Summer 8-23-2015

Early Patterns of Change in Parent-Child Interaction Therapy

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Early Patterns of Change in Parent-Child Interaction Therapy

A Dissertation

Presented in

Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

By

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August, 2015

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Acknowledgments

I would like to express my sincere gratitude to my dissertation chair and graduate school mentor, Dr. Karen Budd, for her continuous support of my academic and professional aspirations. I also would like to thank my committee member, Dr. Jocelyn Carter, for her invaluable statistical support and encouragement throughout this project. I am grateful for the many of hours of research assistance from undergraduate and post-baccalaureate members of Dr. Budd's lab that made it possible to analyze these data. My deepest appreciation goes to my unfailingly supportive husband, Matthew Garbacz, whose encouragement always helps to keep me focused, productive, and inspired.

Biography

The author was born in Washington, D.C., on August 19, 1979. She graduated from Georgetown Visitation Preparatory School, received her Bachelor of Science degree from Vanderbilt University in 2001, and Master of Arts degrees in Psychology from Columbia University, Teachers College in 2007 and from DePaul University in 2010.

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Abstract

Early intervention for young children with behavior problems is important for promoting healthy social/emotional development and reducing the risk of persistent and worsening conduct problems (DuPaul, McGoey, Eckert, & VanBrakle, 2001; Lahey et al., 1995; Shaw, 2013). Parent-Child Interaction Therapy (PCIT) is an evidence-based treatment for young children exhibiting behavior problems (Eyberg, Nelson, & Boggs, 2008). PCIT aims to promote parents' use of positive attention and effective discipline skills with their children (Zisser & Eyberg, 2010). Although substantial research has demonstrated the efficacy of PCIT in research settings, far fewer studies have tested its effectiveness with clinically referred samples in community settings.

Pilot and case studies have shown promise that PCIT can be implemented effectively in community settings and produce clinically meaningful results (Budd, Hella, Bae, Meyerson, & Watkin, 2011; Lyon & Budd, 2010; McCabe & Yeh, 2009; Phillips, Morgan, Cawthorn, & Barnett, 2008). However, attrition tends to be higher and treatment often takes longer in community settings (Budd, Danko, & Legato, 2012; Lanier, et al., 2011). The early stage of treatment in PCIT is particularly important, as most attrition occurs in the first stage as compared to the later stage of treatment (Lanier et al., 2011). Learning more about parents' trajectories across the early phase of treatment and the associated effects on child behavior change has implications for improving the effectiveness of PCIT and reducing treatment attrition with clinically referred and diverse ethnic, racial, and socio-economic populations.

The current study examined data from 48 young children and their families who were referred to a PCIT program in a university-affiliated, community mental health center. Through use of longitudinal multilevel modeling, this dissertation study is the first to describe trajectories

of parental skill acquisition using session-by-session observational data in the early stage of PCIT with a clinically referred sample. As hypothesized, all parents showed significant linear increases in the targeted positive skills (i.e., praise, reflections, and behavioral descriptions) taught during the early stage of treatment, and linear decreases in behaviors to avoid (i.e., negative talk, asking questions, giving commands). Parents' session-by-session ratings of their child's behavior problems also showed a significant linear decrease across the first phase of treatment. Importantly, the analyses demonstrated that parents' increases in positive skill use mediated the decreases in child behavior ratings, whereas parents' decreases in negative skills use did not show a mediating effect.

Several treatment engagement and demographic factors predicted parental skill acquisition. Specifically, parents who attended weekly sessions gained positive skills and decreased negative behaviors faster than parents with more days elapsed between sessions. Single parents showed slower acquisition of positive skills than parents from two-parent households; however, single parents decreased their negative behaviors at a faster rate. Household income, parents' racial/ethnic minority status, and initial child severity did not predict differing rates of skill acquisition or child behavior ratings across time. Homework completion also did not emerge as a clear predictor of skill gains. Although completers of the first phase of treatment showed faster progress with decreasing negative behaviors than dropouts, they did not differ in positive skill acquisition rates. In summary, the current study demonstrated a mediating effect of parents' session-by-session trajectory of positive skill acquisition on child behavior ratings across the early phase of PCIT, identified several variables related to parents' rates of target skill gains, and failed to confirm other variables as predictors of change. Implications for treatment and future research directions are discussed.

CHAPTER I

INTRODUCTION

Externalizing behavior problems begin early and tend to persist without treatment. Estimated prevalence rates suggest behavior problems occur in 9-17% of preschool children, similar to rates of disruptive behavior disorders seen in older, school age children (Carter et al., 2010; Egger & Angold, 2006; Loeber, Burke, Lahey, Winters, & Zera, 2000). Most clinically significant behavior problems occur by age two, termed "early-onset," with a minority of children later moving into the clinical range beyond age two (Shaw, 2013). Roughly two thirds of the children with early-onset behavior problems remain in the clinically elevated range through early school age (Shaw, Bell, & Gilliam, 2000). Since behavior problems start early in development and do not remit for most children without treatment, early intervention is critical.

Childhood Behavior Problems

Rates of externalizing symptoms show high stability through adolescence when left untreated (Fischer, Rolf, Hasazi, & Cummings, 1984; Fontaine, et al., 2008; Lahey et al., 1995). Boys from ethnic or racial minority backgrounds, lower socio-economic status, and high-stress family environments who show early behavior problems are at highest risk for persistent conduct problems later in life (Lahey et al., 1998; Moffitt & Caspi, 2001). Further, preschool children from low income families show a greater prevalence of behavior problems compared to children from the general population (Huaqing Qi & Kaiser, 2003).

Behavior problems in young children are associated with impairments in social, adaptive, and educational functioning (DuPaul, et al., 2001). In adolescents and adults, persistent conduct problems can be associated with serious negative outcomes, such as delinquency, criminality,

and violent behavior (Farrington, 1995; Lacourse et al., 2006; Loeber, Green, Keenan, & Lahey, 1995; Vitelli, 1997). With high community prevalence rates and significant associated impairments, disruptive behavior disorders are among the most common reason for mental health referrals in children and adolescents, especially in low income, highly stressed populations (Jensen & Weisz 2002; Verhulst & van der Ende, 1997; Weisz, Doss, & Hawley, 2005).

Parent Management Training

Given the stability and persistence of behavior problems across development and their high rates of referral, availability of effective treatment is necessary for meeting the great demands within the child and adolescent mental health system. Fortunately, decades of research have demonstrated efficacy for several treatments available for externalizing problems in children. Parent management training (PMT) is considered the gold standard in psychosocial treatment for disruptive behavior disorders in children and adolescents (Eyberg, et al., 2008). Parent training has been defined as "an intervention in which parents actively acquire parenting skills" (Kaminski, Valle, Filene, & Boyle, 2008, p. 569). Therefore, parent training uses the parent as the primary treatment agent for children's behavior change.

Social learning theory posits that parenting practices have a direct effect on child behavior, which is particularly true in early childhood when children are highly reliant on their parents. Changes in parent behavior in PMTs for young children have demonstrated partial mediation of child treatment effects (Bagner & Eyberg, 2007; Gardner, Burton, & Klimes, 2006; Kling, Forster, Sundell, & Melin, 2010). Parent training research has also shown that early intervention is more efficacious than intervening when children are older (Baydar, Reid, & Webster-Stratton, 2003; Lundahl, Risser, & Lovejoy, 2006).

Research has begun to examine components of PMTs that are associated with parent skill acquisition and improvements in child behavior. In a meta-analysis of 77 outcome studies of parent training prevention and treatment programs for ages 0-7, Kaminski and colleagues (2008) found medium effect sizes for overall parent (.43) and child outcomes (.30). In mixed effects regression models, four treatment components emerged as robust predictors of larger effect sizes for outcomes. Specifically, the components of emotional communication and in vivo practice with the child predicted more robust effects on parenting skills and behaviors. The components of positive interactions with their child and consistent use of timeout procedures predicted more robust effects on child outcomes.

Programs with emotional communication components targeted relationship-building communication skills (e.g., active listening) and helping children identify and appropriately express emotions. Parents who had the opportunity to practice with their child in treatment showed larger effects for skill acquisition. Positive interacting involves learning the importance of positive, non-disciplinary interactions with children, using skills that promote positive parent–child interactions (e.g., demonstrating enthusiasm, following child's interests, offering appropriate recreational options), and providing positive attention. The components of positive interactions with their child and consistent use of timeout procedures predicted more robust effects on child outcomes. These four components reliably contributed the most variance of those examined to parent and child outcomes in parent training programs.

Parent-Child Interaction Therapy

Parent-Child Interaction Therapy (PCIT) is an evidence-based behavioral parent training program for the treatment of disruptive behavior disorders in children ages 2 to 7 (Eyberg et al., 2008). PCIT contains several features of parent training programs found to be most predictive of

large effects in the Kaminski et al. (2008) meta-analysis, including in vivo coaching of parent-child dyads, building positive interactions and emotional communication strategies between parent and child while decreasing negativity, and explicit training and practice in use of consistent and effective discipline strategies (Zisser & Eyberg, 2010).

Based on attachment and social learning theories, PCIT is designed to promote warmth, consistency, and nurturance in the parent-child relationship while decreasing negative, coercive interactions between parent and child (Zisser & Eyberg, 2010). To this end, PCIT theory postulates that discipline skills are most effective when a positive foundation is created in the parent-child relationship. Mastering relationship-building skills is considered the essential building block for successful parental use of the discipline skills taught later in treatment. The theorized importance of a positive parent-child relationship makes the early stage of PCIT critical for overall parent success in treatment.

PCIT treatment is segmented into two phases: Child Directed Interaction (CDI) and Parent Directed Interaction (PDI). In the CDI phase, parents are taught to follow their child's lead during play situations and to give attention to their child's positive behaviors while ignoring mild negative behaviors, a technique termed differential social attention. Once parents have mastered the CDI skills, they enter the PDI phase of treatment. In PDI, parents learn strategies to manage their children's behaviors that do not respond to ignoring or that are too severe to ignore. Parents practice giving effective commands and calmly and consistently following through using a warning and timeout procedure to achieve child compliance. Mastery consists of performance to criterion rates of observed parents' use of target skills in both CDI and PDI phases, parental rating of the child's behavior well within normal levels, and parents' expressed confidence in the ability to manage their child's behavior (Eyberg & Funderburk, 2011). Since PCIT is a mastery-

based program, treatment is not time limited, such that all families who complete treatment (i.e., meet mastery criteria) are considered treatment successes.

PCIT Effectiveness Research

Despite the strong efficacy base behind PCIT in the literature (Eyberg et al., 2001; McNeil, Capage, Bahl, & Blanc, 1999; Schuhmann et al., 1998), less has been published on the effectiveness of PCIT. Differentiating efficacy from effectiveness studies is often not clear cut; however, differences in treatment characteristics and conditions have been identified between efficacy studies and usual practice contexts (Southam-Gerow, Weisz, & Kendall, 2003; Weisz, et al., 2013). Weisz and colleagues offered three criteria that can be used to distinguish effectiveness from efficacy studies: 1) clinically referred vs. recruited youth; 2) treatment by usual care practitioners vs. research staff; and 3) practice settings vs. university clinics or lab settings (Weisz, et al., 2005). As of 2002, only 2% of treatment outcome studies for common child and adolescent disorders (published in peer reviewed journals and including a comparison or control group) met all three criteria for representativeness of usual care conditions (Weisz et al., 2005; 2013).

Clinically referred youth and their families tend to differ from youth in efficacy study samples in a number of ways. Youth seen in community clinics tend to have higher rates of comorbid and co-occurring problems, which could require more frequent shifts in treatment goals as different needs emerge throughout the course of treatment (Weisz, et al., 2013). Since they are not responding to a recruitment advertisement with specific inclusion criteria, caregivers may not be thinking about diagnostic problems, but rather problems of daily living, when they present for usual care treatment for their children (Weisz et al., 2013). These issues may impact treatment expectations and can serve to diversify the presenting problems.

Likely as a result of some of the differences between efficacy and effectiveness research related to child, parent, and treatment characteristics, effect sizes for EBT outcomes in effectiveness studies have been lower than in efficacy studies, where treatment occurs under highly controlled conditions (Self-Brown, et al., 2012; Weisz, Jenson-Doss, & Hawley, 2006). However, a different picture emerged from a recent meta-analysis examining PMT studies that met at least one practice criteria approximating "real world" treatment conditions (Michelson, Davenport, Dretzke, Barlow, & Day, 2013). The authors found significant effects for PMT outcomes compared to wait list controls in this sample. The four practice criteria used in the meta-analysis were similar to Weisz and colleagues criteria: the study involved clinic-referred samples, occurred in routine settings, provided routine services, and was implemented by non-specialist therapists. No differences in effect sizes emerged depending on number of real-world practice criteria met by studies. It is important to note that the practice criteria were coded separately, such that many studies included in the review only met one or two of the four practice criteria, and only two studies met all four criteria. Even so, this preliminary evidence provides promise that PMTs can deliver effective treatment under conditions approximating community-based practice.

There are a limited number of published effectiveness studies of PCIT with clinically referred children with behavior problems. Several studies that fully or partially meet Weisz and colleagues' (2006) criteria for effectiveness have been conducted with a child maltreatment population; however, generally the children in the samples have not been clinically referred and were not rated as having clinical levels of behavior problems (Galanter, et al., 2012; Thomas & Zimmer-Gembeck, 2011; 2012; Timmer, Urquiza, & Zebell, 2006). By contrast, one study of PCIT, which was conducted in an urban community clinic in Australia with clinically referred

children, demonstrated a significant reduction in the percent of children with behavior problems measuring in the clinical range and in parenting stress post treatment. This study is notable for using nurses as PCIT therapists and for its extremely low attrition rate (12%; Phillips, et al., 2008).

