Published in final edited form as:

J Posit Behav Interv. 2011 October ; 13(4): 198–207. doi:10.1177/1098300711405337.

The Application of a Three-Tier Model of Intervention to Parent Training

Leah Phaneuf¹ and Laura Lee McIntyre²

¹Elmcrest Children's Center, Syracuse, NY, USA

²University of Oregon, Eugene, OR, USA

Abstract

A three-tier intervention system was designed for use with parents with preschool children with developmental disabilities to modify parent–child interactions. A single-subject changing-conditions design was used to examine the utility of a three-tier intervention system in reducing negative parenting strategies, increasing positive parenting strategies, and reducing child behavior problems in parent–child dyads ($n = 8$). The three intervention tiers consisted of (a) self-administered reading material, (b) group training, and (c) individualized video feedback sessions. Parental behavior was observed to determine continuation or termination of intervention. Results support the utility of a tiered model of intervention to maximize treatment outcomes and increase efficiency by minimizing the need for more costly time-intensive interventions for participants who may not require them.

Keywords

Incredible Years parent training; video modeling and feedback; developmental disabilities; early intervention

Children with developmental delays or disabilities (DD) are more likely to develop behavior disorders than their typically developing counterparts (Emerson, 2003). Family members and other caregivers of individuals with DD and co-occurring behavior problems are often negatively affected and report higher levels of stress, caregiving burden, and depression than parents with children with DD only (Herring et al., 2006; McIntyre, Blacher, & Baker, 2002; Singer, Ethridge, & Aldana, 2007). Research suggests a bidirectional effect such that both child behavior and parent behavior affect family adjustment and well-being (Sameroff & Fiese, 2000). These bidirectional effects may be especially true in the case of child behavior influencing parenting stress and parenting stress influencing child behavior (e.g., Baker et al., 2003; Orsmond, Seltzer, Krauss, & Hong, 2003).

Reprints and permission: <http://www.sagepub.com/journalsPermissions.nav>

Corresponding Author: Laura Lee McIntyre, Department of Special Education and Clinical Sciences, 340 HEDCO, 5208 University of Oregon, Eugene, OR 97403-5208, USA, llmcinty@uoregon.edu.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Although children with DD are at heightened risk for developing a severe behavior disorder, less is known about the emergence of behavior problems in young children with DD. It is likely a combination of biological, environmental, and social factors that contribute to child risk (Sameroff & Fiese, 2000). At a very early age, families are children's main socializing agents. The home environment is the primary context for children's development of adaptive (as well as maladaptive) strategies (Dishion et al., 2008; Dishion & Stormshak, 2007; Forgatch & DeGarmo, 1999; Patterson, 1976; Sameroff & Fiese, 2000). This is consistent with a developmental psychopathology framework, which recognizes multiple pathways to adaptation, rather than a single causal link.

Regardless of the cause of behavior problems, children with DD have demonstrated the onset of behavior problems at a young age (Baker, Blacher, Crnic, & Edelbrock, 2002) with relative stability across the preschool period across both home and school settings (Baker et al., 2003; Eisenhower, Baker, & Blacher, 2007; McIntyre, Blacher, & Baker, 2006). The early onset, stability, and generalization across settings suggest the need for early systematic, preventive efforts focused on reducing the risk of future behavior difficulties and family stress. A recent meta-analysis by Singer et al. (2007) suggests that parents who receive parent education in the form of parent management training and stress reductive techniques may have more favorable child and parent outcomes.

Given the established link between parenting and behavior problems, parent education and support interventions have been used as an intervention mechanism for both children with DD (e.g., Baker & Brightman, 2004; Hudson et al., 2003; Koegel, Koegel, Harrower, & Carter, 1999; McIntyre, 2008a, 2008b; Roberts, Mazzucchelli, Studman, & Sanders, 2006; Whittingham, Sofronoff, Sheffield, & Sanders, 2009) and typically developing children with behavior disorders (e.g., Eyberg, 1988; Hood & Eyberg, 2003; Sanders, 1999; Webster-Stratton, 1984). Although meta-analyses suggest the efficacy of parent management training in reducing child behavior problems (e.g., Lundahl, Risser, & Lovejoy, 2006), results of individual studies show varied outcomes. A variety of factors may influence treatment outcomes, such as varying intervention formats (e.g., self-administered, group sessions), child factors (e.g., age, severity of problems) and parent and community factors (e.g., cognitive status, mental health, poverty, social support). Indeed, a number of mediators or moderators of treatment outcomes have been explored (Beauchaine, Webster-Stratton, & Reid, 2005; Lundahl et al., 2006; O'Dell, 1985). In addition, various content dimensions of intervention programs have been associated with parent and child effects (Kaminski, Valle, Filene, & Boyle, 2008). For example, programs that emphasize promoting positive parent-child interactions and behavioral consequences for child appropriate and inappropriate behavior have been shown to be more effective than those that do not include these intervention components (Kaminski et al., 2008).

