THE IMPACT OF PCIT-BASED CHILD COMPLIANCE TRAINING ON CHILDREN'S SELF-REGULATION

by

CAROLYN MARIE SCHOLTES

A DISSERTATION

Presented to the Department of Counseling Psychology and Human Services
and the Division of Graduate Studies of the University of Oregon
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy

June 2022

DISSERTATION APPROVAL PAGE

Student: Carolyn Marie Scholtes

Title: The Impact of PCIT-Based Child Compliance Training on Children's Self-Regulation

This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Counseling Psychology and Human Services by:

Elizabeth Skowron	Chair
Dave DeGarmo	Core Member
Nichole Kelly	Core Member
Phil Fisher	Institutional Representative

and

Andrew Karduna	Interim Vice Provost for Graduate Studies

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded June 2022.

DISSERTATION ABSTRACT

Carolyn Marie Scholtes

Doctor of Philosophy

Department of Counseling Psychology and Human Services

June 2022

Title: The Impact of PCIT-Based Child Compliance Training on Children's Self-Regulation

Parent-Child Interaction Therapy (PCIT) is an evidence-based parenting intervention composed of two distinct phases – Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI). PCIT has been found to promote positive outcomes for parents and children. However, little process-oriented research has been conducted on PCIT to date, with a majority of process-based research focusing on CDI. Thus, the present study sought to: 1) Characterize PDI-specific patterns of parenting skills; and 2) Examine whether parents' use of PDI-phase skills is related to their children's post-treatment self-regulation.

Participants included 3–7-year-old children and their primary caregivers (n = 50) with prior child welfare system involvement. Families were drawn from a larger randomized clinical trial of PCIT and included dyads who completed one or more PDI sessions. First, patterns of PDI-specific parenting processes, including positive and negative parenting, effective commands, navigation of command sequences, and time-outs were plotted across PDI. Next, linear regression analyses were utilized to determine whether parents' use of PDI skills predicted their children's post-treatment self-regulation. Finally, exploratory latent growth curve models were utilized to examine

patterns of change in the number of and duration in time-outs experienced by children over the course of PDI, and to explore whether these patterns of change predicted children's post-treatment self-regulation.

Results indicated parents' use of positive and negative parenting remained relatively stable during PDI. Parents also initiated a consistent number of effective commands and successful command sequences across PDI. Notably, younger parents delivered more effective commands and navigated a higher proportion of command sequences successfully. The number of and duration in time-outs declined over the course of PDI, with significant linear declines in duration in time-outs observed during the first four PDI sessions. Parents' PDI skills were not found to positively predict children's post-treatment self-regulation. However, one finding emerged that ran counter to study hypotheses - children who experienced more time-outs and spent more time in time-outs demonstrated lower post-treatment HTKS behavioral regulation. While the present study offers important insight into PDI-specific parenting processes, further research is needed to fully understand patterns of these processes across treatment and assess how they might support children's post-treatment outcomes.

CURRICULUM VITAE

NAME OF AUTHOR: Carolyn Marie Scholtes

GRADUATE AND UNDERGRADUATE UNIVERSITIES ATTENDED:

University of Oregon, Eugene
University of Iowa, Iowa City

DEGREES AWARDED:

Doctor of Philosophy, Counseling Psychology, 2022
University of Oregon

Master of Science, Counseling, Family, and Human Services, 2019
University of Oregon

Master of Education, Counseling, Family, and Human Services, Specialization in Prevention Science, 2016
University of Oregon

Bachelor of Arts, Psychology, 2015
University of Iowa

PROFESSIONAL EXPERIENCE:

Pre-Doctoral Psychology Intern, Children's Hospital Los Angeles, 2021-2022

Clinical Extern, Oregon Health & Science University, Department of Pediatrics, Child Development and Rehabilitation Center, 2020-2021

Graduate Instructor and Teaching Assistant, University of Oregon, Family and Human Services (FHS) Program, 2020-2021

Graduate Research Assistant, Coaching Alternative Parenting Strategies (CAPS) Study, University of Oregon, 2015-2020

Assessment Extern, Oregon Health & Science University, Department of Pediatrics, Child Development and Rehabilitation Center, 2019-2020

PCIT Therapist, University of Oregon Prevention Science Institutes, 2017-2020

Child and Family Therapist, University of Oregon Child and Family Center, 2018-2019

Psychometrician, Dr. David Truhn Forensic Psychology Private Practice, 2018-

2019

Practicum Clinician, University of Oregon Counseling Center, 2017-2018

Undergraduate Research Assistant, Child Development Lab, University of Iowa, 2012-2015

GRANTS, AWARDS, AND HONORS:

College of Education Research Travel Award, University of Oregon, 2019

First Year Research Fellowship, University of Oregon, 2016-2017

First Year Student Champion, University of Iowa, 2015

President's List, University of Iowa, 2014-2015

Adelaide Boerner Trickey Scholarship, University of Iowa, 2013-2015

Dean's List, University of Iowa, 2011-2015

Honors Program, University of Iowa, 2011-2015

PUBLICATIONS:

Skoranski, A. M., Skowron, E. A., Nekkanti, A. K., **Scholtes, C. M.**, Lyons, E. R., & DeGarmo, D. S. (2021). PCIT engagement and persistence among child-welfare involved families: Associations with harsh parenting, physiological reactivity, and social cognitive processes at intake. *Development and Psychopathology,* 1-18. https://doi.org/10.1017/S0954579421000031

Nekkanti, A. K., Jeffries, R., **Scholtes, C. M.**, Shimomaeda, L., DeBow, K., Wells, J., Lyons, E. R., Giuliano, R., Gutierrez, F., Woodlee, K. X., Funderburk, B. W., & Skowron, E. A. (2020). Study protocol: The coaching alternative parenting strategies (CAPS) study of Parent-Child Interaction Therapy in child welfare families. *Frontiers in Psychiatry, 11*, 839. https://doi.org/10.3389/fpsyt.2020.00839

Scholtes, C. M., Lyons, E. R., & Skowron, E. A. (2020). Dyadic synchrony and repair processes are related to preschool children's risk exposure and self-control. *Development and Psychopathology,* 1-13. https://doi.org/10.1017/S0954579420000358

Norman Wells, J., Skowron, E. A, **Scholtes, C. M.**, & DeGarmo, D. S. (2020).

Differential physiological sensitivity to child compliance behaviors in abusing, neglectful, and non-maltreating mothers. *Development and Psychopathology, 32*(2), 531-543. https://doi.org/10.1017/S0954579419000270

Lyons, E. R., Norman Wells, J., **Scholtes, C. M.**, Mintz, B., Giuliano, R., & Skowron, E. (2019). Recollections of positive early caregiving relate to sympathetic nervous system activation and chronic inflammation in subsequent generations. *Developmental Psychobiology*, *61*(5), 261-274. https://doi.org/10.1002/dev.21815

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the support of many people in my life. First and foremost, I would like to thank my advisor, Dr. Elizabeth Skowron, for both her mentorship throughout my doctoral training as well as her support and guidance in completing this dissertation. Elizabeth, I sincerely appreciate all the opportunities you have provided me that have allowed me to grow immensely as a clinician and researcher over the past six years. I would also like to express my gratitude to my dissertation committee members, Dr. Dave DeGarmo, Dr. Phil Fisher, and Dr. Nichole Kelly. I deeply appreciate your time, thoughtful feedback, and encouragement throughout this process. Thank you to all the CAPS Study staff, graduate students, and undergraduate students who I had the opportunity to work with over the past six years. You all made me look forward to coming into the lab each day, and all the hard work you did that made this dissertation possible is much appreciated. I would also like to acknowledge all the CAPS Study families who sparked my passion for this work and made this research possible.

I want to express my deep appreciation to my friends and family. Thank you to my colleagues and friends, near and far, for your ongoing levity and encouragement during my graduate school journey. To Jett, thank you for being my loyal writing companion throughout the dissertation process. To my mom and dad, Deb and Gary, thank you for always supporting me in everything I do and encouraging me to pursue my dreams, even when that meant moving across the country. I would not be where I am without everything you have done for me. Your unconditional love and support mean the world to me. Finally, I could not have completed this dissertation without the love and

encouragement of my partner, Brandon. Thank you for always believing in me, making me laugh, and reminding me to enjoy life.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

Parent-Child Interaction Therapy (PCIT) is an evidence-based parenting program that is effective at improving disruptive behavior in children and improving parenting skills, even in families with a history of maltreatment (Batzer et al., 2018; Thomas & Zimmer-Gembeck, 2007). PCIT is composed of two sequential phases – child-directed interaction (CDI) and parent-directed interaction (PDI; Eyberg, 1988). Whereas CDI focuses on supporting parents' use of positive, responsive parenting skills, PDI is designed to help parents develop safe, effective child management skills that support children's prosocial compliance behaviors. PCIT utilizes a unique structure, which involves parents practicing their skills with their child during each session with support from the therapist using remote bug-in-ear technology. Thus, PCIT is a behavioral parenting intervention with dyadic parent-child in-session skills practice that meta-analyses (Kaminski et al., 2008; Kaminski & Claussen, 2017) have linked to increased efficacy of parenting interventions. Despite its efficacy, little process research has been conducted on PCIT to date. Of the process research conducted on PCIT, most has focused on CDI, with few studies examining in-session PDI processes and their associations with positive outcomes for children and families.

Self-regulation is one aspect of child development that is closely linked to disruptive behavior (Eisenberg et al. 2001, 2005, 2009) and involves the ability to regulate one's own thoughts, behaviors, attention, and emotions to complete necessary tasks and adhere to social standards (Kopp, 1982). Self-regulatory skills are important as they support a variety of adaptive social, academic, and psychological outcomes for

children (Eisenberg et al., 2001, 2003, 2007; Rueda et al., 2005; Spinrad et al., 2006, 2007). Conversely, deficits in self-regulation may lead children to make more impulsive decisions, resulting in disruptive behavior disorders (Dodge et al., 2006; Eisenberg et al., 2001). Thus, although self-regulatory skills have been consistently identified as important for helping children to achieve a variety of positive outcomes, less is known about how interventions may serve to support children's self-regulation development.

Children's self-regulation has been minimally studied in relation to PCIT, with past research focusing specifically on children's physiological regulation. One study by Bagner and colleagues (2012) found that children with lower baseline respiratory sinus arrhythmia (RSA), which is typically associated with more psychological and behavioral challenges (Calkins et al., 2007; Calkins & Demon, 2000; Hinnant & El-Sheikh, 2009), experienced greater reductions in their disruptive behavior following PCIT. Findings suggest that PCIT may be most effective in improving disruptive behavior for children who demonstrate the greatest pre-treatment regulation challenges. Additionally, a study with the same sample revealed that children who experienced more positive parenting during PCIT also demonstrated greater post-treatment RSA suppression during a challenging clean-up task (Graziano et al., 2012). Greater RSA suppression indicates a decrease in RSA from baseline to task (Calkins & Keane, 2004; Porges et al., 1996) and is associated with better self-regulation and fewer externalizing behavior challenges (Calkins, 1997; Calkins & Dedmon, 2000; Calkins & Keane, 2004; Porges et al., 1996). Thus, this finding indicates that parents' increased use of positive parenting skills in PCIT may support improvements in children's post-treatment regulation.

Research conducted on children's self-regulation and parenting more broadly has repeatedly shown that regulation is supported via positive parenting and compromised among children exposed to negative parenting (Valcan et al., 2018). Children's self-regulation deficits have been linked to problems in four key parenting domains. Specifically, children who experience self-regulation challenges: 1) experience inconsistent and unpredictable parenting, 2) are more likely to experience harsh parenting and discipline, 3) lack warm and sensitive caregiving relationships, and 4) are deprived of caregiver scaffolding (e.g., verbal and/or physical guidance to help children engage in challenging tasks that they cannot yet perform independently) during disciplinary exchanges that serves as "inhibitory control training". If these aspects of parenting can be improved via parenting interventions, it stands to reason that such interventions should also be capable of strengthening children's self-regulation abilities.

Following this logic, the present study aims to examine whether in-session parenting processes taught and coached in PDI, including use of positive parenting, negative parenting, delivery of effective commands, successful navigation of command sequences, and implementation of consistent consequences via time-out, improve post-treatment self-regulation outcomes for children from child welfare-involved families. Children involved in the child welfare system experience less predictable parenting (Cerezo & D'Ocon, 1999; Norman Wells et al., 2019; Skowron et al., 2011), more harsh and less warm, responsive caregiving (Baer & Martinez, 2006; Dadds et al., 2003; Kavanagh et al., 1988), and less caregiver scaffolding (Valentino et al., 2006, 2011). Additionally, child-welfare involved children are at higher risk for self-regulation deficits (DePrince et al., 2009; Fay-Stammbach, et al., 2017; Kirke-Smith et al., 2016;

Mezzacappa et al., 2001). Thus, it is particularly important to understand whether interventions like PCIT are capable of promoting positive self-regulation outcomes via improvements in parenting for child welfare-involved youth.

The PDI phase of PCIT is designed to teach parents a set of safe and effective child management skills that include formulating and delivering simple, developmentally appropriate, effective, and direct commands. Parents are then taught to follow through through with specific labeled praise if their child complies or a predictable sequence of warning and brief time-out from positive reinforcement if their child does not comply. Following children's compliance with a parental directive, the parent is coached to return to use of positive parenting skills while playing with their child before giving a new directive for the child to practice complying with. This PDI process is hypothesized to help promote children's self-regulation first by supporting parents in using effective child directives or commands, and second by promoting consistent and predictable sequences that follow children's compliance and non-compliance behaviors. Children's experience with developmentally sensitive scaffolding during 'minding and listening practice' serve as a form of "inhibitory control training," in the context of parent and child interactions, and is hypothesized to strengthening children's regulatory skills. Further, as parents employ positive, non-directive parenting skills between parent command-child compliance sequences (i.e., 'minding and listening' practice), and decrease their reliance on harsh, aversive strategies to obtain compliance, children experience their parents as safe, effective, warm, and responsive caregivers. Together, parent's use of effective child management skills during the PDI phase of treatment, including use of positive parenting

skills and decreased reliance on negative parenting, will be examined as predictors of children's self-regulatory outcomes.

The present paper begins with a review of the efficacy of PCIT and other behavioral parent training interventions targeting children's disruptive behavior, and then describes PCIT-specific processes thought to be relevant for children's self-regulation skills. Next, a summary of published process-oriented research conducted on PCIT is provided. Following a review of research on child self-regulation and the impact of maladaptive parenting processes on children's self-regulation, I outline the key aims of this dissertation, namely, to characterize PDI specific processes and examine their effect on children's self-regulation development.

Efficacy of PCIT

Parent-Child Interaction Therapy (PCIT) is an evidence-based parenting intervention that promotes positive parenting and effective parent management of child behavior (Eyberg, 1988). PCIT was originally developed for families of children between the ages of 3-7 experiencing externalizing behavior problems, including excessive tantrums, aggression, defiance, and destructive behaviors (Eyberg, 1988). For such families, PCIT produces reductions in children's disruptive behavior concerns (Thomas et al., 2017), increases children's compliance with their caregivers' directives (Eisenstadt et al., 1993), and reduces children's trauma symptoms (Pearl et al., 2012). These improvements in child functioning are hypothesized to occur through changes in parenting – specifically, through increases in positive parenting and reductions in use of maladaptive parenting skills (Thomas & Zimmer-Gembeck, 2007). Since its development, PCIT has been tested for use with a variety of client populations. Notably,

PCIT is one of the few interventions that has been shown to be efficacious for child welfare involved families, for whom it has been found to reduce future reports of child maltreatment (Euser et al., 2015; Kennedy et al., 2016). Children with histories of maltreatment who complete PCIT demonstrate reductions in their disruptive behavior challenges (Batzer et al., 2018), consistent with findings from PCIT conducted with non-maltreated children. Similarly, following PCIT, maltreating parents demonstrate increases in their positive parenting skills and decreases in their use of maladaptive parenting skills (Batzer et al., 2018; Chaffin et al., 2004; Thomas & Zimmer-Gembeck, 2007), consistent with the changes observed among non-maltreating families. Thus, PCIT is efficacious in reducing future instances of maltreatment, improving children's behavior, and enhancing parenting skills among families with a history of maltreatment.

Parenting Interventions Addressing Disruptive Child Behavior

However, PCIT is just one of many parenting interventions designed to address children's disruptive behavior. Interventions shown to be most efficacious in reducing children's externalizing behavior concerns and improving parenting behaviors possess three common factors, according to a meta-analysis conducted by Kaminski and colleagues (2008). Parenting interventions found to be the most effective: 1) increase positive parent-child interactions and emotional communication skills, 2) teach parents to use time-out and the importance of consistency in parenting, and 3) require parents to practice new skills with their child(ren) in sessions (Kaminski et al., 2008). Further, treatment approaches that focus on individual parent behavioral therapy with child participation have been identified as well-established in their ability to reduce children's disruptive behavior challenges (Kaminski & Claussen, 2017). In addition to PCIT,

several other evidence-based parenting interventions utilize some of these techniques. The Triple P Positive Parenting Program (Sanders, 1999), Incredible Years (Webster-Stratton, 2001), and Parent Management Training Oregon (PMTO; Forgatch & Patterson, 2010) are three programs designed for children in the preschool to early elementary school age range that have consistently been shown to reduce children's disruptive behavior problems (Thomas & Zimmer-Gembeck, 2007; Tully & Hunt, 2016; van Aar et al., 2017). Triple P uses a tiered system of intervention including universal communication (level 1), low-intensity seminars, individual, and group intervention (levels 2 and 3), and more intensive group and individual services (levels 4 and 5; Sanders, 1999). The Incredible Years program consists of three integrated programs designed for parents, teachers, and children, including separate child and parent group treatment settings (Webster-Stratton, 2001). PMTO may be delivered in a group or individual format and focuses on reviewing and troubleshooting parents' practice of skills in the home, as well as planning ongoing practice for the coming week (Forgatch & Patterson, 2010). PCIT, Triple P, Incredible Years, and PMTO all focus on promoting positive parent-child interactions, teaching parents to be consistent, and utilizing effective behavior management strategies, such as time-out. However, PCIT is unique in that parents practice the techniques they are learning each week in session with their child with supportive, live coaching from their therapist. Thus, PCIT is the only intervention which utilizes all three techniques shown to reduce children's behavioral outcomes and promote adaptive changes in parenting skills, with its use of live parent coaching comprising the most unique aspect of the intervention. Next, I will outline the structure of

PCIT and how live therapist coaching is flexibly applied throughout treatment to best meet the needs of families.

PCIT and Parent-Directed Interaction (PDI) Processes

PCIT is delivered in two phases – Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI). Both phases follow a similar structure, with each phase beginning with a didactic 'teach' session, followed by several coaching session. During the respective 'teach' session for each phase, the therapist meets with the caregiver to teach and role-play the use of phase-specific skills. Following the teach session, subsequent sessions in each phase focus on caregivers practicing phase-specific parenting skills with their child for a majority of each session while being coached by the therapist. Each coaching session begins with a brief 5-10-minute check-in about family stressors unrelated to the child's behavior. Next, caregivers complete the Eyberg Child Behavior Inventory (ECBI; Robinson et al., 1980) to assess changes in their child's challenging behaviors across the course of treatment. Therapists then collect and review the parent's homework completed since the previous session, including troubleshooting any barriers to consistent homework practice. Coding of parents' CDI skills is completed at the beginning of every CDI session and at the beginning of some PDI sessions. Coding of CDI and PDI skills is utilized to help track parents' skill use progression and to inform goals for coaching. Following coding, the therapist coaches the parent in their CDI and/or PDI skill use for a majority of the session. Coaching sessions in each phase conclude with the therapist assigning homework for the parent to complete prior to the next session.

Child-Directed Interaction

In standard length PCIT (e.g., Chaffin et al., 2004), CDI typically lasts for 7-10 sessions and focuses on improving the parent-child relationship through the use of positive parenting skills. Positive parenting skills (i.e., PRIDE skills) facilitated in CDI include following the child's lead in play, Praising positive child behaviors, Reflecting appropriate child verbalizations, Imitating the child's appropriate play, Describing the child's play, and demonstrating Enjoyment during play. Parents are also taught to avoid giving commands, asking questions, or criticizing their child (i.e., "Don't" skills or negative parenting behavior) during child-led play. Further, parents begin to develop skills for engaging in effective, non-violent discipline as they are taught to ignore minor child misbehavior and offer positive reinforcement in the form of praise for behaviors that are the 'positive opposite' of their child's challenging behaviors. For example, if a child struggles with sharing, the parent might be coached to offer praise whenever the child engages in sharing or turn-taking spontaneously to help increase the frequency of these prosocial behaviors.

Parent-Directed Interaction

Following CDI, families proceed to the PDI phase of treatment. In standard length PCIT, PDI also typically lasts 7-10 sessions and focuses on helping caregivers learn developmentally appropriate child management skills and to apply consistent, appropriate consequences to their child's behavior. During the initial PDI 'teach' session, parents learn and role-play how to 1) deliver effective commands, 2) follow through with responses that are contingent upon their child's compliance or non-compliance, and 3) implement a standardized time-out procedure in response to child non-compliance.

