

Predictor and Moderator Effects in the Treatment of Oppositional Defiant Disorder in Pediatric Primary Care

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Objective To examine predictors and moderators of parent-training outcomes for treatment of Oppositional Defiant Disorder (ODD) in pediatric primary care. **Methods** Parents of 117 children with ODD, ages 3–6 years, seen in primary care received either a minimal intervention bibliotherapy treatment (MIT), or a 12-session parenting program led by a nurse or psychologist. **Results** More initial total life stress, parenting distress, internalizing problems, functional impairment, and difficult temperament were associated with more improvement, but families scoring lower on those variables had fewer behavior problems at posttreatment and follow-up. Gender was a significant moderator, with more improvement for girls than boys in the nurse-led group but more improvement for boys than girls in the MIT group. Less well-educated mothers treated by psychologists showed the greatest change. **Conclusions** Predictors and moderators may play a role in deciding, which families receive a particular form of treatment for ODD in primary care.

Key words parent training; predictors; primary care; moderators; Oppositional Defiant Disorder.

Oppositional Defiant Disorder (ODD), the most common psychiatric disorder among preschool children (Egger & Angold, 2006), is relatively stable (Lavigne et al., 1998a) and is a precursor to other disorders including conduct disorder and internalizing disorders comorbid with ODD. Relatively few preschool children with ODD in the community are referred for treatment in the mental health service system (Horwitz, Leaf, Leventhal, Forsyth, & Speechley, 1992; Lavigne et al., 1993), however, and the need to extend treatment services to other settings is increasingly being recognized (Kazdin, 1997).

The efficacy of parent training for ODD has received considerable support (Brestan & Eyberg, 1998; Kazdin, 1997; Lundahl, Riser, & Lovejoy, 2006; Serketich & Dumas, 1996), and extending parent training efforts into primary care may be particularly important for families who do not send their children to preschool, whose children manifest the symptoms of ODD at home but not school, or who trust their primary care providers about treatments for their child more than they do school personnel. Recent studies have examined extending the

treatment of ODD and ODD-related symptoms into primary care. Turner and Sanders (2006) showed that brief interventions involving four, 20 min therapist contacts reduced behavior problems in children ages 2–6 years seen in primary care settings. That study excluded children with psychiatric problems and did not include a long-term follow-up. More recently, we (Lavigne et al., 2007) conducted a study comparing a minimal intervention involving bibliotherapy and no therapist contact with a moderately intensive, 12-session parent training program (Webster-Stratton, 1997) using two models for linking primary care to mental health services: an “office” model in which services were provided by primary care nurses, and a “referral” model, in which pediatric psychologists provided treatment. That study showed improvement over a 12-month follow-up for all three treatment conditions, no advantage overall for the therapist-led groups compared to bibliotherapy, and no difference in services delivered by nurses versus psychologists. There was a dose effect, however, with children of parents attending seven or more sessions

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showing gains on one outcome measure when compared to those receiving no therapist contact, and children of parents attending nine or more sessions showing gains on two outcome measures.

While parent training has considerable support, many children and families do not benefit from treatment for ODD or ODD-related problems, with a recent meta-analysis yielding an effect size of 0.42 across all ages of children (Lundahl et al., 2006), and one-third of the young children treated with behavioral parent training not improving (Webster-Stratton & Hammond, 1997). Under these circumstances, subgroups of children and families may respond differently to treatment (Kraemer, Wilson, Fairburn, & Agras, 2002). Both nonspecific treatment predictors and specific treatment moderators indicate who benefits from treatment, or under which conditions treatment works best (Kraemer et al., 2002). Predictors are variables that can be measured before treatment, are associated with outcomes, but do not differ across treatment conditions (e.g., if girls respond better than boys to both behavior therapy and interpersonal therapy, gender is a predictor). In contrast, moderators are variables that can be measured before treatment and are associated with treatment outcome, but the magnitude or direction of the effect differs across treatments (e.g., if boys did better in behavior therapy and girls in interpersonal therapy, then gender is a moderator). Predictors and moderators can help determine which patients should receive a particular treatment.