Given that young children with DD and their families may experience myriad risk factors, early intervention directed at supporting both child and family functioning may be especially important. Although there is a range of parent training programs available (see Webster-Stratton & Taylor, 2001), there is a need for flexible interventions that may be adapted based on family needs and treatment response. Service delivery systems, such as education and healthcare systems, often are responsible for providing services to a range of children and

families, some requiring intensive services whereas others requiring fewer services. Thus, service delivery systems that provide cost-effective, evidence-based practices that are flexible and can be adapted for a range of clientele may be an important contribution to serving the needs of children and families (McIntyre & Phaneuf, 2007).

Health and education practitioners have a history of supporting individuals' needs while negotiating the demands of numerous people. In American health care, particularly in managed care settings, clinicians may use a stepped care approach to meet the needs for those requiring services while maximizing treatment resources (Bower & Gilbody, 2005). Similarly, in educational systems, the methods used in a response to intervention (RTI) model involve intensifying, modifying, or changing an intervention based on a student's response to educational interventions (Gresham, 2002). Individuals who require little intervention to display significant improvement do not continue to the next level of intervention intensity. This conservation of treatment allows resources to be used for individuals requiring more intensive or individualized services (Walker, 2004; Walker & Shinn, 2002). Considering that clinic and school settings experience many of the same treatment barriers inherent in parent training programs, a parent training model that uses methods similar to stepped care and RTI approaches may optimize efficiency without sacrificing treatment efficacy.

Purpose of the Study

Provided that young children with DD and their families may be at risk for a number of negative outcomes, it is imperative that early intervention options be available; however, not all families may require the same intensity of intervention. The overarching goal of the current study was to examine the utility of a three-tier model of parent training intervention with parents of preschool children with DD. The intervention tiers consisted of (a) self-administered reading material (RM), (b) group training (GT) based on Webster-Stratton's Incredible Years Parent Training with developmental disabilities modification (IYPT-DD; McIntyre, 2008a), and (c) individualized video feedback sessions (VF). Specifically, we asked the following two research questions: (a) What percentage of parent-child dyads will respond to each of the intervention tiers? and (b) Will there be significant pre- to postintervention reductions in child problem behavior as assessed by both direct observations of parent-child interactions and parent ratings on the Child Behavior Checklist for ages 1½–5 (CBCL; Achenbach, 2000)? Although a three-tier approach is a novel application to parent training, each intervention tier is established within the early intervention, parent training, education, and support literature. It was expected that all parents would display significantly fewer negative parenting strategies and more positive strategies postintervention, with varying levels of intervention anticipated. Treatment effects were expected to be maintained at a three-month follow-up assessment. In addition, it was expected that child problem behavior would be significantly reduced from pre- to postintervention.

Method

Participants

Participants were randomly selected from a larger pool of parents of 2- to 4-year-old children with DD who attended a free, 11-week parent training program. Parents were recruited from local early intervention and preschool programs and were eligible if their child (a) had a Vineland Adaptive Behavior Scales (Vineland-II, Sparrow, Balla, & Cicchetti, 2005) adaptive behavior composite standard score between 45 and 85, (b) was ambulatory, and (c) lived with the primary caregiver for a minimum of 1 year prior to study initiation. In addition, to be included in the present study, baseline assessments of observed parent–child interactions needed to be characterized by more than 20% of intervals containing negative parenting strategies and low levels of positive parenting strategies (i.e., less than a 3:1 ratio of positive to negative strategies). Of the 13 families that met criteria, 8 caregivers (61%) agreed to participate. All primary caregiver participants were mothers with an average age of 35.50 years ($SD = 5.78$). Six mothers had college degrees and two mothers had high school diplomas. All but one family reported a spouse/partner in the home, and five families reported that the participating child had siblings living in the home. The mean age for participating children was 4.11 years ($SD = 0.77$). According to caregiver reports, children had the following diagnoses: autism spectrum disorders ($n = 3$), speech/language delays ($n = 3$), and global developmental delays ($n = 2$). Children's mean Adaptive Behavior Composite Score on the Vineland-II was 58.88 ($SD = 6.15$).

Setting

Both the reading material (Tier 1) and video feedback training (Tier 3) interventions were administered in the home of the participating families, whereas the group training intervention (Tier 2) was conducted at an early childhood education program in the community.

