Chamberlain & Reid, 1987) and internal reliability was .84 (Chamberlain et al., 2006). In the current study, the internal consistency reliability based on the Kuder-Richardson Formula 20 (KR-20) was .89. The PDR was completed before the intervention and every 2 weeks during intervention implementation.

Child temperament was reported on the 34-item Teacher School-Age Temperament Inventory (T-SATI; McClowry & Lyons-Thomas, 2009). The T-SATI, an adaptation of the parent-report School-Age Temperament Inventory (SATI; McClowry, 1995), is a 5-point Likert-type scale, ranging from 1 (never) to 5 (always), standardized with a diverse national

sample of 142 teachers reporting on 267 students. Both versions have dimensions derived from principal factor analysis: negative reactivity (the intensity and frequency with which the child expresses negative affect); task persistence (the degree of self-direction that a child exhibits in fulfilling tasks); withdrawal (the child's initial response to new people and situations); and activity (large motor activity). In the current study, Cronbach's α for the T-SATI ranged from .81 to .95, similar to the alphas reported in McClowry and Lyons-Thomas (2009). The T-SATI was completed before the intervention.

Parental depression was assessed before the intervention on the six-item depression subscale of the Brief Symptom Inventory (BSI; Derogatis, 1993), which asks respondents to rank the intensity of their distress in the past week on a 5-point scale, ranging from 1 (not at all) to 5 (extremely). In the current study, the Cronbach's alpha for the depression subscale was .86.

Procedures

This quasi-experimental study built on a community partnership from the previous study. The first cohort consisted of four schools randomly assigned to the parallel or collaborative model of INSIGHTS. Remaining schools were matched for ethnicity and size, and alternately assigned to one of the program models.

Recruitment strategies were derived for cultural appropriateness with community leaders (McClowry & Galehouse, 2002). Teacher consent was the prerequisite for enrolling parents and children. All procedures were approved by university and school district research boards.

Study progression involved baseline, intervention, and posttest stages. At baseline and at posttest, parents were interviewed by audio-CASI on the PDR, PSOC, and the BSI. At these stages, teachers also completed the T-SATI for each participating student. Parents were interviewed with the PDR every 2 weeks. For data collection at each stage, parents received \$30, teachers \$20, and children a gift worth less than \$5.

During the intervention stage, facilitators implemented both models of INSIGHTS. To avoid a facilitator effect, facilitators were trained in each model and alternated facilitating both in a counterbalanced design. Before the intervention, facilitators enrolled in a graduate-level course on temperament theory, parenting practices, behavior management strategies, and sociocultural issues. They also received training using scripted manuals and drama therapy techniques. Facilitators came from diverse racial/ethnic and educational backgrounds.

Parenting and teacher sessions lasted 2 hours; classroom sessions lasted 45 minutes. The classroom component was the same in both models, but the parent and teacher sessions were different. In the parallel model, parent and teacher sessions were held separately. In the collaborative version, half of the sessions were held jointly with parents and teachers, and more content related to social competencies was included (see the Appendix for a comparison).

Regardless of the model in which they participated, parents received up to \$170 as an incentive for participation and teachers received professional development credit. Of 10 sessions, the mean number of sessions attended was nine for teachers, seven for parents, and eight for children. The majority (56%) of teachers attended all sessions and 42% attended eight or nine sessions. For parents, 47% attended all sessions and 16% attended eight to nine sessions. Twenty-eight percent of children attended all sessions, 34% attended nine, and 22% attended eight. There were no significant differences in attendance rates between the models for teachers (9.11 vs. 9.42 for collaborative vs.

parallel), parents (7.28 vs. 7.32 for collaborative vs. parallel), or children (8.42 vs. 8.40 for collaborative vs. parallel).