In another effectiveness study, McCabe and Yeh (2009) found the condition receiving PCIT as showing significant improvement in child behavior problems and parent skills compared to treatment as usual in a low income, clinically referred sample on Mexican-American families. Treatment was provided in a community mental health center with treatment administered by trained graduate students. Two pilot studies in community settings have also shown promising effects for the effectiveness of PCIT with diverse, clinically referred children from low income families (Lyon & Budd, 2010; Nieter, Thornberry, & Brestan-Knight, 2013).

Patterns of Change in Early Stages of PCIT

As the field becomes increasingly interested in studying the effectiveness of PMTs as part of dissemination efforts (Eyberg, 2005; Gardner et al., 2006; Herschell at al., 2009; Pearl et al., 2012; Hutchings, et al., 2007; Spijkers, Jansen, de Meer, & Reijneveld, 2010), researchers have called for more studies that examine how, why, and for whom efficacious treatments work (De Rubeis, S., & Granic, 2012; Gardner, Hutchings, Bywater, & Whitaker, 2010; Kaminski et al., 2008; Kazdin & Nock, 2003; Lundahl et al., 2006). As a skills-based, time unlimited treatment that uses parent observational data to guide treatment on a session-by-session basis, understanding trajectories of parent skill acquisition and child behavior change in PCIT is important for better understanding variability in treatment outcomes.

Part of the behavioral theory underlying PCIT stems from the child coercive cycle, a theoretical model describing a negative dynamic that can develop between parents and children

with behavior problems (Patterson & Reid, 1984; Reid et al., 2002; Zisser & Eyberg, 2010). When children display patterns of noncompliance, parents may be more likely to use coercive methods or negative reinforcement to achieve short-term compliance. Over time, parents use less positive reinforcement. Children with behavior problems tend to respond with increased aversion to coercive methods compared to children without behavior problems (Reid et al., 2002). Together, these dynamic factors increase negative interactions between parent and child and often erode the parent-child relationship over time.

Since clinical referrals typically originate after the negative coercion cycle has already been established and reinforced for some time, change in the parent-child dynamic is a gradual process that unfolds over the course of treatment as parents and children learn new ways of interacting. In PCIT, the CDI phase in particular is instrumental in rebuilding the parent-child relationship by increasing positive interactions and establishing new patterns of responding between parent and child (Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993). The process of incorporating more positive interactions into the parent-child dynamic is theorized to engender a stronger attachment between parent and child (Zisser & Eyberg, 2010).

The positive foundation that is built between parent and child in the CDI phase is also designed to support the later introduction of discipline skills in the PDI phase (Zisser & Eyberg, 2010). Parents must be able to use CDI skills with automaticity to be successful in following the sequence of discipline techniques taught later in PDI. Further, the child must have opportunities to learn to be responsive to the parents' use of positive reinforcement skills in order for key PCIT strategies, such as differential social attention, to be a successful in improving child behavior. As a result of these foundational shifts in the parent-child dynamic early in treatment, Harwood and

Eyberg (2006) demonstrated that significant improvements in child behavior ratings occurred after the CDI phase alone.

Although CDI skills are considered the basis of treatment in PCIT and are necessary for parents' effective use of strategies to improve compliance in the PDI phase, some parents may have difficulty "buying into" a treatment that begins with teaching positive attention skills when they are seeking help with effective discipline for difficult-to-manage child behaviors. Efficacy studies of PCIT have reported dropout rates ranging from 27% to 47% (Bagner & Eyberg, 2007; Boggs et al., 2004; Fernandez & Eyberg, 2009; Schuhmann et al., 1998; Werba, Eyberg, Boggs, & Algina, 2006). Studies examining the effectiveness of PCIT in community mental health clinics or with low income, minority families have noted wider variability in rates of attrition (12 to 69%) than those reported in PCIT efficacy studies (Lanier et al., 2011; Lyon & Budd, 2010; Phillips, et al., 2008; Thomas & Zimmer-Gembeck, 2011; Timmer, Urquiza, Zebell, & McGrath, 2005). In effectiveness studies, the highest attrition rates have been reported to occur in the early phase of treatment (Budd et al., 2012; Lanier, et al., 2011). This suggests a need to identify predictive variables in the early phase of parent skill acquisition or in perceptions of child behavior change during early treatment that may help to minimize attrition.

Although parent observational skill variables occasionally have been found to relate to attrition, studies have been limited to examining pre-treatment skill use. Previous studies have found pre-treatment levels of negative talk (high) and/or praise (low) to significantly predict attrition from PCIT (Fernandez & Eyberg, 2009; Werba et al., 2006). Other studies, including one involving a subset of families comprising the current sample, found that pre-treatment skills did not relate to PCIT attrition (Henriquez, 2012). No studies have looked at PCIT skill trajectories across treatment in relation to attrition.

Given that the CDI phase is considered foundational to later success in PCIT and that higher attrition often occurs in CDI, this study focused on parent skill acquisition and change in child ratings in the early phase of PCIT. The current study seeks to inform understandings about parents' trajectories of skill acquisition in the CDI phase of PCIT and the association of skill acquisition with session-by-session child behavior ratings within a clinical sample. Learning more about parents' patterns of change across treatment and their associated effects on child behavior is particularly important for improving the effectiveness of PCIT with clinically referred, low income populations because they tend to demonstrate higher treatment attrition.

Parent Change Trajectories

Given that PCIT is a mastery-based model, it is important to better understand average, or expected, change trajectories and how skill acquisition and parents' concurrent perception of child behavior change may relate to treatment attrition. Few studies exist in the psychosocial treatment literature looking at patterns of change across treatment with clinically referred populations, as opposed to the typical pre- and post treatment study designs. More recently, several researchers in the area of child and adolescent treatment have begun to consider methods for examining behavior change over time (e.g., Gardner et al., 2010; Jungbluth & Shirk, 2013; Shaffer, Lindhiem, Kolko, & Trentacosta, 2013), but very few studies have examined observational outcome data. Gardener et al. (2010) examined observational data as a mediator of child behavior change following completion of Incredible Years using baseline and post treatment time points. Mediator analyses found positive parenting skill to predict change in conduct problems at post treatment. Studies in this limited literature that examined session-by-session data or multiple time points across treatment are reviewed in the following section, as they are most similar to the methodology employed by the current study.

In an effort to identify mechanisms of change in treatments for anxiety, a study focused on an adult sample examined session-by-session mediators in relation to participant outcomes (Arch, Wolitzky-Taylor, Eifert, & Craske, 2012). Mediator variables (in this case, measures of anxious thoughts and feelings) were measured every two sessions across ten sessions of treatment; however, no observational data were collected as part of the study. In the parent training literature, Leathers, Spielfogel, McMeel, and Atkins (2011) studied child externalizing behaviors, dosage effects, and parent reports of skill change at four time points: baseline, 3 months, 6 months, and 12 months. Since treatment only lasted 16 weeks, time points did not match up with weekly sessions, and no observational data were collected.

In the child anxiety treatment literature, Gallo, Cooper-Vince, Hardway, Pincus, and Comer (2014) employed a similar analytic strategy to the current study. The authors examined three dependent variables (panic severity, fear, and avoidance) using self-report measures at session-by-session time points across an 8-day intensive CBT program for adolescents with severe panic disorder. Multilevel modeling allowed researchers to analyze the shape and rate of change on anxiety measures across treatment. Trajectories on these outcome indices provided information about the processes of change during treatment. Also within the child anxiety treatment literature, Chu, Skriner, and Zandberg (2014) used multilevel modeling to explore patterns of change in therapist and youth-rated therapeutic alliance at multiple time points throughout CBT. Therapists and youth showed differing growth patterns, which can help clinicians adjust expectations during treatment and inform training in CBT.

In the PCIT literature, there are few studies that analyze session-by-session data to elucidate change processes for parents' skill acquisition or child behavior across treatment. One study used time-series analysis to evaluate the role of differential attention as a mechanism of

change in treatment (Pemberton, Borrego, & Sherman, 2013). Results showed that parent behavior does have an effect on child behavior in moment-to-moment interactions. Parental differential attention in one time segment predicted child prosocial attention in the subsequent time segment for two out of three participants. Despite this finding, global changes were not seen in overall change in differential attention or child prosocial behavior across treatment. Although this study used observational measures of parental behavior, it employed a case study design with a very small sample size, which limited generalizability of findings. Also, observations occurred during coaching sessions, which meant observations were not a naturalistic measure of parental skill acquisition independent of therapist guidance.

Lanier and colleagues (2011) used growth models to assess change over time on child and parent variables at three time points during PCIT: baseline, after CDI, after PDI, i.e., post treatment. Although they did not use observational methods of parent-child interaction, the investigators found linear improvements in parent outcomes (stress and psychopathology) and in child outcomes (behavior ratings and global functioning) across treatment. The quadratic function did not improve model fit suggesting that change across time followed a linear pattern.

In a closer approximation to the current study within the PCIT literature, Hakman, Chaffin, Funderburk, and Silovsky (2009) studied trajectories of change in parent-child interactions session-by-session over the course of PCIT in a sample of physically abusive mothers. The authors found significant quadratic change trajectories for both positive and negative parental responses to child behavior across PCIT sessions, with positive responses increasing and negative responses decreasing across treatment. Further, piecewise growth modeling showed that most of the growth occurred early -- in the first three sessions of treatment.

Results of Hakman and colleagues' (2009) study demonstrated the value of studying longitudinal effects of PCIT using session-by-session data; however, a number of factors limit the generalizability of their findings. First, children in the study were not exhibiting clinical levels of behavior problems and were drawn from a maltreatment population, which is not typical of most families referred for PCIT. Second, CDI and PDI coding was collapsed into a single growth model, and definitions of what made up positive or negative parent behavior changed by phase. This did not allow for an examination of specific, early patterns of skill acquisition when parents are most at risk for attrition. There are currently no studies in the literature that examine weekly observations of parent skill use in the early phase of PCIT and how it relates to parental perceptions of child behavior.

Family, Parent, and Child-Level Predictors of Change

Family and parent-level variables have been examined frequently as predictors of child outcomes in the PMT literature with mixed findings (Gardner et al., 2010). In recent meta-analyses, socioeconomic status (SES) emerged as the most robust and consistent parent and family predictor of child outcomes in the PMT literature (Liejten, Raaijmakers, Orobio de Castro, & Matthys, 2013; Lundahl, et al., 2006; Reyno & McGrath, 2006). Results demonstrated that income has a large effect on treatment outcomes, with lower-income families having worse outcomes compared to higher income families. Lavigne et al. (2010) found socioeconomic status and parent minority group membership to predict treatment attrition from parent training in the Incredible Years model. However, Gardner et al. (2010) did not find low income or single parent status to moderate treatment outcomes in a study of the Incredible Years parenting program in England.

Since low SES is overrepresented among individuals who are racial and/or ethnic minorities, this can make studying these variables challenging (Kazdin, 2005). Other factors also may be more likely to occur in low SES samples, such as single parenting. Single parent status is especially important to account for in parent training studies because it has been associated with lower perceived social support in PCIT, which predicted impaired mother–child functioning following CDI (Harwood & Eyberg, 2006). Single parent status was also associated with poor treatment outcomes as measured by child behavior ratings in meta-analyses of parent training studies described earlier (Lundahl, et al., 2006; Reyno & McGrath, 2006).

In the PCIT literature, Werba et al. (2006) found no effects of SES on attrition rates; however, other studies with more diverse samples have identified low-income status as a risk factor for premature dropout from PCIT (Fernandez & Eyberg, 2009; Lanier et al., 2011). Bagner (2013) found that single-mother families were significantly more likely to dropout of treatment than two-parent families in a sample of families who received PCIT for children with elevated externalizing behavior problems and developmental delay. Fernandez, Butler, and Eyberg (2011) reported that PCIT was efficacious in a small sample of low-income African American families who completed treatment; however, attrition was far higher for this group than in the larger efficacy sample from which the subsample was drawn. Family income, single parent status, and racial and ethnic minority group membership have yet to be studied as predictors of parent skill acquisition and perception of child behavior change using observational data in PCIT.

In addition to SES and related variables, child initial severity has been studied in a limited capacity and found to predict PMT child outcomes (Reyno & McGrath, 2006). Initial child severity of conduct problems is often controlled for in relation to child post treatment outcomes in parent training studies, and it has been shown to relate to parent ratings of child

behavior problems at the end of treatment (Kazdin & Wassell, 2000). In the Liejten et al. (2013) meta-analysis, initial problem severity demonstrated an interaction effect with low SES such that disadvantaged samples benefited less from parent training only when levels of initial problem severity were low. Child severity of behavior problems is especially salient to examine when parent skill use is employed as a dependent variable because parents with more behaviorally disruptive children may have greater difficulty using positive attention skills than parents with less disruptive children.

Parent change in PMTs generally has been studied through self-reports that measure parent characteristics such as depression, parenting stress, and marital adjustment (Bagner & Eyberg, 2007; Beauchaine, Webster-Stratton, & Reid, 2005; Gardner et al., 2010; Harwood & Eyberg, 2006; Hood & Eyberg, 2003; Kazdin & Wassell, 2000; Lanier et al., 2011). No studies have examined predictors of parent skill change through observational measures as they relate to treatment outcome or skill acquisition. Two studies did find that higher levels of negative talk and/or lower levels of total praise at pre-treatment measures predicted dropout from PCIT (Fernandez & Eyberg, 2009; Werba et al., 2006). This provides some evidence that treatment engagement, possibly related to skill acquisition or parent perceptions of child behavior change, can be predicted by observed parent skill use.

Another possible predictor of parent skill acquisition and child behavior ratings is intensity of exposure related to the theorized active ingredients of PCIT; that is, dosing effects related to coaching and homework. In-vivo coaching and homework are considered mechanisms of parent skill change in PCIT (Zisser & Eyberg, 2010), but these elements of treatment are understudied in the PCIT and wider PMT literature. Shanley and Niec (2010) found that coaching had a positive effect on parent skill acquisition in an analogue study of mothers who

received coaching or no coaching following a didactic session teaching PCIT skills. There was a significant time by group interaction such that parents in the coaching group improved in their use of positive attention skills from baseline to post-intervention, whereas the control group declined in their skill use at post. Further, behaviors that were not targeted by coaching (e.g., questions, commands) showed no significant effects.