Response Measurement

Observed Parent–Child Interactions

Videotaped parent–child interactions were the primary outcome variable of interest and were collected in the home throughout the course of the study using a standardized set of toys, activities, and instructions. Observations consisted of 10 min of parent–child unstructured free-play, 2 min of clean-up, and 3 min of a provided activity (e.g., coloring activity, puzzle) in order to observe the parent's behaviors within several contexts (Eyberg, Bessmer, Newcomb, Edwards, & Robinson, 1994). A 30-s partial interval recording system was used to identify intervals of positive parenting strategies and behaviors described as negative for promoting adaptive child outcomes (i.e., negative parenting strategies). The behavior codes comprising the observation system for parent–child interactions during play were designed for this research program (Brzuszkiewicz & McIntyre, 2005; McIntyre, 2008a, 2008b; Phaneuf & McIntyre, 2007) and were rationally derived based on the content areas covered in Webster-Stratton's Incredible Years curriculum. This coding system has been used successfully in previous studies (McIntyre, 2008a, 2008b; Phaneuf & McIntyre, 2007) and

consists of seven behavior categories comprising the negative parenting strategies and two behavior categories comprising the positive parenting strategies.

Negative parenting strategies—We used a combined negative parenting strategy index as our primary outcome variable to reflect the following seven categories: (a) developmentally inappropriate play behavior (parent-directed, competitive, or asking two or more object-related questions), (b) intrusion on child's independence (assisting with task without child's request or parent insisting on completing a task his or her way), (c) positive consequences for child inappropriate behaviors (delivery of a tangible or verbal/nonverbal attention in the presence of child problem behavior), (d) inappropriate commands (commands that are ambiguous, are repeated more than twice, are part of a chain, have no chance for response, begin with "stop" or "don't," and/or contain threats), (e) lack of follow-through (allowing escape from a command or lack of praise after compliance), (f) criticism (verbally expressing discontent with child's performance), and (g) aggression (physical or verbal aggression toward child).

Positive parenting strategies—Two positive parenting strategies were also collected. Descriptive comments (parent provision of verbal commentary that describes what the child is doing, e.g., "You're building a tall tower") were recorded using the 30-s partial interval system. Discrete praise statements directed toward the target child were collected using a frequency count throughout the observation. A positive parenting strategy composite was created for the present study to reflect the percentage of intervals containing a descriptive comment, praise statement, or both.

Child problem behavior—Although parent behavior served as the primary variable of interest, we collected two forms of child behavior data pre- and postintervention. Child problem behavior during parent-child interactions was coded using a 30-s partial interval coding system. Child problem behaviors, including physical aggression (e.g., kicking, pinching, hitting), disruption (e.g., throwing items, banging walls, stomping feet), and negative vocalizations (e.g., whining, screaming), formed a combined inappropriate behavior composite that reflected the percentage of intervals containing a child problem behavior.

Parent Reports of Child Behavior

Child Behavior Checklist—In addition to observed child behavior, parents completed the Child Behavior Checklist for ages 1½–5 (CBCL; Achenbach, 2000) pre- and postintervention. The CBCL has 99 items that indicate child problems. The child's parent indicated, for each item, whether it is *not true* (0), *somewhat or sometimes true* (1), or *very true or often true* (2), now or within the past 2 months. The Total Problems *T*-score was used ($M = 50$, $SD = 10$).

Definition for Response to Intervention

Given our emphasis on altering parent interactions with their children, we conceptualized response to intervention based on parent behavior only. Response to intervention was defined as reducing the percentage of negative parenting strategies to 20% or fewer intervals

and achieving a 3:1 or greater ratio of positive to negative strategies. Response to intervention criteria were based on findings from previous parent training research, suggesting that on average, parents reduce their negative parenting strategies to approximately 20% of observed intervals immediately following participation in a group training program (McIntyre, 2008a, 2008b). In addition, Webster-Stratton (2001) discusses parent training results in terms of the ratio of positive to negative parental behavior, suggesting an optimal achievement of 3 to 5 times the number of positive parent behaviors to the number of negative parent behaviors. Thus, in the current study we conceptualized response to intervention as encompassing both a reduction of negative parenting strategies and an increase in positive parenting strategies. Using the aforementioned response to intervention criteria allowed us to continue intervention with parents who displayed low levels of negative strategies, often due to a lack of interaction with their children, but who did not meet the 3:1 positive to negative strategies ratio.

Interobserver Agreement and Treatment Integrity

Data collectors were blind to the specific goals of the study and anticipated outcomes. To ensure accuracy, the first author and two research assistants were trained to 80% agreement on previously recorded videotapes of parent–child interactions. Once coders were trained to criterion, a third research assistant coded 35.9% ($n = 23$) of observations. Average percentage agreement for total negative parenting strategies was 99.4% (range 90%–100%). Average percentage agreement for positive parenting strategies were 99.4% (range 96.7%–100%) for praise and 96.7% (range 73.3%–100%) for descriptive commenting. Average percentage agreement for the child combined inappropriate behavior index was 97.9% (range 93%–100%).