Parents and teachers evaluated each session on a 3-point Consumer Satisfaction Scale. Average satisfaction scores ranged from 2.97 to 3 for parents and 2.88 to 3 for teachers. Parents and teachers also evaluated the program on a 5-point scale for overall satisfaction, teaching format, usefulness, difficulty, and facilitators. Parent ratings ranged from 4.14 to 4.82, and teacher satisfaction ranged from 3.87 to 4.8.

To maintain model fidelity, facilitators followed scripts for the respective models, used material checklists, documented each session, and received ongoing supervision, feedback, and training. All sessions were videotaped and reviewed according to a priori criteria (Hulleman & Cordray, 2009). Specifically, the INSIGHTS developer or a facilitator from the previous trial reviewed tapes for treatment adherence and delivery. Deviations from protocol or clinical concerns were discussed weekly. Overall, 92% of the components were adequately completed, with no significant differences between models in the percentage of omitted steps or content delivery.

Data Analysis Plan

Because data on child disruptive behavior were collected before the start of the intervention and every other week during it, individual growth modeling was used to examine change over time in PDR scores. Individual growth modeling allows one to model change over time in an outcome with repeated measures. All models were fitted with SAS PROC MIXED. The metric of time used was assessment point. Time was centered at assessment point 5, so that the parameter for the intercept would represent disruptive behavior at the end of the intervention. To center time, 5 was subtracted from the assessment point metric. Examination of the intraclass correlation coefficient (ICC) indicated that children were not clustered in classrooms or schools at a rate that complicated statistical inference (Guilkey & Murphy, 1993).

Initially, an unconditional means model (i.e., random effects analysis of variance [ANOVA]) was estimated to examine the ICC and to determine the amount of variation in PDR scores across children.

$$\text{PDR}_{it} = \gamma_{00} + u_{0i} + r_{it} \quad (1)$$

The subscript t refers to repeated response variable observations (level-1 units) collected from i children (level-2 units) over time (Peugh, 2010). The model in Equation 1 is called an unconditional means model because the disruptive behavior problems score for student i at time t is modeled as a function of (a) a grand mean disruptive behavior problem score for all children (γ_{00}), (b) a term that represents deviations in an individual's disruptive behavior problem mean around the grand disruptive behavior problem mean (u_{0i}), and (c) a time-specific residual term that demonstrates the differences between each individual's observed and predicted disruptive behavior problem scores (r_{it} ; Peugh, 2010).

Next, to investigate the first research question, an unconditional growth model was fitted to examine children's disruptive behavior problems scores from the first assessment point (preintervention) through assessment point 5.

$$\text{PDR}_{ij} = \gamma_{00} + \gamma_{10}(\text{Assessmentpoint}_{ij} - 5) + u_{0i} + u_{1i}(\text{Assessmentpoint}_{ij} - 5) + r_{ij} \quad (2)$$

As shown in Equation 2, each student's disruptive behavior problem score at the intercept (assessment point 5), is modeled as a grand mean disruptive behavior problem score at assessment point 5 (γ_{00}) and a residual term that demonstrates deviations in children's disruptive behavior problem scores at the fifth assessment point about the grand mean (u_{0i}). Additionally, each student's rate of disruptive behavior problem score change across time is modeled as a grand mean rate of disruptive behavior problem change (γ_{10}) and a residual term that shows individual differences in disruptive behavior problem change around the grand mean (u_{1i}).

This unconditional growth model served as the baseline to which predictors were added to investigate the influence of intervention type and child and family characteristics on disruptive behavior problem scores during the intervention. Because of previous empirical work relating child gender and parental depression to disruptive behaviors (e.g., Chang, Schwartz, Dodge, & McBride-Chang, 2003), these variables were included as covariates in the analyses. Thus, the predictors included parental depression, child gender, child temperament, and intervention type. Interaction terms between variables for intervention type and child temperament profile were added to investigate whether the influences of treatment type varied as a function of child temperament.