Brestan and Eyberg (1998) noted that very few studies had examined treatment predictors or moderators of parent training and, almost a decade later, the number continues to be few. A recent meta-analysis of parent training (Lundahl et al., 2006) across all ages of children from preschool to middle school found significant moderator effects for severity level, with greater improvement for more severe children and for children whose parents received individual rather than group treatment. Poorer outcome was noted for children who were economically disadvantaged or came from single parent homes. Child's age was unrelated to outcome (Lundahl et al., 2006). In another report, younger children responded better than older children to behavioral parent training, and children with more severe problems responded better to treatment (Ruma, Burke, & Thompson, 1996). For children approximately age 6 and younger, those with higher initial levels of conduct problems and higher levels of critical parenting benefitted most from treatment (Reid, Webster-Stratton, & Baydar, 2004), while children from single-parent families benefit

least (Webster-Stratton, 1985). In addition, Beauchaine, Webster-Stratton, and Reid (2005) found that: (a) children with more internalizing problems made better progress than children with fewer internalizing problems; (b) children whose father had a history of substance abuse made greater improvements at follow-up; and (c) children of older mothers made more progress. For mothers with high depression scores, treatment was best if it included parent training or child training rather than teacher training alone. In contrast, Harwood and Eyberg (2006) found that maternal depression was not a predictor of outcome in the parent training program, nor were maternal IQ, socioeconomic status (SES), or stress.

The present study adds to the literature on predictors and moderators of treatment effects for behavioral parent training with young children by examining demographic, clinical, and interactional variables related to treatment response. It also extends prior work on predictors and moderators conducted in mental health settings to primary care. With referral biases predisposing younger children to be referred less often for mental health treatment from primary care (Lavigne et al., 1998b), the primary care sample may be systematically different than that seen in the mental health service sector, and the predictors and moderators may be different. With indications that there is little difference overall between minimally and moderately intensive treatments in primary care treatment of ODD, it is important to determine who might benefit differentially from the two levels of intervention intensity, and when that treatment might best be delivered in primary care settings by nurses or referred to mental health professionals working in the mental health services sector.

Methods

Details on participants, measures, and procedures are described in more detail in a companion paper (Lavigne et al., 2007) and summarized below. The study was approved by the hospital's Institutional Review Board.

Participants

A child between the ages of 3.0 and 6.11 years was eligible for participation by meeting DSM-IV criteria for ODD, having receptive language at the 24-month-old level or higher, and not having a DSM-IV diagnosis, such as autism, that preempts the diagnosis of ODD. In the nurse-led treatment group, 49 children with ODD and their families entered treatment; in the psychologist

treatment group, 37; in the minimal intervention treatment (MIT), 31. Of the enrolled children, 53% ($n=62$) were males and 75% ($n=88$) were white. The sample was predominantly middle class (Hollingshead score $M=47.2$, $SD=13.2$). Most families came from Hollingshead–Redlich classes III and IV ($n=66$, 60.0%), but both lower (classes IV and V, $n=11$, 10.0%) and upper classes (class I, $n=33$, 30%) were represented. There were 56% ($n=65$) of the children with no comorbidities, and 44.4% ($n=52$) had one or more comorbid conditions, including ADHD, anxiety and depressive disorders. Of the 117 children who entered treatment, 91 children and parents completed the immediate posttreatment assessment measures (33 in nurse-led treatment, 31 in psychologist-led treatment, and 27 in MIT), and 99 completed the 12-month follow-up measures (33 in each treatment group).

Measures

Assignment of Diagnosis

The psychologists assigning diagnoses reviewed an assessment battery with known predictive validity (Lavigne et al., 1994) that included a semi-structured interview, the Rochester Adaptive Behavior Inventory (Jones, 1977), the Eyberg Child Behavior Inventory (Eyberg, 1999), and the Child Behavior Checklist (Achenbach, 1991). The psychologists also observed a videotape of the parent and child together.

Rochester Adaptive Behavior Inventory (RABI). The RABI (Jones, 1977) is a semi-structured parent-completed interview that yields information on anxiety, mood, and disruptive disorders.

Eyberg Child Behavior Inventory (ECBI). The ECBI (Eyberg, 1999) is parent-rated measure of child oppositional behavior commonly used in parent training intervention studies. The intensity scale provides an estimate of the frequency with which ODD-related symptoms occur. Scores range from 38 to 266 (preschool $M=99.2$, $SD=33.8$).