A treatment manual and session checklists were used for the Tier 2 (GT) intervention and a session checklist specifying video feedback procedures was used for the Tier 3 (VF) intervention. A research assistant used component checklists to monitor the accuracy of treatment implementation in Tier 2 and Tier 3 interventions by recording the percentage of steps accurately completed. The Tier 1 (RM) intervention did not involve therapist facilitation; thus, the degree to which parents completed the reading material was provided through self-report. On average, participants self-reported that they read 52.2% (range 0%–100%) of the material. A research assistant observed 33% ($n = 4$) of the Tier 2 (GT) intervention sessions with an average of 99.8% (range 97%–100%) of intervention steps accurately implemented. During the Tier 3 intervention, 50% of the sessions ($n = 2$) were monitored resulting in an average of 96.8% (range 93.5%–100%) of steps accurately completed.

Design

A single-subject changing conditions design (Alberto & Troutman, 2003) was used to assess the efficacy of each of the three intervention tiers on negative parenting strategies and positive parenting strategies during observed parent–child interactions. All parents received Tier 1 of the intervention at the same time point. Depending on their response to intervention, they were either provided with the next intervention tier or were followed for

maintenance effects (see Figure 1). Changes in parent ratings of child behavior problems (CBCL) and observed child inappropriate behaviors from pre- to postintervention were assessed using paired comparison *t* tests. Preintervention assessments were completed at study intake/baseline and postintervention assessments were completed following the participant's final intervention tier.

Three-Tier Model

Tier 1: Reading materials (RM)—Parent participants were instructed to either read or listen to audiotapes/CDs of provided materials in sequence over the subsequent 3 weeks. Reading materials were drawn from *The Incredible Years: A Troubleshooting Guide for Parents of Children 2–8 Years* (Webster-Stratton, 2005) and consisted of five chapters covering play, praise, rewards, limit setting, and handling misbehavior. Each chapter was short (approximately 10–15 pages) and written in parent-friendly language, with pictures, cartoons, and other illustrations. Reminder cards and phone calls were included to encourage timely reading. Following the 3-week period, parents were asked to self-report on the number of chapters they completed. Following this phase, two parent–child interaction observation sessions were conducted on separate days, which were averaged and compared to the responsiveness to intervention criteria.

Tier 2: Group training (GT)—Tier 2 of the intervention consisted of an 11-week group-based parent training series using Webster-Stratton's Incredible Years Parent Training program (IYPT; Webster-Stratton, 2001) with adaptations made for families with young children with DD (IYPT-DD; McIntyre, 2008a, 2008b). Meetings were facilitated by the second author and held once a week for 2½ hr over the course of 11 weeks. The GT followed a published structured curriculum and targeted skills in four areas: (a) developmentally appropriate play/involvement, (b) praise and rewards, (c) limit setting, and (d) handling misbehavior. Each weekly meeting involved group discussion, generic videotape vignettes, role-playing, and feedback (see McIntyre, 2008a, 2008b; Webster-Stratton, 2000, 2001). At the end of each session, parents were assigned homework to practice and apply their new skills; however, homework completion was not formally monitored. Two parent–child interaction observation sessions were conducted on separate days following the final GT session. The mean of these observations was compared to responsiveness to intervention criteria to determine whether the parent would progress to the next tier or discontinue intervention.

Tier 3: Individualized video feedback training (VF)—The final tier of the intervention consisted of providing an individualized VF session based on the final observation conducted post-GT. In this condition, the therapist (first author) viewed the videotape in advance and identified strengths and weaknesses of the parent's behavior (based on the content provided in the prior intervention tiers). The therapist scheduled a VF session in the family's home and provided feedback to the participating parent. This procedure incorporated modeling, rehearsal, praise, and/ or corrective feedback and has been used successfully with parents of preschool-aged children with DD (Phaneuf & McIntyre, 2007). Two parent–child interaction observation sessions, each on separate days, were conducted following the VF session. If the parent did not respond to intervention, then

further VF sessions were conducted until the mean of the observations met response to intervention criteria or until a maximum of three VF sessions were conducted.

Follow-up—Six of the mothers (75%) participated in follow-up assessments conducted 3 months after their completion of intervention. The follow-up parent–child interaction assessments were conducted in the same manner as previous observations.

Results

Figure 2 depicts negative parenting strategies and positive parenting strategies across baseline, Tier 1 (RM), Tier 2 (GT), Tier 3 (VF), and follow-up assessment phases. Baseline rates of negative parenting strategies ranged between 9.4% and 60%, with an average of 33.6% of intervals containing negative strategies. Postintervention rates ranged between 3.5% and 11.1% with an average of 7.8% of intervals containing negative parenting strategies (see Figure 2). Baseline ratios of positive to negative strategies ranged between 1:1 and 1:4, with an average of 1:1. In contrast, postintervention ratios ranged between 4:1 and 25:1, with an average of 12:1 positive to negative strategies.