In a second coaching study that used observational data from baseline and a subsequent session, responsive coaching statements that reinforced parents' target behaviors had a partial mediation effect on parent's skill development for using praise (Barnett, Niec, & Acevedo-Polakovich, 2014). If coaching guides parents' skill levels in the expected directions, the intensity of dosing parents receive should influence their skill trajectories. In a skill-based programs, parents who attend coach sessions on a weekly basis may show faster trajectories of skill acquisition than parents who attend less frequently.

In the wider PMT literature, studies using Barkley's parent management training program found homework to predict improved child behavior post treatment for parents who completed more homework (Tynan, Chew, & Algermissen, 2004; Tynan, Schuman, & Lampert, 1999). Incredible Years studies also found improved parenting skills and child behavior outcomes for parents more engaged in treatment, which included homework completion (Baydar et al., 2003; Reid, Webster-Stratton & Baydar, 2004). No research has been published on the effects of homework on parent skill acquisition or child behavior change in PCIT. Two preliminary studies examined homework using a subset of the current sample. VanShoick (2013) found marginally significant differences in homework completion between treatment completers and dropouts. Overall, participants were significantly more likely to complete homework in the CDI phase of treatment than in the PDI phase. Percentage of total homework completed also predicted

significant variance in post treatment child behavior ratings when controlling for initial severity. The second study examined homework in relation to parent observational data and revealed total homework completion and homework in CDI to be unrelated to parent skill use at post treatment (Brown, Legato, Danko, & Budd, 2013). It is possible that the impact of homework completion on parent skill use and dropout may be better detected with a more sensitive, longitudinal analysis approach. Further research is needed to identify if and how homework assists in treatment progress.

Building on these earlier investigations, this study examined session-by-session patterns of change across CDI in parent-observed use of target skills. Since parents are coached after each coding session in PCIT and complete homework between weekly sessions to practice their skills, we would expect there to be a greater improvement in skill use, and concurrent improvement in child behavior, over time for parents who receive more consistent, concentrated levels of coaching and regularly complete homework practice. Parents who have longer times between coaching, and those who do less homework outside of sessions, may show slower rates of improvement than parents who consistently attend weekly sessions to build their skills.

Rationale

This study contributes to the knowledge base of how parent training improves child behavior through modification of parent interaction skills with young children referred for clinical behavior problems. Young children with early-onset behavior problems who do not receive treatment are at high risk for negative outcomes later in life, particularly for children from low income, racial and ethnic minority backgrounds (DuPaul et al., 2001; Lahey et al., 1995; Shaw, 2013). Limited PCIT research exists with clinically referred, low income populations. Studies conducted in community settings or with community samples have indicated that treatment attrition is higher under these conditions compared to efficacy trials (Budd et al., 2012; Lanier et al., 2011). The current study is unique in examining how parental skill acquisition and perceptions of child behavior problems early in treatment may relate to attrition.

Since the early phase of PCIT is considered foundational to later treatment success and most attrition occurs early in treatment, this study focuses on parent skill acquisition and change in child behavior ratings in the early phase of PCIT. The current study is the first to describe parents' session-by-session trajectories of PCIT skill acquisition and their association with child behavior ratings within a clinical sample. In addition, little research has been conducted on the effect of homework or exposure to coaching on parent skill acquisition or child behavior change in PCIT. Since homework and coaching occur weekly in treatment, these variables can be studied longitudinally alongside parental skill acquisition and child behavior ratings to assess how they may be associated with PCIT parent and child outcomes. Further, family, parent, and child characteristics that have been found in the parent training literature to be associated with treatment outcomes are included as predictors (i.e., SES, single parent status, parent minority

group membership, and initial child severity). This study aims to longitudinally examine skill acquisition and child behavior change, and to investigate whether demographic variables and elements of PCIT theorized to improve or facilitate positive outcomes, such as homework and coaching, predict differential patterns of change or attrition.

Statement of Hypotheses

Hypothesis I. Parents will show significant linear increases in positive behaviors and significant decreases in negative behaviors across the CDI phase.

Hypothesis II. Parents will show significant linear decreases in their ratings of intensities of child behavior problems across the CDI phase.

Hypothesis III. Increases in parents' positive behaviors and decreases in negative behaviors will mediate improved child behavior ratings across treatment.

Research Question I. Will weeks since last coaching session predict parent skill trajectories or child behavior rating trajectories?

Research Question II. Does number of days of completed homework since the prior session predict parent skill trajectories or child behavior rating trajectories?

Research Question III. Does household income, single parent status, parent minority group membership, or initial child severity predict parent skill trajectories or child behavior rating trajectories?

Research Question IV. Do trajectories of session-by-session skill acquisition and child behavior ratings differ for CDI dropouts and completers?

CHAPTER II

METHOD

This section presents information on the research participants, setting, study procedure, and measures for this study.

Research Participants

A total of 71 families were referred for PCIT in a community mental health center. Of those referred, 13 families did not complete the initial assessment sessions. Of the families who completed assessment sessions, three families declined to participate in research but still received PCIT services. Overall study participants were 55 families who completed a PCIT pre-assessment and agreed to participate in the research, which was approved by the university Institutional Review Board. This study extends findings presented previously using pilot data from the initial 14 families enrolled in the PCIT program (Lyon & Budd, 2010).

Families were included in the current study if they completed at least two CDI coding sessions with their child beyond the pre-assessment in order to meet data analysis requirements that all participants have at least three data points. Seven families dropped out of the study after completing the initial assessment sessions or the initial CDI didactic session, which is attended only by the parents. One family completed only one coding session during treatment and was excluded. An additional family only consented to having their questionnaires used for research but not their videotaped observational data. The final sample included the 46 families who completed the pre-assessment and at least two treatment sessions with their child and consented for use of their videotaped observational data.

Most families in the current sample were self-referred (32%), or referred by schools (22%) and hospitals (22%). Other referrals originated from community clinics or agencies (11%)

and internally from clinic therapists (9%). In addition, one family was referred by a previous completer of the program (2%), and one family was referred by child protective services (2%). In the majority of cases, one caregiver or parent was involved in treatment (n = 30). Occasionally caregivers other than a parent (e.g., aunt, grandparent, or boyfriend) participated, but typically the second caregiver in treatment was a parent. Hereafter, all caregivers will be referred to as parents.

Child participants. Children were deemed eligible to receive PCIT services if the primary referral was characterized by oppositional and/or defiant behavior within the context of the parent-child relationship. Generally the child's age needed to fall between 2 and 7 years old (inclusive), but one exception to this criterion was made for a 9-year-old boy with a developmental delay. Finally, at least one parent and the identified child needed to be available to attend weekly therapy sessions together. Exclusion criteria included non-English speaking primary parents seeking treatment, and presence of severe autism such that social interactions would not be sufficiently reinforcing for the child, making it difficult for differential social attention techniques to be effective.

Two families had twins enrolled in the study, and two parents were involved in treatment in both of those cases. Therefore, although 46 families were enrolled in the study, 48 children participated. For the two families with twins enrolled in the study, one parent in each dyad was paired consistently with one child for purposes of completing self-report measures and pre- and post-observation sessions. One parent also consistently rated the same child on weekly behavior measures across treatment; however, both parents participated in sessions individually with each of their children over the course of treatment.

Children were 79% male and had a mean age of 4.35 (*SD* = 1.38). Most children were from racial or ethnic minority backgrounds (27% African American, 27% Latino, 21% multiracial, 2% Asian), and 23% were Caucasian. Primary diagnoses included Oppositional Defiant Disorder (ODD; 54%), Disruptive Behavior Disorder Not Otherwise Specified (DBD-NOS; 25%), and Attention Deficit/Hyperactivity Disorder (ADHD; 21%). Almost one third of the sample (31%) had comorbid diagnoses, most commonly ODD or DBD-NOS with ADHD.

Parent Participants. Although some families (37%) had two parents participating in treatment, one parent was chosen as the primary parent for the purposes of this study. Using data from both parents would be problematic due to intra-correlations that likely existed among parent data nested within the same child. For consistency, mothers were chosen as the primary parent in the case of two-parent families in treatment, as most parents with one participating parent were mothers. Four fathers were included in the sample. In one case, a single father participated. The other three fathers came from the families participating with their twin children. One of the twin families consisted of two fathers, and the other twin family consisted of a mother and father.

Forty-six parents (92% female) were included in the current study. Parents' mean age was 36.42 (*SD* = 10.0 years, range: 20-59). Most parents had a college education (40%) or some college (31%), but for 23% of the sample a high school diploma was their highest level of education. Two parents reported they did not graduate from high school (4%), and data for one parent was missing (2%). The majority of parents were from ethnic or racial minority backgrounds (37% Latino, 21% African American, 2% Asian), and 40% were Caucasian.

Most families (73%) received services for their child through Medicaid, 21% paid the full fee, and 6% paid a sliding fee scale (which was discontinued by the clinic as an option for

parents partway through data collection). Income was collected as the primary measure of SES. Reporting family income was not required at the community mental health clinic for the initial operation of the program, and several families declined to report these data. Since a sizeable portion of the sample (24%) did not report family income, income data were imputed, or geocoded, in cases of missing values using census data based on the family's address and year of treatment. Geocoding has been documented as an effective and accurate method for imputing income data for purposes of reporting socioeconomic status in a research sample (Krieger, 1992; Krieger, Williams, & Moss, 1997).

Setting

Families received treatment at an urban, community mental health center (CMHC) housed within a university in a large Midwestern city. The CMHC provides training opportunities for doctoral-level clinical psychology students but also employs full-time and part-time staff clinicians. Although the center partners with and benefits from the university, the clinic receives public funding as a CMHC. Based on Weisz and colleagues' criteria (1995) described earlier, the current study meets criteria for clinical representativeness in two out of three areas (clinically referred population and typical service setting). Since treatment is provided by doctoral students trained and supervised by research study staff, it does not meet the usual care provider criterion.

The CMHC primarily serves ethnic minority youth and families receiving public aid; however, PCIT and assessment services are open to families who can privately pay the full fee for services. In addition to PCIT, the center offers school consultation, individual and family counseling, group therapy, and case management services. PCIT sessions were conducted in a family therapy room furnished with chairs, two tables, a couch, and a one-way mirror connected

to the observation room. In the second phase of treatment, a third room with a door including a window functioned as a back-up room for the timeout procedure if children got up from the timeout chair.

Procedure

Following clinic intake, families who were identified as potential candidates for PCIT attended two initial assessment sessions with PCIT therapists consisting of a brief clinical interview, observations of parent-child interactions in three standard play situations (Child-Led Play, Parent-Led Play, and Clean-Up), and administration of child and parent functioning measures. In addition, the therapists provided an overview of PCIT and the research study and reviewed the informed consent form. Only observational data from the first play situation was used in the current study and is used as a baseline measure of parent-child interaction. The content, length, and coding procedures for the Child-Led Play (CLP) situation in the initial assessment session are similar to the coding sessions administered as part of treatment; however, CLP includes slightly different instructions given prior to coding because it is considered a generalization situation.

Treatment procedures followed the standard protocol detailed in the PCIT treatment manual (Eyberg & Child Study Lab, 1999; Eyberg & Funderburk, 2011). Standard PCIT treatment proceeds along two phases, Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI), which are designed, respectively, to strengthen the parent–child relationship and increase children's compliance and prosocial behavior. Each phase begins with a didactic session during which parents receive an overview of the target skills for that phase of treatment. Parents attend the didactic session without their child, but children attend all other sessions. Parents move from the CDI phase to the PDI phase after they meet the CDI mastery criteria,

which involve using a target number of the skills taught in the CDI phase (10 each of behavior descriptions, reflections, and labeled praise) and limiting questions, commands, and negative talk to a maximum of three verbalizations within a 5-minute coding session.

PCIT therapists were doctoral level clinical psychology students and one licensed clinical social worker. All therapists were supervised by a doctoral level faculty supervisor with extensive experience in PCIT and represented diverse racial and ethnic backgrounds. Therapists received specialized training in PCIT either at a 40-hour one-week training offered in Florida by Sheila Eyberg, Ph.D. and the Child Study Lab, or as part of a 24-hour one-week training conducted by the faculty supervisor. For all cases, ongoing PCIT training and weekly supervision was provided by the faculty supervisor. Most therapy sessions were conducted using a co-therapist model for training purposes.

Prior to each session, parents completed a brief rating scale on their child's behavior over the past week to guide treatment progress. If two parents were in treatment, each parent separately completed a rating form. Treatment sessions were audiotaped with parental permission and typically lasted 60-90 minutes. Sessions began with an initial check-in period during which homework and other family/systemic issues were discussed. Although standard PCIT protocol was used in treatment, session time was extended when needed up to 30 minutes to promote engagement and support parents, who were often low resourced and facing multiple stressors that impacted treatment.

After the check-in time at the beginning of each CDI coaching session, therapists coded one parent-child dyad for 5 minutes in a play situation, after which parents were supported in their skill development through live coaching from behind a one-way mirror using a bug-in-the-ear device for about 30 minutes, depending on the number of parents in treatment. When two

parents were in treatment, total coaching time was shortened to allow for coding and coaching of the child with each parent separately. Sessions concluded with brief discussion about parental skill and child behavior progress, planning for the next session, and provision of a homework assignment for week. When participants missed a weekly session, the session was made up typically the following week or as soon as the family rescheduled.