Child Behavior Checklist (CBCL). The CBCL (Achenbach, 1991) provides an estimate of internalizing (e.g., anxiety, depression), and externalizing symptoms (e.g., noncompliance, temper tantrums, aggression), with the T -score $M=50$ and $SD=10$ for each scale. The CBCL externalizing scale and the Eyberg scale were the two primary outcome measures.

Videotaped Parent–child Interaction. The Forehand and McMahon (1981) observational procedure in which parents and children participate in child-chosen activities, parent-chosen activities, and a clean-up period, was used.

The interactions were videotaped for 15 min and reviewed by the clinicians assigning diagnoses. Specific codes used in analyzing predictors and moderators are described subsequently.

Predictor Variables

Campbell (1990) reports that family composition, family environment (including parental psychopathology), parenting skills, and child characteristics all contribute to the development of psychopathology in young children. Variables from within these domains were chosen as potential predictor and moderators of treatment response.

Family and Parent Characteristics

Family Background Questionnaire. Mothers completed a questionnaire to gather demographic information, including the child's age, sex, race, parents' marital status, and SES (Hollingshead, 1975).

Parenting Stress. The total stress scale of the Parenting Stress Index Short Form (Abidin, 1995) was used to assess the occurrence of life stresses before intervention. Possible scores range from 0 to 320. Test–retest reliability is 0.84, $\alpha=.91$.

Parental Depression. The Beck Depression Inventory (Beck & Steer, 1987) is a widely-used questionnaire for assessing adult depression that shows strong correlations with other major depression inventories, and was used to assess maternal depression.

Parental Distress. The parental distress scale of the Parenting Stress Index Short Form (Abidin, 1995) assessed the parent's experience of distress in his or her parental role. Possible scores range from 0 to 52. Test–retest reliability is 0.85, $\alpha=.87$.

Parenting–child Interaction Behaviors. The 15 min videotaped play interactions were reviewed and rated for specific behaviors in 15 s intervals. Observers rated contingent parent attention, negative statements, questions, rewards (including praise), α -commands (specifically stated maternal commands), β -commands (nonspecific directives that are difficult to interpret or do not direct the child to do a specific task), and child compliance. The ks are affected by base rates of observed behaviors, but were substantial (Landis & Koch, 1977) for α -commands (.61), questions (.66), rewards (.84), and attends (.62), and moderate for β -commands (.54), and compliance to α -commands (.59). Because ks were low for compliance to β -commands (.35), that measure was eliminated, as were two measures showing little variability, maternal warnings, and maternal negative statements. Compliance to α -commands was expressed

as a ratio of number of complies to the number of commands, with scores ranging from 0 to 1.0. Compliance to α -command was a secondary outcome measure.

These ratings of specific behaviors were supplemented by qualitative measures of the interaction developed by Rahe (1984). There were five measures: maternal warmth, described as the degree to which the mother demonstrates positive regard and emotional support for the child; maternal respect for autonomy, describing the degree to which the mother maintained appropriate control while providing the child the opportunity to negotiate what he/she wanted to do; maternal structure and limit setting, defined as the adequacy with which the mother established her expectations for the child's behavior and demonstrates a capacity for effective leadership that engenders child compliance; and synchrony/quality of assistance, described as the ability of the mother to assist the child's performance in a manner that protects the child's self-esteem and demonstrates that she is attuned to the child's needs. Scores ranged from 1 to 4 and were dichotomized for data analysis. High degrees of interrater reliability were obtained for these measures ($\kappa = .65$ – 1.0).

Parent-child Dysfunctional Interaction. The Parenting Stress Index Short Form's (Abidin, 1995) parent-child dysfunctional interaction scale assessed the degree to which a parent felt there were dysfunctional aspects to his/her relationship to the child. Possible scores range from 0 to 320. Test-retest reliability is 0.68, $\alpha = .80$.

Child Characteristics

Peabody Picture Vocabulary Test (PPVT). The PPVT (Dunn & Dunn, 1981) is an individually administered measure of single-word receptive language skills. It was used as a language screening measure in this study because many of the study intervention procedures emphasize receptive language skills.