Response to Tier 1 (RM)

Mother D responded to Tier 1 and discontinued intervention following completion of the self-administered reading materials intervention. Mother D's average percentage of intervals containing negative parenting strategies was 17.22% following Tier 1, with an average ratio of positive to negative strategies of 3:1. The remaining seven participants were nonresponders and continued to Tier 2 (GT). These seven mothers (A, B, C, E, F, G, H) demonstrated a mean of 34% (range 24%–52%) of intervals containing negative parenting strategies, with a range of positive to negative strategies ratios of 1:6 to 2:1 following Tier 1.

Response to Tier 2 (GT)

Three participants, Mothers A, E, and F responded to Tier 2 (GT) intervention and discontinued treatment following completion of group parent training sessions. The mean percentage of intervals containing negative parenting strategies was 8% for Mother A, 10% for Mother E, and 15% for Mother F following Tier 2. The ratios of positive to negative strategies were 4:1, 10:1, and 4:1 for mothers A, E, and F, respectively. Mothers B, C, G, and H did not respond to Tier 2 (GT) intervention. Following Tier 2 intervention, these mothers demonstrated a mean of 39% (range 25%–50%) of intervals of negative parenting strategies, with a range of positive to negative strategies between 1:12 and 1:1. One participant (Mother G) withdrew following Tier 2 intervention citing family/personal reasons.

Response to Tier 3 (VF)

Three of the four remaining nonresponding participants (Mothers B, C, and H) continued to the final tier of intervention. Mothers B and H responded to one session of VF and demonstrated low percentages of intervals containing negative parenting strategies, 6.67% and 10%, for Mothers B and H, respectively. Following Tier 3 intervention, Mother B demonstrated a ratio positive to negative strategies of 13:1 and Mother H demonstrated an

8:1 ratio of positive to negative strategies. Mother C required two VF sessions before meeting response criteria. On completion of Tier 3 intervention, Mother C displayed an average of 10% of intervals containing a negative parenting strategy, with a 7:1 ratio of positive to negative strategies. In sum, seven of the eight participants (87.5%) met response to intervention criteria, with one withdrawing from the study. One parent (12.5%) responded to Tier 1, three parents (37.5%) responded to Tier 2, and three parents (37.5%) responded to Tier 3.

Follow-up

Six mother–child dyads participated in 3-month follow-up assessments. As previously mentioned, one mother withdrew from the study following Tier 2 intervention and one mother could not be reached to schedule the follow-up assessment. Thus, follow-up data were collected on 75% of the sample. All six mothers maintained or decreased their observed percentages of negative parenting strategies in comparison to the observation immediately preceding the 3-month follow-up assessment. Furthermore, all six mothers were observed to engage in positive strategies during more than 40% of the intervals, with the highest percentage being nearly 90%. Four of the six mothers slightly increased their use of positive strategies, with only two mothers slightly decreasing their rates of positive strategies (see Figure 2). All ratios of positive to negative strategies remained greater than 3:1, with the highest ratios reaching 25:1.

Child behavior

Table 1 displays pre- and postintervention data for observed child behavior problems during parent–child interactions and parent reports of behavior problems on the CBCL Total Problems scale. Paired comparison *t* tests indicate that child behavior problems significantly reduced pre- to postintervention. Prior to participating in the intervention, children averaged 8.33% (*SD* = 8.17) of intervals containing inappropriate behaviors. Postintervention, the mean percentage of intervals containing inappropriate behavior was reduced to 0.42 (*SD* = 1.18), $t(7) = 2.89$, $p = .023$. Parent ratings of child behavior problems on the CBCL Total Problems reduced from a preintervention mean *T* score of 67.13 (*SD* = 8.29) to a postintervention mean *T* score of 63.75 (*SD* = 7.63) ($t(7) = 2.35$, $p = .051$).

Discussion

Although research in this area is growing, there are limited data on the use of tiered models of intervention in early childhood programs. Currently, there is no known study that uses a tiered model of parent training and employs response to intervention to guide treatment decisions. Thus, this application of a three-tiered model to parent training with an assessment of mothers' response to intervention is unique (McIntyre & Phaneuf, 2007). This study directly applied RTI logic to a tiered model of behavioral intervention targeting parenting behavior during parent–child interactions with preschool children with DD. This study highlights the utility of such a model to maximize treatment outcomes and increase efficiency by minimizing the need for more costly time-intensive interventions for participants who may not require them. For example, rather than providing one-on-one interventions to families over an extended period of time, parent and child response to

intervention could be assessed and used to guide treatment decisions to increase or decrease intensity of supports. Families' progress could be monitored over time, with booster sessions and supports provided as needed. Although the logic of universal screening, progress monitoring, and tiered supports are becoming more common in public education, including early childhood education (e.g., VanderDerHeyden & Snyder, 2006), this is a novel concept as applied to parent education.