Finally, a multiple regression model was used to examine, first, whether change in parenting sense of efficacy was related to disruptive behaviors at assessment point 5 and, second, whether changes in parenting efficacy were a mechanism through which intervention type (parallel vs. collaborative) impacted disruptive behavior. Control variables for parental depression, child gender, and child temperament were included in the model, along with variables for intervention type and change in parenting efficacy. Initially, paired-samples *t* tests were conducted to see if parents reported a change in parenting efficacy over the course of the intervention; then, a change score was calculated. *t* tests were used because data on parenting sense of efficacy were collected at two time points: at baseline and at the end of the intervention.

Subsequently, models were built hierarchically to assess the separate contributions of change in parenting efficacy and to examine change in the β coefficient for intervention type across models. The first step included variables for child gender, parental depression, child temperament, and intervention type. The second included the variable for change in parenting efficacy. A decrease in the coefficient for treatment type would indicate mediation of the effects of intervention through change in parenting efficacy. Lastly, a follow-up Sobel's *z* test was conducted to determine if parenting efficacy mediated the effects of intervention type.

Missing Data Methods

Individual growth modeling is robust to missing data and can accurately estimate individuals' trajectories with one or more data points (Peugh, 2010), so it was possible to include all children with at least one assessment of disruptive behavior. However, 35 children were missing data on one, or more, predictor variable. Missing values were imputed for those variables using a Markov chain Monte Carlo (MCMC) method (Schafer, 1997). This was appropriate as the data were normally distributed and appeared to be missing at random. The MCMC method uses simulation from a Bayesian prediction distribution. Rubin's relative efficiency calculations were used to determine the appropriate number of imputations (Rubin, 1987). Ten imputations were performed with a burn-in period of 500 to prevent imputation starting values from affecting final parameter estimates. Next, SAS PROC MIANALYZE was used to calculate final parameter estimates (Schafer, 1997),

Table 1. Descriptive Statistics

	Mean (SD)	Longitudinal measures		% (n)
		Preintervention	End of intervention	
Maternal depression	.28 (.50)			
Male gender				54 (112)
High maintenance temperament				13 (26)
Intermediate temperament				43 (86)
Industrious temperament				44 (90)
Collaborative intervention				51 (103)
Disruptive behavior (overall)		11.60 (6.38)	8.00 (6.06)	
Disruptive behavior (industrious)		7.52 (4.85)	5.75 (4.43)	
Disruptive behavior (intermediate)		13.19 (4.41)	8.47 (5.60)	
Disruptive behavior (high maintenance)		20.46 (5.25)	14.25 (7.83)	
Parenting efficacy		4.04 (.73)	5.03 (.55)	

Note. SD = standard deviation.

as it aggregates results of the data sets' analyses to determine precise parameter estimates. Descriptive statistics and growth and regression models estimated using the original values were similar to those with the imputed values.

RESULTS

Descriptive Statistics

Means and standard deviations for continuous variables and percentages for dichotomous variables are presented in Table 1. Descriptive statistics reveal considerable variation in family and child characteristics. Disruptive behavior problems decreased from preintervention to the intervention's end, with the greatest decreases by children with high maintenance temperaments. Parenting efficacy increased from preintervention to the end.

Individual Growth Modeling

Results for the unconditional means model shown in Equation 1 are presented in the second column of Table 2, and revealed a significant grand mean disruptive behavior problem score, $\gamma_{00} = 8.68$, $p < .001$. Children's mean disruptive behavior problem scores (i.e., the mean score across all assessments) significantly varied around the grand mean, $\tau_{00} = 36.13$, $p < .001$. Significant differences were shown between each child's observed and predicted disruptive behavior scores over time $\sigma^2 = 13.94$, $p < .001$. ICC calculations indicated that 35% of the variation in problems occurred across students.

Results for the unconditional growth model in Equation 2 are presented in the third column of Table 2. Results indicate a significant grand mean disruptive behavior problem score at assessment point 5 ($\gamma_{00} = 8.04$, $p < .001$) that decreased an average of .43 points every 2 weeks ($\gamma_{10} = -.43$, $p < .001$).