Difficult Child Temperament. The child's degree of temperamental difficulty was assessed with the Parenting Stress Index Short Form (Abidin, 1995). Possible scores range from 0 to 320. Test-retest reliability is 0.78, $\alpha = .85$.

Functional Impairment. The two clinical child psychologists assigning the consensus diagnosis rated the child's overall adjustment on the Children's Global Adjustment Scale (C-GAS) (Shaffer et al., 1983). This scale allowed the clinicians to synthesize diverse sources of information into a numeric global score rating adjustment from 0 to 100, with scores ranging from severely impaired to exhibiting superior functioning.

Procedure

Participants entered treatment at 24 Chicago-area pediatric practices, each of which was randomly assigned to one of three intervention groups. Prospective participants were either screened by research assistants in the practice, referred by a pediatrician, or self-referred after seeing a study-related brochure in the pediatric offices. If the child screened high above the 90th percentile on the CBCL externalizing scale they were seen for the pretreatment assessment, during which the child completed the PPVT, the parent completed the CBCL, Eyberg, RABI, and the interaction session was videotaped. Two doctoral-level psychologists reviewed the assessment battery, independently assigned the appropriate DSM-IV diagnoses and CGAS scores, and met to resolve any differences in diagnosis or CGAS scores that occurred. The test battery was repeated immediately posttreatment and at 12-month follow-up.

Intervention

Intervention Leaders. In the nurse-led treatment condition, one of seven licensed registered nurses provided treatment; in the psychologist-led treatment condition, treatment was provided by one of five doctoral-level clinical child psychologists. Therapists were trained in the Webster-Stratton intervention by attending a 6-hr training seminar and had extensive supervision on cases they treated.

Therapist-led Treatment Conditions. The Webster-Stratton (1997) 12-session, *Incredible Years* treatment program was used. This program used videotaped modeling and discussion of key parenting practices to improve parent-child interaction patterns and reduce oppositional behavior. Skills taught include the use of parental attention, praise, consequences and appropriate discipline techniques, including time out, to manage the child's behavior. Therapists used a manual to guide discussion following the viewing of videotaped vignettes. Parents elected to be seen for 12 1 hr meetings or six 2 hr meetings. The parents in the therapist-led interventions were also given a copy of Webster-Stratton's book, *The Incredible Years*, (Webster-Stratton, 1992), as well.

Minimal Intervention Treatment Group. Parents in the MIT condition were given *The Incredible Years* but had no therapist contact.

Statistical Analyses

Linear mixed modeling procedures were used to assess predictor and moderator relationships. Because clustering effects could occur within pediatric practices, practice was entered as a random effect, while treatment group,

trials, putative predictor/moderator \times trials and putative predictor/moderator \times treatment group \times trials interactions were fixed effects. All analyses followed an intent to treat format.

Results

Baseline Comparisons

Treatment groups did not differ on child's age, gender, race, parent's marital status, social class, maternal or paternal education, child's receptive vocabulary (sample mental age in months, $M = 61.2$, $SD = 17.4$), presence of a comorbid condition, CBCL internalizing (sample $M = 60.7$, $SD = 10.2$), externalizing (sample $M = 70.6$, $SD = 6.0$), or total problem scores (sample $M = 68.9$, $SD = 7.4$), Eyberg intensity scores (sample $M = 155.4$, $SD = 27.4$), or C-GAS scores (sample $M = 60.3$, $SD = 5.8$).

Predictors and Moderators of Treatment Outcome

We followed Kraemer et al. (2002) in describing a predictor as a variable that is present at the time intervention started and is associated with a response to treatment, but that does not show a differential response to type of treatment. In linear mixed model analysis, this occurs when a predictor \times trials interaction is significant. In contrast, a moderator is a preexisting factor that shows an interaction with type of treatment in predicting outcomes, hence the moderator variable \times treatment group \times trials interaction is significant. Moderators can help in understanding which type of patients should be assigned to a particular type of intervention.