Although the current findings are promising, there are several limitations that warrant attention in future research. First, it is likely that the current Tier 1 intervention was relatively weak, particularly given that more than half of participants did not read all five of the chapters that were provided. Because of the sequencing of Tier 2 GT sessions, parents were limited to 3 weeks to complete the self-administered Tier 1 intervention. Given that the majority of parents did not access 100% of the material, it is difficult to form conclusions regarding the efficacy of the Tier 1 intervention. It is unknown if more parents would have responded favorably had they been provided more time to read the material. On the other hand, these results may reflect the real-life situation that not all parents complete self-administered interventions. Future studies could allow more time for parents to complete Tier 1 in order to address this issue.

Related to this topic, a second limitation is the lack of responsiveness that was demonstrated by the majority of the participants after receiving the Tier 1 (RM) intervention. In fact, four participants (50%) actually increased their percentages of negative strategies after reading some of the provided Tier 1 materials. This may have occurred because the first two chapters of the book cover play and praise, with an emphasis on the importance of parents spending time with their children. The increase in negative strategies may reflect mothers' being less interactive with their children at baseline and then attempting to actually increase their interaction with their children. Regardless, it is clear the Tier 1 RM intervention was not sufficient for most to interact appropriately and positively with their children. Future studies could investigate the use of RM as the first tier of intervention with a bit more involvement, such as completing homework assignments, to increase the overall intensity and engagement of parents. On a related note, parents' overall participation, attendance, and engagement in Tier 2 GT sessions was variable, with attendance rates ranging from 45.5% to 100% ($M = 80.7$, $SD = 19.1$). Although we have attendance data, we do not have homework completion data for the tasks associated with GT. As such, our data on active participation and engagement with the intervention is limited to attendance data. These findings suggest that the use of VF sessions may be an appropriate alternative for mothers demonstrating poor completion or for mothers who lack adequate responsiveness to initial interventions.

This study could have been enhanced by including additional assessments. For example, including consumer satisfaction or social validity assessments measuring satisfaction of the tiered intervention approach would have been useful. Assessing parenting stress or mental health problems (e.g., depression) pre- and postintervention would have been valuable for determining whether the intervention tiers were effective in reducing parenting distress. Assessing child behavior change throughout the study, rather than relying on a single pre-

post assessment, would also be useful to determine the effects of each tier on child behavior outcomes.

A final limitation is that parent performance was examined over invariant conditions to maintain consistency across the observations of the parent–child dyad interactions. As such, it was not clear whether training was adequate to promote skill generalization. Further studies should include observations under different conditions to ensure generalization of skills.

In sum, the preliminary findings from this research offer support for the application of a tiered model of intervention for mothers with children with DD using mothers' response to intervention as a decision-making tool. Consistent with the results of applications of stepped care models and RTI models, this study offers a model of intervention that increases the efficiency of parent training programs without sacrificing effectiveness. In fact, a tiered model of parent training intervention allows for parents' individualized needs to be addressed that may not be addressed when administering a single mode of intervention (e.g., self-administered training, group training). As mentioned earlier, treatment outcomes vary to the extent that even the most well-established interventions may leave about one third of the participants with behaviors in the clinical range (Webster-Stratton & Hammond, 1997). A tiered model of intervention may allow practitioners to achieve the delicate balance between effectiveness and efficiency in providing interventions to parents and children.

Acknowledgments

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article:

This study was supported, in part, by grant R03HD047711 from the National Institute of Child Health and Human Development awarded to the second author.

References

- Achenbach, TM. Manual for the child behavior checklist 1½–5. Burlington, VT: University of Vermont, Department of Psychiatry; 2000.
- Alberto, PA.; Troutman, AC. Applied behavior analysis for teachers. 6th ed.. Columbus, OH: Merrill Prentice Hall; 2003.
- Baker BL, Blacher J, Crnic K, Edelbrock C. Behavior problems and parenting stress in families of three-year-old children with and without developmental delays. *American Journal on Mental Retardation*. 2002; 107:433–444. [PubMed: 12323068]
- Baker, BL.; Brightman, AJ. Steps to independence: Teaching everyday skills to children with special needs. 4th ed.. Baltimore, MD: Paul H. Brookes; 2004.
- Baker BL, McIntyre LL, Blacher J, Crnic K, Edelbrock C, Low C. Preschool children with and without developmental delay: Behavior problems and parenting stress over time. *Journal of Intellectual Disability Research*. 2003; 47:217–230. [PubMed: 12787154]
- Beauchaine TP, Webster-Stratton C, Reid MJ. Mediators, moderators, and predictors of one-year outcomes among children treated for early-onset conduct problems: A latent growth curve analysis. *Journal of Consulting and Clinical Psychology*. 2005; 73:371–388. [PubMed: 15982136]
- Bower P, Gilbody S. Managing common mental health disorders in primary care: Conceptual models and evidence base. *British Medical Journal*. 2005; 330:839–842. [PubMed: 15817554]