To explain the unconditional growth model demonstration of significant intercept and slope variance in disruptive behavior problem scores across children, predictor variables were added to Level 1 and Level 2. Values presented in the fourth column of

Table 2. Model Summary for Growth Models Examining Disruptive Behavior Scores

Model parameters		Unconditional	Level 1 main effects Regression coefficients (fixed effects)	Final model
Intercept	γ_{00}	8.68 (.37)***	8.04 (.44)***	6.48 (1.81)***
Time	γ_{10}		-0.43 (.05)***	-0.46 (.18)**
Maternal depression	γ_{01}			1.45 (.85)~
Child = male	γ_{02}			1.17 (4.44)
Temperament = high maintenance	γ_{03}			7.41 (1.40)**
Temperament = intermediate	γ_{04}			2.18 (.93)*
Program model = collaborative	γ_{05}			-1.72 (.84)*
Maternal depression \times time	γ_{11}			0.09 (.09)
Child male \times time	γ_{12}			0.11 (.10)
High maintenance \times time	γ_{13}			-0.38 (.15)*
Intermediate \times time	γ_{14}			-0.33 (.10)**
Collaborative \times time	γ_{15}			0.13 (.09)
Residual	σ^2	13.94 (.69)***	10.35 (.59)***	10.36 (.59)***
Intercept	τ_{00}	36.13 (2.83)***	33.95 (3.97)***	28.51 (3.55)***
Slope	τ_{11}		0.20 (.05)***	0.17 (.03)***
Covariance	τ_{01}		1.28 (.34)***	1.54 (.33)***
Deviance statistic		27875.66	27725.23	26379.90
Number of estimated parameters		3	6	16

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

Table 2 indicate the association between the independent variables and disruptive behavior problems after controlling for the other effects in the model, and can be interpreted as partial correlations. The slope is now the average change in disruptive behavior problems among male, industrious children, in the parallel intervention, whose parents evidenced no depression.

Several significant predictors of the intercept were found. Specifically, children with high maintenance ($\gamma_{03} = 7.41$, $p < .001$) and intermediate ($\gamma_{04} = 2.18$, $p < .05$) temperaments evidenced higher levels of disruptive behavior problems at assessment point 5 than those with industrious temperaments. High maintenance children evidenced disruptive behavior scores 7.41 points higher than their industrious peers, and intermediate children demonstrated scores 2.18 points higher than their industrious peers. A significant effect of intervention type was also found ($\gamma_{05} = -1.72$, $p < .05$), with the collaborative group children scoring 1.72 points lower than children in the parallel group. In addition, several significant predictors of the slope were identified. High maintenance ($\gamma_{13} = -.38$, $p < .05$) and intermediate ($\gamma_{14} = -.33$, $p < .01$) children demonstrated more rapid rates of decline in disruptive behavior problems than their industrious peers. More specifically, high maintenance children's disruptive behaviors declined .38 points more rapidly between each assessment point than their industrious peers while intermediate children's disruptive behaviors declined .33 points more rapidly than their industrious peers. Decreasing Level-1 residual variance and the Level-2 intercept and slope variance estimates indicate that independent variables in the model were relatively strong predictors of disruptive behavior problem variance within and between individuals.

A significant interaction related to the intercept was found such that high maintenance children in the collaborative intervention evidenced lower levels of behavior problems than their peers in the parallel intervention at time 5, and at the intervention's

Table 3. Summary for Models Examining Parenting Self-Efficacy and Disruptive Behavior

	Model β	Model β
Maternal depression	.03	.05
Child gender	.05	.02
High maintenance temperament	.22*	.21*
Intermediate temperament	.19*	.16*
Collaborative intervention	-.14*	-.11
Parenting self-efficacy		-.19**
R ²	.17***	.21***
ΔR^2		.04**

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

end, high maintenance children in the collaborative model had levels of disruptive behaviors not significantly different than their industrious peers. An interaction also was found between temperament, intervention type, and time ($\gamma_{17} = -1.41$, $p < .001$), as high maintenance children in the collaborative program demonstrated faster rates of decline in disruptive behavior than peers in the parallel intervention.