Following the teach session, parents complete several 'coaching' sessions during which they have the opportunity to practice the PDI phase-specific skills with their child. These coaching sessions conform to the general structure described above that is similar for both CDI and PDI sessions (e.g., check-in, review of homework, coding, and coaching). Sessions always begin with several minutes of CDI coding or coaching. Therapists may choose to code the parents' CDI skills as soon as the second PDI coaching session, given that parents are already familiar with these skills from the first phase of treatment. During sessions where therapists are coding parents' CDI skills, they tally the parent's number of PRIDE skills and negative parenting behavior during a 5-minute period where the parent is instructed to use their CDI skills without therapist support. Parents achieve 'mastery' of CDI skills when they use 10 of each PRIDE skill (labeled praises, behavior descriptions, and reflections) and three or fewer negative parenting skills (questions, commands, and criticisms). Following CDI coding, the therapist provides feedback on the parents' skills use. Depending on whether the parent met mastery, they may also set goals for CDI coaching and coach the parent briefly (e.g., 5-10 minutes) in using their CDI skills, if necessary. Following CDI coding and/or coaching, the therapist then transitions to facilitating the parents' use of PDI-specific skills.

Delivery of Effective Commands. In PDI, parents are first taught to deliver commands that are direct, developmentally-sound, and delivered one at a time, and taught to avoid use of indirect commands and commands with which their children have no opportunity to comply. Negatively stated directives (e.g., "Stop that," or "Don't run in the hall") are not considered effective, as they fail to tell the child what behavior they *should* be doing. Thus, such statements are not considered to be commands. Further, situations in

which the child is not given an adequate chance to obey their parent's command, or it is not possible to assess whether they have complied within 5 seconds of the command's issuance, are categorized as commands to which the child did not have an opportunity to comply. This could occur due to the parent: issuing multiple commands in a row without giving the child a chance to comply to the first command given ("Hand me the blue block. Get down off the chair. Sit down. Given me the blocks now."); engaging in an action that makes the original command impossible for the child to comply with (e.g., Parent takes the block out of the child's hand before the child can hand it to their parent); or issuing an initial command that is too ambiguous for the child to understand and comply with (e.g., Parent says "Come on!" or "Hurry up!" and holds out their hand for the block, rather than issuing a clearly stated initial command).

Positively stated commands that provide children with the opportunity to comply may fall into one of two categories: direct commands or indirect commands. Direct commands consist of an instruction or direction for the child to perform a specific action (e.g., "Please hand me the blue block," or "Sit down on the chair"). Indirect Commands include those that are either stated in the form of a question (e.g., "Can you please hand me the blue block?") or stated in such a way that it is unclear whether or not the child is required to complete the request (e.g., "You can hand me the blue block" or "Let's clean up the toys now"). In PCIT, parents are encouraged to use direct commands, rather than indirect commands, as direct commands make it clear that the child is being told, rather than asked, to do something.

After the parent issues a positively stated command to which the child has an opportunity to comply, the child's compliance response may fall into one of two

categories: compliance or non-compliance. Compliance occurs when a child obeys or begins to obey their parent's command within 5 seconds of the command being issued (e.g., Hands the parent the blue block, or holds the block out to their parent as the 5 seconds elapse, etc.). Non-compliance occurs when the child does not obey, does not attempt to obey, or discontinues complying with their parent's command within 5 seconds of the command's issuance (e.g., Child continues to play without acknowledging the parent's direction, child begins to hand their parent the block, but then states, "Wait, I'm using this one!" and continues playing, etc.). In sum, commands must be positively stated and offer the child an opportunity to comply in order to be effective. Parents are traditionally instructed to deliver direct commands during PDI, as direct commands have typically been considered more effective than indirect commands. However, it has been suggested that children who participate in PCIT demonstrate higher levels of compliance to both direct and indirect commands following treatment, and that compliance to both types of commands is linked to positive outcomes for children (Eyberg, 2019). Thus, indirect commands that offer an opportunity for the child to comply may also be considered effective.

Contingent Responding to Child Compliance and Non-Compliance. Next, parents are taught to contingently respond to their child's compliance behavior. Appropriate contingent responding results in a command sequence that is considered successful, while parental responses that are not contingent upon their child's behavior are considered unsuccessful. When children comply with their parent's command, parents are taught to deliver a labeled praise (e.g., "Thank you for listening to me!") to reinforce their child's positive behavior. When a child complies with an effective command and the

parent follows up with a labeled praise, this is considered a successful command sequence. If the child does not comply with the parent's original command, the parent is then instructed to deliver a single time-out warning (e.g., "If you don't *(insert the original command*; e.g., hand me the blue block), then you will have to go to the time-out chair"). If the child obeys after receiving the time-out warning, parents are instructed to reinforce their child's positive compliance behavior with a labeled praise. Child compliance following a time-out warning that is met with a parent's labeled praise also constitutes a successful command sequence. However, if the child does not comply with their parent's time-out warning, parents are then taught a specialized time-out procedure which always ends with the child complying with their parent's original command. If the parent puts their child in time-out, follows the appropriate time-out sequence, and their child obeys the original command following the time-out, this also constitutes a successful command sequence. In sum, command sequences are considered successful when, 1) the parent praises their child's compliance to the original command, 2) the parent praises their child's compliance following the time-out warning, or 3) the parent places their child in time-out, navigates the time-out procedure appropriately, and following the time-out, the child complies with their parent's original command. Sequences that start with a direct or indirect command and provide an opportunity for the child to comply, but do *not* end with appropriate follow-through (e.g., parent forgets to praise their child's compliance, the parent should have taken their child to time-out, but did not, etc.) are considered to be unsuccessful.

Time-Out Implementation. Parents are taught the steps to a consistent, safe, and standardized time-out procedure in the event their child refuses to comply to a command

and subsequent time-out warning. The time-out procedure requires children to sit in a time-out chair for three minutes, after which they are given the opportunity to comply with their parent's original command. If the child gets out of the time-out chair before three minutes have elapsed, they are led to a separate time-out space. Once one minute has elapsed in the separate time-out space, they return to sit on the time-out chair. After the child is sitting quietly on the time-out chair, they are once again given the opportunity to comply with their parent's original command (e.g. "You are sitting quietly on the time-out chair. Are you ready to *(insert the original command*; e.g., hand me the blue block)?). Once the child complies, they receive a brief acknowledgement from their caregiver (e.g., "okay") and parents are taught to immediately issue another small command, to which children typically comply. Following the child's compliance to the follow-up command, parents are taught give the child an enthusiastic labeled praise for complying and then return to using their PRIDE skills while following their child's lead in play, thus displaying both warmth and positivity alongside the use of fair and effective parent management. For the purposes of the Time-Out Coding employed in this study, a successfully navigated time-out procedure was initiated with a parent's compliable command to the child, includes the appropriate progression through the time-out procedure as described above, and ended when the child complied with the parent's original command. In sum, PDI phase parenting skills teach parents to initially allow children to obey commands on their own and then step in with more involved parent management via the implementation of a time-out when needed. Together, children's experiences with command sequences and time-outs are thought to form gradations in the scaffolding that parents provide their children during PDI sessions.

Because PDI skills are initially new to both the parent and child in the PDI phase of treatment, parents initially practice the PDI procedure in session with intensive therapist guidance and support via live coaching. Parents receive this intensive support for practicing PDI processes in the first two PDI sessions, and the third PDI session is the first during which parents may have the opportunity to briefly practice their skills independently during a 5-minute PDI coding segment, during which therapists quietly observe and code parents' skills use. Therapists collaboratively choose to incorporate PDI coding based on the parents' level of comfort and proficiency with the PDI skills, so PDI coding does not take place until subsequent sessions for some families. During sessions where PDI coding is completed, parents are instructed to use their PDI-specific skills (e.g., effective commands, contingent follow-through, and implementation of time-out, if needed) for 5-minutes without support from the therapist. Therapists code the effectiveness of parents' commands (e.g., whether they were direct and provided an opportunity for the child to comply) and whether parents' follow-through contingently, based on their child's behavior, to complete a successful command sequence (e.g., via a labeled praise for compliance, issuance of the time-out warning and subsequent praise for compliance following the warning, or successful navigation of the time-out procedure for non-compliance, if needed). Therapists may interrupt the 5-minute coaching period in the event the parent is having difficulty implementing the time-out procedure successfully, or if the parent is exhibiting difficulties with their PDI-specific skills in another manner that the therapist deems necessary of further support. Parents are considered to have met mastery if 75% or more of the commands they issue are effective (e.g., direct and provide an opportunity for compliance) and if 75% or more of the command sequences they

navigate with their child are successful (e.g., end with a labeled praise for compliance, include a time-out warning followed by a labeled praise for compliance, or conclude with child compliance following successful navigation of the time-out procedure). Following PDI coding, the therapist provides the parent with feedback on their skill use and sets goals for PDI coaching. Examples of coaching goals include helping the parent consistently issue a labeled praise for child compliance, supporting the parent in consistently issuing a time-out warning and/or implementing the time-out procedure, when needed, in response to their child's non-compliance, and increasing the parents' use of PRIDE skills between commands.

Over the course of PDI phase sessions, parents are initially coached to practice giving simple, play-based commands and gradually shift to using more challenging real-life commands. Thus, coaching begins with directing parents to give simple, play-based commands (e.g., "Please hand me the blue block,"), and engage in contingent follow-through, gradually building up to use of commands that are more difficult, including sharing commands ("I would like a turn with the car you're playing with. Please hand it to me,") and commands to switch activities ("I would like to play with the blocks now. Please come sit at the table with me"). Once parents have mastered these commands, therapists guide parents in using clean-up commands ("It's almost time to leave. Please put these three cars into the toy bin,") and more "real-life" commands (e.g. "Please put on your shoes," or "Hold my hand while we walk down the hallway, please,") with their child. Thus, the commands issued by parents gradually place more challenging and realistic demands on children over the course of PDI sessions. During coaching, therapists instruct parents to consistently return to using their positive PRIDE skills in

between commands to maintain an interactional context of warmth and positivity, and to reinforce children's compliance with time devoted to child-led play in between the effective parent management training.

Homework is also an important component of PDI-phase work. Parents are instructed to practice their CDI skills at home each week. Once parents demonstrate comfort and proficiency with the PDI-phase skills, they are also instructed to practice these skills at home between sessions. Parents are typically considered ready for homework when a majority of the commands they deliver in-session are positively stated, compliable, and direct. Parents considered ready for homework practice also typically issue a labeled praise for compliance or the time-out warning in response to non-compliance during sessions. Finally, parents who have implemented at least one time-out in session, or who express a clear understanding of the time-out procedure if a time-out has not yet been implemented in-session, are typically considered ready for PDI homework. PDI-specific homework may be assigned as soon as the first session, depending on parents' comfort and skill level. As parents proceed through the PDI phase of treatment and develop their skills further, they learn to generalize their skills to other settings, including in public settings and with siblings. Families also develop 'House Rules' (e.g., no hurting) which result in an automatic time-out if the child engages in a behavior violating the rule (e.g., hitting a sibling). Taken together, the PDI procedure (e.g., effective commands, command sequences, and time-outs) practiced in PDI with continued interspersed use of the positive PRIDE skills helps to support effective parent management of child behavior within the context of a warm, responsive caregiver-child relationship, However, no published research to date has examined these processes in the

PDI phase of PCIT or how use of these skills may support positive changes in child behavior functioning. Instead, most process research on PCIT has focused on understanding what happens in the CDI phase of treatment that promotes positive child outcomes.

PCIT Process Studies

Despite its well-documented efficacy, little process-oriented research has been conducted on the PDI phase of PCIT to date. Consistent with research citing the efficacy of in-session parent skills practice in producing positive outcomes (Kaminski et al., 2008; Kaminski & Claussen, 2017), the use of in vivo coaching inherent to PCIT plays an important role in its efficacy. Specifically, use of live coaching in PCIT has been linked to the acquisition of more positive parenting skills and decreases in negative parenting (Shanley & Niec, 2010). A handful of studies have focused specifically on development of parenting processes observed during CDI sessions and associated outcomes for children. One study conducted using a case study design (n = 3) found that parents' differential attention predicted children's prosocial behavior in CDI for two out of three families (Pemberton et al., 2013). Another study found that parents' combined use of reflections, behavior descriptions, and labeled praises during the CDI phase of treatment increased their child's on-task behaviors (Tempel et al., 2013). Finally, one study identified that a majority of the changes in parents' positive and negative parenting skills occurred during the first three CDI sessions (Hakman et al., 2009). To date, the study conducted by Hakman and colleagues (2009) represents one of the only studies examining in-session processes in PDI. In this study, the authors examined broad positive, negative, and neutral parenting behaviors in response to positive, negative, or

neutral child behaviors, and only 3-4 PDI sessions were examined for each family. Thus, although this study elucidates patterns of parents' contingent responding over the course of PCIT, to my knowledge, no research has been conducted to date examining PDI-specific in-session processes or these processes' effects on child outcomes. This dissertation study is designed to contribute new knowledge about PDI phase-specific processes, which comprise half or more of the sessions delivered during PCIT, and test their impact on children's self-regulation outcomes.

Child Self-Regulation

Self-regulation is one aspect of child development that has not yet been extensively studied in relation to PCIT. As previously defined, self-regulation is the ability to regulate one's thoughts, behaviors, attention, and emotions (Grolnick & Farkas, 2002; Kochanska et al., 2000, 2001; Kopp, 1982; McCabe et al., 2004; Rothbart & Bates, 2006). Self-regulatory abilities emerge in toddlerhood and improve rapidly over the preschool years (Kochanska et al., 2001). There are several aspects of self-regulation which vary in their degrees of complexity. Compliance with parental directives represents a prototypic form of self-regulation in which children initiate, discontinue, or redirect their behavior based on the requests of their caregiver (Kochanska et al., 2001; Kopp, 1982). Compliance is considered to be less complex than other forms of regulation because it involves children modulating their actions with the scaffolding and support of their caregiver. As children develop their regulatory abilities, they are able to engage in more complex and independent forms of self-regulation. Effortful control represents a more mature, dispositional trait that involves one's ability to engage in utilizing attentional focusing, shifting, inhibition, and active control of behavior in order to inhibit

automatic responses, detect errors, and engage in alternative courses of action (Rothbart & Bates, 2006; Rothbart et al., 2003). Inhibitory control represents a sub-component of effortful control that consists of one's ability to inhibit dominant responses and engage in sub-dominant responses when necessary (Rothbart et al., 2003). For example, a child might need to inhibit their dominant response of hitting a peer and instead engage in a less-automatic alternative action, such as seeking out an adult or asking the peer for their toy back. Effortful control and inhibitory control represent more complex forms of self-regulation because they require more internalization to allow children to engage in acts of regulation without the support of their caregiver or another adult.

Well-developed self-regulatory abilities help to support a wide range of positive social, academic, and psychological outcomes for children. Effortful control is linked to a variety of adaptive developmental skills, including empathy and sympathy (Eisenberg et al., 2007; Valiente et al., 2004), development of conscience and morality (Kochanska et al., 2000; Kochanska & Knaack, 2003), social competence (Eisenberg et al., 2003; Fabes et al., 1999; Spinrad et al., 2006, 2007), and academic competence (Fabes et al., 2003; Valiente et al., 2007, 2008). Likewise, better inhibitory control skills are associated with successful school adjustment, positive peer relations, and adaptive socioemotional functioning (Allan et al., 2014; Bell & Deater-Deckard, 2007; Blair, 2002; Lewit & Baker, 1995; Rueda et al., 2005). It is hypothesized that deficits in regulatory processes lead children to make impulsive decisions that are often socially or situationally maladaptive, resulting in externalizing behavior concerns (Dodge et al., 2006; Eisenberg et al., 2001). Indeed, in addition to supporting other adaptive outcomes, well-developed effortful and inhibitory control skills have both been linked to lower rates of externalizing

behavior challenges for children (Eisenberg et al., 2001, 2005, 2009). Thus, adaptive self-regulatory skills lead to a variety of positive developmental outcomes, while regulatory deficits present challenges that are linked to children's externalizing disorders.

Parenting, Self-Regulation, and PDI Pathways for Promoting Regulatory Skills

Children who are exposed to maladaptive parenting demonstrate greater deficits in their self-regulation abilities in both childhood and adolescence (DePrince et al., 2009; Fay-Stammbach et al., 2017; Kirke-Smith et al., 2016; Mezzacappa et al., 2001). Notably, deficits in self-regulation have been linked to exposure to parenting characterized by four key domains: 1) lack of consistent and predictable parenting, 2) lack of developmentally sensitive, scaffolded child management exchanges, 3) harsh caregiving and discipline, and 4) lack of warmth and sensitivity in parenting. Although the negative impact of maladaptive parenting on children's self-regulation is widely documented, less is known about how interventions might serve to support the development of regulation skills for children. Given that deficits in regulatory processes have been linked to comorbid externalizing challenges for children (Eisenberg et al 2001, 2005, 2009), it stands to reason that interventions designed to target disruptive behavior disorders for children may also be capable of promoting gains in their self-regulatory skills. Following this logic, the present study focuses specifically on PDI phase processes that are hypothesized to improve children's regulatory outcomes. Although the PDI phase is the least-studied aspect of PCIT, it offers some theoretically important mechanistic pathways through which children's self-regulation development may be supported. PDI may help to promote children's developing self-regulatory skills by promoting the development of more adaptive parenting skills in the same four domains in which parenting deficits have

been linked to poor self-regulation for children. Specifically, children's self-regulation may be supported in PDI: 1) through experiences with consistent and predictable parenting during command sequences and time-outs, 2) via the appropriately scaffolded disciplinary exchanges that occur during time-out implementation, 3) through reduced reliance on harsh discipline and parenting behaviors, and 4) via increased use of positive PRIDE skills between command sequences. Thus, PDI may support children's self-regulation development by promoting safe, predictable, and effective parent management skills delivered within the context of a warm, responsive parent-child relationship. The following section will examine linkages between parenting in each of the four key parenting domains (consistency/predictability, scaffolding, harsh parenting, and warmth/sensitivity) and children's self-regulation outcomes, and then discuss the hypothesized pathways through which PDI may support more adaptive parenting in each domain.

Consistent, Predictable Parenting

Lack of consistent, predictable parenting is a key parenting factor which negatively impacts children's regulatory skills. Parenting that is unpredictable is characterized by a parent indiscriminately responding to their child's problematic and prosocial behavior in an aversive manner (Wahler & Dumas, 1986). This unpredictable parenting in turn drives child behavior. Children who experience unpredictable parenting are more likely to behave in aggressive and aversive ways in response to their parent's aversive behavior (Wahler & Dumas, 1986). In such interactional contexts, engaging in self-regulatory skills is not necessarily adaptive for children. For example, if children are equally likely to be responded to aversively if they engage in an uninhibited response of

yelling at their parent or asking their parent nicely for something they want, they view their own ability to influence the social response of their caregiver as minimal (Bernier et al., 2010). Thus, regulatory behaviors are not as useful because they require more effort and their utilization doesn't result in desired social outcomes (Bernier et al. 2010). In other words, if there is no 'reward' (in the form of predictable social interactions) for engaging in regulated behavior, the utility of developing regulatory skills is diminished (Bernier et al. 2010; Colman et al. 2006; McCabe et al. 2004). Further, the aversive behavior that is exhibited by children in such interactional context is inherently unregulated. This unregulated behavior is likely to increase, as children's unregulated behavior is 'rewarded' with a predictable parent response (Wahler & Dumas, 1986). Further, higher levels of unregulated behavior also result in fewer opportunities for children to be positively reinforced for engaging in self-regulation. On occasions when children do successfully regulate their behavior, it is unlikely to be positively reinforced due to their caregiver's pattern of indiscriminate responding (Wahler & Dumas, 1986). Thus, while parenting that is unresponsive and unpredictable serves to undermine children's regulatory skills, parenting that is sensitive and appropriately attuned to children's behavior should be linked with better regulatory outcomes for children. Indeed, there is extensive literature linking parental responsiveness to children's compliance, which represents an early form of regulation (Kochanska, 1997; Kochanska & Murray, 2000; Parpal & Maccoby, 1985). Further, there is some evidence that parental responsiveness can predict more complex forms of regulation, such as inhibitory control, attention, and lower impulsivity in preschoolers (Birmingham et al., 2017).

The parenting processes facilitated during PDI are hypothesized to provide children with more consistent and predictable parenting in several ways. First, the command sequences taught during PDI are reliable and predictable for children. Parents are coached to give commands that are stated clearly, positively (e.g., what to do rather than what not to do), and directly, so there is no ambiguity as to whether the child is expected to listen to their parent. Consistent language is used to address children's compliance or non-compliance to a command. They learn that they will either receive a praise for listening or a warning that they will go to time-out if they fail to manage their behavior. In instances where children do not initially listen to their parent, the time-out procedure provides a discipline option that is safe, predictable, and consistent for children. Further, the time-out procedure is always implemented in the same way, so children receive consistent messaging that they need to comply with their caregiver's original command in order to end the time-out. Thus, predictable follow through following a command via praise for compliance or implementation of the time-out procedure for non-compliance is expected to lead to improved regulatory skills for children.