We examined demographic characteristics (age, gender, maternal education, paternal education, minority status, marital status, SES), parent characteristics (maternal life stress, maternal depression) child characteristics (presence or absence of a comorbid condition, CBCL internalizing score, functional impairment, temperamental difficulty) and interactional variables (initial levels of maternal warmth, respect, structure, assistance, or overall competence; parent-child dysfunction ratings; specific interaction variable including pretreatment α -commands, questions, rewards, attends) as predictors and moderators.

Because of the large number of comparisons (each predictor variable for three outcome measures), results were only considered significant at the $p < .01$.

Predictors of Treatment Outcome

Following Aiken and West's (1991) procedures for presenting the interaction effects of continuous variables,

each table and figure presents the pattern of change for the 25th and 75th percentile levels for the significant variables.

Demographic Predictors

None of the demographic factors were significant general predictors of outcome.

Parent Characteristics

Table I shows the pretreatment, posttreatment, and follow-up scores for the 25th and 75th percentiles for each of the parent characteristics that predicted treatment response at statistically significant levels.

Parents reporting higher levels of pretreatment life stress had children who displayed more ODD-related symptoms on the Eyberg intensity scale at pretreatment, and made greater gains by follow-up than children of parents reporting less initial total life stress (Fig. 1). While children of parents showing lower levels of life stress showed smaller gains, they showed fewer symptoms at pretreatment, posttreatment, and follow-up. Thus, children of parents experiencing lower levels of pretreatment life stress made less overall improvement, but they consistently "looked better" (i.e., had fewer symptoms) than children of parents who were more distressed.

The pattern differed slightly for the relationship between total life stress and the CBCL externalizing scales (Fig. 1). On that scale, there was little difference in externalizing problems at pretreatment for parents at the 25th and 75th percentile on total stress, but the parents experiencing less total stress had children who made greater gains and displayed fewer externalizing symptoms at posttreatment and follow-up.

The relationship between parental distress and treatment response on the Eyberg scale was similar to that for total stress and the Eyberg scale. Parents reporting higher levels of initial parental distress had children who displayed more ODD-related symptoms on the Eyberg intensity scale at pretreatment, but made greater gains by follow-up than children of parents reporting less initial parental distress. While children of parents showing less initial parental distress showed smaller gains, they showed fewer symptoms at pretreatment, posttreatment, and follow-up. Maternal depression was not a significant predictor of outcome.¹

¹Figures displaying trends over time for other significant predictors and moderators not included herein are available on line at Oxford Press.

Child Characteristics

In general, the child characteristics that were significant predictors of treatment outcomes followed a similar pattern to that for the parent characteristics, with children showing poorer initial functioning showing greater gains with treatment (i.e., more internalizing symptoms, more temperamental difficulty, greater functional impairment), but the children with less severe initial problems showing lower levels of ODD-related symptoms at each trial. This pattern was present for internalizing disorders as a predictor of change on the Eyberg intensity scale, difficult child temperament as a predictor of change on the Eyberg intensity scale, and the CGAS as a predictor of change on the CBCL externalizing scale.

A somewhat different pattern emerged for the CBCL internalizing scale and child temperamental difficulty as predictors of change on the CBCL externalizing scale, and the CGAS as a predictor of change on the Eyberg scale. Children higher on initial levels of internalizing problems made more rapid progress at posttreatment

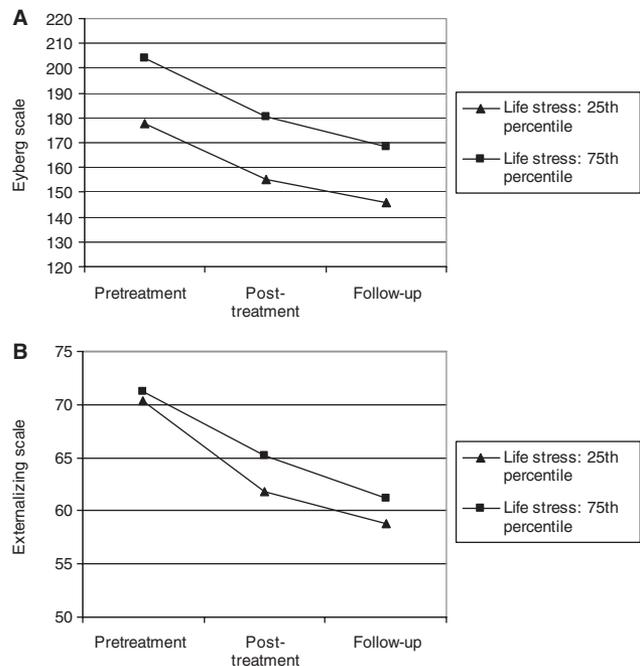


Figure 1. Initial parental life stress as a predictor of treatment gains for the Eyberg scale (A) and the CBCL externalizing scale (B).