Regression Models Examining Mediation Effects

Paired-samples t tests ($t = -3.94$, degree of freedom [df] = 201, $p < .001$) indicated that parents reported increased parenting efficacy over the course of the intervention. Results from the regression analyses predicting disruptive behavior at the end of the intervention are in Table 3. After controlling for parental depression, child gender, child temperament and intervention type, children whose parents reported greater gains in parenting efficacy demonstrated lower disruptive behavior at assessment point 5 ($\beta = -.19$, $p < .01$). Furthermore, examination of the β coefficients, and their associated significance levels indicated that positive effects of intervention type were mediated through parenting efficacy changes. Adding the variable for change in parenting efficacy showed that intervention type was no longer significant and increases in parenting efficacy fully mediated the effects of collaborative intervention type. This was confirmed by Sobel's z tests ($z = 1.42$, $p = .05$).

DISCUSSION

We report on a quasi-experimental group randomized intervention study contrasting the effects of the parallel and collaborative models of INSIGHTS in reducing children's disruptive behaviors. Behavior changes were examined during the intervention in relation to children's temperament, parental characteristics, and intervention model. In general, children evidenced decreases in disruptive behaviors, regardless of the model. On average, they evidenced a decrease of approximately one point in disruptive behavior scores, as rated on the PDR, every four sessions. Previous research using the PDR found children in foster care with scores of six or lower were at low risk for subsequent disruption in care, while the hazard of disruption increased by 17% for every point increase among children with scores of six or higher (Chamberlain et al., 2006). Thus, a one point decrease in PDR scores among the current sample, whose mean PDR score preintervention was 11.60, is of clinical significance and reinforces evidence that INSIGHTS supports children's socioemotional and behavioral development (McClowry et al., 2005, 2010).

Children with high maintenance temperaments evidenced greater rates of decline in PDR scores than their industrious peers during the course of the intervention, leading to an 8.5-point difference in behavior problems between the two groups at final assessment, compared with a nearly 13-point preintervention gap. The greater decrease in behavior problems for children with high maintenance temperaments might relate to the INSIGHTS curriculum that teaches caregivers strategies to match a child's temperament, particularly challenging ones.

We also found that children with high maintenance temperaments in the collaborative program evidenced greater rates of decline in disruptive behaviors than peers in the parallel program during the intervention, and lower levels of disruptive behavior when it ended. Children with high-maintenance temperaments in the collaborative version showed levels of disruptive behaviors similar to industrious peers, echoing earlier findings that children with challenging temperaments are more influenced by environment than their peers (Kingston & Prior, 1995).

Little research has examined the potential mediating role of parental cognition and affect in associations between intervention enrollment and child outcomes, and few interventions target parent perceptions of the child as contributing to parental and child behavior (Landy & Menna, 2006). As Landy and Menna noted (2006), however, an effective intervention may need to change parents' perceptions of their children and parenting. In both versions of INSIGHTS, parents reported and evidenced increased parenting efficacy that related to children's lower levels of disruptive behavior, suggesting children's behavior changes were at least partly due to parents feeling more efficacious after learning how children's behavior relates to temperament and temperament-based parenting strategies.

In contrast to the parallel version, parents and teachers attended half of the collaborative version sessions together, and additional content and activities were included to enhance the social competencies of parents, teachers, and children. In particular, parents and teachers engaged in exercises to enhance their listening, empathy, assertiveness, problem solving, and collaboration skills. Although these results do not reveal which additional components drive the improved effects, the results reinforce previous findings that teacher and parent communication and cooperation enhance elementary-age children's adaptation and functioning (Barnard, 2004; Epstein & Dauber, 1991; Henderson & Berla, 1994; Jeynes, 2005).