Caregiver Scaffolding During Child Management Exchanges

Children's regulatory abilities may also be negatively impacted when they do not receive the necessary caregiver scaffolding during child behavior management exchanges required to develop their independent self-regulatory skills. Scaffolding involves a caregiver's deliberate use of verbal and/or physical guidance to help children engage in challenging tasks that they cannot yet perform independently (Lewis & Carpendale, 2009). Scaffolding is dynamic in nature, as caregivers increase their support when

children struggle and withdraw their support to allow children to complete tasks independently when they are likely to succeed (Matte-Gagné & Bernier, 2011; Lewis & Carpendale, 2009). Scaffolding is thought to help support children's regulatory development by allowing caregivers to externally support their child's efforts to focus attention, inhibit automatic responses, and engage in alternative courses of action (Vygotsky, 1978). With repeated practice, children are able to internalize these regulatory processes and begin to engage in self-regulation independently (Wertsch et al., 1980). Indeed, parent scaffolding has been extensively linked with children's self-regulatory abilities (Valcan et al., 2018).

PDI promotes caregiver scaffolding both during commands to which children comply and during implementation of the time-out procedure, which is thought to serve as an "inhibitory control training" experience for children (Skowron & Funderburk, 2021). First, the initial command sequence offers an opportunity for the child to engage in self-regulation. During a command, children are typically asked to discontinue a preferred behavior, such as playing, and engage in a non-preferred behavior, such as cleaning up their toys. When children are initially able to regulate their behavior, in this example by cleaning up, they receive positive reinforcement in the form of praise from their caregiver. This positive reinforcement bolsters the child's ability and desire to engage in similar regulatory behavior in the future. When children are unable to successfully regulate their behavior, the parent helps to scaffold their regulation by implementing the time-out procedure. The time-out procedure involves a consistent set of steps which always result in the child obeying the original command. Thus, even if the child is initially unable to regulate their behavior, the standardized time-out procedure

supports them in doing so. Over time, repeated practice of this sequence should enable children to internalize the regulatory role of their caregiver and gradually regulate their own behavior without parental scaffolding in the form of time-out. Thus, the scaffolding provided during parent management in PDI should help support children's self-regulation development.

Harsh, Controlling Parenting and Warm, Sensitive Caregiving

Finally, harsh, controlling parenting and warm, sensitive caregiving have both been linked to children's self-regulation development. Harsh parenting undermines children's regulatory efforts through parenting behaviors that are critical, negative, or rejecting (O'Connor, 2002). Such harsh parenting may prevent caregivers from supporting their child's attempts to regulate, such as in overly controlling parenting during which the parent completes tasks for the child that could promote regulation if completed independently. Further, caregiving that is critical may serve to lower children's self-esteem and autonomy, subsequently reducing their ability to engage in regulatory tasks. Indeed, aversive parenting has been linked to deficits in children's regulatory skills (Fay-Stammbach et al., 2014; Mash et al., 1983; Valcan et al., 2018). For example, parental control, harsh caregiving, and ignoring have been linked to deficits in children's executive functioning and inhibitory control (Bindman et al., 2013; Roskam et al., 2013). In regard to harsh discipline, research suggests that parental violence towards children constituting physical abuse often occurs in the context of disciplinary exchanges (Ateah & Durrant, 2005; Crouch & Behl, 2001). Although use of harsh, controlling discipline may result in short-term child compliance, children may begin avoiding their parent's directives due to fear of harsh punishment. Child avoidance of

parent directives may result in increased reliance on increasingly harsh discipline techniques, eventually leading to techniques that would be considered physically or emotionally abusive. Such disciplinary exchanges escalate into coercive cycles (Patterson, 1982; Patterson & Reid, 1984) and result in reciprocal and escalating harsh parenting and child behavior problems over time (Riggins-Caspers et al., 2003). Use of such harsh discipline has been linked to deficits in children's self-regulation abilities. For example, Cecil and colleagues (2012) found that parents' report of their own harsh discipline use, consisting of yelling and physical discipline, when their child was three years-old was linked to more inattention and hyperactivity, lower ability to persist in challenging tasks, and poorer emotion regulation abilities for children at age four. Conversely, parenting characterized by positive affect and warmth promotes self-regulation by providing a context in which children are more readily able to internalize regulatory strategies (Bernier et al., 2012). Consistent with this notion, deficits in positive parenting including warmth, sensitivity, and responsiveness, have been linked with regulatory deficits for children (Fay-Stammbach et al., 2014; Valcan et al., 2018). Increased parental warmth and sensitivity may even help buffer against the negative impact of prior risk factors, including child maltreatment. For example, increased use of positive parenting strategies appears to buffer against the negative impact of maltreatment on children's self-regulatory skills (Fay-Stammbach et al., 2016).

The PDI procedure helps to promote children's regulatory skills by reducing reliance on harsh, controlling parenting strategies and simultaneously creating a context of warm, sensitive parenting. The ongoing focus on PRIDE skills and implementation of non-harsh discipline in PDI helps to promotes children's regulatory skills by reducing the

amount of harsh parenting they experience. Continuing to promote positive parenting skills throughout PDI helps reduce harsh parenting by providing caregivers with alternative and more effective parenting strategies (e.g., praising a child for a 'positive opposite' behavior or giving them a command to engage in a different behavior rather than criticizing the undesired behavior). Further, the focus on utilizing effective command sequences limits the likelihood of escalating parent-child coercive interaction sequences. When parents respond to children in a calm and consistent manner (i.e., with praise or implementation of the time-out procedure), children are more likely to listen, and parents are less likely to resort to harsher parenting techniques. Additionally, the time-out procedure serves as a less harsh and more effective replacement for harsh discipline, reducing parents' reliance on harsher disciplinary strategies. The associated reductions in harsh parenting are hypothesized to lead to improvements in children's regulatory skills. Simultaneously, the continued focus on utilizing PRIDE skills between effective command sequences results in improved relationship quality by creating a parent-child relationship characterized by higher levels of warmth and positivity. Thus, the continued use of positive parenting skills in PDI is thought to be important for supporting children's regulatory skills. In sum, the PDI phase-specific skills taught in PCIT are thought to promote parent skill use of more adaptive parenting behaviors that have been linked with positive self-regulation outcomes children. Namely, PDI provides children with: 1) predictable, consistent parenting and 2) appropriately scaffolded commands and time-out procedures in response to child non-compliance, all while promoting 3) reduced levels of harsh parenting within a context of 4) warm, sensitive caregiving.

Current Study

Given the hypothesized pathways through which PDI phase work in PCIT may support gains in children's self-regulation abilities, the following study aims are proposed within the context of an NIH-funded clinical trial of PCIT versus a services-as-usual condition with child welfare involved families. **Aim 1: Characterize PDI-phase patterns of A) positive parenting skills, B) negative parenting behavior, C) effective commands, D) successful command sequences, and E) number of and duration in time-outs over the course of PDI.**

H1. Given that patterns of in-session parenting processes have not previously been examined in the PDI phase of PCIT, this aim is considered exploratory in nature and no hypotheses are specified.

Aim 2: Examine whether parents' use of PDI-specific skills impact children's post-treatment self-regulation outcomes. Specifically, A) positive parenting skills, B) negative parenting behavior, C) effective commands, D) successful command sequences, and E) number of and duration in time-outs will be examined as predictors of children's post-treatment self-regulation abilities.

H2A. Higher positive parenting skills will predict better post-treatment self-regulation. **H2B.** Fewer negative parenting behaviors will predict better post-treatment self-regulation. **H2C.** More compliable commands issued by parents will predict better post-treatment self-regulatory skills. **H2D.** More successful command sequences will predict better post-treatment self-regulatory skills. **H2E.** More successful time-out experiences and longer amounts of time spent in successful time-outs will predict better post-treatment self-regulation.

CHAPTER II

METHOD

Participants

Participants were drawn from the Coaching Alternative Parenting Strategies study (5R01DA036533, MPIs: Skowron and Fisher), a randomized clinical trial investigating the biological and behavioral methods of change of Parent-Child Interaction Therapy in a sample of child welfare-involved families. Participating parent-child dyads were recruited directly through their child welfare or self-sufficiency caseworkers at the Department of Human Services (DHS). Eligible dyads were biological parents with a child between 3 and 7 years-old at study entry, lived together at least 50% of the time, and spoke English fluently. Dyads were excluded if the child had a history of sexual abuse with their parent or another caregiver in the home, as this is contraindicated for PCIT. Participants in the full study included $N = 204$ child welfare-involved parents and their 3-7 year-old children. Of these families, $n = 120$ were randomly selected to receive PCIT.

Child and parent participants included in the present study are 50 dyads who following completion of CDI, attended one or more PDI coaching session. Chi-square tests and independent samples t-tests were performed to examine pre-treatment group difference between dyads in the present study and those who were randomized into PCIT but did not participate in any PDI coaching sessions. Families included in the present study were marginally more likely to rate their child as more temperamentally challenging, defiant, and demanding [$t(118) = -1.95$, $p = .05$] on the Difficult Child scale of the Parenting Stress Index (PSI; Abidin, 1995). Further, parents in the present study

were significantly more likely to rate their child at or above the 90th percentile on the Difficult Child scale [$\chi^2(1) = 5.45$, $p = .02$]. Finally, parents in the present study were more likely to female [$\chi^2(1) = 4.14$, $p = .04$]. However, this finding should be interpreted with caution given the small number of fathers in the study overall ($n = 24$) and randomized into PCIT ($n = 13$).

There were no significant group differences in child sex [$\chi^2(1) = 0.004$, $p = .95$], parent [$t(118) = -0.23$, $p = .82$] or child [$t(118) = -0.81$, $p = .42$] age, parent [$\chi^2(6) = 5.19$, $p = .52$] or child [$\chi^2(5) = 3.87$, $p = .57$] ethnicity, parent marital status [$\chi^2(6) = 6.72$, $p = .35$], parent education [$\chi^2(7) = 6.88$, $p = .44$], income [$t(97) = 0.85$, $p = .40$], parent [$t(118) = 1.20$, $p = .23$] or child [$t(118) = -1.07$, $p = .29$] ACEs, or parents' ratings of their interactions with their child on the Parent-Child Dysfunctional Interaction subscale of the PSI [$t(118) = -1.49$, $p = .14$]. There were also no significant differences in pre-treatment parenting behaviors, including frequency of positive parenting skills [$t(118) = 1.21$, $p = .27$] and negative parenting skills [$t(118) = 0.15$, $p = .88$] during child-led play, and frequency of positive parenting skills [$t(118) = 1.12$, $p = .27$] frequency of compliable direct commands issued [$t(118) = 1.34$, $p = .18$], and proportion of successful direct command sequences [$t(113) = -0.04$, $p = .97$] during a parent-directed clean-up task, as assessed by the Dyadic Parent-Child Interaction Coding System, Fourth Edition (DPICS-IV; Eyberg et al., 2013). In sum, the sample included in the present study was indistinguishable from the larger sample randomized to PCIT, apart from their ratings of their children as more temperamentally challenging, defiant, and demanding on the Difficult Child Scale of the PSI.

Descriptive statistics for the dyads included in the present study are presented in Table 1. A majority of parents participating in the present study were mothers (n = 48; 96.0%), with two fathers participating (4.0%). Parents were between the ages of 18 and 64 (M = 32.24; SD = 6.95) and a majority of parents were single (n = 26; 52.0%). Most parents (n = 35; 70.0%) and children (n = 26; 52.0%) identified as White, 22.0% of parents (n = 11) and 46.0% of children (n = 23) identified as Bi- or Multi-Racial, 4.0% of parents (n = 2) and 2.0% of children (n = 1) identified as Hispanic American/Latinx, and 4% of parents (n = 2) identified as Pacific Islander. Participating children were 52.0% male (n = 26) and 48.0% female (n = 24). Children ranged in age from 3 to 7 years at study onset (M = 4.58; SD = 1.33). Most participating children were enrolled in preschool or Head Start (n = 22; 44.0%) followed by kindergarten (n = 11; 22.0%), not currently enrolled in school (n = 8; 16.0%), second grade (n = 5; 10.0%) and first grade (n = 4; 8.0%).

Regarding socioeconomic risk, annual household income for families in the present study ranged from $2,160 - $44,400, with a mean annual income of $17,694 ($SD$ = 10,856) and median annual income of $14,400. Nine parents in the present study declined to report their annual income. Over half of the parents in the present study were unemployed (n = 28; 56.0%) and a majority of parents had obtained a high school education or less (n = 29; 58.0%). Other relevant risk factors include exposure to Adverse Childhood Experiences (ACEs). Exposure to ACEs was assessed for both participating parents and children using the ACEs questionnaires (Felitti et al., 1998), with possible exposure ranging from 0-10 early adverse events. Parents reported they were exposed to an average of 4.88 (SD = 3.08) ACEs before age 18. Prior to study entry, parents reported

Table 1

Sociodemographic Characteristics of Sample

Variable	*N*	*M*	*SD*	Range
Child age (years)	50	4.58	1.33	3 - 7
Parent age (years)	50	32.24	6.95	18 - 64
Child ACEs	50	3.52	1.89	0 - 7
Parent ACEs	50	4.88	3.08	0 - 10
Annual household income (dollars)	41	17,694.44	10,856.58	2,160 – 44,400

Variable	*N*	Percent endorsed
Child ethnicity		
European American/White	26	52.0%
Hispanic American/Latinx	1	2.0%
Bi-/Multi-Racial	23	46.0%
Parent ethnicity		
European American/White	35	70.0%
Hispanic American/Latinx	2	4.0%
Pacific Islander	2	4.0%
Bi-/Multi-Racial	11	22.0%
Child sex		
Male	26	52.0%
Female	24	48.0%
Parent sex		
Male	2	4.0%
Female	48	96.0%

Table 1, Continued.

Variable	*N*	Percent endorsed
Child grade in school		
Not in school	8	16.0%
Preschool/Head Start	22	44.0%
Kindergarten	11	22.0%
First grade	4	8.0%
Second grade	5	10.0%
Parent education		
Partial high school	4	8.0%
Graduate high school/GED	25	50.0%
Technical/vocational certificate	7	14.0%
Associate degree/junior college	9	18.0%
Bachelor's degree	4	8.0%
Graduate degree	1	2.0%
Parent marital status		
Married	10	20.0%
Living together	6	12.0%
Separated	3	6.0%
Divorced	2	4.0%
Widowed	1	2.0%
Single	26	52.0%
Other	2	4.0%
Parent employment status		
Unemployed	28	56.0%

Table 1, Continued.

Variable	*N*	Percent endorsed
Parent employment status		
Part time temporary/seasonal	3	6.0%
Part time stable	9	18.0%
Full time temporary/seasonal	1	2.0%
Full time stable	9	18.0%

Note. ACEs stands for Adverse Childhood Experiences**.** The possible range of ACEs for both parents and children was 0-10.

their children had experienced an average of 3.52 (*SD* = 1.89) ACEs.

Procedure

Study procedures were approved by the University of Oregon and State of Oregon Department of Human Services (DHS) Institutional Review Boards. Study recruitment and assessment began in 2015. Eligible families were identified and recruited through the Oregon DHS Child Welfare and Self Sufficiency divisions.

Parents and children participated in laboratory-based biobehavioral assessments at pre-treatment and post-treatment. The post-treatment assessment occurred immediately following the completion of PCIT for intervention families. Families completed two separate visits lasting 2-3 hours at both time points. At the initial pre-treatment visit, parents received and read a written copy of the informed consent document and provided consent for themselves and their participating child. Measures were collected from both parents and children, including behavioral measures of child inhibitory control, survey measures of socio-demographic information, and parent-reported child executive function

(for further details on the assessment protocol, see Nekkanti et al., 2020). At the end of their participation in the pre-treatment assessment, each family received a sealed envelope with a letter detailing their random assignment to PCIT or the services as usual condition. Participating families were offered childcare and provided with snacks and a gift for their participating child at each visit. Parents were compensated for their time at each visit and received an additional $10 for transportation costs at each visit.

The current study includes assessment measures collected at both pre-treatment and post-treatment. During their first visit, parents completed a brief demographic interview where they reported on their and their child's age, race/ethnicity, their household income, and other key demographic characteristics. Children then completed the Head Toes Knees Shoulders task (HTKS; McClelland et al., 2014) to assess behavioral inhibition. Families returned for a second visit approximately one week following the initial visit, during which performance measures of children's inhibitory control were collected during a Zoo Go/No-Go task (Grammer et al., 2014), and parents completed standardized questionnaires, including the Behavior Rating Inventory of Executive Function (BRIEF; Gioia et al., 1996, 2000; Sherman & Brooks, 2010). To account for variations in parent literacy, all questionnaires were read aloud to parents and their answers were entered into a laptop computer by a trained research assistant. All study families repeated these procedures approximately 9 months following their pre-treatment assessment (M = 7.57; SD = 2.38 months post-study entry).

PCIT Intervention

Initially, study protocol was designed to allocate PCIT families to receive two individual motivational enhancement (ME) sessions adapted from Chaffin and

colleague's (2004) six-session group-based model only if parents reported low or moderate readiness to change. Approximately 1.5 years into study enrollment, all CAPS families randomized to receive PCIT reported high readiness to change despite demonstrating non-engagement and drop-out rates comparable to those typically reported for other parenting interventions (e.g., Danko et al., 2016; Wierzbicki & Pekarik, 1993). Thus, the intervention protocol was adapted to deliver Motivational Enhancement sessions to all families 1.5 years into study enrollment, regardless of parents' readiness to change scores. 56% (n = 28) of families in the present study participated in ME sessions, while 44% (n = 22) did not participate. Independent samples t-tests indicated there were no significant differences in the post-treatment self-regulation scores for children whose parents did versus did not participate in ME sessions [Transformed HTKS: $t(46) = 0.54$, $p = .59$; Zoo Go-No-Go dPrime: $t(43) = 1.19$, $p = .24$; BRIEF Shift: $t(44) = -0.86$, $p = .39$; BRIEF Inhibit: $t(44) = -0.17$, $p = .87$; BRIEF Emotional Control: $t(45) = -0.23$, $p = .82$]. Following ME sessions, parents participated in PCIT, starting with Child-Directed Interaction (CDI) and followed by the Parent-Directed Interaction (PDI) phase. All families were able to participate in up to 22 sessions, including 2 ME sessions, 9 total CDI sessions (including one teach session), and 11 total PDI sessions (including one teach session). Initially, a small sub-set of intervention families (n = 4), all of whom are included in the present study, were permitted to participate in more than 22 sessions. These four families participated in 9-13 CDI sessions and 13-18 PDI sessions.

PCIT was delivered to families during weekly sessions at the University of Oregon. Each phase began with a didactic 'teach' session, during which therapists met with the parent to teach and role-play the use of phase-specific skills. Following the teach

sessions, dyads participated in several coaching sessions during each treatment phase. Each coaching session began with a brief 5-10-minute check-in regarding family stressors unrelated to the child's behavior. Next, caregivers completed the Eyberg Child Behavior Inventory (ECBI; Robinson et al., 1980) to assess changes in their child's challenging behaviors across the course of treatment. Therapists then collected and reviewed the parent's homework completed since the previous session, including troubleshooting any barriers to consistent homework practice. Assessment of parents' CDI and PDI skills were conducted during 5-minute periods prior to coaching, during which the parent was asked to practice their skills independently, without therapist support. CDI coding was conducted at all CDI sessions and during some PDI sessions, and PDI coding was conducted during some PDI sessions, per PCIT International protocol. Based on their live coding, therapists then provided parents with feedback on their skill use and set specific coaching goals. Following this, a majority of each session was devoted to coaching time, during which the therapist provided the parent with live feedback regarding their skill use with their child. In some PDI sessions, depending on parent skill mastery and treatment progress, time was devoted to creating house rules, discussing strategies for implementing PDI in public settings, or practicing PDI skills with siblings, per PCIT International protocol. Coaching sessions in each phase concluded with therapists assigning homework for the family to complete prior to the next session. All intervention sessions were video-recorded, and session length and coaching time were calculated from videos.

PCIT was delivered by 8 therapists, including 6 doctoral-level graduate students, a licensed psychologist, and a social worker. All therapists were trained by master PCIT

trainers from the University of Oklahoma and received ongoing weekly remote consultation and regular live supervision of therapy sessions. Treatment integrity was assessed in two ways: Therapists completed fidelity ratings following each session and independent raters blind to family session numbers coded 15% of sessions. Out of 1,013 total PCIT sessions, including both CDI and PDI sessions, 203 (20%) were coded by independent integrity raters. The average integrity rating for these sessions was 95%, indicating therapists exhibited a high level of adherence to the PCIT treatment protocol. Of the 203 sessions coded by independent integrity raters, 42 (21%) were rated by a second independent integrity rater to assess the consistency of ratings between coders. Coders demonstrated an average inter-rater agreement of 98%.

Measures

Sociodemographic Characteristics

Parents completed a semi-structured interview, during which they reported on their age and race/ethnicity, as well as the age and race/ethnicity of their child. Parents also reported on a variety of socioeconomic factors, including household income, employment status, and educational attainment.