Measures

Observations of Parents' Skill Use. The Dyadic Parent-Child Interaction Coding System–Third Edition (DPICS-III; Eyberg, Nelson, Duke, & Boggs, 2005) is a behavioral coding system used to assess the content and quality of caregiver-child interactions. DPICS-III has shown adequate reliability and validity in a number of efficacy studies (Eyberg et al., 2005). Construct validity of the DPICS-III has been demonstrated for low-income Mexican American families, such that coding differentiated between clinically referred and non-referred families (McCabe, Lau, Argote, & Liang, 2010); however, there remains a lack of psychometric data on the use of the DPICS with ethnic minority families (Butler & Eyberg, 2006).

The DPICS coding system includes specific definitions for parent verbalizations. Categories of parent verbalizations include behavioral descriptions, reflections, labeled and unlabeled praise, neutral talk, questions, direct commands, indirect commands, and negative talk (Eyberg et al., 2005; Zisser & Eyberg, 2010). Certain behaviors are targeted as verbalizations to increase ("Do Skills") or decrease ("Don't Skills") throughout treatment. Do Skills include behavioral descriptions, reflections, and labeled and unlabeled praises, whereas Don't Skills are questions, negative talk, and, during child-led play, direct and indirect commands. Child compliance behaviors also are coded using DPICS; however, they are not a focus of this study, as compliance is more relevant to the PDI phase.

In addition to the initial assessment session, 5-minute dyadic interactions between parent and child were videotaped by therapists during each coaching session. Although not used for the purposes of the current study, a post treatment DPICS session was also administered. Parent and child verbalizations were later transcribed verbatim by undergraduate research assistants. Transcripts were then independently coded by two trained research assistants. Each parent statement, or thought unit, received one behavior code. Following the coding manual, coders used a priority order established for when verbalizations fall into two (or more) categories (Eyberg et al., 2005). In these cases, the code for the category with the highest priority order is used. For example, the statement "Isn't that pretty snowflake you drew!" contains both a labeled praise and a behavioral description. Since labeled praise is higher in the priority order than behavioral description, the statement is coded as a labeled praise.

Using methodology consistent with other PCIT studies that have analyzed DPICS data (e.g., Bagner & Eyberg, 2007; Bagner, Sheinkopf, Vohr, & Lester, 2010; Budd, Hella, Bae, Meyerson, & Watkin, 2011), two composite categories were created to summarize the behaviors that parents were both encouraged (Do Skills) and discouraged (Don't Skills) to use during CDI coding sessions. Do and Don't Skills were calculated by summing the frequencies of behaviors within each category for each observation session.

Graduate and undergraduate research assistants received 10-12 hours of initial coding training and practice before independently coding sessions. Coders met with graduate student supervisors on a weekly basis to review behavioral definitions and examples in order to prevent observer drift and maintain reliability. After separate coders independently coded the same transcript, they met to discuss discrepancies by jointly reviewing relevant segments of the videotape and agreed on the final consensus codes used for data analysis.

Child Behavior Ratings. The Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999) is a 36-item parent rating measure of child externalizing behavior problems valid for children ages 2 to 16. The ECBI Intensity Scale assesses the frequency of disruptive behaviors with higher ratings representing greater intensity of disruptive behaviors. It is designed to be used with parents at pre- and post treatment as well as weekly throughout treatment. The recommended clinical cut-off score is 132, which is one standard deviation above the mean in the most recent restandardization sample (Colvin, Eyberg, & Adams, 1999).

A second scale, the ECBI Problem Scale measures whether or not parents view those behaviors as a problem. ECBI Problem was only completed at baseline and post treatment. The pre-treatment ECBI Problem measurement was used as an index of initial child severity in the current study. Intensity Scale ratings were gathered at the initial assessment session (baseline) and weekly before each coaching session. Parents completed the ECBI Intensity Scale in the waiting room at the beginning of each session prior to receiving any treatment that day. The recommended clinical cut-off score is 15 (Colvin et al., 1999).

Research indicates that the ECBI has good internal and test-retest reliability, and that it demonstrates adequate content and discriminant validity (Eyberg & Pincus, 1999; Rich, & Eyberg, 2001). Strong inter-item correlations have been also been reported for the Intensity Scale (.92 to .95) in low- to middle-income African American and Latino parents (Gross et al., 2007).

Homework Completion. At the end of each session, families were provided with a standard CDI homework sheet (one for each parent) from the PCIT treatment manual (Eyberg & Child Study Lab, 1999; Eyberg & Funderburk, 2011). Homework was assigned weekly beginning at the didactic session prior to the first CDI coach session. The homework completed

prior to the first coach session was considered the baseline time point for homework in the current study.

The homework assignment remained the same each week, and each parent was instructed to practice using CDI skills at home with his/her child for 5-minutes per day during a dedicated play time called "special time." On the homework sheet, a space is provided for each day where parents were told to record the date, activity, and any problems or notes for each day they completed special time. Homework completion was calculated by counting the number of days of homework completed per week of treatment. If there was more than one week between sessions (usually due to cancellations or holidays), homework was calculated only for a single week, such that parents received maximum credit for seven days of homework completed between sessions. The days of homework completion variable was transformed into a percentage for each week by dividing the total number of completed homework days by the total number of possible homework days (typically seven). Homework completion was calculated by a trained research assistant and checked for accuracy by a second research assistant.

CDI Completion. Participants were considered CDI completers if they met the standard mastery criteria for the CDI phase of PCIT described earlier. Participants were considered dropouts when they explicitly told the therapist that they wished to end treatment in the CDI phase or stopped coming any further sessions, including a failure to return calls despite several weeks of repeated, weekly documented staff efforts to re-contact and re-engage the parent by phone or mail.

PCIT Treatment Integrity Checks. Therapists' adherence to the PCIT manual was measured using the PCIT fidelity checklists (Eyberg & Child Study Lab, 1999; Eyberg & Funderburk, 2011). Trained research assistants reviewed a randomly generated sample (38% of

CDI sessions, with 100% of participants represented) and coded adherence to the PCIT manual. An independent reviewer randomly selected 25% of those coded sessions to calculate inter-rater reliability using percent agreement between coders.

Data Analysis

Hypotheses and research questions were investigated using longitudinal multilevel modeling techniques. Multilevel modeling (MLM) is well-suited for longitudinal analyses when there are three or more waves of data; a continuous outcome whose values change systematically over time; and a consistent, logical metric for time (MLM; Singer & Willett, 2003). The current study uses data collected along the same time metric, i.e., sessions attended, with at least three time points available per participant. Outcome data (observational data, homework, and behavior ratings) are all continuous variables that change systematically over the course of treatment. As long as the underlying metric is consistent across participants, MLM permits variables to be measured at variably-spaced measurement occasions across participants and for number of measurement occasions to vary. These allowances provide significant advantages for analyzing data collected in the field under less controlled circumstances than in laboratory studies.

MLM enables simultaneous analysis of time variant and time-invariant predictors at multiple levels in order to address two types of questions: 1) the patterns of change over time, and 2) the association between predictors and patterns of change (Singer & Willett, 2003). Level-1 is the unconditional growth model, which uses within-person, or individual data, to describe the direction and shape of change over time. In Level-1, time is the predictor. Level-2 allows for the inclusion of time-invariant predictors to examine between-subject effects that may account for variation in patterns of change among individuals.

Unconditional linear growth models were constructed to address the first two hypotheses. For the first hypothesis, time was added as a Level-1 predictor of patterns of change in parents' use of Do (DV1) and Don't Skills (DV2) across treatment. Two separate models were constructed in order to test each dependent variable. To test the second hypothesis, time was added as a Level-1 predictor of patterns of change in child behavior ratings. In terms of the time metric used, the initial assessment session during which the baseline observation took place was used as the baseline session. The first session attended where coaching occurred was Coach 1, the next coaching session attended was Coach 2, and so on, no matter how many weeks occurred in between coaching sessions.

For the first and second hypotheses, the percent change in the odds of the DV was presented for each one unit change in time (i.e., session). When odds ratios [Exp(β)] were less than one, increasing values of the variable were interpreted as corresponding to decreasing odds of the event's occurrence (i.e., odds were reduced). When Exp (β) was greater than one, increasing values of the variable were interpreted as corresponding to increasing odds of the event's occurrence (i.e., odds increased). The percent change in the odds of the dependent variable (Do or Don't Skills) for each unit increase in time (i.e., session) was calculated by subtracting one from the odds ratio and multiplying by 100.

For the third hypothesis, parents' Do and Don't Skills were examined as mediators in the relationship between time and ECBI ratings. Mediation was tested through bootstrapped methods (Preacher & Hayes, 2004). Bootstrapped sampling was used to examine whether significant indirect effects of the mediation existed within the relatively small sample size for parent observational skills.

The first research question was explored in three models using days since the prior coaching session (beginning with the first coach session) as a Level-1 variable predicting parents' use of Do (DV1) and Don't (DV2) skills and child behavior ratings (DV3). For this research question, the time metric was adjusted from sessions to days between coaching sessions. This time variable was lagged to account for the 7 days prior to each coach session, with the first measurement occasion for this variable occurring at Coach 2, in order to test whether time between coach sessions affected parents' skills or child ratings.

Similarly, the second research question was examined in three models using percent of homework completion as a predictor of parents' use of Do (DV1) and Don't (DV2) skills and child behavior ratings (DV3). Homework completion took into account the previous week's homework as a predictor of parents' skill use at the beginning of each session and ECBI ratings, both of which occurred before any treatment was delivered. Therefore, this variable did not need to be lagged since measurement occurred for the week prior to treatment on the day of the session, prior to the parent observations.

For the third research question, several demographic predictors, including income, single parent status, parent minority status, and child initial severity, were added as time-invariant Level-2 predictors to the unconditional growth models tested for hypotheses one and two. The fourth research question was examined using a dichotomous variable to represent early phase attrition status as a time-invariant, Level-2 predictor of Do (DV1) and Don't Skill (DV2) trajectories and child behavior ratings (DV3).

Significant two-way interactions were probed using a multiple linear regression (MLR) two-way interaction tools that to further explained the interaction effects (Preacher, Curran, and Bauer, 2006). Results of simple intercept and slope tests are reported. Deviance and model fit

statistics are reported for comparisons across models. Deviance statistics are the result of a likelihood-ratio test and are used as a measure of fit between model and data. Generally, larger deviance statistics indicate poorer fit to the data. The deviance value is usually not interpreted directly, but rather used to compare to deviance(s) from other models fitted to the same data. In the case of the current study, multiple models are run on the same dependent variables using different predictors, allowing for comparisons of model fit when various predictors are included. The Quasilikelihood Criterion (QIC) is also reported for each DPICS model. QIC is an estimate of model fit, and the model with a smaller statistic indicates a better fit. For ECBI models, the deviance, Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC) statistics are reported. In these cases, smaller statistics also indicate better fitting models.

CHAPTER III

RESULTS

This section presents sample descriptives, reliability data on measures, and the results of analyses testing the hypotheses and research questions.

Preliminary Analyses

Predictor and Outcome Descriptives. Descriptive data for predictor and outcome variables are presented in Table 1. In addition to demographic predictors, means for several variables related to treatment are noted in Table 1, including number of days between treatment sessions, percentage of homework completed between sessions, and number of treatment sessions completed by CDI completers and dropouts, respectively. Baseline means for study outcome variables, namely frequencies of observed parent behaviors and child behavior ratings, are also presented. Nearly two-thirds of the children in the sample came from single-parent households (n = 17). Annual family income ranged from $0-$200,000. The sample's median income ($32,716) was lower than the mean due to a few outlier families who reported much larger incomes than most families in the sample. Parents' ethnicity was dummy-coded into a dichotomous variable representing parents who identified as an ethnic or racial minority member (n = 29) and parents identifying as white (n = 19).

Table 1. Descriptive Data for Predictor Variables and Outcome Measures

Demographic Variables	Mean (*SD*)	%
Single Parents	-	36%
Parent Minority Status	-	60%
Household Income	$48,688 ($45, 653)	-
Child Severity (ECBI Problem Scale)	17.45 (9.22)	-
Treatment-Related Variables	**Mean (*SD*)**	**%**
Days Between Sessions	9.38 (7.82)	-
Mean Amount of Homework Completion	-	52%
# CDI Sessions for Treatment Completers	4.37 (3.63)	-

# CDI Sessions for Treatment Dropouts	2.35 (2.11)	-
Outcome Variables	Mean (*SD*)	
Baseline Do Skills (DPICS)	6.17 (4.51)	-
Baseline Don't Skills (DPICS)	32.38 (15.35)	-
Baseline ECBI Intensity	148.55 (36.73)	-

Note. ECBI = Eyberg Child Behavior Inventory; DPICS = Dyadic Parent-Child Interaction Coding System. ECBI Problem Scale clinical cut off = 15; ECBI Intensity Scale clinical cut off = 132.

Figures 1 and 2 present frequency distributions for parent skill usage in DPICS observations across CDI sessions. In order to account for the skewed distribution common with count data, a Poisson distribution was used for all analyses in which parent skill change (Do or Don't Skills) was the dependent variable.