Table 1. Significant Predictor Variables

Predictor	Outcome measure	Percentile	Pretreatment	Posttreatment	Follow-up	F (df)
Total life stress	Eyberg	25th	177.5	154.9	145.7	13.4
		75th	203.8	180.2	168.3	(3, 310.7)**
	Externalizing	25th	70.4	61.8	58.8	7.3
		75th	71.2	65.2	61.2	(3, 316.8)**
Parental distress	Eyberg	25th	149.2	129.0	124.4	5.7
		75th	160.5	139.8	129.9	(3, 313.3)**
	Internalizing	25th	148.7	127.3	121.6	21.4
		75th	161.9	139.9	132.3	(3,330.9)**
Difficult temperament	Eyberg	25th	148.1	131.1	124.8	10.67
		75th	162.5	139.2	130.6	(3, 310.2)**
	Externalizing	25th	70.5	62.2	59.2	6.2
		75th	71.2	64.8	60.9	(3, 323.0)**
C-GAS	Eyberg	25th	162.8	143.6	134.5	29.3
		75th	144.5	120.4	116.3	(3, 310.0) **
	Externalizing	25th	72.5	65.4	61.9	25.1
		75th	68.1	59.7	56.7	(3, 313.9)**
Parent-child dysfunction	Eyberg	25th	148.6	132.0	125.0	6.7
		75th	159.9	142.7	135.2	(3, 310.1)**
	Externalizing	25th	70.2	61.6	58.5	4.5
		75th	71.2	64.4	60.8	(3, 316.0)*
Maternal structuring	α - Command compliance	25th	0.80	0.84	0.84	6.8
		75th	0.91	0.94	0.91	(3, 314.0)**

* $p < .004$, ** $p < .001$.

on the externalizing scale, but differed little at follow-up from children with lower initial levels of internalizing problems. Consistent with the overall pattern, children with lower initial levels of internalizing problems showed fewer symptoms at posttreatment and follow-up. The pattern was similar for the CGAS as a predictor of change for the Eyberg intensity scale scores. In contrast, children with lower levels of temperamental difficult made slightly more gains in treatment overall and had lower levels of symptoms on the externalizing scale at both posttreatment and follow-up. Trends across time for internalizing problems are presented in Fig. 2.

Parent-child Interaction Measures

For the interactional measures, parents reporting higher initial levels of parent-child dysfunction initially showed more treatment progress on the Eyberg scale, but the children of parents reporting less parent-child

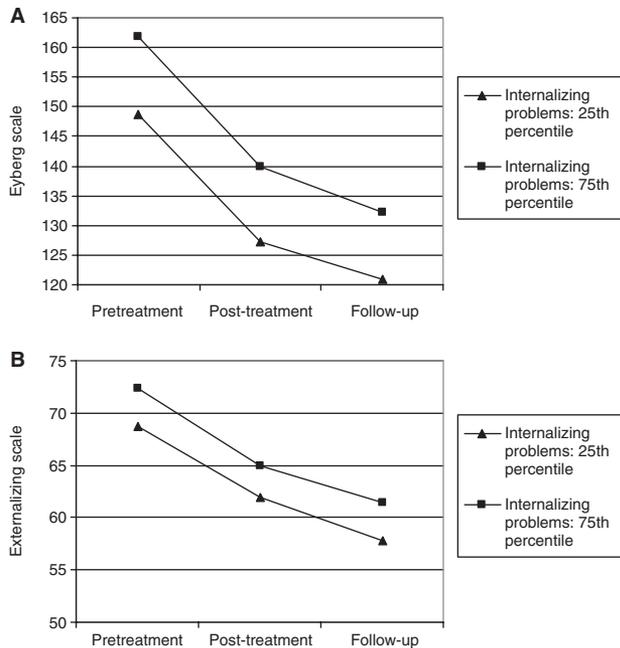


Figure 2. Initial CBCL internalizing scale scores as a predictor of treatment gains for the Eyberg scale (A) and the CBCL externalizing scale (B).