Dyadic Parent-Child Interaction Coding System, Fourth Edition (DPICS-IV)

Positive parenting skills, negative parenting behavior, effective commands, and command sequences were coded using the well-validated Dyadic Parent-Child Interaction Coding System, Fourth Edition (DPICS-IV; Eyberg et al., 2013). The DPICS-IV coding system categorizes parent verbalizations into one of the following categories: behavior description, reflection, labeled praise, neutral talk, unlabeled praise, question,

negative talk, direct command, or indirect command. Behavior descriptions (e.g., "You are building a tall tower!"), reflections (e.g., "You're right, that truck *is* red,"), and labeled praises (e.g., "I love the picture you colored for me,") are considered positive parenting skills. Neutral talks (e.g., "I am going to play with this car,") and unlabeled praises (e.g., "Nice job!") are considered neutral, while questions (e.g., "What are you doing?") and negative talks (e.g., "You're going too fast on your drawing, it looks messy,") are considered negative parenting behaviors. Direct commands (e.g., "Please hand me the blue block,") are encouraged during PDI as they provide clear direction to the child. Parents are taught to avoid indirect commands (e.g., "Can you hand me the blue block?" or "You can hand me the blue block,") during PDI, as they create ambiguity as to whether the child is expected to comply. All commands are avoided during CDI coaching and coding, as they put the parent in charge of the play, rather than the child. Situations in which the child is not given an adequate chance to obey their parent's command, (e.g., due to parents issuing multiple commands in a row or engaging in actions which make it impossible for the child to comply) or it is not possible to assess whether they have complied within 5 seconds of the command's issuance are categorized as commands to which the child did not have an opportunity to comply. Child compliance to commands which the child did have an opportunity to comply with is coded into one of two categories: compliance or non-compliance. Compliance occurs when a child obeys or begins to obey their parent's command within 5 seconds of the command being issued. Non-compliance occurs when the child does not obey, does not attempt to obey, or discontinues complying with their parent's command within 5 seconds of the command's issuance.

DPICS coding was completed by a team of independent coders who completed 20 hours of intensive training and continued to meet regularly to maintain inter-rated reliability. Coders were blind to family session number so as not to influence their coding of parent skill use (e.g., coders may unconsciously be more lenient in giving parents positive credit for an ambiguous parenting skill if they know the session they are observing is later on in treatment). Coding was completed both for CDI coding and PDI coding segments that occurred during the PDI phase of treatment, during which parents used their CDI or PDI skills independently with their child, without support from the therapist. Out of 718 total CDI coding segments occurring during both the CDI and PDI phase of treatment, 197 CDI coding segments (27%) were coded for reliability. Coders obtained an average inter-rater agreement of 78%. Out of 167 total PDI coding segments, 27 (16%) were coded for reliability. Coders obtained an average inter-rater agreement of 79%.

Positive Parenting Skills. Positive Parenting Skills (e.g., reflections, behavior descriptions, and labeled praises) were coded during the 5-minute PDI coding period, during which parents were instructed to utilize effective commands and follow through contingently with specific praise, a time-out warning, and implementation of time-out, if needed. Positive parenting was assessed during PDI coding in order to assess the extent to which caregivers maintained a context of warm, sensitive parenting while simultaneously effectively managing their child's behavior without support from the therapist. Consistent with PCIT International guidelines, behavior descriptions, reflections, and labeled praises were categorized as Positive Parenting Skills. Codes falling into these three categories were summed to create a count of Positive Parenting

Skills during each session where PDI coding occurred. Positive Parenting Skills for each family were also added together across sessions and averaged to create a score representing the average number of Positive Parenting Skills used by each parent over the course of PDI.

Negative Parenting Behaviors. Negative Parenting Behaviors (e.g., questions, commands, and criticisms) were assessed during the 5-minute CDI coding period, during which parents were instructed to utilize their PRIDE skills and follow their child's lead in play, without support from the therapist. Negative parenting was assessed during this period as commands are included in the 'negative' parenting category, but are appropriate and expected during the 5-minute PDI coding period. Thus, examining Negative Parenting Behavior during child-led CDI coding provides a clearer assessment of whether parents are engaging in parenting that is critical and controlling in a context where the child should have autonomy. Consistent with PCIT International guidelines, questions, direct commands, indirect commands, and negative talks were categorized as Negative Parenting Behaviors during this coding period. Codes falling into these three categories were summed to create a count of Negative Parenting Behavior during each PDI session where CDI coding occurred. Negative Parenting Behaviors were also added together and averaged across all sessions where CDI coding occurred to produce a score representing the average number of Negative Parenting Behaviors exhibited by each parent over the course of PDI.

Effective Commands. Effective commands were assessed during the 5-minute PDI coding period. Commands issued by the parent were coded as either direct commands or indirect commands. Following the issuance of a command, the child's

compliance response was coded into one of three categories: compliance, non-compliance, or no opportunity for compliance. PCIT protocol specifies that compliable commands should be direct rather than indirect. However, given that children who participate in PCIT demonstrate higher levels of compliance to both direct and indirect commands following treatment, and compliance to both types of commands has been linked to positive outcomes for children (Eyberg, 2019), both direct and indirect commands to which children had an opportunity to comply were examined in the present study. Direct or indirect commands to which the child's compliance response was coded as 'compliance' or 'non-compliance' were considered effective, compliable commands. Direct and indirect commands to which the child's compliance response was coded as 'non opportunity for compliance' were considered ineffective, non-compliable commands. Effective commands were examined as a proportion of all commands issued. The proportion of Non-Compliable Commands was calculated by dividing the number of non-compliable commands (direct and indirect) by the total number of direct (complied, non-complied, and non-compliable) plus indirect (complied, non-complied, and non-compliable) commands. The proportion of Compliable Direct Commands was calculated by dividing the number of compliable (complied and non-complied) direct commands by the total number of direct (complied, non-complied, and non-compliable) commands. The proportion of Total Compliable Commands was calculated similarly, by dividing the total number of compliable (complied and non-complied) commands (direct and indirect) by the total number of direct (complied, non-complied, and non-compliable) plus indirect (complied, non-complied, and non-compliable) commands. Thus, scores for the proportion of Non-Compliable Commands, Compliable Direct Commands, and Total

Compliable Commands were available for each session during which PDI coding occurred. The proportion of Non-Compliable Commands, Compliable Direct Commands, and Total Compliable Commands were also averaged across all PDI sessions where PDI coding occurred, resulting in scores reflecting the average proportion of Non-Compliable Commands, Compliable Direct Commands, and Total Compliable Commands issued over the course of PDI.

Command Sequences. Success of command sequences was also assessed during the 5-minute PDI coding period. Following assessment of whether a command was effective and compliable, the parent's subsequent actions were assessed to determine success of the overall command sequence. Command sequences were assessed only when the child either complied or did not comply with the original command – thus, commands to which a child did not have the opportunity to comply were excluded from further examination. In the instance of child compliance, it was assessed whether a parent delivered a labeled praise to reinforce their child's positive behavior. If a parent delivered a labeled praise in response to their child's compliance, the command sequence was categorized as successful. In the event of child non-compliance, it was assessed whether the parent issued the time-out warning. If the child obeyed the time-out warning, and the parent then issued a labeled praise in response to their child's compliance to the time-out warning, the command sequence was categorized as successful. If the child did not obey the time-out warning, it was assessed whether the parent put the child in time-out. The parent's use of the time-out procedure was assessed to determine whether they appropriately proceed through the time-out sequence, ending with the child obeying the original command. If the parent put their child in time-out, followed the appropriate time-

out sequence, and their child obeyed their original command following the time-out, the command sequence was categorized as successful. Thus, command sequences were considered successful when: 1) the parent praised their child's compliance to the original command, 2) the parent praised their child's compliance following the time-out warning, or 3) the parent placed their child in time-out, and following the time-out, the child complied with their parents' original command. In sum, sequences that start with a compliable command and end with appropriate follow-through (e.g., a labeled praise for listening or a time-out procedure ending in child compliance) are coded as successful command sequences. Sequences that start with a compliable command, do not receive a no opportunity for compliance code, and do not end with appropriate follow-through (e.g., parent forgets to praise their child's compliance, the parent should have taken their child to time-out, but did not, etc.) are coded as unsuccessful command sequences. Similar to the criteria established for effective commands, the PCIT protocol specifies that successful command sequences should begin with direct commands, rather than indirect commands. Again, given the potential utility of children also complying with their parents' indirect commands in supporting self-regulatory outcomes, successful command sequences beginning with both direct and indirect commands were examined in the present study.

In addition to the DPICS-IV coding scheme elements, the beginning and end of successful command sequences were identified using the following codes: direct command successful sequence start, direct command successful sequence end, indirect command successful sequence start, indirect command successful sequence end. Thus, successful command sequences were summed by totaling the number of successful direct

and successful indirect command sequence end codes. Unsuccessful direct and indirect command sequences did not receive corresponding sequence start or end codes. The number of unsuccessful direct command sequences was assessed by subtracting the number of successful direct command sequence end codes from the total number of compliable direct commands issued. Similarly, the number of unsuccessful total command sequences was calculated by subtracting the number of total (direct and indirect) successful command sequence end codes from the total number of compliable direct and indirect commands issued. After calculating the number of successful and unsuccessful command sequences navigated by parents, the proportion of effective commands issued by parents were examined as a proportion of all compliable commands issued. The proportion of Successful Direct Command Sequences was calculated by dividing the number of successful direct command sequences by the number of total (successful and unsuccessful) direct command sequences. Similarly, the proportion of Total Successful Command Sequences was calculated by dividing the number of total (direct and indirect) successful command sequences by the number of total (successful and unsuccessful) direct and indirect command sequences. The proportions were calculated for each session, and were also averaged across all sessions where PDI coding occurred, producing scores reflecting the average proportion of Successful Direct Command Sequences and average proportion of Total Successful Command Sequences navigated over the course of PDI.

PDI Time-Out Coding System

We developed a PDI Time-Out Coding system that enables time-ordered coding of time-out sequences during PDI intervention sessions. This coding system was

developed in consultation with our collaborators Dr. Funderburk and her team of master PCIT therapists at Oklahoma University Health and Sciences Center (OUHSC). Time-outs were coded by a team of independent coders who completed 20 hours of intensive training and continued to meet regularly to maintain inter-rater reliability. Out of 390 PDI sessions, 84 (22%) were coded for reliability. Average inter-rater agreement between coders for all sessions, including those where no time-outs occurred, was 100%. Average inter-rater reliability for sessions that were coded for reliability during which a time-out occurred (n = 21) was also high (99%), likely given that time-outs represent easily observable events with a clear start and end.

Time-outs that occurred any time during a PDI session were coded using the PDI Time-Out Coding scheme. Given that time-outs were coded throughout the PDI sessions, parents had consistent access to guidance and support from the therapist while they implemented time-outs. This stands in contrast to the other observed parenting variables, which were assessed during 5-minute periods at the outset of sessions when parents practiced their skills independently while therapist quietly observed. The time-out coding system captured the number of times during a command sequence that a child was sent to the time-out chair and back-up space, as well as the total number of time-out events. Time-out events began when the child was first seated in the time-out chair, at which time a simultaneous time-out start code was entered, and events ended with a successful or unsuccessful time-out end code. Successful time-out sequences were characterized by a child complying with their parent's original command in order to conclude a time-out. Unsuccessful time-out sequences occurred when the parent ended the time-out prematurely – for example, by issuing another command – without the child complying

with the original command, or otherwise ending the time-out before the child complied. Using time-out start and end codes, the coding system also captured the amount of time, in minutes, that a child spent in time-out during each PDI session. A child's experience in time-out may range theoretically from having no time-out experiences in any of their PDI sessions to experiencing multiple time-outs in multiple PDI sessions.

For the present study, I examined the number of and duration in successful and unsuccessful time-outs. The number of successful and unsuccessful time-outs were calculated by totaling the number of time-out sequences. Successful and unsuccessful time-outs were totaled separately, distinguished by the code concluding the time-out sequence, to produce variables summarizing the Number of Successful Time-Outs and the Number of Unsuccessful Time-Outs experienced by children in each session. To examine the total duration that children spent in time-out, the time in minutes of each time-out was summed by using the video time stamps corresponding to the initiation of a time-out and the successful or unsuccessful time-out end code. If multiple time-outs occurred in a single session, the total duration of each time-out that occurred was summed to reflect the total number of minutes a child spent in time-out during a given session. Again, successful and unsuccessful time-outs were examined separately, based on the concluding successful or unsuccessful time-out end code, to produce the Duration in Successful Time-Outs and the Duration in Unsuccessful Time-Outs experienced by children in each session. The total number and of duration in successful time-outs experienced by children were also totaled across all sessions, producing scores reflecting the total Time-Out Number and Duration in Time-Outs experienced by children over the

course of PDI. The name and operationalization of all observed parenting variables utilized in the present study are presented in Table 2.

Child Self-Regulation

The dependent variables in the present study consist of two performance-based measures of children's inhibitory control skills and one parent-report measure of children's self-regulation.

Inhibitory Control. Children completed two tasks designed to assess inhibitory control: the Head Toes Knees Shoulders task (HTKS; McClelland et al., 2014) and the Zoo Go/No-Go task (Grammer et al., 2014). The Head Toes Knees Shoulders task serves as a behavioral measure of inhibitory control. During the task, children initially receive two sets of instructions: "touch your head," and "touch your toes." After several initial non-conflict trials, children arethen instructed to do the "opposite" of what the examiner is requesting (e.g., touch their toes when instructed to touch their head). Trials grow increasingly more difficult with the examiner sequentially introducing two additional prompts ("touch your shoulders," and "touch your knees") and then changing the rules (e.g., children must touch their knees when instructed to touch their head rather than touching their toes). A total of 36 trials are presented and each trial response is scored as correct (2 points), self-correct (1 point), or incorrect (0 points). Possible scores range from 0-72, with higher scores indicating better inhibitory control. Studies indicate that higher HTKS scores correlate with greater cognitive flexibility and working memory (McClelland & Cameron, 2011). Further, HTKS is reliable and predictive of academic achievement (McClelland et al., 2007, 2014; Pointz et al., 2009).

Table 2

Name and Description of Observed Parenting Variables

Name	Coding system	Task collected	Operationalization
Positive Parenting Skills	DPICS-IV	PDI Coding	The total number of PRIDE skills (behavior descriptions, reflections, and labeled praises) used by the parent
Negative Parenting Behavior	DPICS-IV	CDI Coding	The total number of Don't skills (questions, commands, and criticisms) used by the parent
Non-Compliable Commands	DPICS-IV	PDI Coding	Proportion score representing the number of commands issued by the parent to which the child had no opportunity to comply, divided by the total number of all commands issued
Total Compliable Commands	DPICS-IV	PDI Coding	Proportion score representing the total number of commands (direct and indirect) issued by the parent to which the child had an opportunity to comply, divided by the total number of all commands issued
Compliable Direct Commands	DPICS-IV	PDI Coding	Proportion score representing the number of direct commands issued by the parent to which the child had an opportunity to comply, divided by the total number of all direct commands (compliable + non-compliable) issued

Table 2, Continued.

Name	Coding system	Task collected	Operationalization
Total Successful Command Sequences	DPICS-IV	PDI Coding	Proportion score representing the number of total command-child comply sequences successfully navigated by the parent, divided by the total number of command sequences (successfully navigated + unsuccessfully navigated) that were initiated
Successful Direct Command Sequences	DPICS-IV	PDI Coding	Proportion score representing the number of direct command-child comply sequences successfully navigated by the parent, divided by the total number of direct command sequences (successfully navigated + unsuccessfully navigated) that were initiated
Number of Successful Time-Outs	PDI Time-Out Coding	Throughout PDI Session	The average number of time-outs initiated that ended successfully (e.g., with child compliance to the original command) in a given session
Number of Unsuccessful Time-Outs	PDI Time-Out Coding	Throughout PDI Session	The average number of time-outs that ended unsuccessfully (e.g., without the child compliance to the original command) in a given session
Duration in Successful Time-Outs	PDI Time-Out Coding	Throughout PDI Session	The average duration, in minutes, of all time-outs that ended successfully in a given session

Table 2, Continued.

Name	Coding system	Task collected	Operationalization
Duration in Unsuccessful Time-Outs	PDI Time-Out Coding	Throughout PDI Session	The average duration in minutes, of all time-outs that ended unsuccessfully in a given session
Time-Out Number	PDI Time-Out Coding	Throughout PDI Session	The total number of successful time-outs experienced over the course of PDI
Duration in Time-Out	PDI Time-Out Coding	Throughout PDI Session	The total amount of time spent in successful time-outs, in minutes, over the course of PDI

Note. Positive Parenting Skills, Negative Parenting Skills, Number of Successful Time-Outs, and Number of Unsuccessful Time-Outs are presented as mean values. Duration in Successful Time-Outs and Duration in Unsuccessful Time-Outs are presented as mean values, in minutes. Variables representing commands and command sequences are presented as proportions. Time-Out Number and Duration in Time-Outs represent the total number of time-outs and duration spent in time-out (in minutes) across all PDI sessions.

The Zoo Go/No-Go Task (Zoo GNG; Grammer et al., 2014) is another performance measure of inhibitory control. Children are presented with a story about a zoo and are instructed to press a button each time a zoo animal appears in order to assist the zookeeper in catching escaped animals. After 12 initial practice trials, children are then instructed to withhold their response when they see a picture of a monkey, as they are told the monkey will help them catch the other zoo animals. Thus, the 'No-Go' trials, where children should refrain from pressing the button, are those where a monkey appears on the screen. The 'Go' trials, when children should press the button, consist of those trials where any other animal is displayed. Children then complete 12 additional practice trials, during which they practice more 'Go' trials as well as the 'No-Go' response when the picture of the monkey appears. Following these practice trials, children complete 4 blocks of the task consisting of 45 trials each, for 180 total trials. Of these 180 trials, 33% of the trials in each block are No-Go trials. Each stimulus is presented for 1200 milliseconds and children have 500 milliseconds to correctly respond to Go trials. If children fail to respond to a Go trial within the allotted time, they receive feedback in the form of an angry emoticon. They do not receive feedback for correct Go responses. For the No-Go trials, children receive feedback in the form of a smiley emoticon for correctly withheld responses and an angry emoticon for incorrectly pressing the button. All feedback images are presented for 1000 milliseconds. The main outcome of interest for the Zoo Go/No-Go Task is d' (dPrime), which is calculated by subtracting the standardized false alarm rate from the standardized hit rate (Macmillan & Creelman, 2005). The standardized hit rate represents the proportion of trials where children correctly respond to the stimulus presented by pressing the button, while the false alarm

rate represents the proportion of trials where children incorrectly respond by pressing the button to a stimulus that required them to withhold responding. Thus, dPrime serves as a sensitivity index and reflects the degree to which children can differentially respond to the two stimuli presented (Wiebe et al., 2012). Zoo GNG dPrime scores may theoretically range from -4.65 to 4.65, with higher values representing better discrimination (Wiebe et al., 2012).

Parent-Reported Child Self-Regulation. Parents reported on their children's self-regulatory abilities using the Behavior Rating Inventory of Executive Functioning (BRIEF; Gioia et al., 1996, 2000). Parents completed the BRIEF or the BRIEF-Preschool Version (BRIEF-P) depending on the age of their child. Parents with children between the ages of 5-8 completed the BRIEF, while parents with children ages 3-4 completed the BRIEF-P. Parents rated each item on a three-point frequency scale (1 = never, 2 = sometimes, 3 = often). Both the BRIEF and the BRIEF-P produce the following scales: Inhibit, Shift, and Emotional Control. The Inhibit scale measures one's ability to control impulsive behaviors, the Shift scale measures mental flexibility and the ability to transition between situations, and the Emotional Control scale measures one's ability to manage emotions. Possible raw scores ranged from 8-24 on the Shift subscale, 10-30 on the Inhibit subscale, and 10-30 on the Emotional Control subscale, with higher scores indicating greater executive functioning challenges. Raw scores were converted to T-scores, based on child age and sex, prior to analyses.

Analytic Plan

Data Screening and Preparation

Data analyses were conducted using IBM SPSS version 26.0, AMOS version 26.0, and R version 4.0.2 (Arbuckle, 2014; IBM Corp., 2019). Data were inspected to ensure assumptions for planned analyses were met. Little's test for missing completely at random (MCAR) was utilized to determine whether missing variable values meet criteria for missing completely at random. Descriptive statistics for all variables of interest and covariates were explored. Correlations between self-regulation variables and risk factors (e.g., child and parent ACEs), key demographic variables (e.g., child and parent age, ethnicity, and sex; parent education and marital status; family income), and primary study predictor variables of interest (e.g., positive parenting, negative parenting, command effectiveness, command sequence success, time-out number and duration in time-outs) were examined. Given the lack of current research on PDI in-session processes, a thorough, exploratory investigation of relationships that may exist between these processes and key self-regulation outcome variables in the present study was performed.

To address Aim 1: Characterize PDI-phase patterns of A) positive parenting, B) negative parenting, C) effective commands, D) successful command sequences, and E) number of and duration in time-outs over the course of PDI, session-by-session values of each process variable were plotted using R software to visually examine patterns of change across the course of PDI.