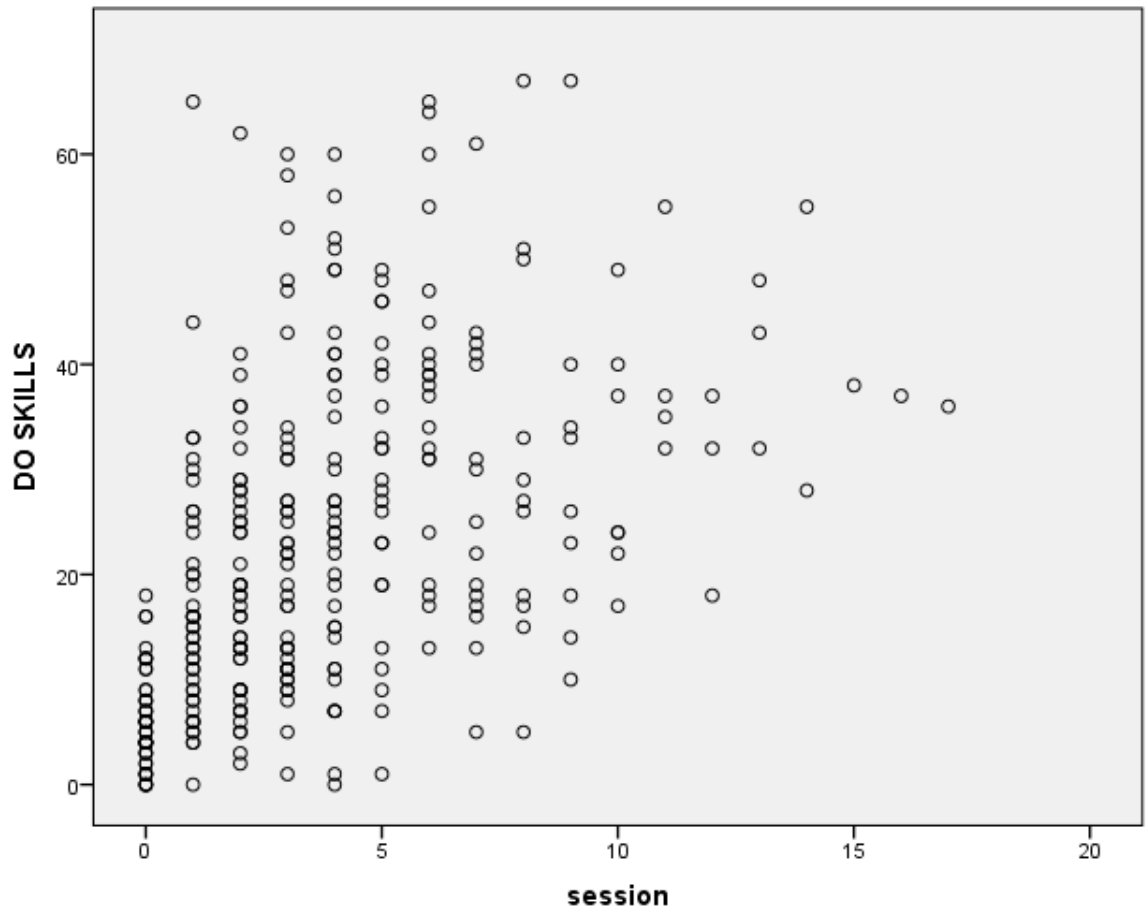


Figure 1. Frequency Distribution of Do Skills by Session.

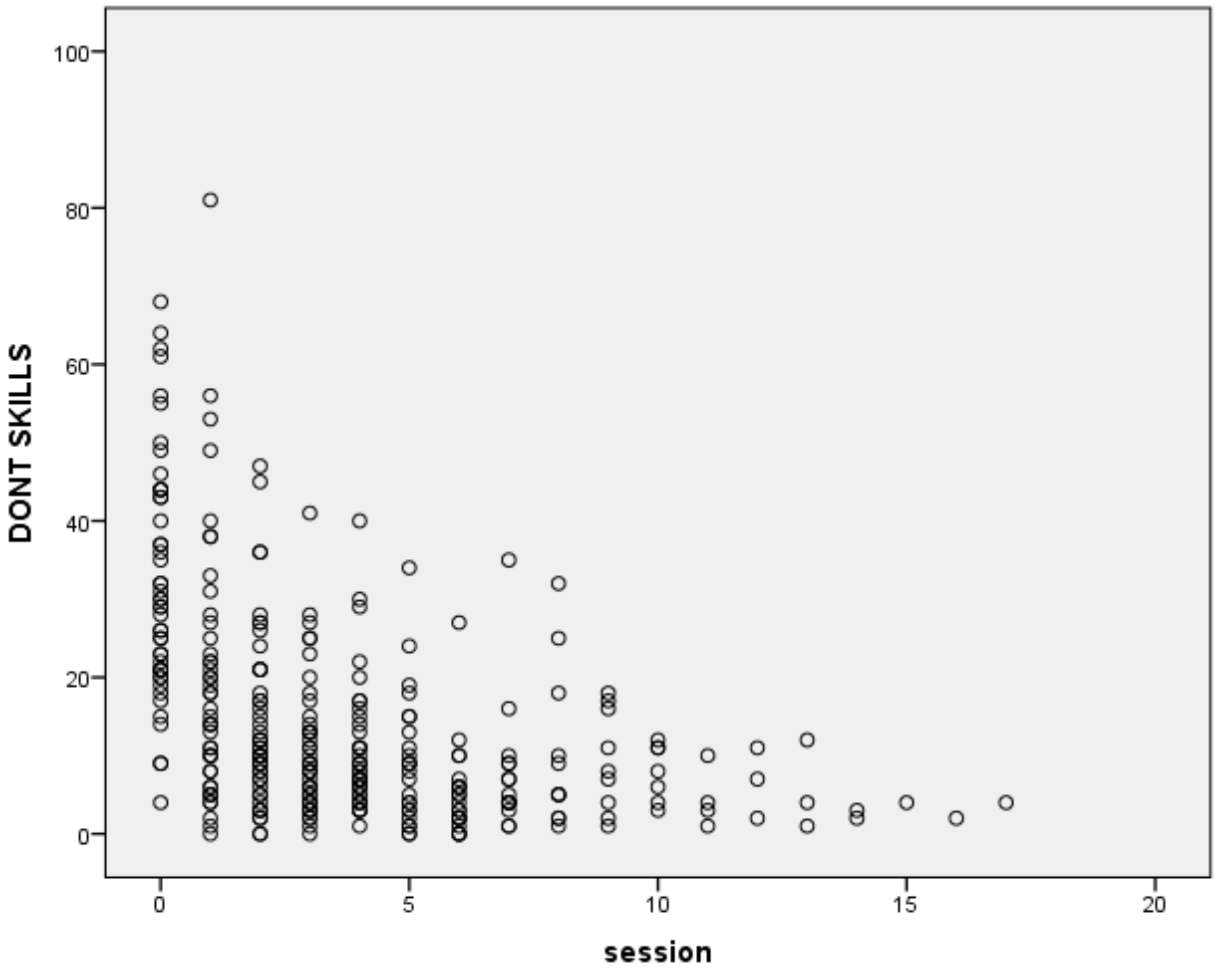


Figure 2. Frequency Distribution of Don't Skills by Session.

Reliability of Measures

DPICS. Kappa reliabilities were calculated for a randomly chosen sample of 30% of the 5-minute segments for DPICS coding using the individual original and reliability codes for parent behaviors included in the Do and Don't Skill composites. Kappa ranged from .76 (Unlabeled Praise) to .85 (Labeled Praise) across Do Skills and .63 (Negative Talk) to .91 (Questions) across Don't Skills. According to Landis and Koch (1977), kappa values between .61 and .80 are classified as substantial, and above .81 are considered "almost perfect."

ECBI and Treatment Integrity. Cronbach's alpha for the pre-treatment ECBI in the current sample showed acceptable reliability (α = .94). Protocol adherence checks revealed 94.2% adherence to the treatment manual. Inter-rater reliability between adherence coders was 93.7%.

Hypothesis I

The first hypothesis stated that parents will show significant linear increases in Do Skills and significant decreases in Don't Skills across the CDI phase. Results supported the first hypothesis in the expected directions (see Table 2). Parents showed significant linear increases in Do Skills and significant decreases in Don't Skills across the CDI phase. For all participants (completers and dropouts) examined together, Do Skills showed significant linear increases over time (β = .10, p < .001). The odds ratio for time indicated that every unit increase in time (i.e., one session) was associated with a 10.9% increase in likelihood of Do Skill usage. Conversely, Don't Skills showed significant linear decreases over time (β = -.26, p < .001). The odds ratio for time indicated that every unit increase in time (i.e., one session) was associated with a 23.0% decrease in likelihood of Don't Skill usage.

Table 2. Level-1 Growth Model for Parents' Skill Acquisition Across Sessions

	Do Skills				Don't Skills			
	β	SE	*p*	Exp (B)	*β*	SE	*P*	Exp (B)
Intercept	2.73	.03	<.001	15.26	3.14	.03	<.001	23.15
Session	.10	.00	<.001	1.11	-.26	.01	<.001	.78
QIC	2993.96				3211.36			

Hypothesis II

The second hypothesis stated that parents will show significant linear decreases in their ratings of intensities of child behavior problems across the CDI phase. Results also supported the second hypothesis in the expected direction (see Table 3). For all participants (completers and

dropouts) examined together, ECBI ratings showed significant linear decreases over time (β = -3.47, p < .001). Every unit increase in time (i.e., one session) was associated with an average 3.5 unit decrease in ECBI ratings beyond the average baseline rating of 144.71.

Table 3. Level-1 Growth Model for ECBI Ratings Across Sessions

	β	SE	*t*	*p*
Intercept	144.71	5.21	27.79	<.001
Session	-3.47	.82	-4.21	<.001
Model Fit				
Deviance	2980.56			
AIC	2990.56			
BIC	3009.74			

Hypothesis III

The third hypothesis stated that increases in Do Skills and decreases in Don't Skills will mediate improved child behavior ratings across the CDI phase (see Figures 3 and 4). This hypothesis was supported for Do Skills. Using the bootstrapped method to account for the small sample size, Do Skills showed full mediation of the relationship between time and ECBI ratings Time significantly predicted increases in Do Skills (a) (b = 2.36, p < .001) and decreases in ECBI ratings (b) (b = -.46, p = .01). In the third regression, Do Skills significantly predicted decreases in ECBI ratings (c) (b = -1.40, p = .04). However, the effect of time on ECBI ratings was reduced and non-significant (b = -.32, p = .69, *ns*) when controlling for the mediating variable (Do Skills). Indirect effects were shown to be significant as the bootstrapped 95% confidence interval [-1.99, -.28] did not include zero. Thus, the hypothesis that ECBI scores would decrease over time through increases in Do Skills was supported according to the Preacher and Hayes (2008) bootstrapped method.

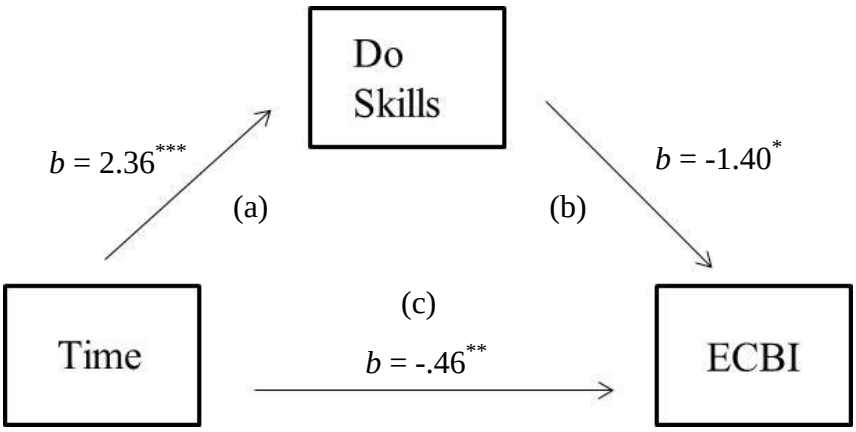
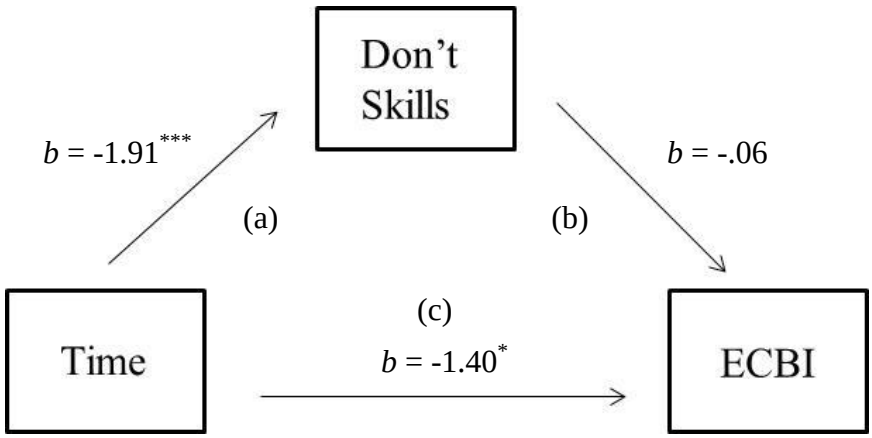


Figure 3. Mediation Model for Do Skills.

The third hypothesis was not supported for Don't Skills. In the mediation model, time significantly predicted decreases in Don't Skills (a) (b = -1.91, p < .001) but did not significantly predict ECBI ratings (b) (b = .06, p = .75, *ns*). Lower Don't Skills significantly predicted decreases in ECBI ratings (c) (b = -1.40, p = .04). When controlling for the mediating variable (Don't Skills), the effect of time on lower ECBI ratings was reduced and non-significant (b = -1.20, p = .10, *ns*). Indirect effects were shown to be non-significant as the bootstrapped 95% confidence interval [-.83, .55] included zero. Thus, the mediation hypothesis that ECBI scores would decrease over time through decreases in Don't Skills was not supported because time did not significantly predict ECBI ratings and indirect effects were non-significant.



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

Figure 4. Mediation Model for Don't Skills.

Research Question I

The first research question looked at whether weeks since last coaching session would predict parent skill trajectories or child behavior rating trajectories. As shown in Table 4, there was a trend toward significance for a main effect of days elapsed since the prior session on Do Skills (β = .01, p = .06), showing that those with higher days between sessions displayed marginally higher Do Skills prior to the second coach session (i.e., baseline). There was a significant interaction between days and time, indicating variance in the slopes for Do Skills across time according to days elapsed between sessions (β = -.00, p = .04). Simple slope tests demonstrated slopes differed from zero at multiple conditional values of days elapsed, indicating that all participants' Do Skills significantly increased over time (see Figure 5). However, participants with seven days between sessions showed a steeper upward trajectory in Do Skills (z = 6.59, $p < .001$) compared to those with greater time elapsed between sessions (14 days: z = 6.00, $p < .001$; 21 days: z = 5.41, $p < .001$).