dysfunction showed lower symptom levels at each assessment period. On the CBCL externalizing scale, children of parents reporting lower levels of parent-child dysfunction both made better treatment gains and showed fewer symptoms at posttreatment and follow-up. Parents less effective initially in structuring the play observation made more progress than those with better ability to provide structure because a ceiling effect limited improvement in α -compliance for more effective parents [$F(3, 313.92)$ for structured \times trial interaction = 6.77, $p = .001$]. Maternal warmth, respect for autonomy and synchrony/quality of assistance were not significant predictors of outcome.

Moderators

Gender

Gender was a significant moderator on the CBCL externalizing scale [gender \times treatment group \times trials interaction, $F(12, 304.01) = 2.79, p = .001$] (Table II). The gender groups did not differ at pretreatment [$F(3, 311.91) = 0.874, p = .502$] on that scale. For nurse-led treatment, the rate of improvement was higher for girls than boys (from pretreatment to follow-up, -6.1 for girls; for boys, -11.7); in the MIT group, the pattern was the reverse, with greater improvement for boys (-14.7) than girls (-9.8). There was little difference in the rate of change for the two genders in the psychologist-led treatment (boys, -12.7; girls, -11.1).

Maternal Education

Maternal education, classified as high school or less versus some college/completed college showed a moderating effect for the Eyberg scale [treatment group \times trials $F(12, 298.0) = 1.65, p = .01$]. Certain cell sizes in this analysis fell below 10 per group, however, so these results were not interpreted further.

Discussion

The present study examined predictors and moderators associated with treatment outcomes for children with

Table II. Significant moderator variables

Moderator	Outcome measure	Group	Pretreatment	Posttreatment	Follow-up	F (df)
Gender	Externalizing	Nurse:boy	68.2	64.5	62.1	2.8* (12, 304.0)
		Nurse:girl	70.69	62.2	59.0	
		Psychologist:boy	69.9	59.2	57.2	
		Psychologist:girl	70.6	62.3	59.4	
		MIT:boy	70.0	61.1	55.3	
		MIT:girl	77.2	71.7	67.5	

* $p < .001$.

ODD with the Webster-Stratton *Incredible Years* program. One group received a minimal intervention consisting of the companion book to the *Incredible Years* program, and two other groups received treatment following either a primary care office model with nurses providing the 12-session intervention or a mental health referral model in which psychologists provided the intervention. The outcomes show little advantage for the therapist-led (nurse, psychologist) groups compared to the minimally intensive bibliotherapy group overall, while dose effects indicate that parents who attended seven or more sessions showed some advantages in outcome over those without therapist-contact.

Because parents often fail to attend enough treatment sessions in mental health clinics to complete a 12-session treatment programs (Armbruster & Kazdin, 1994), a substantial number of families and children do not benefit from treatment, and the minimal intervention is more flexible and less costly than the therapist-led groups, it is important to begin to understand what factors might be associated with improvement with parent training, and what factors might make some individuals respond better to minimal contact versus therapist-led treatment. In addition, it is important to see who might benefit from nurse-led treatment that could potentially be done in the pediatric office versus those who might require a mental health referral.

General predictors are variables that predict outcomes similarly across groups. Several parent and child characteristics and parent-child interactional variables were associated with different outcomes across types of treatment and therapists. These include parental distress, and life stress; child internalizing problems, functional impairment, and difficult temperament; and parent-child dysfunction and poor structuring ability at pretreatment. Generally, higher levels of problems on the predictor variables were usually associated with greater improvement in treatment. This occurred with life stress, parenting distress, child internalizing symptoms, difficult child temperament, and parent-child dysfunction as predictors of improvement on the Eyberg intensity scale, and for functional impairment on the CBCL externalizing scale. For two measures, child internalizing symptoms as a predictor of CBCL externalizing scores, and the CGAS as a predictor of the Eyberg intensity scale, greater problems were associated with more improvement at posttreatment but not overall. For three other variables, life stress, difficult child temperament, and parent-child dysfunction as predictors of the CBCL externalizing scale, lower levels of pretreatment problems were associated

with greater treatment gains. Across all of the significant predictors, however, families and children displaying fewer problems on the predictor variables at pretreatment had fewer problems at posttreatment and follow-up. Thus, even when more symptomatic and impaired children and families made greater gains they did not “catch up” with the less symptomatic or impaired children after treatment.