Linear regression analyses were utilized to address Aim 2: Examine whether parents' use of A) positive parenting, B) negative parenting, C) effective commands, D)

successful command sequences, and E) number of and duration in time-outs used in the PDI phase of PCIT impact children's post-treatment self-regulation abilities.

Given the patterns observed in the number of and duration in successful time-outs over the course of PDI, exploratory latent growth curve models within a structural equation modeling (SEM) framework were also utilized to: 1) examine linear and quadratic change in the number of and duration in time-outs children experienced over the course of PDI and 2) explore whether linear or quadratic change in the number of and duration in time-outs over the course of PDI predicted children's post-treatment self-regulation outcomes (Preacher et al., 2008). Model fit was assessed using the χ^2 fit statistic, the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). Values consistent with good fit include non-significant χ^2 values, CFI values > .95, and RMSEA values from .05 - .08 (Hu & Bentler, 1999).

CHAPTER III

RESULTS

Descriptive Statistics

Missing Data

Little's missing completely at random (MCAR) test was used to examine variables included in the present study and revealed that data met assumptions for missing at random (Little's MCAR χ^2 (499) = 531.07, p = .15).

Descriptive Statistics for Child Self-Regulation Variables

At pre-treatment, children's HTKS scores ranged from 0 – 69, with an average score of 25.3 (*SD* = 26.30). Children's post-treatment HTKS scores ranged from 0 – 72, with an average score of 35.65 (*SD* = 27.47). Children's pre-treatment dPrime scores on the Zoo GNG task ranged from -0.66 – 3.64, with an average score of 1.26 (*SD* = 1.18). Children's Zoo GNG dPrime scores at post-treatment ranged from -0.39 – 4.45, with a mean score of 1.68 (*SD* = 1.23). On the BRIEF, parents' average ratings of their child at pre-treatment on the Inhibit subscale was 61.27 (*SD* = 11.64; range: 38 – 80), 58.61 on the Shift subscale (*SD* = 10.90; range: 41 – 83), and 58.08 on the Emotional Control subscale (*SD* = 12.20; range: 36 – 89). At post-treatment, the mean score on the Inhibit subscale was 59.00 (*SD* = 11.28; range: 38 – 86), 55.89 on the Shift subscale (*SD* = 11.58; range: 40 – 84), and 52.77 on the Emotional Control Subscale (*SD* = 10.96; range: 36 – 78). Skewness and kurtosis values for all variables at each wave were found to be within normal limits (e.g., skewness: -1 – 1, kurtosis: -2 – 2). However, pre-treatment and post-treatment HTKS scores were found to exhibit a floor effect, such that a significant

proportion of scores at pre-treatment (n = 12; 25.00%) and post-treatment (n = 8; 16.67%) were found to be zeros. To correct for the observed floor effects, a value of one was first added to each HTKS at pre-treatment and post-treatment to retain values post-transformation for children who had received a score of zero. Next, a log transformation was applied to children's HTKS scores at pre-treatment and post-treatment, and the transformed variables were used in the main study analyses. Descriptive statistics for child self-regulation variables are presented in Table 3.

Table 3

Descriptive Statistics for Child Self-Regulation Variables

	Pre-treatment				Post-treatment			
Variable	*N*	*M*	*SD*	Range	*N*	*M*	*SD*	Range
HTKS	48	25.30	26.30	0 – 69	48	35.65	27.47	0 – 72
$HTKS_{log}$	48	1.01	0.73	0.00 – 1.85	48	1.24	0.70	0.00 – 1.86
Zoo Go-No-Go dPrime	46	1.26	1.18	-0.66 – 3.64	45	1.68	1.23	-0.39 – 4.45
BRIEF Inhibit	41	61.27	11.64	38 – 80	46	59.00	11.28	38 – 86
BRIEF Shift	41	58.61	10.90	41 – 83	46	55.89	11.58	40 – 84
BRIEF Emotional Control	49	58.08	12.20	36 – 89	47	52.77	10.96	36 – 78

Note. HTKS = Head Toes Knees Shoulders task. BRIEF = Behavior Rating Inventory of Executive Function. Higher scores on the HTKS and Zoo Go-No-Go dPrime tasks

indicate better inhibitory control skills. Higher scores on the BRIEF subscales indicate greater problems in that domain of executive functioning.

Descriptive Statistics for Observed Parenting Behavior

Positive Parenting Skills. In terms of Positive Parenting Skills (i.e., PRIDE skills; behavior descriptions, reflections, and labeled praises), parents used 15 of these skills, on average, during the 5-minute PDI coding period (M = 14.75; SD = 5.74; range: 4.50 – 28.00). Average Positive Parenting Skills were found to be significantly positively skewed (skewness = 1.58; SE = 0.35) and had a leptokurtic distribution (kurtosis = 4.17; SE = 0.69). Given this, a log transformation was applied to the average Positive Parenting Skills variable to correct positive skew. The transformed average Positive Parenting Skills variable was found to be within normal limits for skew and kurtosis (skewness = -0.64, SE = 0.36; kurtosis = 0.17, SE = 0.71), and was utilized in the main study analyses.

Negative Parenting Behaviors. Parents used approximately 8 Negative Parenting Behaviors (i.e., questions, commands, and criticisms), on average, during the 5-minute CDI coding period (M = 7.82; SD = 5.25; range: 0.80 – 28.33). As a reference, skills mastery for use of these negative parenting behaviors is achieved when parents employ three or fewer negative behaviors in the 5-minute CDI coding period. Thus, the average number of Negative Parenting Behaviors observed sample-wide was above that cut-off score.

Effective Commands. The quality of parents' command use during the 5-minute PDI coding segments was operationalized in three ways. The proportion of Non-Compliable Commands was calculated by dividing the number of non-compliable

commands (direct and indirect) by the total number of direct (complied, non-complied, and non-compliable) plus indirect (complied, non-complied, and non-compliable) commands. The proportion of Compliable Direct Commands was calculated by dividing the number of compliable (complied and non-complied) direct commands by the total number of direct (complied, non-complied, and non-compliable) commands. The proportion of Total Compliable Commands was calculated similarly, by dividing the total number of compliable (complied and non-complied) commands (direct and indirect) by the total number of direct (complied, non-complied, and non-compliable) plus indirect (complied, non-complied, and non-compliable) commands. The proportion of Non-Compliable Commands, Compliable Direct Commands, and Total Compliable Commands were averaged across all PDI sessions where PDI coding occurred, resulting in scores reflecting the average proportion of Non-Compliable Commands, Compliable Direct Commands, and Total Compliable Commands issued over the course of PDI by each parent. The proportion of Non-Compliable Commands composed roughly a third of all commands issued to children during PDI phase sessions (M = 0.31; SD = 0.16; range: 0.00 – 0.75). The remaining two thirds of commands issued by parents constituted compliable commands, either in the form of direct or indirect commands. The proportion of Total Compliable Commands (i.e., direct + indirect commands) issued by parents over the course of treatment was 0.69 (SD = 0.16; range: 0.25 – 1.00). Compliable Direct Commands comprised over three fourths (76.8%) of all compliable commands, and just over half of all commands (compliable or non-compliable) issued by parents (M = 0.53; SD = 0.20; range: 0.00 – 0.88).

Command Sequences. Command sequences were considered successful when: 1) the parent praised their child's compliance to the original command, 2) the parent praised their child's compliance following the time-out warning, or 3) the parent placed their child in time-out, and following the time-out, the child complied with their parents' original command. Sequences that started with a compliable command, provided the child with an opportunity for compliance, and did not end with appropriate follow-through were coded as unsuccessful command sequences. Proportions were averaged across all sessions where PDI coding occurred, producing scores reflecting the average proportion of Successful Direct Command Sequences and average proportion of Total Successful Command Sequences navigated over the course of PDI. Out of all command sequences initiated with a direct or indirect command during PDI coding, slightly more than half were found to be successful (e.g., Total Successful Command Sequences; M = 0.55; SD = 0.27; range: 0.00 – 1.00). When considering only those command sequences initiated with a direct command, the rate of Successful Direct Command Sequences was slightly higher, with around 60% of direct commands issued ending with appropriate parent follow-through (M = 0.61; SD = 0.27; range: 0.00 – 1.00).

Time-Out Variables. Variables assessing the number of and duration in successful and unsuccessful time-outs were first examined in a sessions-by-session manner for the first 10 sessions of PDI. Next, the number of and duration in successful and unsuccessful time-outs were summed across all PDI sessions, consistent with characterizations of the other PDI parenting process variables.

Number of and Duration in Unsuccessful Time-Outs. Unsuccessful time-outs were relatively rare events, with only seven unsuccessful time-outs occurring over the

course of treatment within the entire sample. Only five families experienced an unsuccessful time-out and the majority occurred in earlier PDI sessions. One child experienced three unsuccessful time-outs across all PDI sessions: two in Session 2 (total duration: 13.28 minutes) and one in Session 4 (duration: 3.42 minutes). The remaining four families each experienced a single unsuccessful time-out. These occurred during Session 1 (18.62 minutes), Session 2 (14.31 minutes), Session 3 (3.46 minutes), and Session 9 (2.31 minutes). No other children in the sample experienced an unsuccessful time-out during PDI session coaching. Four different therapists were assigned to families who experienced unsuccessful time-outs during treatment.

Number of Successful Time-Outs. Throughout PDI, the percentage of children who did not experience *any* time-outs in a given session was relatively high. The percentage of children who did not experience any time-outs in a given session ranged from 51.06% in Session 1, to 85.37% in Session 5. Over the course of treatment, 42 children experienced at least one successful time-out. The number of total successful time-outs experienced over the course of PDI ranged from 1-15. Half of all children experienced one or more successful time-outs in Session 1 (49%). The number of children who experienced a time-out in session gradually decreased over the course of PDI, with the lowest proportion of children going to time-out in Session 5 (15%). Following Session 5, few children experienced a time-out in remaining PDI sessions (i.e., 24% in Session 8 to 17% in Session 10).

Three was the maximum number of successful time-outs experienced for a child in a single session. Experiencing three time-outs in a single session was a relatively rare event and was most common in Session 3 (n = 4 children). One child experienced three

successful time-outs in Session 1 (2%) and one child experienced three successful time-outs in Session 9 (5%). Experiencing two successful time-outs in a single session was also relatively rare, with the most children experiencing two successful time-outs in Session 1 (11%). Again, the likelihood of experiencing two successful time-outs gradually decreased over the course of treatment, with no children experiencing two successful time-outs during Sessions 9 or 10. Experiencing a single successful time out was more common, particularly during the first four PDI sessions. 36% of children experienced a single successful time-out during the first session, 27% during the second session, 27% during the third session, and 33% during the fourth session. Experiencing a time-out grew less common over the course of treatment following Session 4, with less than a quarter (14-21%) of children going to time-out during Sessions 6 to 10. Only 3 children experienced a time-out in PDI Session 9 (14%) or Session 10 (17%). The sample-wide means for the number of Successful Time-Outs occurring in each session declined over time as well. The average Number of Successful Time-Outs was 0.64 for the full sample during Session 1. The average Number of Successful Time-Outs for the full sample ranged from 0.39-0.64 for Sessions 2-4. By Session 5, the average Number of Successful Time-Outs for the full sample dropped to 0.15, and remained relatively low (0.17 – 0.29) from Sessions 6-10. Next, the length of time children spent in time-out was explored.

Duration in Successful Time-Outs. The average Duration in Successful Time-Out, in minutes, was highest during Session 1 (9.32 minutes) and declined over the course of treatment. Average time spent in Successful Time-Outs ranged from 9.32 – 4.32 minutes during Sessions 1-4. However, for sessions 5-10, the average Duration in

Successful Time-Outs ranged from 1.70 – 4.32 minutes. Average Duration in Successful Time-Outs was the shortest in Session 7 (1.70 minutes) followed by Session 5 (1.84 minutes). Descriptive statistics for the frequency of successful and unsuccessful time-outs for PDI sessions 1-10 are presented in Table 4. Descriptive statistics for the average number of and average duration in successful and unsuccessful time-outs for PDI sessions 1-10 are reported in Table 5.

Time-Out Summary Variables. Time-outs were also examined by summarizing the total number of and duration in successful time-outs over the course of PDI. To characterize successful time-out sequences, the total Number of Successful Time-Outs (M = 2.82; SD = 2.93; range: 0.00 – 15.00), the total Duration in Successful Time-Outs (M = 32.57; SD = 41.24; range: 0.00 – 189.22), and the Average Duration in Successful Time-Outs (Total number of successful time-outs divided by the total time spent in successful time-outs; M = 10.02; SD = 7.16; range: 0.00 – 31.01) were examined. The total Number of Unsuccessful Time-Outs (M = 0.14; SD = 0.50; range: 0.00 – 3.00) and Duration in Unsuccessful Time-Outs (M = 1.13; SD = 4.04; range: 0.00 – 18.62) were also examined, but due to the low base rate of these events (n = 7) and the fact that they occurred in only five families, they were not included in any remaining models examining the impact of time-out experience on children's self-regulation abilities. Because unsuccessful time-outs were dropped from subsequent analyses, the term 'successful' will be dropped as a descriptor, and summary variables for successful time-outs will be referred to as 'Time-Out Number' and 'Duration in Time-Outs'.

Time-Out Number (skewness = 2.11; SE = 0.34), Duration in Time-Outs (skewness = 2.11; SE = 0.34), and Average Duration in Time-Outs (skewness = 1.04;

Table 4

Frequency of Successful and Unsuccessful Time-Outs for PDI Sessions 1-10

	Number of Time-Outs							
	0		1		2		3	
Session number (*n*)	*n*	*%*	*n*	%	*n*	*%*	*n*	%
Successful Time-Outs								
Session 1 (47)	24	51.06%	17	36.17%	5	10.64%	1	2.13%
Session 2 (49)	33	67.35%	13	26.53%	3	6.12%	0	0.00%
Session 3 (44)	26	59.09%	12	27.27%	2	4.55%	4	9.09%
Session 4 (43)	26	60.47%	14	32.56%	3	6.98%	0	0.00%
Session 5 (41)	35	85.37%	6	14.63%	0	0.00%	0	0.00%
Session 6 (38)	29	76.32%	8	21.05%	1	2.63%	0	0.00%
Session 7 (31)	25	80.65%	5	16.13%	1	3.23%	0	0.00%
Session 8 (33)	25	75.76%	7	21.21%	1	3.03%	0	0.00%
Session 9 (21)	17	80.95%	3	14.29%	0	0.00%	1	4.76%
Session 10 (18)	15	83.33%	3	16.67%	0	0.00%	0	0.00%
Unsuccessful Time-Outs								
Session 1 (47)	46	97.87%	1	2.13%	0	0.00%	0	0.00%
Session 2 (49)	47	95.92%	1	2.04%	1	2.04%	0	0.00%
Session 3 (44)	43	97.73%	1	2.27%	0	0.00%	0	0.00%
Session 4 (43)	42	97.67%	1	2.33%	0	0.00%	0	0.00%
Session 5 (41)	41	100.00%	0	0.00%	0	0.00%	0	0.00%
Session 6 (38)	38	100.00%	0	0.00%	0	0.00%	0	0.00%

Table 4, Continued.

	Number of Time-Outs							
	0		1		2		3	
Session number (*n*)	*n*	*%*	*n*	%	*n*	*%*	*n*	%
Session 7 (31)	31	100.00%	0	0.00%	0	0.00%	0	0.00%
Session 8 (33)	33	100.00%	0	0.00%	0	0.00%	0	0.00%
Session 9 (21)	20	95.24%	1	4.76%	0	0.00%	0	0.00%
Session 10 (18)	18	100.00%	0	0.00%	0	0.00%	0	0.00%

Note. The *n* following each session number in the first column represents the number of families with coded time-out data from each respective session. The *n* and percentage values in each respective column represent the number and percentage of children who experienced 0, 1, 2, and 3 successful or unsuccessful time-outs in each session. Only five families experienced unsuccessful time-outs over the course of PDI.

SE = 0.35) were significantly positively skewed. Time-Out Number (kurtosis = 5.72; *SE* = 0.67) and Duration in Time-Outs (kurtosis = 4.76; *SE* = 0.67) were also found to be leptokurtic in their distribution. To correct for skew and kurtosis, a value of one was first added to each score for the number of, duration in, and average duration in time-outs to retain values of zero post-transformation for families who did not experience any time-outs over the course of treatment. Next, a log transformation was applied to the number of, duration in, and average duration in time-outs to correct positive skew. The transformed variables for Time-Out Number (skewness = 0.16, *SE* = 0.34; kurtosis = -0.20, *SE* = 0.67) and Duration in Time-Outs (skewness = -0.49, *SE* = 0.34; kurtosis = -0.54, *SE* = 0.67) were found to be within normal limits for skew and kurtosis. These transformed variables were used in the main study analyses. The transformed Average

Table 5

Average Number of and Duration in Successful and Unsuccessful Time-Outs for PDI Sessions 1-10

	Number of Time-Outs				Duration in Time-Outs			
Variable	*N*	*M*	*SD*	Range	*N*	*M*	*SD*	Range
Successful Time-Outs								
Session 1	47	0.64	0.76	0 – 3	47	9.32	15.26	0.00 – 63.40
Session 2	49	0.39	0.61	0 – 2	49	4.73	9.26	0.00 – 36.86
Session 3	44	0.64	0.94	0 – 3	44	4.32	6.58	0.00 – 22.70
Session 4	43	0.47	0.63	0 – 2	43	5.17	9.23	0.00 – 45.43
Session 5	41	0.15	0.36	0 – 1	41	1.84	5.63	0.00 – 29.37
Session 6	38	0.26	0.50	0 – 2	38	4.32	15.35	0.00 – 90.31
Session 7	31	0.23	0.50	0 – 2	31	1.70	4.18	0.00 – 15.81
Session 8	33	0.27	0.52	0 – 2	33	4.01	9.82	0.00 – 40.78
Session 9	21	0.29	0.72	0 – 3	21	2.06	4.51	0.00 – 15.18
Session 10	18	0.17	0.38	0 – 1	18	2.56	6.90	0.00 – 23.83
Unsuccessful Time-Outs								
Session 1	47	.02	.15	0 – 1	47	0.40	2.72	0.00 – 18.62
Session 2	49	.06	.32	0 – 2	49	0.56	2.76	0.00 – 14.31
Session 3	44	.02	.15	0 – 1	44	0.08	0.52	0.00 – 3.46
Session 4	43	.02	.15	9 – 0	43	0.08	0.52	0.00 – 3.42
Session 5	41	.00	.00	0 – 0	41	0.00	0.00	0.00 – 0.00
Session 6	38	.00	.00	0 – 0	38	0.00	0.00	0.00 – 0.00

Table 5, Continued.

	Number of Time-Outs				Duration in Time-Outs			
Variable	*N*	*M*	*SD*	Range	*N*	*M*	*SD*	Range
Unsuccessful Time-Outs								
Session 7	31	.00	.00	0 – 0	31	0.00	0.00	0.00 – 0.00
Session 8	33	.00	.00	0 – 0	33	0.00	0.00	0.00 – 0.00
Session 9	21	.11	.50	0 – 1	21	0.11	0.50	0.00 – 2.31
Session 10	18	.00	.00	0 – 0	18	0.00	0.00	0.00 – 0.00

Note. Number of Time-Outs is the average number of time-outs in a given session, including zeros. Duration in Time-outs is the average duration (in minutes) of time spent in time-out in given session, including zeros.

Duration in Time-outs variable (skewness = -1.06, *SE* = 0.35; kurtosis = 1.62, *SE* = 0.70) was significantly negatively skewed and leptokurtic, so was dropped from subsequent analyses given that the two key components of this variable are reflected by the total number and total duration in time-outs. Descriptive statistics for summary observed parenting variables are presented in Table 6.

Characterizing Associations Between Sociodemographic Characteristics, Child Self-Regulation, and Observed Parenting

Prior to conducting the main analyses, bivariate correlations were examined among child self-regulation variables and potential covariates, including child and parent age, child and parent ACEs, and family income. Correlations between the same covariates and observed parenting variables also were explored. Independent t-tests then were conducted to examine child sex differences in child self-regulation variables and

Table 6

Descriptive Statistics for Observed Parenting Variables

Variable	Sample *N*	*M*	*SD*	Range
Parenting variables assessed during CDI coding				
Negative parenting behavior	46	7.82	5.25	0.80 – 28.33
Parenting variables assessed during PDI coding				
Positive parenting skills	43	14.75	5.74	4.50 – 28.00
Parenting variables assessed during PDI coding				
Transformed positive parenting skills	43	1.13	0.19	0.65 – 1.45
Non-compliable commands	43	0.31	0.16	0.00 – 0.75
Total compliable commands	43	0.69	0.16	0.25 – 1.00
Compliable direct commands	43	0.53	0.20	0.00 – 0.88
Total successful command sequences	43	0.55	0.27	0.00 – 1.00
Successful direct command sequences	41	0.61	0.27	0.00 – 1.00
Time-out variables assessed during PDI session coaching				
Number of successful time-outs	49	2.82	2.93	0.00 – 15.00
Transformed number of successful time-outs	49	0.48	0.29	0.00 – 1.20
Duration in successful time-outs	49	32.57	41.24	0.00 – 189.22

Table 6, Continued.