As depicted in Table 4, there was a significant main effect for days elapsed since the prior session on Don't Skills (β = -.02, $p < .001$). Those with higher days between sessions

showed significantly lower Don't Skills in the first coach session. There was also a significant interaction between days and time, indicating significant variance in slopes for Don't Skills across time according to days elapsed between sessions (β = .004, p < .001). As shown in Figure 6, simple slope tests showed that participants with seven days between sessions had a steeper downward trajectory (z = -16.97, p < .001) compared to those with longer times elapsed between sessions (14 days: z = -14.30, p < .001; 21 days: z = -11.63, p < .001).

There were no significant effects for days between sessions on ECBI scores. Days between sessions did not predict differences in ECBI ratings (β = -.06, p = .75, *ns*), but time remained a significant predictor of decreases in ECBI ratings across sessions (β = -2.26, p = .01).

Table 4. Effects of Days Since Last Session on Parents' Skill Acquisition

	Do Skills				Don't Skills			
	β	SE	p	Exp (B)	β	SE	p	Exp (B)
Intercept	2.84	.09	<.001	17.17	3.08	.03	<.001	21.65
Session	.09	.01	<.001	1.09	-.21	.01	<.001	.81
Days	.01	.01	.06	1.01	-.02	.00	<.001	.98
Day*Session	-.001	.00	.04	1.00	.004	.00	<.001	1.00
QIC	2354.58				2192.39			

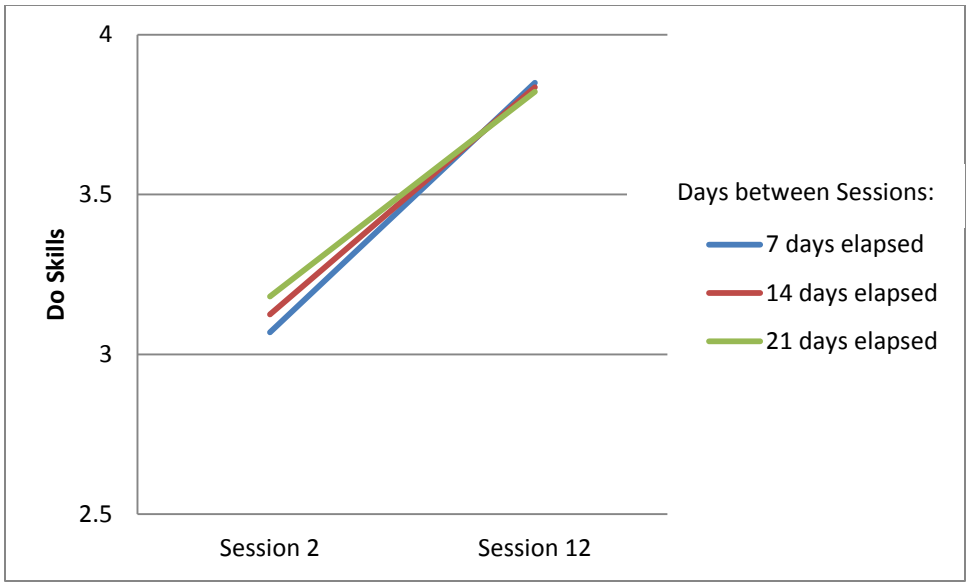


Figure 5. Interaction of Days between Sessions and Time for Do Skills.

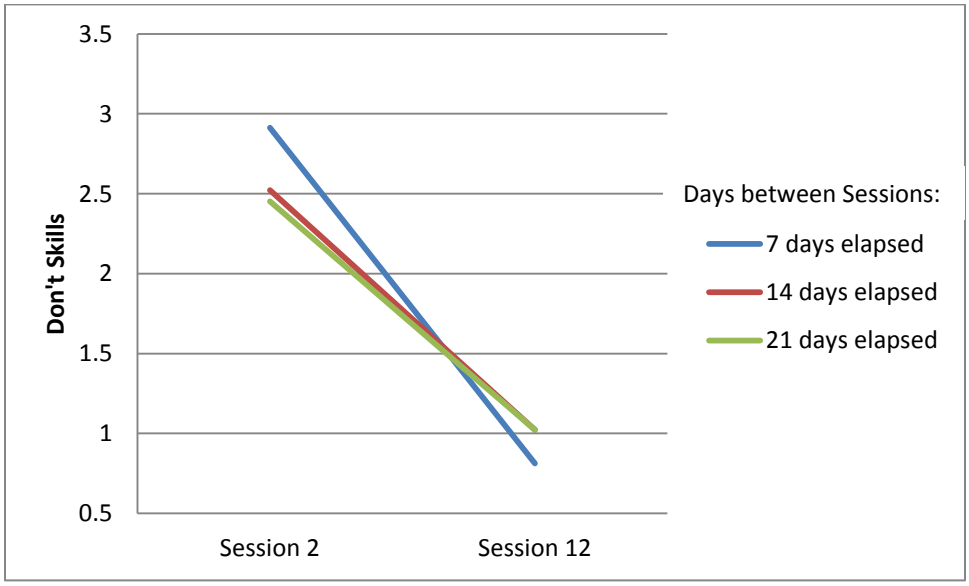


Figure 6. Interaction of Days between Sessions and Time for Don't Skills.

Research Question II

The second research question explored whether the percentage of completed homework since the prior session would predict parent skill trajectories or child behavior rating trajectories. As seen in Table 5, homework completion did not show a significant main effect for Do Skills (β = .00, p = .83, *ns*). The interaction between time and homework was also non-significant (β =

.00, p = .80, *ns*). Therefore, percent of weekly homework completion did not predict differences Do Skill acquisition.

Although there was no significant main effect for homework completion on Don't Skills, indicating that no differences existed at baseline in Don't Skills according to amount of homework completed, there was a significant interaction between homework completion and time for Don't Skills. The interaction indicated variance in the slopes for Don't Skills across time according to percentage of weekly homework completed (β = .001, p < .01). Simple slope tests showed that slopes differed from zero at multiple conditional values of homework completion. Contrary to expectations, participants with homework completion one standard deviation below the mean showed a steeper downward trajectory in Don't Skills across time (z = -15.80, p < .001) compared to people who completed the mean percentage of homework (z = -12.97, p < .001) as well as one standard deviation above the mean (z = -10.15, p < .001). As depicted in Figure 7, people with higher homework completion showed a significantly flatter trajectory in Don't Skill reduction than those who completed less homework.

There were no significant effects for homework completion on ECBI scores (β = .02, p = .65, *ns*), but time remained a significant predictor of decreases in ECBI ratings across sessions (β = -2.20, p = .02).

Table 5. Effects of Homework on Parents' Skill Acquisition

	Do Skills				Don't Skills			
	β	SE	p	Exp (B)	β	SE	p	Exp (B)
Intercept	2.91	.10	<.001	18.32	3.09	.05	<.001	21.93
Session	.08	.01	<.001	1.08	-.23	.01	<.001	.80
Homework	.00	.00	.83	1.00	-.001	.00	.17	1.00
Homework *Session	.00	.00	.80	1.00	.00	.00	<.01	1.00
QIC	2346.50				2235.33			

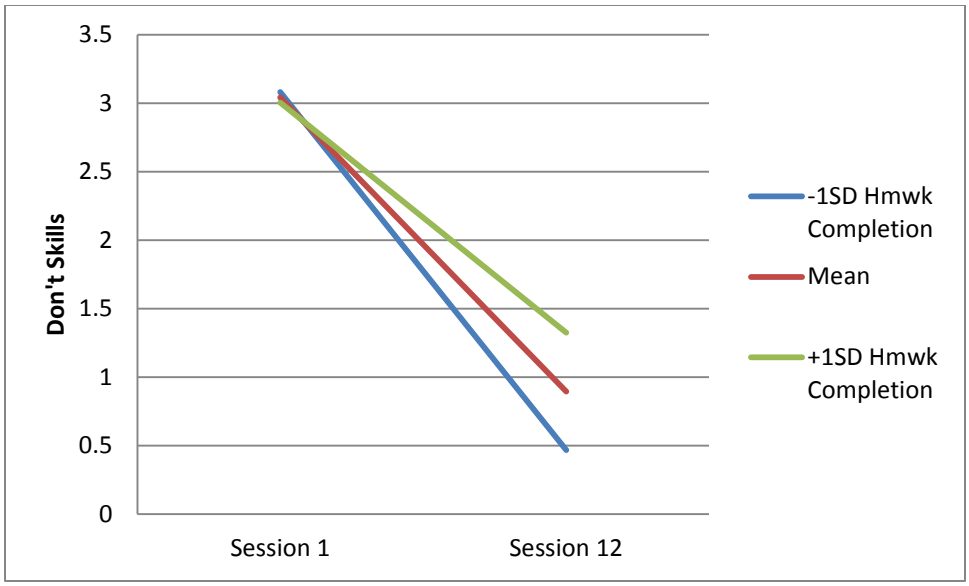


Figure 7. Interaction of Homework and Time for Don't Skills.

In an effort to better understand the unexpected interaction between homework and time on Don't Skills, an additional variable was entered into the model as a potential moderator of the homework by time interaction. Initial child behavior severity as measured by the ECBI Problem Scale was entered to explore whether parents' perceptions of how problematic their child's behavior was at baseline affected their homework completion during CDI (see Table 6). With ECBI problem entered into the model, homework completion did show a significant main effect on Don't Skills, indicating that differences existed at baseline in Don't Skills according to amount of homework completed. ECBI Problem did not indicate a main effect on Don't Skills. Although marginally significant at $p = .05$, the interaction between homework completion and time for Don't Skills showed a higher p value than the initial model (see Table 5) with initial severity entered into the model.

The significant three-way interaction between homework, initial severity, and time indicated variance in the slopes for Don't Skills across time according to percentage of weekly homework completed and initial severity ($\beta = .0001$, $p < .01$). Simple slope tests showed that

slopes differed from zero at multiple conditional values of homework completion and initial severity. In the group with the least homework completion (i.e., one standard deviation below the mean), parents endorsing high ECBI Problem scores at baseline demonstrated a steeper downward trajectory in Don't Skills across time (z = -8.93, p < .001) compared to parents with low initial problem ratings (z = -10.28, p < .001). Therefore, within the group of parents who showed steeper Don't Skill trajectories with little homework completion, initial behavior severity appeared to predict decreases in Don't Skills (see Figure 8). Parents who rated higher problems at the start of treatment made greater gains in decreasing Don't Skills compared to parents rating lower problems.

Table 6. Effects of Homework and Initial Child Severity on Parents' Don't Skill Acquisition

	β	SE	p	Exp (B)
Intercept	3.03	.12	<.001	20.74
Session	-.18	.04	<.001	.84
ECBI Prob.	-.002	.01	.80	1.00
Homework	.01	.00	<.001	1.01
ECBI Prob*Session	-.002	.00	.33	1.00
Homework*Session	-.001	.00	.05	1.00
ECBI Prob*Homework	.00	.00	<.001	1.00
ECBI Prob*Homework* Session	.00	.00	<.01	1.00
QIC	2243.81			

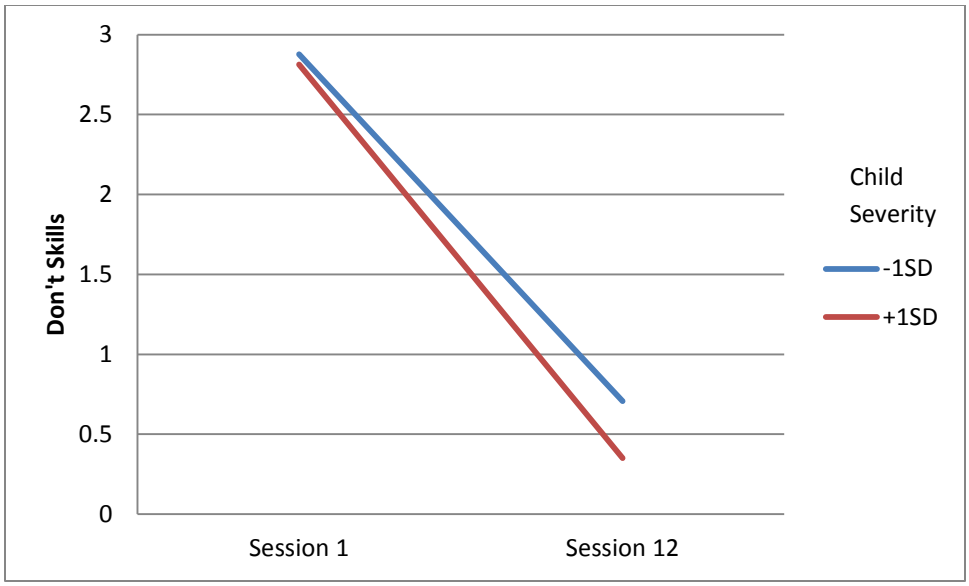


Figure 8. Interaction of Initial Child Severity and Time for Don't Skills in the -1 SD Homework Group.

Research Question III

The third research question examined whether household income, single parent status, parent minority group membership, or initial child severity would predict parent skill trajectories or child behavior rating trajectories. Single parent status and parents of minority status (i.e., non-Caucasian) served as the reference groups i.e., coded as zero, for the dichotomous variables in this model. As depicted in Table 7, parents from minority backgrounds showed significantly lower Do Skills at baseline (β = -.39, p < .01). Household income, single parent status, and initial child severity did not show significant main effects on Do Skills at baseline. There was a significant interaction between single parent status and time (β = .46, p = .03), such that single parents showed less steep increases in Do Skills over time compared to parents from two-parent households. Shown in Figure 9, simple slopes for one and two parent households were significantly different from zero, indicating that both showed increases over time but participants

from two-parent households gained Do Skills at a faster rate ($z = 5.32$, $p < .01$) than single parents ($z = 8.70$, $p < .01$).