None of the parent, child, or parent-child interaction variables were significant treatment moderators, but one of the demographic characteristics, gender, was. Boys showed better improvement than girls in the MIT intervention. Possibly, material in the assigned book was more amenable to working with boys than girls, or that ODD symptoms differ enough across genders that receipt of the book alone was more helpful to parents of boys than girls. This awaits future research to sort out.

The results also indicate that nurses obtained a better treatment response with families of girls than boys, while there was no gender difference in responsiveness to the psychologist-led groups. Overall, the treatment response in the nurse-led groups for girls was similar to that for psychologists with parents of children with both genders, but the nurses had less success with boys. Although the nurses in the intervention group did as well overall as the psychologists, they had less general mental health treatment experience than did the psychologists. Even while following the manualized treatment, they had personal experience but limited child mental health experience to draw upon than did the psychologists. Possibly, their personal experience “fit” better with girls than boys and led to a better treatment response, while the greater mental health experience of psychologists were equally applicable to boys and girls. If replicated, this pattern would argue for retaining girls in primary care settings for parenting programs, while referring boys for treatment in the mental health sector. One limitation of this study is that sample sizes in these moderator analyses were relatively small, so the results are particularly in need of replication.

Maternal education was also a significant moderator, but cell sizes were too small to warrant further interpretation of those results. The significant findings suggest that maternal education may be an important predictor to examine in future studies with large *N*s.

There are few existing studies on moderator and predictors with parent training with which to compare these results. Beauchaine et al. (2005) reported that children with higher initial internalizing scores did better in treatment, while the present study shows better

response when internalizing problems were low. A closer inspection of their results, however, shows children lower in internalizing problems actually showed fewer externalizing symptoms at follow-up even though the rate of improvement was lower than those with higher initial internalizing symptoms. Thus the results of the two studies were similar. In contrast to Webster-Stratton (1985), neither this study nor Harwood and Eyberg (2006) found a relationship between depression and treatment outcome.

The pattern of results for predictors and moderators needs to be examined in the context of the overall study findings, which showed no overall difference between the minimal intervention bibliotherapy group and the therapist-led treatments, no differences in outcomes overall between the two types of therapists, nurses, and psychologists, and dose effects when parents attended a sufficient number of sessions, a number that exceeds the number of sessions that families often attend in clinic settings. While the present study did not directly test a stepped-care procedure, the results suggest that a stepped-care approach might be most appropriate to treating ODD in primary care. For most families, stepped care could begin with a minimally intensive intervention such as bibliotherapy since families unable or unwilling to attend enough treatment sessions will fare as well with that intervention as with therapist-led treatments. Families not responding to minimal intervention but willing to commit to a sufficient number of treatment sessions may be candidates for therapist-led interventions. Families with girls needing treatment might do well remaining in treatment with primary care nurses; families with college educated mothers seem equally suited to treatment with nurses and psychologists; and families with less educated mothers and boys needing treatment might find a referral to a psychologist for treatment to be most helpful. When more severe child and family problems are present, some gains can be expected, but these children may not “catch up” with families and children having less severe problems. For these children, parent training alone may be insufficient, and different or more intensive treatments may be necessary, including treatments to address internalizing as well as externalizing symptoms, or to address parental problems with stress, or other difficulties.

One limitation of the study is that it did not directly test a stepped-care approach; this remains for future research. Furthermore, the sample size did not allow for a careful analysis of children and families receiving bibliotherapy alone to determine which families benefited from that treatment specifically. In addition, the purpose

of this study was to examine the effects of treatment in the primary care setting, which has not been done with children diagnosed with ODD previously, and further research would be needed to determine if the results would be replicated in mental health settings as well.

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