Variable	Sample *N*	*M*	*SD*	Range
Transformed duration in successful time-outs	49	1.17	0.64	0.00 – 2.28
Average duration in successful time-outs	45	10.02	7.16	0.00 – 31.01
Transformed average duration in successful time-outs	45	0.93	0.35	0.00 – 1.51
Number of unsuccessful time-outs	49	0.14	0.50	0.00 – 3.00
Average duration in unsuccessful time-outs	49	1.13	4.04	0.00 – 18.62

Note. Sample N reflects the number of dyads for whom data summarizing each observed parenting variable was available. Average negative parenting skills, average positive parenting skills, number of successful time-outs, and number of unsuccessful time-outs are presented as mean values. Duration in successful and unsuccessful time-outs are presented as mean values, in minutes. Variables representing commands and command sequences are presented as proportions.

observed parenting variables. Given the small number of fathers included in the present study ($n = 2$), differences in child self-regulation and observed parenting variables related to parent sex were not examined.

Associations Between Sociodemographic Characteristics and Child Self-Regulation. Child age and sex at pre-treatment were found to be significantly associated with several key self-regulation variables. As expected, child age was positively associated with performance on the HTKS task at pre-treatment [$r(48) = 0.68$, $p < .001$]

and post-treatment [$r(48) = 0.60$, $p < .001$], as well as Zoo GNG dPrime scores at pre-treatment [$r(46) = 0.67$, $p < .001$] and post-treatment [$r(45) = .49$, $p = .001$], with older children obtaining significantly higher scores on both tasks at each time point. Notably, child age was not related to any of the parent-reported BRIEF scales at pre-treatment or post-treatment. With respect to child sex, boys were found to have significantly higher scores on the post-treatment BRIEF Shift subscale ($M = 59.57$) compared to girls [$M = 52.22$; $t(44) = 2.25$, $p = .03$], indicating greater difficulties with self-regulation related to cognitive flexibility and transitions. No additional sex-based differences in child self-regulation variables were identified.

Parent age was also significantly associated with several child self-regulation variables. Specifically, parent age at pre-treatment was significantly associated with children's HTKS scores at post-treatment ($r(48) = 0.31$, $p = .03$), with the children of older parents scoring higher, indicating better inhibitory control. Additionally, older parents reported more regulation difficulties for their child on the Shift subscale of the BRIEF at post-treatment, [$r(46) = .33$ $p = .02$]. These associations are particularly notable, given child age was not significantly associated with parent age [$r(50) = .06$ $p = .68$]. This suggests associations between parent age and child self-regulatory outcomes are not reflective of older parents being likely to have older children.

Child ACE scores were significantly associated with their BRIEF Emotional Control scores at pre-treatment [$r(49) = 0.33$, $p = .02$], such that children exposed to more early adverse experiences were reported to have more difficulties with emotional control. Child ACEs were unrelated to other self-regulation scores. Parent ACE scores were significantly associated with their child's BRIEF Inhibit scores at pre-treatment [$r(41) =$

0.31, $p < .05$], such that parents who reported experiencing more adverse experiences in their own childhoods rated their child as having greater problems with behavioral inhibition at study entry. Family income was not significantly associated with any of the child self-regulation scores.

Most pre- and post-treatment scores on the child self-regulation measures were correlated. As anticipated, pre-treatment self-regulation scores were significantly positively associated with post-treatment scores on the HTKS [$r(46) = 0.69$, $p < .001$], Zoo GNG dPrime [$r(42) = 0.79$, $p < .001$], the BRIEF Inhibit subscale [$r(37) = 0.72$, $p < .001$], the BRIEF Shift subscale [$r(37) = 0.63$, $p < .001$], and the BRIEF Emotional Control subscale [$r(46) = 0.63$, $p < .001$]. Children with higher scores at pre-treatment demonstrated higher scores at post-treatment on the same measure. Bivariate correlations among demographic characteristics and child self-regulation variables are reported in Table 7.

Associations Between Sociodemographic Characteristics and Observed Parenting. Child age was also found to be significantly associated with several of the observed parenting process variables. Specifically, child age was found to be significantly associated with Time-Out Number [$r(49) = -0.35$, $p = .01$] and Duration in Time-Outs [$r(49) = -0.30$, $p = .04$], such that younger children spent more time in time-outs and experienced more time-outs across treatment compared to older children. However, independent samples *t*-tests revealed no significant differences in observed parenting variables based on child sex.

Parent age was associated with a number of parenting process variables, including the proportion of Compliable Direct Commands [$r(43) = -0.39$, $p = .01$], the proportion of

Table 7

Bivariate Correlations Among Demographic Characteristics and Child Self-Regulation Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Child age														
2. Parent age	.06													
3. Child ACEs	.06	.01												
4. Parent ACEs	.08	-.09	.16											
5. Income	-.10	.17	-.09	-.13										
6. Pre-Treatment $HTKS_{log}$	.68**	.11	.03	.06	-.06									
7. Post-Treatment $HTKS_{log}$	.60**	.31*	.00	-.09	-.08	.69**								
8. Pre-Treatment Zoo Go-No-Go dPrime	.67**	.22	.06	-.14	.02	.81**	.71**							
9. Post-Treatment Zoo Go-No-Go dPrime	.49**	.20	.06	.05	-.10	.56**	.62**	.79**						
10. Pre-Treatment BRIEF Inhibit	-.16	.21	.12	.31*	.06	-.13	-.23	-.24	-.29					

Table 7, Continued.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
11. Post-Treatment BRIEF Inhibit	-.18	.10	.04	.24	-.09	-.30*	-.35*	-.33*	-.26	.72**				
12. Pre-Treatment BRIEF Shift	.01	.19	.30	.04	-.25	-.02	-.02	.03	-.02	.43**	.50**			
13. Post-Treatment BRIEF Shift	-.07	.33*	.13	-.04	-.02	-.17	-.24	-.09	-.08	.41*	.65**	.63**		
14. Pre-Treatment BRIEF Emotional Control	.06	.24	.33*	.12	-.22	-.04	-.15	-.10	-.15	.66**	.54**	.67**	.65**	
15. Post-Treatment BRIEF Emotional Control	-.04	.14	.21	.13	-.25	-.21	-.23	-.26	-.09	.44**	.71**	.61**	.70**	.63**

Note. ACEs = Adverse Childhood Experiences, HTKS = Head Toes Knees Shoulders task. BRIEF = Behavior Rating Inventory of Executive Function. Higher scores on the HTKS task and Zoo Go-No-Go dPrime indicate better inhibitory control skills. Higher scores on the BRIEF subscales indicate greater problems with executive functioning. * $p < .05$, ** $p < .001$.

Total Compliable Commands [$r(43) = -0.43$, $p = .004$], and the proportion of Non-Compliable Commands [$r(43) = 0.43$, $p = .004$] issued by parents. Specifically, younger parents were more likely to issue higher proportions of successful direct and total commands, and less likely to issue commands that were non-compliable, than were older parents. Further, parent age was found to be strongly associated with the proportion of Successful Direct Command Sequences [$r(41) = -0.50$, $p < .001$] and the proportion of Total Successful Command Sequences [$r(43) = -0.42$, $p = .005$] navigated by parents, such that younger parents navigated a higher proportion of direct and total command sequences successfully over the course of treatment. Overall, these associations represent a pattern of older parents exhibiting weaker PDI-specific skills in contexts where they are asked to practice skills without therapist support (e.g., during PDI coding). Notably, there were no parent age-based differences in the number of or duration in time-outs implemented during PDI sessions, during which parents had consistent access to support from their therapist to navigate command-child compliance skills practice via active therapist coaching.

There were also several significant associations among the observed parenting variables. Specifically, parents who issued a higher proportion of Compliable Direct Commands to their children also exhibited fewer Negative Parenting Behaviors over the course of treatment [$r(41) = -0.33$, $p = .03$]. Additionally, parents who exhibited a higher proportion of Successful Direct Command Sequences also displayed higher average Positive Parenting Skills [$r(41) = 0.50$, $p = .001$] and fewer Negative Parenting Behaviors [$r(39) = -0.54$, $p < .001$]. Similarly, parents who navigated a higher proportion of Total Successful Command Sequences also displayed more Positive Parenting Skills [$r(43) =$

0.41, $p = .006$] and fewer Negative Parenting Behavior, on average [$r(41) = -0.48$, $p = .002$]. Bivariate correlations among demographic characteristics and observed parenting variables are presented in Table 8.

Associations Between Child Self-Regulation and Observed Parenting. Several significant associations were identified between observed parenting variables and self-regulation outcomes for children. An inverse association was found between the number of time-outs children received during treatment and the children's HTKS pre-treatment [$r(47) = -0.31$, $p = .04$] and post-treatment scores [$r(47) = -0.51$, $p < .001$], as well as Zoo GNG dPrime pre-treatment [$r(45) = -0.50$, $p < .001$] and post-treatment [$r(44) = -0.39$, $p = .01$] scores. Children who demonstrated higher scores (e.g., better self-regulation) at pre-treatment and post-treatment for both tasks experienced fewer time-outs over the course of PDI. Similarly, Duration in Time-Outs was inversely associated with Zoo GNG dPrime scores at pre-treatment [$r(45) = -0.45$, $p = .002$] and post-treatment [$r(44) = -0.38$, $p = .01$], as well as HTKS scores at post-treatment [$r(47) = -0.43$, $p = .002$], suggesting that children who demonstrated better scores on Zoo GNG dPrime at pre-treatment and post-treatment and on the HTKS task at post-treatment spent less time in time-out over the course of PDI. Time-Out Number [$r(45) = 0.45$, $p = .002$] and Duration in Time-Outs [$r(45) = 0.47$, $p = .001$] were also associated with children's post-treatment BRIEF Inhibit scores, such that children who experienced more frequent and longer time-outs were rated to have more difficulties with self-regulation on the Inhibit subscale at post-treatment. Positive Parenting Skills were found to be inversely associated with post-treatment HTKS scores [$r(42) = -0.31$, $p < .05$], such that children of parents who used more Positive Parenting Skills over the course of PDI exhibited lower post-treatment

Table 8

Bivariate Correlations Among Demographic Characteristics and Observed Parenting Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Child age													
2. Parent age	.06												
3. Child ACEs	.06	.01											
4. Parent ACEs	.08	-.09	.16										
5. Income	-.10	.17	-.09	-.13									
6. Positive parenting $skills_{log}$	-.15	-.13	-.05	-.23	-.06								
7. Negative parenting behavior	-.03	.23	-.21	.10	-.04	-.26							
8. Non-compliable commands	.18	.43**	-.10	-.06	-.04	-.02	.25						
9. Total compliable commands	-.18	-.43**	.10	.06	.04	-.02	-.25	-1.00**					
10. Compliable direct commands	-.12	-.39*	-.01	-.12	.11	.26	-.33*	-.60**	.60**				
11. Total successful command sequences	-.08	-.42**	.03	-.18	.15	.41**	-.48**	-.36**	.36*	.72**			
12. Successful direct command sequences	-.09	-.50**	.07	-.20	.13	.50**	-.54**	-.43**	.43**	.54**	.96**		

Table 8, Continued.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
13. Time-out number$_{log}$	-.35*	-.14	-.02	.04	-.02	.17	-.02	.11	-.11	.12	.33*	.27	
14. Duration in time-outs$_{log}$	-.30*	-.07	-.07	-.05	-.08	.20	.04	.11	-.11	.13	.30	.21	.92**

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

HTKS scores. No significant associations were identified between the command-based variables (e.g., proportions of compliable commands and successful command sequences) or parents' use of Negative Parenting Behaviors and children's self-regulation outcomes. Bivariate correlations among observed parenting variables and child self-regulation variables are presented in Table 9.

Retained Covariates

Retained covariates included child age, child sex, parent age, and pre-treatment child self-regulation scores. Child age was retained as a covariate for all analyses given research indicating children's self-regulation abilities drastically improve with age, particularly throughout the preschool years and early childhood (Kochanska et al., 2001). Parent age was retained for models where HTKS and the BRIEF Shift score were outcomes of interest, and child sex was retained as a covariate in models examining the BRIEF Shift score as an outcome. Pre-treatment HTKS, Zoo GNG dPrime, BRIEF Shift, BRIEF Inhibit, and BRIEF Emotional Control subscale scores were retained as covariates for analyses examining the same respective score at post-treatment as an outcome.

Main Analyses

Aim 1: Characterizing Patterns of PDI-Phase Parenting Processes

To explore Aim 1, session-by-session Positive Parenting Skills, Negative Parenting Behavior, effective Commands (Non-Compliable Commands, Total Compliable Commands, and Compliable Direct Commands), command Sequences (Total Command Sequences and Direct Command Sequences), Time-Out Number, and Duration in Time-Outs were plotted using R software to visually examine patterns of

Table 9

Bivariate Correlations Among Observed Parenting Variables and Child Self-Regulation Variables

Variable	Pre-tx $HTKS_{log}$	Post-tx $HTKS_{log}$	Pre-tx Zoo Go-No-Go dPrime	Post-tx Zoo Go-No-Go dPrime	Pre-tx BRIEF Inhibit	Post-tx BRIEF Inhibit	Pre-tx BRIEF Shift	Post-tx BRIEF Shift	Pre-tx BRIEF Emotional Control	Post-tx BRIEF Emotional Control
Positive parenting $skills_{log}$	-.14	-.31*	-.12	-.15	.00	.08	.17	.22	-.03	.07
Negative parenting behavior	-.11	.09	-.15	.15	.12	.08	-.07	.05	.00	.07
Non-compliable commands	.03	.05	.13	.15	-.08	.00	-.29	.03	-.11	-.11
Total compliable commands	-.03	-.05	-.13	-.15	.08	.00	.29	-.03	.11	.11
Compliable direct commands	-.20	-.20	-.18	-.19	.10	.19	.23	.05	.19	.20
Total successful command sequences	-.11	-.29	-.08	-.09	-.12	.05	.07	.08	.05	.00
Successful direct command sequences	.03	-.25	.08	.00	-.15	-.06	-.03	.01	-.09	-.14
Time-out $number_{log}$	-.31*	-.51**	-.50**	-.39**	.23	.45**	-.06	.27	.18	.24
Duration in $time\text{-}outs_{log}$	-.26	-.43**	-.45**	-.38*	.30	.47**	.02	.28	.20	.22

Note. HTKS = Head Toes Knees Shoulders task. BRIEF = Behavior Rating Inventory of Executive Function, Pre-tx = pre-treatment, Post-tx = post-treatment. Higher scores on the HTKS task and Zoo Go-No-Go dPrime indicate better inhibitory control skills. Higher scores on the BRIEF subscales indicate greater executive functioning challenges. * $p < .05$, ** $p < .001$

change across the course of PDI.

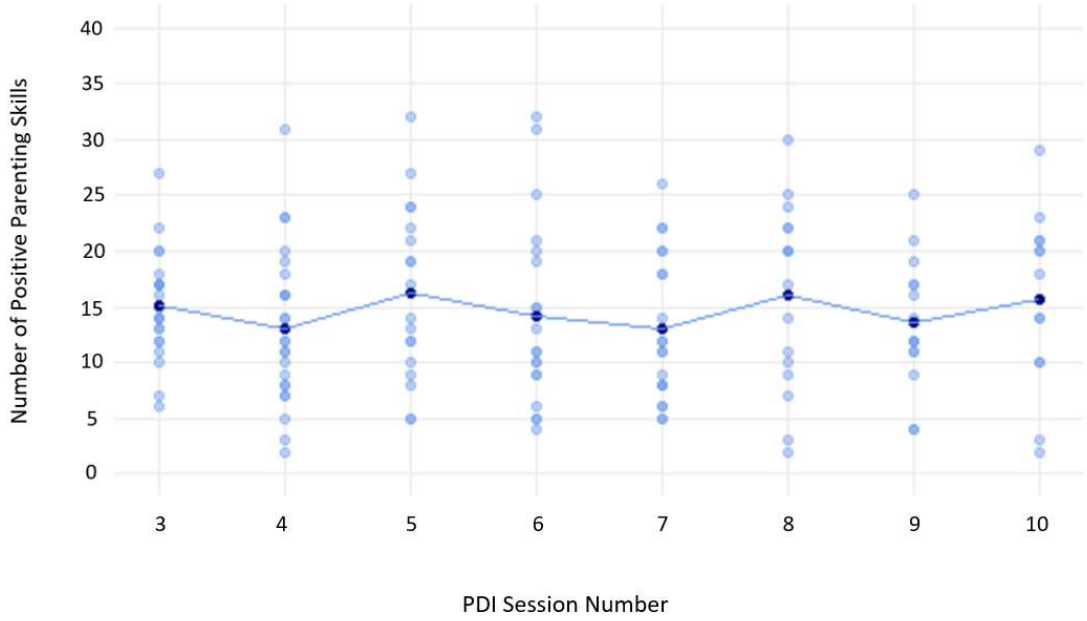
Positive Parenting Skills. First, parents' use of Positive Parenting Skills was plotted over the course of PDI. Positive parenting skills are the main focus of the CDI phase of treatment but remain an important focus during PDI, as parents are asked to continue to use their Positive Parenting Skills between commands. Positive Parenting Skills were assessed during the PDI coding portion of the session, and thus were plotted for session 3-10, as Session 3 is the earliest session during which therapists complete PDI coding. Positive Parenting Skills were shown to have a relatively stable trajectory over the course of treatment, with parents demonstrating an average of approximately 15 skills (range: 12-17) during each session. There was considerable variation in parents' use of Positive Parenting Skills. Across treatment, the number of Positive Parenting Skills within 1 standard deviation of the mean ranged from approximately 5 – 25. The number of Positive Parenting Skills for PDI Sessions 3-10 are depicted in Figure 1.

Negative Parenting Behaviors. Next, parents' use of Negative Parenting Behaviors was plotted across the course of treatment. Negative Parenting Behaviors were assessed during the CDI coding portion of the session. CDI coding during the PDI phase of treatment begins during Session 2, at the earliest, so trajectories of Negative Parenting Behaviors were plotted for sessions 2-10. Negative Parenting Behaviors were shown to have a relatively stable trajectory over the course of treatment, with parents demonstrating an average of approximately 8 behaviors (range: 6-10) during each session. There was considerable variation in parents' use of Negative Parenting Behaviors. Across treatment, the number of Negative Parenting Behaviors within 1

standard deviation of the mean ranged from approximately 0 – 17. The number of Negative Parenting Behaviors for PDI Sessions 2-10 are depicted in Figure 2.

Figure 1

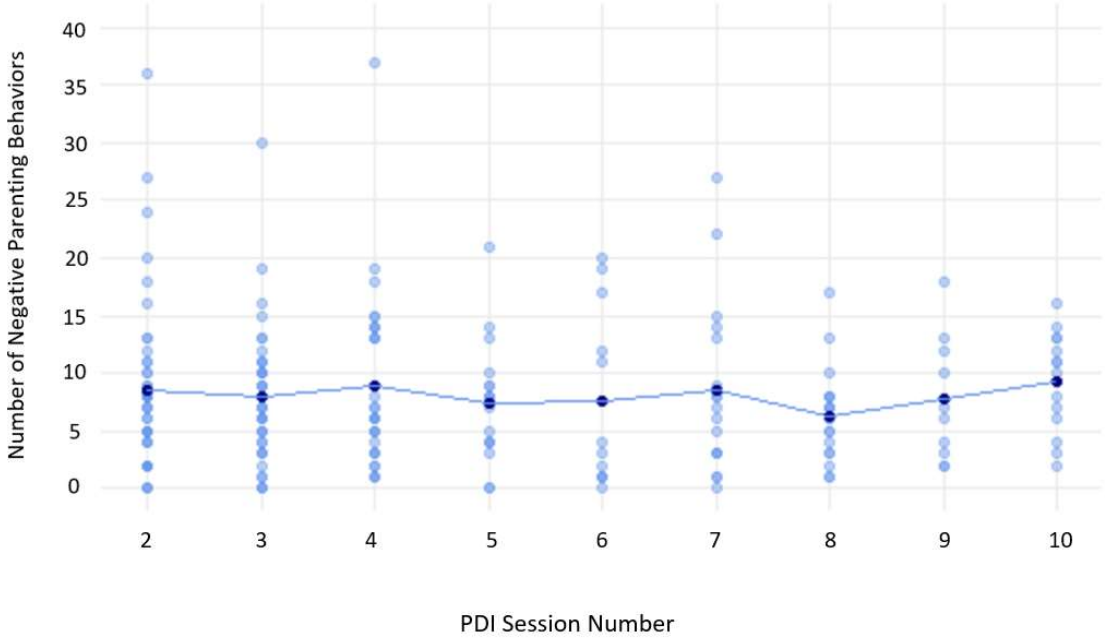
Number of Positive Parenting Skills by PDI Session



Note. Positive Parenting Skills include the total number of behavior descriptions, reflections, and labeled praises used by the parent during the 5-minute PDI coding period. Mean scores are represented by navy blue dots. Dots surrounding the mean score represent the number of Positive Parenting Skills demonstrated by each parent during each session, with darker dots representing multiple overlapping scores.