Similar to the results for Do Skills, parents of minority status (i.e., non-Caucasian) showed significantly higher Don't Skills at baseline ($\beta = .29$, $p < .01$). Household income, single parent status, and initial child severity did not show significant main effects on Don't Skills at baseline. There was a significant interaction between single parent status and time ($\beta = .10$, $p = .01$), indicating the trajectories for each group were significantly different from each other.

As shown in Figure 10, simple slope plotting showed that single parents exhibited a steeper decrease in Don't Skills over time compared to two-parent households. The simple slopes for single parents was significantly different from zero; however, the simple slope for two-parent households was not significantly different from zero, indicating that single parents showed a significant decrease in Don't Skills over time ($z = -4.87$, $p < .01$), but parents from two-parent households showed a flat trajectory that did not differ significantly from zero over time ($z = -0.76$, $p = .45$, *ns*). In supplemental analyses conducted by regressing time and single parent status on each Don't Skill individually, single parent status was marginally significant in predicting changes over time for negative talk ($\beta = .63$, $p = .06$). Single parent status did not significantly predict change over time for questions ($\beta = .05$, $p = .73$, *ns*) or commands ($\beta = -.28$, $p = .18$, *ns*).

There were no significant effects for any of the demographic predictors on ECBI scores except for child severity (ECBI Problem: $\beta = 2.33$, $p < .001$), indicating that higher problem scores at baseline were associated with higher ECBI intensity scores at baseline. Time remained a significant predictor of decreases in ECBI ratings across sessions ($\beta = -3.60$, $p < .001$).

Table 7. Effects of Demographic Variables on Parents' Skill Acquisition

	Do Skills				Don't Skills			
	β	SE	*p*	Exp (B)	*β*	SE	*p*	Exp (B)
Intercept	2.91	.18	<.001	18.38	3.28	.17	<.001	26.57
Session	.10	.01	<.001	1.10	-.25	.02	<.001	.78
Income	.00	.00	.27	1.00	.00	.00	.92	1.00
Single Parent	.02	.15	.89	1.02	-.29	.12	.75	.02
Parent Minority	-.39	.13	<.01	.68	.29	.11	.01	1.34
ECBI Prob.	-.004	.01	.46	1.00	-.003	.00	.60	.98
Single Parent* Session	.05	.02	.03	1.05	.10	.04	.01	1.11
QIC	2647.31				2583.05			

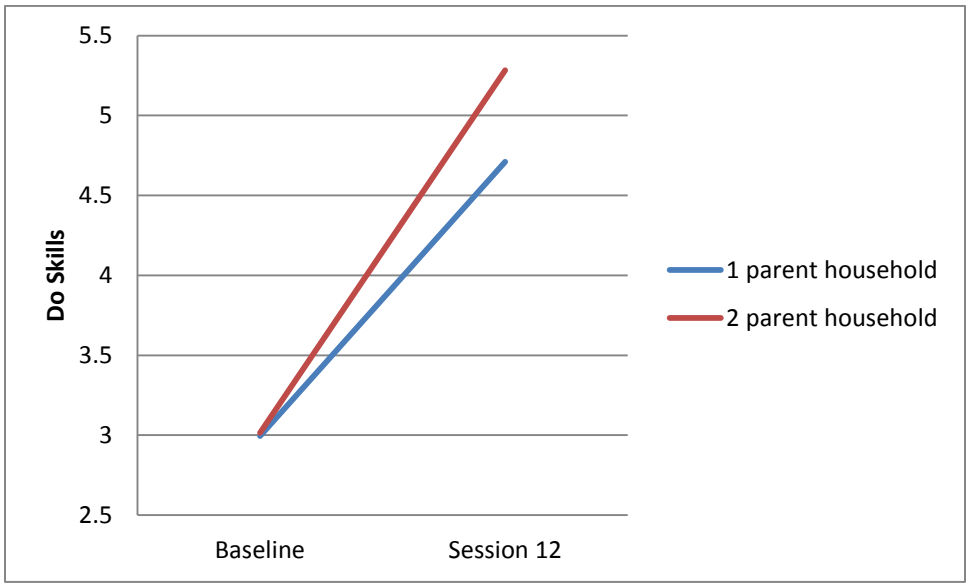


Figure 9. Interaction of Single Parent Status and Time for Do Skills.

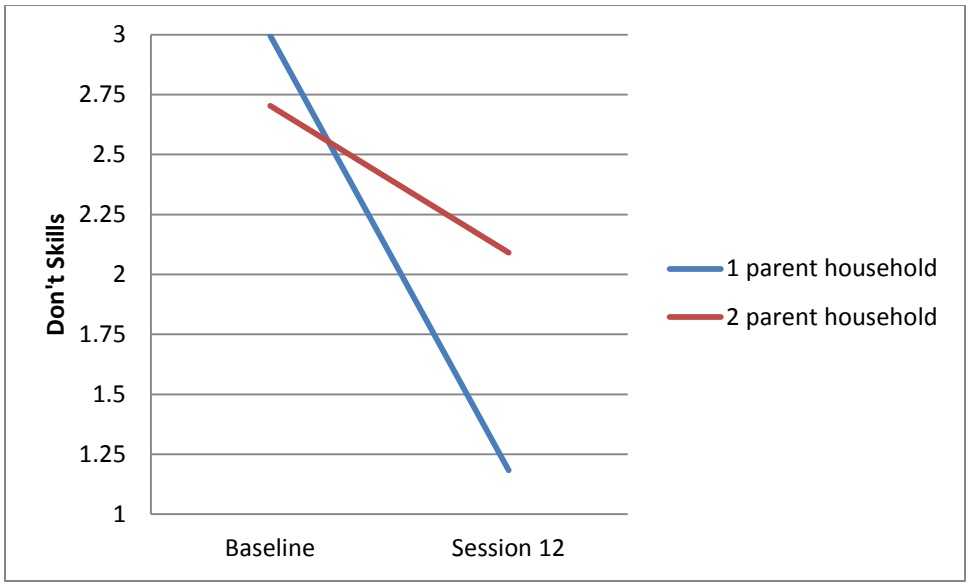


Figure 10. Interaction of Single Parent Status and Time for Don't Skills.

Research Question IV

The final research question looked at whether trajectories of session-by-session skill acquisition and child behavior ratings differed for CDI dropouts and completers. CDI completion status was created as a dichotomous variable in which dropouts were used as the reference group, i.e., coded as zero. CDI completion status did not significantly predict changes on ECBI ratings. As shown in Table 8, there was a significant main effect for completion status on Do Skills, indicating that dropouts tended to have lower Do Skills at baseline compared to completers of CDI (β = -.60, p < .001). A non-significant interaction term showed no differences between CDI completers and dropouts in their trajectories of Do Skill acquisition over time (β = .02, p = .60, *ns*).

There was also a significant main effect for completion status on Don't Skills, indicating that dropouts tended to have lower Don't Skills at baseline compared to completers of CDI (β = -.19, p < .001). Shown in Figure 11, there was a significant interaction between CDI completer status and time (β = .06, p = .01), indicating that CDI completers and dropouts showed

trajectories that were significantly different from each other. Simple slope plotting indicated that completers (z = -28.57, p < .01) demonstrated a steeper downward trajectory over time in Don't Skills compared to dropouts (z = -9.36, p < .01). Simple slopes for completers and dropouts of CDI were significantly different from zero, indicating that both showed decreases over time but at different rates.

Supplemental multilevel modeling analyses were conducted to examine whether parents' skill acquisition trajectories during treatment predicted CDI completion status. A binomial distribution was used to account for the dichotomous dependent variable (i.e., completer or dropout). Results were non-significant for differences in baseline Do and Don't Skills and interactions with time.

Table 8. Effects of Attrition from CDI on Parents' Skill Acquisition

	Do Skills				Don't Skills			
	β	SE	*p*	Exp (B)	*β*	SE	*p*	Exp (B)
Intercept	2.87	.08	<.001	17.66	3.33	.02	<.001	28.01
Session	.10	.01	<.001	1.10	-.24	.02	<.001	.79
Dropout	-.60	.15	<.001	.55	-.19	.05	<.001	.83
Dropout *session	.02	.03	.60	1.02	.06	.02	.01	1.06
QIC	2800.76				2755.32			

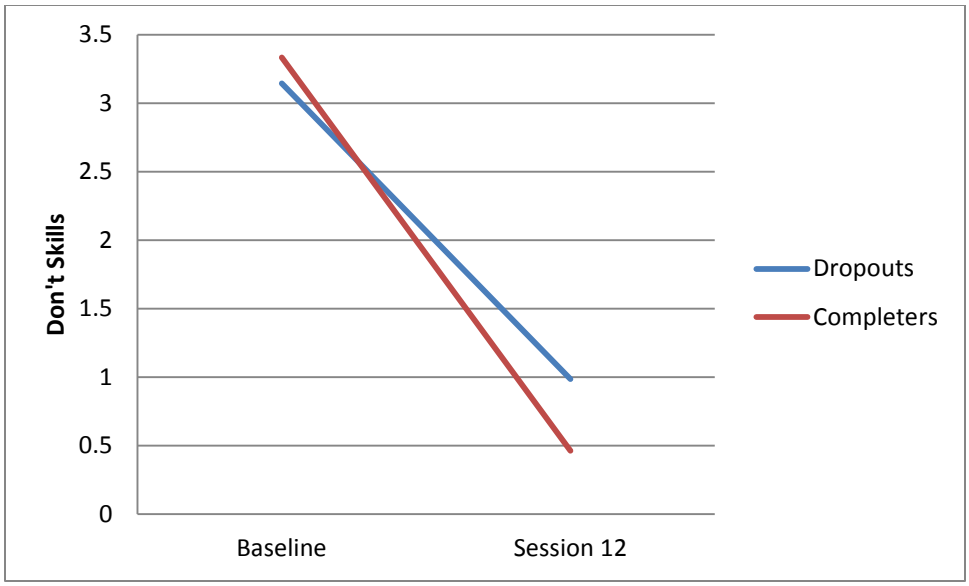


Figure 11. Interaction of CDI Completion Status and Time for Don't Skills.

CHAPTER IV

DISCUSSION

Using longitudinal parent observation data and ratings of child behavior problems, the current study explored predictors of parent skill acquisition and patterns of parent-rated child behavior change across the early phase of treatment in Parent-Child Interaction Therapy (PCIT). This is the first study to explore trajectories of parental skill acquisition and child behavior ratings using session-by-session observational data during the early phase of PCIT, and thus it contributes longitudinal data regarding patterns of parental skill usage across treatment as well as effects of parents' skills on perceptions of child behavior change to the parent training literature. Study results revealed a significant linear increase in target skills to increase (Do Skills) and linear decrease in behaviors to avoid (Don't Skills) across Child Directed Interaction (CDI) sessions. Parents' ratings of child behavior problems also showed a significant linear decrease across sessions. Parental acquisition of Do Skills across time was found to mediate the decrease in ECBI ratings during the CDI phase. Weekly session attendance demonstrated the most robust parent skill change compared to less frequent attendance. Other demographic and treatment-level predictors showed mixed findings related to type of parent skill acquisition, with Do and Don't Skills showing different relationships with predictor variables. In some cases, surprising results emerged, such as for single parent status and homework completion variables. Interestingly, CDI completers and dropouts did not differ on Do Skill change across CDI, but completers showed steeper declines in Don't Skills.

Study Hypotheses

As hypothesized, session-by-session observational data of parents' behavior demonstrated positive trajectories in Do Skills and negative trajectories in Don't Skills across the

CDI phase. As would be expected, the odds that parents would improve their Do Skills increased across time, with later sessions showing a higher likelihood for use of Do Skills. Similarly, the odds that parents would decline in their use of Don't Skills decreased over the course of CDI, with earlier sessions showing a higher likelihood for use of Don't Skills. Do Skills also exhibited a smaller overall odds ratio for time (11%) than Don't Skills (23%). Since parents showed higher frequencies of Don't Skills at baseline compared to Do Skills, they may have had more room to improve. In addition, Do Skills may take longer to learn, and they also end up replacing Don't Skills over time. Therefore, Do Skills may be more likely to show a flatter upward trajectory over time compared to Don't Skills, which drop off more quickly. Several studies have demonstrated pre-post gains in parents' observed skill use following both phases of PCIT (e.g., Galanter, et al., 2012; McCabe, et al., 2010; Schuhmann et al., 1998; Thomas & Zimmer-Gembeck, 2012), but no PCIT study has examined parents' skill acquisition session-by-session following the CDI phase alone. The current study's results expand on existing PCIT findings by describing a linear, summative pattern of parental skill acquisition the early phase of treatment using longitudinal data across sessions.

As parents moved through the first phase of treatment, their ratings of child behavior problems showed significant linear decreases across sessions. These findings are consistent with the broader literature on pre-post studies of PCIT (Bagner & Eyberg, 2007; Fernandez & Eyberg, 2011; Schuhmann et al., 1998), including effectiveness studies of PCIT with community-referred samples (Galanter, et al., 2012; McCabe et al., 2010; Phillips et al., 2008; Self-Brown et al., 2012). Two prior studies have examined pre-post ECBI ratings after CDI (Harwood & Eyberg, 2007; Lanier et al., 2011). Consistent with those two studies, parents in the current study showed significant decreases in EBCI intensity ratings after CDI alone. The combined results indicate

that parents in PCIT perceive positive changes in their children's behavior even during the initial phase of treatment, prior to when discipline procedures are covered.