- Brzuszkiewicz L, McIntyre LL. Observation system for parent-child play interactions: Parental behavior manual. Unpublished manual. 2005
- Dishion TJ, Shaw DS, Connell AM, Gardner F, Weaver CM, Wilson MN. The Family Check-Up with high-risk indigent families: Preventing problem behavior by increasing parents' positive behavior support in early childhood. *Child Development*. 2008; 79:1395–1414. [PubMed: 18826532]
- Dishion, TJ.; Stormshak, EA. Intervening in children's lives: An ecological, family-centered approach to mental health care. Washington, DC: American Psychological Association; 2007.
- Eisenhower AS, Baker BL, Blacher J. Early student-teacher relationships of children with and without intellectual disability: Contributions of behavioral, social, and self-regulatory competence. *Journal of School Psychology*. 2007; 45:363–383. [PubMed: 21490876]
- Emerson E. Prevalence of psychiatric disorders in children and adolescents with and without intellectual disabilities. *Journal of Intellectual Disability Research*. 2003; 47:51–58. [PubMed: 12558695]
- Eyberg SM. Parent-child interaction therapy: Integration of traditional and behavioral concerns. *Child & Family Behavior Therapy*. 1988; 10:33–46.
- Eyberg, S.; Bessmer, J.; Newcomb, K.; Edwards, D.; Robinson, E. Dyadic parent-child interaction coding system II: A manual. Social and behavioral sciences documents. San Rafael, CA: Select Press; 1994.
- Forgatch MS, DeGarmo DS. Parenting through change: An effective prevention program for single mothers. *Journal of Consulting and Clinical Psychology*. 1999; 67:711–725. [PubMed: 10535238]
- Gresham, FM. Responsiveness to intervention: An alternative approach to the identification of learning disabilities. In: Bradley, R.; Danielson, L.; Hallahan, DP., editors. Identification of learning disabilities: Research to practice. Mahwah, NJ: Lawrence Erlbaum; 2002. p. 467-519.
- Herring S, Gray K, Taffe J, Tonge B, Sweeney D, Einfeld S. Behaviour and emotional problems in toddler with pervasive developmental disorders and developmental delay: Associations with parental mental health and family functioning. *Journal of Intellectual Disability Research*. 2006; 50:874–882. [PubMed: 17100948]
- Hood K, Eyberg SM. Outcomes of parent-child interaction therapy: Mothers' reports on maintenance three to six years after treatment. *Journal of Clinical Child and Adolescent Psychology*. 2003; 32:419–429. [PubMed: 12881030]
- Hudson AM, Matthews JM, Gavidia-Payne ST, Cameron CA, Mildon RL, Radler GA, Nankervis KL. Evaluation of an intervention system for parents of children with intellectual disability and challenging behaviour. *Journal of Intellectual Disability Research*. 2003; 47:238–249. [PubMed: 12787156]
- Kaminski JW, Valle LA, Filene JH, Boyle CL. A meta-analytic review of components associated with parent training program effectiveness. *Journal of Abnormal Child Psychology*. 2008; 36:567–589. [PubMed: 18205039]
- Koegel LK, Koegel RL, Harrower JK, Carter CM. Pivotal response intervention 1: Overview of approach. *Journal of the Association for Persons with Severe Handicaps*. 1999; 24:175–185.
- Lundahl B, Risser HJ, Lovejoy C. A meta-analysis of parent training: Moderators and follow-up effects. *Clinical Psychology Review*. 2006; 26:86–104. [PubMed: 16280191]
- McIntyre LL. Adapting Webster-Stratton's Incredible Years Parent Training for children with developmental delay: Findings from a treatment group only study. *Journal of Intellectual Disability Research*. 2008a; 52:1176–1192. [PubMed: 18671808]
- McIntyre LL. Parent training in young children with developmental disabilities: A randomized controlled trial. *American Journal on Mental Retardation*. 2008b; 113:356–368. [PubMed: 18702556]
- McIntyre LL, Blacher J, Baker BL. Behaviour/mental problems in young adults with intellectual disability: Impact on families. *Journal of Intellectual Disability Research*. 2002; 46:239–249. [PubMed: 11896809]
- McIntyre LL, Blacher J, Baker BL. The transition to school: Adaptation in young children with and without developmental delays. *Journal of Intellectual Disability Research*. 2006; 50:349–361. [PubMed: 16629928]