Results should be examined in view of the limitations of our quasi-experimental design. First, we had no control group, so other reasons for the children's behavior changes must be considered. Although the most obvious reason is maturation, this is unlikely because when left untreated, children's disruptive behavior usually escalates over time (Institute of Medicine [IOM], 1994; Patterson, Reid, & Dishion, 1992). Second, to control for potential omitted variable biases, all models included multiple variables for child and family factors, thus providing stringent bias controls and conservative estimates of intervention effects.

Other study limitations include its focus on behavior at home. Future research should examine child behavior outside the home and generalized to the classroom. Also, we examined changes in parental attitude to explain the intervention effects on child behavior, but changes in parenting behavior should be explored. Third, other related programs that focused on social-emotional and behavioral outcomes have shown larger, longer effects (Greenberg et al., 2001; Kellam et al., 2008; Mesman et al., 2009), so long-range tracking of children's behavior is needed. Finally, new research should take steps to explore the transportability of INSIGHTS to community agencies and schools to increase its sustainability and cost effectiveness.

Conclusion

Our study shows comprehensive interventions can reduce disruptive behaviors of urban children at risk for developing more serious behavioral disorders. It is relevant for social policy and practice because of the positive impact on child behavior and feasibility of implementation in low-income, urban communities. Our findings indicate that changes in parenting attitudes may be a critical mechanism in preventive interventions and that a collaborative intervention focused on awareness of—and responsiveness to—child temperament may be particularly helpful to children with challenging temperaments, who are at greatest risk for developing subsequent behavior problems.

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APPENDIX

Comparison of the Content of the Parallel and Collaborative Models of INSIGHTS

<i>Parallel session</i>	<i>TOPIC</i>	<i>Collaborative session</i>
1	Recognizing child temperament. The major tenets of temperament are explained: its biological basis, resistance to modification, manifestation in situations that involve stress and change, and relationship to goodness of fit. Vignettes demonstrating the four dimensions of school-age temperament are shown.	1
2	Reframing child temperament. Participants discuss the temperament profile that they created by completing the School-Age Temperament Inventory. Strengths and concerns regarding particular temperaments are discussed. Four common temperament profiles are presented.	2
3	Caregiver responses. Vignettes demonstrate how parent and teacher responses lead to different adult/child interactions. The participants learn how to identify their responses as optimal, adequate, or counterproductive.	3
4	Gaining control. This session focuses on how parents and teachers can gain control through effective child management strategies. Individual child contracts are designed for repetitive behavior problems.	4 ^a
5	Giving recognition. The importance of giving recognition is stressed in this session. Examples of reinforcements are discussed, demonstrated in vignettes and role-played.	
	Fostering social competencies. Social competency skills of listening, empathy, giving recognition, assertiveness, and cooperation are discussed. Strategies to enhance such skills in adults and children are explored.	5 ^a
	Fostering more social competencies. Additional social competency skills of problem solving, anger management, and conflict resolution are explored along with enhancement strategies for adults and children.	6 ^a
6	Disciplining school-age children. General principles of discipline are discussed in this session. Vignettes display some of the common behavior problems that school-age children exhibit. Guidelines for time-out and other strategies are presented in relation to different child temperaments.	7
7	Parents and teachers are people too. Gaining compliance is still emphasized, but adult needs are also acknowledged. Strategies to implement time-out for caregivers are explored.	8 ^a
8	Fostering independence and responsibility. The developmental need of school-age children for independence is explored. Vignettes demonstrate age-appropriate activities and child management strategies that foster responsibility and positive lifestyle habits.	9
9	Review of sessions 1-3. Content from the first three sessions is reviewed.	
10	Putting it all together. Vignettes demonstrating more complex behavioral problems are shown. Parents and teachers model their responses. Completion certificates are awarded.	10

^aParent and teachers attended these sessions together.