The current study adds to the literature on parent-rated child behavior change early in PCIT by including data from more than two measurement points across time in the CDI phase. As is more common in PCIT studies with community-referred and diverse samples (Fernandez & Eyberg, 2009; Lanier et al., 2011), the current study's CDI dropout rate (27%) was higher than in the Harwood and Eyberg sample (19%), Nevertheless, dropout was not a significant moderating factor in ECBI ratings, suggesting that parents rated their child's behavior as improving across the early phase of PCIT regardless of the family's subsequent attrition status. Thus, parents' perceptions of their child's behavior change in the early part of treatment may not directly relate to their decision to remain in treatment. Families appeared to gain some benefit in the early phase of treatment. Even so, it is important to note that statistical change in ECBI ratings across CDI may not relate clinically to meaningful change for parents.

Results supported a mediating effect of parents' session-by-session acquisition of Do Skills on decreases in ECBI ratings over time. Improvements in Don't Skills did not mediate changes in ECBI ratings. Although the PCIT model is built upon the assumption that parent training produces changes in child behavior, no PCIT study to date has demonstrated a mediation effect over the course of treatment. This finding is similar to other significant mediation models in the parent training literature supporting the indirect effect of positive parenting behavior on parent-reported child behavior problems (Bagner & Eyberg, 2007; Dishion et al., 2008; Gardner et al., 2010; Kling, Forster, Sundell, & Melin, 2010). Findings on the mediating role of negative parent behaviors are more mixed. One study of the Incredible Years program, using regression and a Sobel's test, found no mediating effects of negative parenting behaviors on behavior

problems (Gardner et al., 2010), while another study of parent management training found harsh and inconsistent parenting, using a Sobel's test, to mediate parent-reported child behavior (Kling et al., 2010). A PCIT study with children with intellectual disabilities, using analysis of covariance and parent change scores from pre to post treatment, found that negative parenting behavior contributed to less child behavior change (Bagner & Eyberg, 2007). The mixed findings for the relationship between negative parenting behaviors and child behavior ratings may be related to differing constructs and tools used to define and measure negative parent behaviors, as well as differing analyses employed. For instance, PCIT includes questions and commands in the Don't Skill construct. The differences in the PCIT definition of negative parent behaviors and Gardner and Kling's constructs may have accounted for discrepancies in findings

The current study's findings lend further support to the possibility that parents' acquisition of positive behavior skills contributed to the process of improving their children's behavior over time. However, since this model does not assume causality, it is important to consider other processes that also may have accounted for the mediating relationship of Do Skills on child behavior ratings in the current study. One alternative explanation is that parents may have perceived their children's behaviors less intensely or negatively, thus rating them as improved, as they experienced greater positivity in their relationship with their child through increased use of Do Skills, whether in session and/or at home. It is possible that the support parents gained through treatment provided them with greater hope about the ability to improve their child's behaviors, which may have influenced their perceptions of their child's behavior intensity. Future studies may be able to control for this possibility through employing a comparison group that receives supportive contact but does not include the skill building components that are considered active ingredients in PCIT.

Exploratory Research Questions

We explored several factors concerning parents' demographic characteristics and treatment engagement in relation to acquisition of target skills and child behavior ratings across CDI. These factors did not show relationships to changes in child behavior ratings but did predict parent acquisition of skills in several cases. First, we explored the amount of time that elapsed between coach sessions as a measure of treatment engagement, given that sessions were scheduled to occur on a weekly basis. Results showed that fewer days between sessions was related to steeper increases in parental Do Skills and decreases Don't Skills over time. All parents made progress in the expected direction, but parents who attended sessions more frequently made faster progress in CDI and showed better skill outcomes at their last CDI session than those with greater numbers of days between sessions.

Limited studies on parent training have examined treatment attendance in relation to treatment outcome (e.g., Kazdin & Wassell, 1998; Prinz & Miller, 1994). A meta-analysis conducted by Reyno and McGrath (2006) found small effects for overall attendance as a predictor of treatment outcomes in the parent training literature. When measuring attendance in PMTs, researchers typically examine percentage of total attendance across the intervention period (e.g., Baker, Arnold, & Meagher, 2011). The findings of the current study suggest that, in addition to looking at attendance as a whole, time elapsed between sessions is an important factor to consider in a skill-based treatment. In order to better understand factors that may affect parents' uptake of target skills in parent training programs, more studies are needed that longitudinally examine patterns of attendance in relation to outcome variables across intervention periods.

A second measure of treatment engagement examined was percentage of weekly homework completion. Homework completion did not significantly predict skill acquisition for Do Skills; however, contrary to expectations, results showed that parents who did less homework had steeper downward trajectories in Don't Skills across sessions compared to parents who completed more homework. Subsequent analyses indicated a significant three-way interaction, such that initial child severity ratings moderated the relationship between low homework completion and Don't Skill trajectories. Among parents who completed the least homework, the parents who rated their children's behavior as more problematic pre-treatment showed steeper downward slopes in Don't Skill trajectories during CDI than parents who rated few problems pre-treatment.

Since higher pre-treatment child severity has predicted poorer treatment outcomes (Reyno &McGrath, 2006), particularly for disadvantaged families (Leijten et al., 2013), it is an important variable to consider in conjunction with homework, which often is viewed by clinicians as a proxy for treatment engagement. It is possible that some parents who view their child's behavior as more problematic may avoid homework completion, or may face additional barriers to completing homework; however, these parents still appear to benefit from treatment, particularly in their Don't Skills, despite their poor adherence to homework practice. Alternatively, high initial child severity may also give parents an incentive to work hard during sessions even if they do not practice outside of session through structured homework assignments. Clinicians may consider spending additional time discussing perceived treatment benefits with families when parents who report lower initial problem behaviors also demonstrate low homework completion during CDI.

Single parent status emerged as the strongest demographic predictor of parent skill trajectories across CDI. Despite non-significant differences in skill level at baseline, single parents showed a flatter trajectory in Do Skill acquisition across CDI compared to participants from two-parent households. Interestingly, single parents showed steeper downward trajectories in Don't Skills despite starting at statistically equal levels at baseline with two-parents household participants. These findings contradict non-significant meta-analytic findings for single parent status as a predictor of parent behavior outcomes in PMTs (Lundahl et al., 2006). However, in the Lundahl study, family adversity predicted poorer parent behavior change. The lower SES sample in the current study may have accounted for these discrepant findings. Although Do Skill change appeared to take longer for single parents, they benefitted at a greater rate from Don't Skill decreases than two-parent families. In a follow-up study of an early childhood parent training program, Sitnick et al. (2014) found high levels of positive engagement to be associated with lower levels of parent-child coercion a year following treatment. Maintaining engagement for single parent families early in treatment may be critical to allow them the time they need to build up their positive engagement skills.

Contrary to other findings in the PMT literature, results in the current study were non-significant for initial severity of child behavior ratings and other demographic factors as predictors of parent skill trajectories. Meta-analytic studies have found family income, single parent status, and parent minority status to predict poorer child behavior change post treatment (Lundahl et al., 2006; Reyno & McGrath, 2006). Another study of Incredible Years did not find family income to moderate treatment outcomes (Gardner et al., 2010). The sample from the Gardner study was predominantly lower SES with little income variability, which likely accounted for their non-significant findings. Despite some higher income outliers, the current

sample may have also had limited income variability, given the small sample size, such that differences were difficult to detect. Of note in the current study, parental minority status predicted lower Do Skills and higher Don't Skills at baseline; however, all parents made significant skill gains across treatment regardless of minority status. These results support effectiveness of CDI in a predominantly lower income, racially and ethnically diverse sample of community-referred families.

Finally, as expected, attrition predicted differences in rates of parents' skill acquisition for Don't Skills early in treatment. Although parents showed similar rates of Do Skill increases regardless of CDI attrition status, Don't Skills decreased at faster rates for completers. In addition, completers showed main effects for higher Don't Skills at the beginning of treatment, indicating that they may have been a group at greater need for the skills targeted in PCIT. Prior to the current study, PCIT studies (e.g., Fernandez & Eyberg, 2009; Werba et al., 2006) had only examined pre-treatment variables accounting for attrition. This examination adds to the PCIT literature by demonstrating differences in skill acquisition patterns across CDI by skill type and attrition status It may be especially beneficial for clinicians to closely monitor parents' perceptions of treatment buy-in and coaching around Don't Skills early in treatment as a method for preventing attrition. Future research in this area is needed with larger samples to identify other moderating variables that may interact with skill acquisition rates of early dropouts, such as treatment barriers or demographic factors.

Strengths and Limitations

The current study has several strengths, including a longitudinal design across early treatment sessions with multiple measurement points, a mediation analysis, and focus on a socioeconomically and racially/ethnically diverse sample of clinically referred families receiving

treatment in a community mental health center. Although an increasing number of studies are using longitudinal data and multilevel modeling to identify mechanisms and model patterns of change in other child-focused treatments, such as anxiety (e.g., Chu et al., 2014; Gallo et al., 2014), only a handful of studies in the PMT literature have employed longitudinal methods to examine treatment changes over time (i.e., Hakman et al., 2009; Lanier et al., 2011; Sitnick et al., 2014). The current study is unique within the PMT literature for analyzing parent skill trajectories using session-by-session observational data.

Further, the current study adds to the still small, but growing, body of PCIT effectiveness literature. Effectiveness studies promote generalizability of research findings to applied practice by using methods with greater approximations to real-world settings as compared to highly controlled efficacy studies. Other studies have also found results supporting the effectiveness of PCIT in clinically referred and community-based samples (i.e., Lanier et al., 2011; Lyon & Budd, 2010; McCabe & Yeh, 2009; Nieter et al., 2013; Phillips et al., 2008; Self-Brown et al, 2011); however, only McCabe and Yeh (2009) reported on statistical effectiveness results using observational measures of parental skill improvement. By measuring treatment effectiveness using standardized parent behavior measures, researchers can contribute data related to the theorized mechanisms of change in PMTs and are able to more sensitively capture short term changes occurring during treatment (Snyder et al., 2006).

The current study also contained several limitations, including a modest sample size of families who completed treatment, imputation of missing income data, and lack of a comparison or control group. A selection bias may have influenced findings since only families who attended at least three sessions were included for statistical reasons. Some exploratory findings were marginally significant and require future study with larger sample sizes. In particular, the

findings on homework completion were unexpected and difficult to explain. Results may be reflective of the small sample size and limited power, measurement error in methods for calculating homework, or simply that homework may not be as influential in parent skill acquisition as other variables in PCIT, such as coaching.

Homework completion is particularly difficult to calculate when parents attend treatment inconsistently. In an effort to "standardize" homework measurement across varying attendance patterns in the current study, a maximum of seven days of homework was counted for each participant no matter how many days lapsed between sessions. As a result, some families may have completed two weeks of homework if they missed a session, with only one week of homework counted. In other cases, families may have last completed homework two weeks prior to attending a coach session, but it was counted in the same way as homework completed in the week prior to sessions for other families. Little is known about recency effects in homework practice or how multiple weeks of cumulative practice may affect skill level, and likely these factors introduced bias and measurement error into the homework completion variable. Further, the homework measure reflects only the percent of days homework was completed, not the quality of homework completion.

Finally, there are many variables not included in the current study that may affect parents' skill acquisition and child behavior ratings across treatment. For instance, measures of parents' perceptions of treatment, barriers to treatment, parental stress, and parental psychopathology are all factors that could influence attrition as well as parents' engagement and perceptions of child change. Further study is needed to identify and weigh the relative influence of different treatment engagement and demographic variables that may predict early treatment gains and attrition in an effort to maximize PCIT treatment success for all families.

Implications and Future Directions

The current study statistically described the shape of parents' skill acquisition trajectories and child behavior ratings across the first phase of PCIT. Although the current study demonstrated linear trends for Do and Don't Skills, future studies could examine non-linear growth trends to compare model fits for different skills as well as ECBI ratings across CDI and PDI. For example, Gallo et al. (2014) identified different growth patterns across varying self-report outcome variables in child anxiety treatment. Based on the current findings, clinicians may expect to see linear increases in Do Skills and linear decreases in Don't Skills and ECBI ratings in the early phase of treatment. Using the observational and self-report data available on a session-by-session basis, clinicians can intervene early in treatment if families do not display the expected patterns as a way to maximize treatment success for families. Of note, data used in the current analyses were likely more reliable than live coding conducted by clinicians due to the rigorous research methodology used to code the current data.

Further, several variables may place families at risk for slower or poorer treatment success. Occurrence of these variables may be more common in community-based and clinically referred samples. Single parent status and irregular attendance influenced parents' rate of skill acquisition. Close monitoring of these families, discussions of their perceptions of treatment progress, and support in reducing attendance barriers may aid in establishing/maintaining treatment engagement and success. Little research exists currently to inform clinicians about whether longer time spent in CDI affects attrition, post treatment outcomes, or maintenance effects. Meanwhile, findings demonstrating similar rates of skill acquisition and changes in behavior ratings across income levels, race/ethnicities, and child severity levels provide

encouraging evidence that PCIT can be effective for a wide range of families who present at a community clinic.

Despite the contributions of this study to the PCIT literature, future research is needed to better understand the families who do not complete treatment. Why did families who dropped out show slower decreases in Don't Skills early in treatment? Are they more uncomfortable with letting go of those interaction patterns with their child? Do they disagree with the treatment approach? Considering that dropouts and completers showed no differences in acquisition of positive parent skills or ratings of child behavior across sessions in CDI, what aspects of PCIT are key to the differential outcomes for completers and dropouts over time (Fernandez & Eyberg, 2009; Lanier et al., 2011)? There is also need for further exploration of parents' overall number of verbalizations as well as direct measures of child behavior as predictors of skill acquisition. Future research could assist in gathering longitudinal data on parents' treatment perceptions related to skills taught and buy-in at each session during treatment. Perhaps differing patterns of parental skill acquisition may serve as flags for families at risk for dropping out of treatment. Since observational data are typically more sensitive to change than self-report measures, future PCIT research could benefit from the rich potential data pool inherent in session-by-session DPICS observations. By using the session-by-session observational data built into the program, PCIT research is poised to answer innovative questions about treatment mechanisms and patterns of parental behavioral change that could contribute greatly to the broader parent management training literature.

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