- McIntyre LL, Phaneuf L. A three-tier model of parent education in early childhood: Applying a problem-solving model. *Topics in Early Childhood Special Education*. 2007; 27:214–222. [PubMed: 20076764]
- O'Dell SL. Progress in parent training. *Progress in Behavior*. 1985; 10:57–108.
- Orsmond GI, Seltzer MM, Krauss MW, Hong J. Behavior problems in adults with mental retardation and maternal well-being: Examination of the direction of effects. *American Journal on Mental Retardation*. 2003; 108:257–271. [PubMed: 12780337]
- Patterson, GR. The aggressive child: Victim and architect of a coercive system. In: Mash, JJ.; Hamerlynck, LA.; Handy, LC., editors. *Behavior modification and families*. New York, NY: Bruner/Mazel; 1976. p. 267–316.
- Phaneuf L, McIntyre LL. Effects of individualized video feedback combined with group parent training on maternal inappropriate behavior. *Journal of Applied Behavior Analysis*. 2007; 40:737–741. [PubMed: 18189109]
- Roberts C, Mazzucchelli T, Studman L, Sanders MR. Behavioral family interventions for children with developmental disabilities and behavioral problems. *Journal of Clinical Child and Adolescent Psychology*. 2006; 35:180–193. [PubMed: 16597214]
- Sameroff, AJ.; Fiese, BH. Transactional regulation: The developmental ecology of early intervention. In: Shonkoff, JP.; Meisels, SJ., editors. *Handbook of early intervention*. 2nd ed.. New York, NY: Cambridge University Press; 2000. p. 139–159.
- Sanders MR. The Triple P-positive parenting program: Towards an empirically validated multilevel parenting and family support strategy for the prevention of behavior and emotional problems in children. *Clinical Child and Family Psychology Review*. 1999; 2:71–90. [PubMed: 11225933]
- Singer GHS, Ethridge BL, Aldana SI. Primary and secondary effects of parenting and stress management interventions for parents of children with developmental disabilities: A meta-analysis. *Mental Retardation and Developmental Disabilities Research Reviews*. 2007; 13:357–369. [PubMed: 17979202]
- Sparrow, S.; Balla, D.; Cicchetti, D. *Vineland Adaptive Behavior Scales*. 2nd ed.. Circle Pines, MN: American Guidance Service; 2005.
- VanderDerHeyden AM, Snyder P. Integrating frameworks from early childhood intervention and school psychology to accelerate growth for all young children. *School Psychology Review*. 2006; 35:519–534.
- Walker HM. Use of evidence-based interventions in schools: Where we've been, where we are, and where we need to go. *School Psychology Review*. 2004; 33:398–407.
- Walker, HM.; Shinn, MR. Structuring school-based interventions to achieve integrated primary, secondary, and tertiary prevention goals for safe and effective schools. In: Shinn, MR.; Stoner, G.; Walker, HM., editors. *Interventions for academic and behavior problems: Preventive and remedial approaches*. Silver Spring, MD: National Association of School Psychologists; 2002. p. 1–25.
- Webster-Stratton C. Randomized trial of two parenttraining programs for families with conduct-disordered children. *Journal of Consulting and Clinical Psychology*. 1984; 52:666–678. [PubMed: 6470293]
- Webster-Stratton C. The Incredible Years Training series. Office of Juvenile Justice and Delinquency Prevention Bulletin Review. 2000 Jun.:1–24.
- Webster-Stratton, C. *The Incredible Years: Parents, teachers, and children training series. Leader's guide*. Seattle, WA: Author; 2001.
- Webster-Stratton, C. *The Incredible Years: A troubleshooting guide for parents of children aged 2–8 years*. Seattle, WA: Author; 2005.
- Webster-Stratton C, Hammond M. Treating children with early-onset conduct problems: A comparison of child and parent training interventions. *Journal of Consulting and Clinical Psychology*. 1997; 65:93–109. [PubMed: 9103739]
- Webster-Stratton C, Taylor T. Nipping early risk factors in the bud: Preventing substance abuse, delinquency, and violence in adolescence through interventions targeted at young children (0–8 years). *Prevention Science*. 2001; 2:165–192. [PubMed: 11678292]

Whittingham K, Sofronoff K, Sheffield J, Sanders MR. Stepping Stones Triple P: An RCT of a parenting program with parents of a child diagnosed with an Autism Spectrum Disorder. *Journal of Abnormal Child Psychology*. 2009; 37:469–480. [PubMed: 19023654]

Biographies

Leah Phaneuf, PhD, BCBA-D, is the director of the ABA program at Elmcrest Children's Center's Early Education Program in Syracuse, New York. Her current interests include parent training, education, and support and interventions for children with autism spectrum disorders.

Laura Lee McIntyre, PhD, BCBA-D, is an associate professor and director of the school psychology program in the Department of Special Education and Clinical Sciences at the University of Oregon. Her current interests include early identification and treatment of children with developmental disabilities and challenging behavior and family-based interventions.

Figure 1.
Study design

Figure 2.
Percentage of intervals containing positive and negative parenting strategies

Table 1

Child Problem Behavior Pre- and Postintervention

Child	Percentage of intervals of observed inappropriate behavior		CBCL total problems <i>T</i> scores	
	Preintervention	Postintervention	Preintervention	Postintervention
A	20.00	0.00	72	68
B	3.33	0.00	70	65
C	6.67	0.00	61	55
D	16.67	0.00	80	76
E	3.33	0.00	54	59
F	0.00	0.00	66	66
G	0.00	0.00	61	53
H	16.67	3.33	73	68