Figure 2

Number of Negative Parenting Behaviors by PDI Session



Note. Negative Parenting Behaviors include the total number of questions, commands, and criticisms used by the parent during the 5-minute CDI coding period. Mean scores are represented by navy blue dots. Dots surrounding the mean score represent the number of Negative Parenting Behaviors demonstrated by each parent during each session, with darker dots representing multiple overlapping scores.

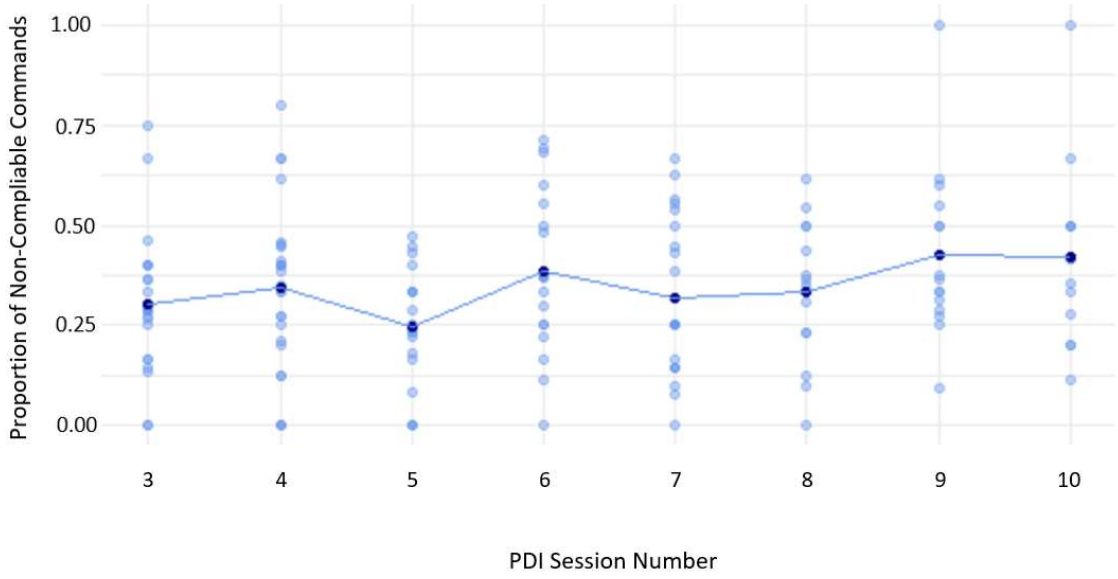
Effective Commands. Next, parents' use of effective commands, including the proportion of Non-Compliable Commands, Total Compliable Commands, and Compliable Direct Commands were plotted across the course of treatment. Effective commands were assessed during PDI coding, so were plotted for sessions 3-10.

Proportion of Non-Compliable Commands. The proportion of Non-Compliable Commands issued by parents was found to remain relatively stable over the course of

treatment, with an average of 31% (range: 25% - 42%) of commands delivered by parents being characterized as non-compliable. There was considerable variation in the proportion of Non-Compliable Commands issued by parents. Across treatment, the proportion of Non-Compliable Commands within 1 standard deviation of the mean ranged from approximately 10% – 63%. The proportion of Non-Compliable Commands for PDI Sessions 3-10 are depicted in Figure 3.

Figure 3

Proportion of Non-Compliable Commands by PDI Session



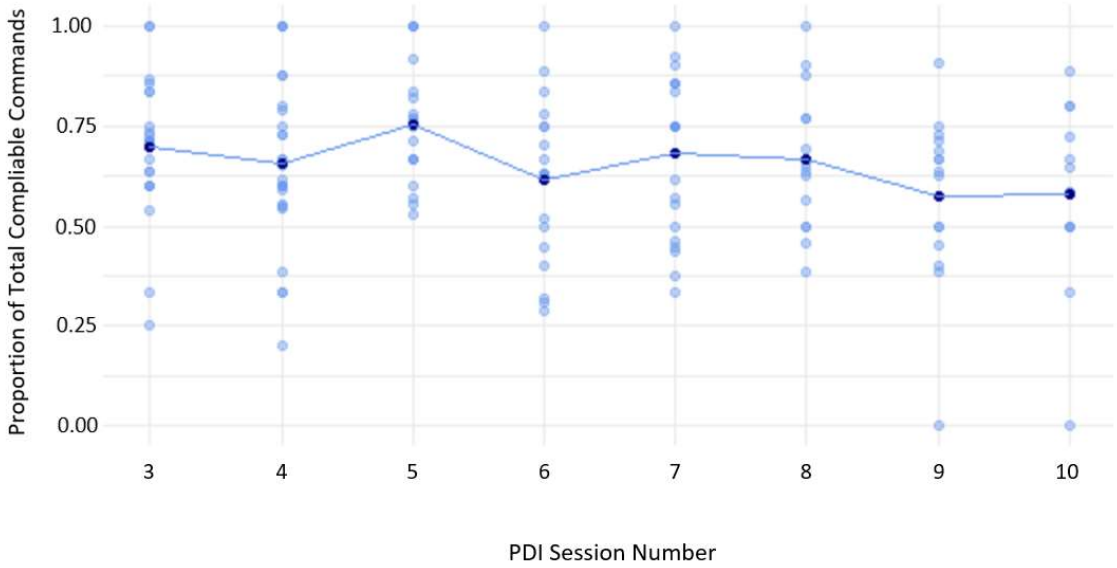
Note. The proportion of Non-Compliable Commands represents the number of commands issued by the parent during the 5-minute PDI coding period to which the child had no opportunity to comply, divided by the total number of commands (compliable + non-compliable) issued. Mean scores are represented by navy blue dots. Dots surrounding the mean score represent the proportion of Non-Compliable Commands

demonstrated by each parent during each session, with darker dots representing multiple overlapping scores.

Proportion of Total Compliable Commands. The proportion of Total Compliable Commands issued by parents was found to remain relatively stable over the course of treatment, with an average of 69% (range: 58% - 75%) of total commands delivered by parents being characterized as compliable. There was considerable variation in the proportion of Total Compliable Commands issued by parents. Across treatment, the proportion of Total Compliable Commands within 1 standard deviation of the mean ranged from approximately 37% – 90%. The proportion of Total Compliable Commands for PDI Sessions 3-10 are depicted in Figure 4.

Figure 4

Proportion of Total Compliable Commands by PDI Session



Note. The proportion of Total Compliable Commands represents the number of total (direct + indirect) commands issued by the parent during the 5-minute PDI coding period

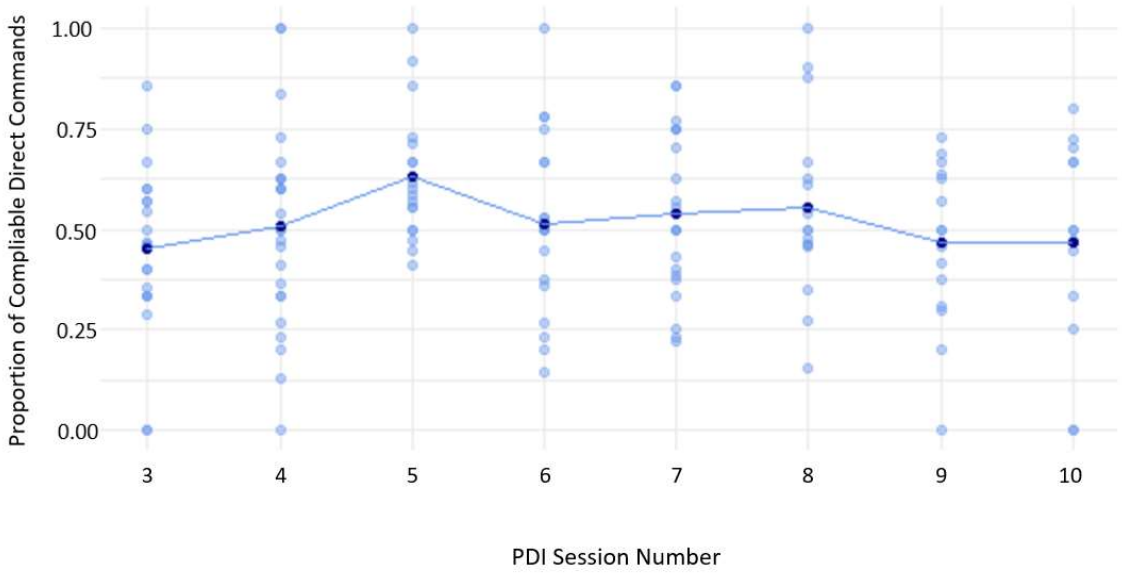
to which the child had an opportunity to comply, divided by the total number of commands (direct + indirect; compliable + non-compliable) issued. Mean scores are represented by navy blue dots. Dots surrounding the mean score represent the proportion of Total Compliable Commands demonstrated by each parent during each session, with darker dots representing multiple overlapping scores.

Proportion of Compliable Direct Commands. The proportion of Compliable Direct Commands issued by parents was found to remain relatively stable over the course of treatment, with an average of 53% (range: 46% - 63%) of direct commands delivered by parents being characterized as compliable. There was considerable variation in the proportion of Compliable Direct Commands issued by parents. Across treatment, the proportion of Compliable Direct Commands within 1 standard deviation of the mean ranged from approximately 21% – 79%. The proportion of Compliable Direct Commands for PDI Sessions 3-10 are depicted in Figure 5.

Command Sequences. Next, results characterizing parents' command sequences, including both the proportion of Total Successful Command Sequences and the proportion of Successful Direct Command Sequences, were plotted across the course of treatment. Command sequences were assessed during PDI coding, so were plotted for sessions 3-10.

Figure 5

Proportion of Compliable Direct Commands by PDI Session



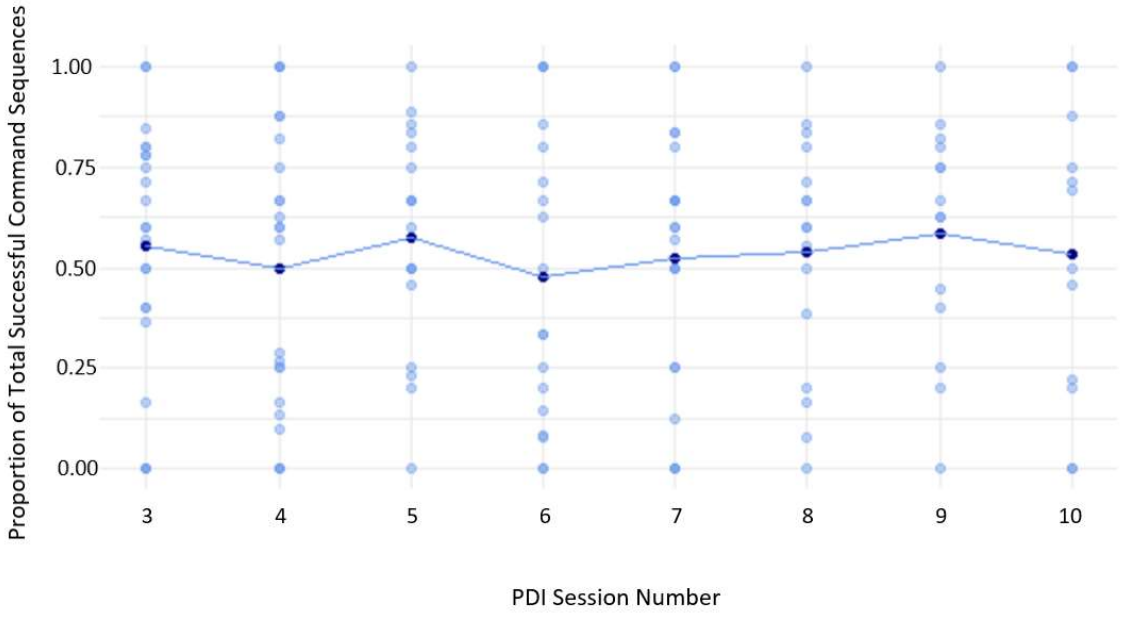
Note. The proportion of Compliable Direct Commands represents the number of direct commands issued by the parent during the 5-minute PDI coding period to which the child had an opportunity to comply, divided by the total number of direct commands (compliable + non-compliable) issued. Mean scores are represented by navy blue dots. Dots surrounding the mean score represent the proportion of Compliable Direct Commands demonstrated by each parent during each session, with darker dots representing multiple overlapping scores.

Proportion of Total Successful Command Sequences. The proportion of Total Successful Command Sequences initiated by parents remained relatively stable over the course of PDI sessions, with an average of 55% (range: 49% - 62%) of total compliable command sequences initiated by parents ending successfully. There was considerable variation in the proportion of Total Successful Command Sequences navigated by parents. Across treatment, the proportion of Total Successful Command Sequences

within 1 standard deviation of the mean ranged from approximately 12% – 88%, indicating that some parent-child dyads achieved few successful command sequences after parents initiated a command, while for others, a majority of commands issued led to successful child compliance. The proportion of Total Successful Command Sequences for PDI Sessions 3-10 are depicted in Figure 6.

Figure 6

Proportion of Total Successful Command Sequences by PDI Session



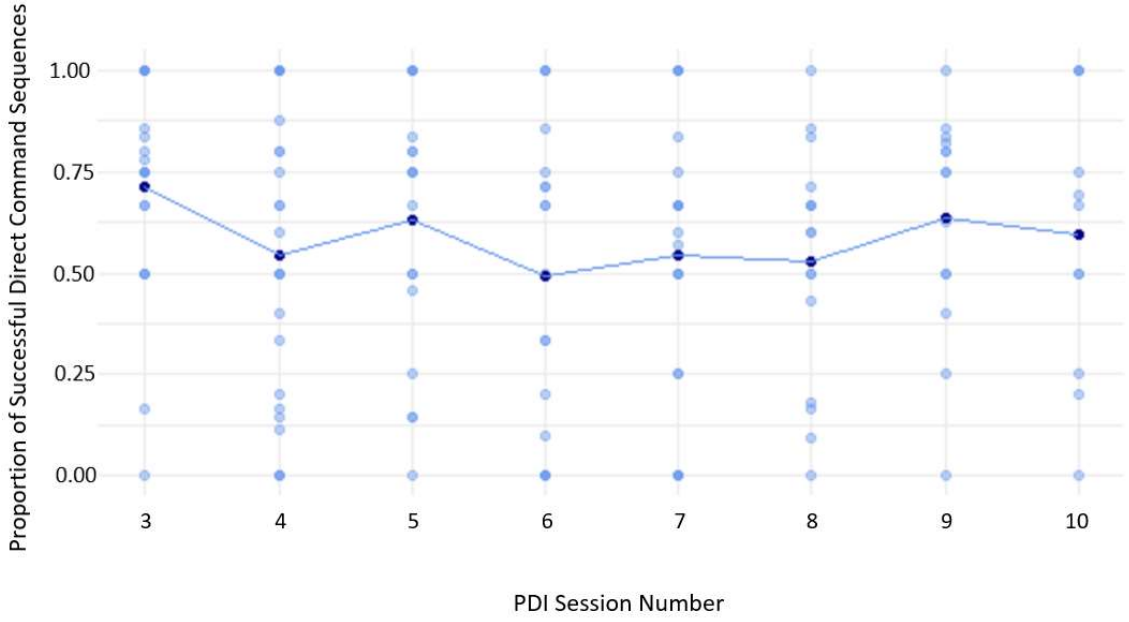
Note. The proportion of Total Successful Command Sequences represents the number of total (direct + indirect) command sequences successfully navigated by the parent during the 5-minutes PDI coding period, divided by the total number of command sequences that were initiated (i.e., direct + indirect; successfully navigated + unsuccessfully navigated). Mean scores are represented by navy blue dots. Dots surrounding the mean score represent the proportion of Total Successful Command Sequences demonstrated by each parent during each session, with darker dots representing multiple overlapping scores.

Proportion of Successful Direct Command Sequences. The proportion of Successful Direct Command Sequences navigated by parents was found to remain relatively stable over the course of treatment, with an average of 61% (range: 50% - 71%) of direct compliable command sequences initiated by parents ending successfully. There was considerable variation in the proportion of Successful Direct Command Sequences navigated by parents. Similar to the findings for Total Successful Command Sequences, these findings indicate that some parent-child dyads achieved few successful command sequences following the delivery of a direct command, while for others, a majority of direct commands issued resulted in child compliance. Across treatment, the proportion of Successful Direct Command Sequences within 1 standard deviation of the mean ranged from approximately 12% – 99%. The proportion of Successful Direct Command Sequences for PDI Sessions 3-10 are depicted in Figure 7.

Time-Out Use. Finally, both the number of and duration in successful and unsuccessful time-outs were plotted across the course of treatment. Unsuccessful time-outs were very rare, with only five families experiencing an unsuccessful time-out over the course of PDI. Given that time-outs that occurred any time during a PDI session were coded, time-out implementation was available and plotted for each of the first 10 PDI sessions.

Figure 7

Proportion of Successful Direct Command Sequences by PDI Session



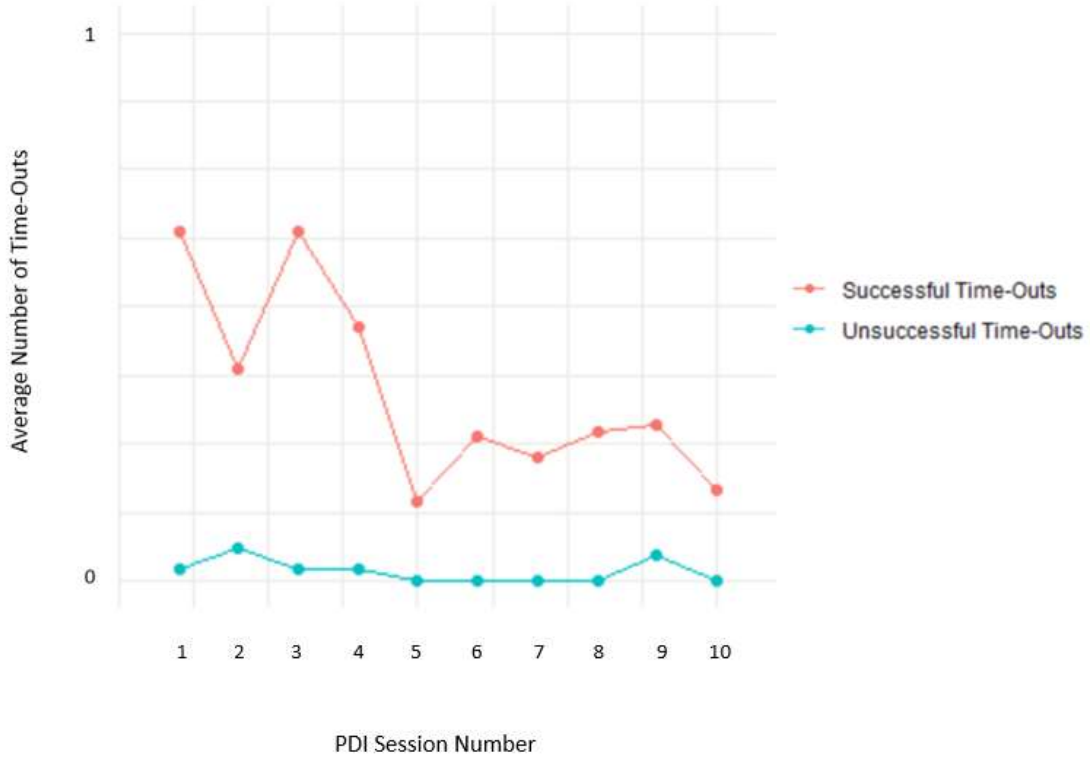
Note. The proportion of Successful Direct Command Sequences represents the number of direct command sequences successfully navigated by the parent during the 5-minute PDI coding period, divided by the total number of direct command sequences (successfully navigated + unsuccessfully navigated) that occurred. Mean scores are represented by navy blue dots. Dots surrounding the mean score represent the proportion of Successful Direct Command Sequences demonstrated by each parent during each session, with darker dots representing multiple overlapping scores.

Time-Out Number. First, the number of time-outs were plotted for PDI sessions 1-10. The average Number of Successful Time-Outs implemented by parents demonstrated a general pattern of decline over the course of treatment. Sessions 1 and 3 had the highest average Number of Successful Time-Outs (0.64). From Sessions 1-4, the average Number of Successful Time-Outs implemented by parents ranged from 0.39 –

0.64. The average Number of Successful Time-Outs was lowest during Session 5, at 0.15, and remained relatively low from Sessions 6-10, ranging from 0.17 – 0.29. Conversely, unsuccessful time-outs were relatively rare, and the average Number of Unsuccessful Time-Outs remained low over the course of treatment. The average Number of Unsuccessful Time-Outs ranged from 0.00 (Sessions 5-8 and Session 10) to 0.11 (Session 9). The average number of successful and unsuccessful time-outs for PDI Sessions 3-10 are depicted in Figure 8.

Figure 8

Average Number of Successful and Unsuccessful Time-Outs by PDI Session Number



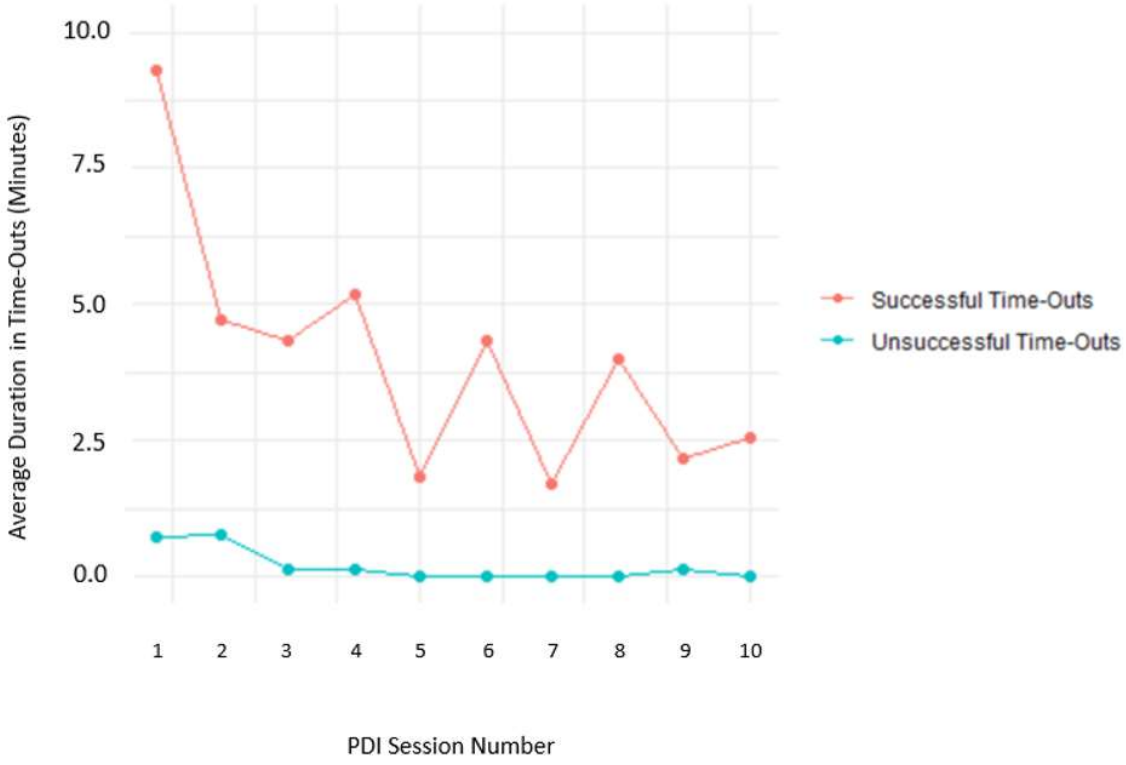
Note. The average Number of Successful Time-Outs represent the average number of time-outs that ended successfully in a given session, including zeros. The average

Number of Unsuccessful Time-Outs represent the average number of time-outs that ended unsuccessfully in a given session, including zeros.

Duration in Time-Outs. Next, the Duration in Successful Time-Outs and Duration in Unsuccessful Time-Outs were plotted for PDI sessions 1-10. Similar to the average Number of Successful Time-Outs, the average Duration in Successful Time-Outs demonstrated a general pattern of decline over the course of treatment. The average Duration in Successful Time-Outs was highest in Session 1, at 9.32 minutes. The average Duration in Successful Time-Outs was slightly lower in Sessions 2-4, at 4.73 minutes (Session 2), 4.32 minutes (Session 3), and 5.17 minutes (Session 4). The average Duration in Successful Time-Outs declined to 1.84 minutes in Session 5, and then demonstrated some variability from Sessions 6-10, at 4.32 minutes (Session 6), 1.70 minutes (Session 7), 4.01 minutes (Session 8), 2.06 minutes (Session 9) and 2.56 minutes (Session 10). Again, given that unsuccessful time-outs were relatively rare and were only experienced by five families over the course of PDI, the average Duration in Unsuccessful Time-Outs remained low over the course of treatment. The average Duration in Unsuccessful Time-Outs was highest in Session 2 (0.56 minutes), followed by Session 1 (0.40 minutes), and ranged from 0.00 – 0.11 minutes during Sessions 3-10. The average duration in successful and unsuccessful time-outs for PDI Sessions 3-10 are depicted in Figure 9.

Figure 9

Average Duration in Successful and Unsuccessful Time-Outs by PDI Session Number



Note. The average Duration in Successful Time-Outs represent the average duration (in minutes) of time-outs that ended successfully in a given session, including zeros. The average Duration in Unsuccessful Time-Outs represent the average duration (in minutes) of time-outs that ended unsuccessfully in a given session, including zeros.

In summary, parents' use of positive parenting skills, negative parenting behavior, effective commands (Non-Compliable Commands, Total Compliable Commands, and Compliable Direct Commands) and command sequences (Total Command Sequences and Direct Command Sequences) remained relatively stable over the course of PDI. The number of and duration in successful time-outs started off somewhat high and

demonstrated general patterns of decline over the course of PDI. In contrast, unsuccessful time-outs were rare events experienced by only five families over the course of PDI.

Aim 2: Testing Associations Between Observed Parenting and Child Self-Regulation.

Linear regression analyses were used to test the hypothesis that Positive Parenting Skills, Negative Parenting Behavior, Non-Compliable Commands, Total Compliable Commands, Compliable Direct Commands, Total Successful Command Sequences, Successful Direct Command Sequences, Time-Out Number, and Duration in Time-Outs experienced by children over the course of PDI would predict greater self-regulation skills as measured by post-treatment HTKS scores, Zoo GNG dPrime scores, and Shift, Inhibit, and Emotional Control BRIEF subscale scores.

HTKS. First, the observed parenting variables of Positive Parenting Skills, Negative Parenting Behavior, Non-Compliable Commands, Total Compliable Commands, Compliable Direct Commands, Total Successful Command Sequences, Successful Direct Command Sequences, Time-Out Number, and Duration in Time-Outs were examined as predictors of children's post-treatment HTKS scores. Each predictor was tested in an individual model, and HTKS pre-treatment scores, child age, and parent age were entered in Step 1 for each model as covariates. The covariates in Step 1 were significantly related to post-treatment HTKS scores for all models. [Positive Parenting Skills: $F(3, 37) = 13.35$, $p < .001$, $R^2 = .52$; Negative Parenting Behavior: $F(3, 39) = 16.19.80$, $p < .001$, $R^2 = .56$; Compliable Direct Commands: $F(3, 37) = 13.35$, $p < .001$, $R^2 = .52$; Total Compliable Commands: $F(3, 37) = 13.35$, $p < .001$, $R^2 = .52$; Non-Compliable Commands: $F(3, 37) = 13.35$, $p < .001$, $R^2 = .52$; Successful Direct Command Sequences: $F(3, 35) = 12.07$, $p < .001$, $R^2 = .51$; Total Successful Command

Sequences: $F(3, 37) = 13.35$, $p < .001$, $R^2 = .52$; Time-Out Number: $F(3, 41) = 16.86$, $p < .001$, $R^2 = .55$; Duration in Time-Oust: $F(3, 41) = 16.86$, $p < .001$, $R^2 = .55$]. Pre-treatment HTKS scores and parent age significantly predicted post-treatment HTKS scores in all models. Child age significantly predicted children's post-treatment HTKS scores only for the models examining Time-Out Number and Duration in Time-Outs as predictors.

In Step 2, Time-Out Number [$\Delta F(1, 40) = 6.43$, $p = .02$, $\Delta R^2 = .06$] and Duration in Time-Outs [$\Delta F(1, 40) = 4.64$, $p = .04$, $\Delta R^2 = .05$] were found to account for a significant amount of variance in children's post-treatment HTKS scores. Specifically, counter to study hypotheses, children who experienced more time-outs and spent more time in time-outs over the course of PDI were found to have lower post-treatment HTKS scores, that is, lower behavioral inhibitory control, following PCIT. Table 10 presents the findings of the linear regression model examining the impact of the number of time-outs experienced on children's post-treatment HTKS scores, and Table 11 presents findings from the linear regression model assessing the impact of the duration in time-outs on children's post-treatment HTKS scores. Positive Parenting Skills [$\Delta F(1, 36) = 2.31$, $p = .14$, $\Delta R^2 = .03$], Negative Parenting Behavior [$\Delta F(1, 38) = 0.65$, $p = .43$, $\Delta R^2 = .01$], Compliable Direct Commands [$\Delta F(1, 36) = 0.02$, $p = .89$, $\Delta R^2 = .00$], Total Compliable Commands [$\Delta F(1, 36) = 1.28$, $p = .27$, $\Delta R^2 = .02$], Non-Compliable Commands [$\Delta F(1, 36) = 1.28$, $p = .27$, $\Delta R^2 = .02$], Successful Direct Command Sequences [$\Delta F(1, 34) = 0.89$, $p = .35$, $\Delta R^2 = .01$], and Total Successful Command Sequences [$\Delta F(1, 36) = 0.99$, $p = .33$, $\Delta R^2 = .01$] did not account for a significant amount of variance in children's post-treatment HTKS scores.

Table 10

Summary of Linear Regression Analysis for Time-Out Number Predicting Children's Post-Treatment HTKS Scores

Step	Predictor	*B*	*SE*	*β*	*t*	F	R^2	ΔR^2
1						16.86**	.55	.55**
	Pre-treatment HTKS score	.48	.13	.50	3.60*			
	Child age	.13	.08	.24	1.75			
	Parent age	.02	.01	.22	2.07*			
2						15.93**	.61	.06*
	Pre-treatment HTKS score	.45	.13	.46	3.53*			
	Child age	.09	.07	.17	1.30			
	Parent age	.02	.01	.21	2.10*			
	Time-out number	-.66	.26	-.27	-2.54*			

Note. Time-out number represents the average number of successful time-outs over the course of treatment. * $p < .05$, ** $p < .001$.

Zoo Go-No-Go dPrime. Next, the same observed parenting variables were examined as predictors of children's post-treatment Zoo GNG dPrime scores. Again, each predictor was tested in an individual model, and Zoo GNG dPrime pre-treatment scores and child age were entered in Step 1 for each model as covariates. The covariates were found to significantly predict post-treatment Zoo GNG dPrime scores in each model [Positive Parenting Skills: $F(2, 34) = 21.88$, $p < .001$, $R^2 = .56$; Negative Parenting Behavior: $F(2, 36) = 29.44$, $p < .001$, $R^2 = .62$; Compliable Direct Commands:

Table 11

Summary of Linear Regression Analysis for Duration in Time-Outs Predicting Children's Post-Treatment HTKS Scores

Step	Predictor	*B*	*SE*	*β*	*t*	F	R^2	ΔR^2
1						16.86**	.55	.55**
	Pre-treatment HTKS score	.48	.13	.50	3.60*			
	Child age	.13	.08	.24	1.75			
	Parent age	.02	.01	.22	2.07*			
2						14.93**	.60	.05*
	Pre-treatment HTKS score	.46	.13	.47	3.53*			
	Child age	.11	.07	.20	1.46			
	Parent age	.02	.01	.22	2.19*			
	Duration in time-outs	-.25	.11	-.23	-2.15*			

Note. Duration in time-outs represents the average duration in successful time-outs, in minutes, over the course of treatment. * $p < .05$, ** $p < .001$.

$F(2, 32) = 19.39$, $p < .001$, $R^2 = .55$; Total Successful Command Sequences: $F(2, 34) = 21.88$, $p < .001$, $R^2 = .56$; Time-Out Number: $F(2, 38) = 29.20$, $p < .001$, $R^2 = .61$; Duration in Time-Outs: $F(2, 38) = 29.20$, $p < .001$, $R^2 = .61$]. Pre-treatment Zoo GNG dPrime scores significantly predicted post-treatment Zoo GNG dPrime scores in all models. Child age did not significantly predict pos-treatment Zoo GNG dPrime scores in any of the models.

In Step 2, none of the observed parenting variables were found to account for a significant amount of variance in children's post-treatment Zoo GNG dPrime scores [Positive Parenting Skills: $\Delta F(1, 33) = 1.37$, $p = .25$, $\Delta R^2 = .00$; Negative Parenting Behavior: $\Delta F(1, 35) = 1.81$, $p = .19$, $\Delta R^2 = .02$; Compliable Direct Commands: $\Delta F(1, 33) = 0.07$, $p = .80$, $\Delta R^2 = .00$; Total Compliable Commands: $\Delta F(1, 33) = 0.00$, $p = .97$, $\Delta R^2 = .00$; Non-Compliable Commands: $\Delta F(1, 33) = 0.00$, $p = .97$, $\Delta R^2 = .00$; Successful Direct Command Sequences: $\Delta F(1, 31) = 0.37$, $p = .55$, $\Delta R^2 = .00$; Total Successful Command Sequences: $\Delta F(1, 33) = 0.29$, $p = .60$, $\Delta R^2 = .00$; Time-Out Number: $\Delta F(1, 37) = 1.06$, $p = .31$, $\Delta R^2 = .01$; Duration in Time-Outs: $\Delta F(1, 37) = 1.09$, $p = .30$, $\Delta R^2 = .01$].

BRIEF Inhibit. The same analyses were repeated to assess whether the observed parenting variables significantly predicted children's post-treatment scores on the BRIEF Inhibit, Shift, and Emotional control subscales. In the models examining post-treatment BRIEF Inhibit scores, pre-treatment BRIEF Inhibit scores and child age were entered as covariates in Step 1. The covariates were found to significantly predict post-treatment BRIEF Inhibit scores in each model [Positive Parenting Skills: $F(2, 30) = 17.74$, $p < .001$, $R^2 = .54$; Negative Parenting Behavior: $F(2, 31) = 15.45$, $p < .001$, $R^2 = .50$; Compliable Direct Commands: $F(2, 30) = 17.74$, $p < .001$, $R^2 = .54$; Total Compliable Commands: $F(2, 30) = 17.74$, $p < .001$, $R^2 = .54$; Non-Compliable Commands: $F(2, 30) = 17.74$, $p < .001$, $R^2 = .54$; Successful Direct Command Sequences: $F(2, 29) = 17.24$, $p < .001$, $R^2 = .54$; Total Successful Command Sequences: $F(2, 30) = 17.74$, $p < .001$, $R^2 = .54$; Time-Out Number: $F(2, 33) = 18.76$, $p < .001$, $R^2 = .53$; Duration in Time-Outs: $F(2, 33) = 18.76$, $p < .001$, $R^2 = .53$]. Pre-treatment BRIEF Inhibit scores significantly predicted

post-treatment BRIEF Inhibit scores in all models. Child age did not significantly predict pos-treatment BRIEF Inhibit scores in any of the models.

In Step 2, none of the observed parenting variables were found to account for a significant amount of variance in children's post-treatment BRIEF Inhibit scores [Positive Parenting Skills: $\Delta F(1, 29) = 0.09$, $p = .77$, $\Delta R^2 = .00$; Negative Parenting Behavior: $\Delta F(1, 30) = 0.15$, $p = .70$, $\Delta R^2 = .00$; Compliable Direct Commands: $\Delta F(1, 29) = 0.00$, $p = .93$, $\Delta R^2 = .00$; Total Compliable Commands: $\Delta F(1, 29) = 0.10$, $p = .75$, $\Delta R^2 = .00$; Non-Compliable Commands: $\Delta F(1, 29) = 0.10$, $p = .75$, $\Delta R^2 = .00$; Successful Direct Command Sequences: $\Delta F(1, 28) = 0.03$, $p = .86$, $\Delta R^2 = .00$; Total Successful Command Sequences: $\Delta F(1, 29) = 0.10$, $p = .76$, $\Delta R^2 = .00$; Time-Out Number: $\Delta F(1, 32) = 2.07$, $p = .16$, $\Delta R^2 = .03$; Duration in Time-Outs: $\Delta F(1, 32) = 2.02$, $p = .17$, $\Delta R^2 = .03$].

BRIEF Shift. In the model examining post-treatment BRIEF Shift scores, pre-treatment BRIEF Shift scores, child age, child sex, and parent age were entered as covariates in Step 1. The covariates were found to significantly predict post-treatment BRIEF Shift scores in each model [Positive Parenting Skills: $F(4, 28) = 7.62$, $p < .001$, $R^2 = .52$; Negative Parenting Behavior: $F(4, 29) = 8.54$, $p < .001$, $R^2 = .54$; Compliable Direct Commands: $F(4, 28) = 7.62$, $p < .001$, $R^2 = .52$; Total Compliable Commands: $F(4, 28) = 7.62$, $p < .001$, $R^2 = .52$; Non-Compliable Commands: $F(4, 28) = 7.62$, $p < .001$, $R^2 = .52$; Successful Direct Command Sequences: $F(4, 27) = 0.21$, $p < .001$, $R^2 = .55$; Total Successful Command Sequences: $F(4, 28) = 0.30$, $p < .001$, $R^2 = .52$; Time-Out Number: $F(4, 31) = 8.85$, $p < .001$, $R^2 = .53$; Duration in Time-Outs: $F(4, 31) = 8.85$, $p < .001$, $R^2 = .53$]. Pre-treatment BRIEF Shift scores significantly predicted post-treatment BRIEF Shift scores in all models. Parent age significantly predicted post-treatment BRIEF Shift

scores for all models except for modeling examining Successful Direct Command Sequences as the outcome. Child sex was a significant predictor of post-treatment BRIEF Shift scores only in the model utilizing Negative Parenting Behavior as a Predictor. Child age did not significantly predict pos-treatment BRIEF Shift scores in any of the models.

In Step 2, none of the observed parenting variables were found to account for a significant amount of variance in children's post-treatment BRIEF Shift scores [Positive Parenting Skills: $\Delta F(1, 27) = 2.00$, $p = .17$, $\Delta R^2 = .03$, Negative Parenting Behavior: $\Delta F(1, 28) = 0.44$, $p = .51$, $\Delta R^2 = .00$, Compliable Direct Commands: $\Delta F(1, 27) = 0.15$, $p = .70$, $\Delta R^2 = .00$, Total Compliable Commands: $\Delta F(1, 27) = 1.35$, $p = .26$, $\Delta R^2 = .02$, Non-Compliable Commands: $\Delta F(1, 27) = 1.35$, $p = .26$, $\Delta R^2 = .02$, Successful Direct Command Sequences: $\Delta F(1, 26) = 0.21$, $p = .65$, $\Delta R^2 = .00$, Total Successful Command Sequences: $\Delta F(1, 27) = 0.30$, $p = .59$, $\Delta R^2 = .00$, Time-Out Number: $\Delta F(1, 30) = 3.04$, $p = .09$, $\Delta R^2 = .04$, and Duration in Time-Outs: $\Delta F(1, 30) = 0.96$, $p = .33$, $\Delta R^2 = .02$].

BRIEF Emotional Control. In the model examining post-treatment BRIEF Emotional Control scores, pre-treatment BRIEF Emotional Control scores and child age were entered as covariates in Step 1. The covariates were found to significantly predict post-treatment BRIEF Emotional Control scores in each model [Positive Parenting Skills: $F(2, 38) = 13.09$, $p < .001$, $R^2 = .41$; Negative Parenting Behavior: $F(2, 39) = 12.97$, $p < .001$, $R^2 = .40$; Compliable Direct Commands: $F(2, 38) = 13.09$, $p < .001$, $R^2 = .41$; Total Compliable Commands: $F(2, 38) = 13.09$, $p < .001$, $R^2 = .41$; Non-Compliable Commands: $F(2, 38) = 13.09$, $p < .001$, $R^2 = .41$; Successful Direct Command Sequences: $F(2, 36) = 11.33$, $p < .001$, $R^2 = .39$; Total Successful Command Sequences: $F(2, 38) = 13.09$, $p < .001$, $R^2 = .41$; Time-Out Number: $F(2, 42) = 13.83$, $p < .001$, $R^2 = .40$;

Duration in Time-Outs: $F(2, 42) = 13.83$, $p < .001$, $R^2 = .40$]. Pre-treatment BRIEF Emotional Control scores significantly predicted post-treatment BRIEF Emotional Control scores in all models. Child age did not significantly predict pos-treatment BRIEF Emotional Control scores in any of the models.

In Step 2, none of the observed parenting variables were found to account for a significant amount of variance in children's post-treatment BRIEF Emotional Control scores [Positive Parenting Skills: $\Delta F(1, 37) = 0.40$, $p = .53$, $\Delta R^2 = .00$; Negative Parenting Behavior: $\Delta F(1, 38) = 0.00$, $p = .93$, $\Delta R^2 = .00$; Compliable Direct Commands: $\Delta F(1, 37) = 0.44$, $p = .51$, $\Delta R^2 = .00$; Total Compliable Commands: $\Delta F(1, 37) = 0.07$, $p = .80$, $\Delta R^2 = .00$; Non-Compliable Commands: $\Delta F(1, 37) = 0.07$, $p = .80$, $\Delta R^2 = .00$; Successful Direct Command Sequences: $\Delta F(1, 35) = 0.41$, $p = .53$, $\Delta R^2 = .00$; Total Successful Command Sequences: $\Delta F(1, 37) = 0.06$, $p = .81$, $\Delta R^2 = .00$; Time-Out Number: $\Delta F(1, 41) = 0.31$, $p = .58$, $\Delta R^2 = .00$; Duration in Time-Outs: $\Delta F(1, 41) = 0.07$, $p = .79$, $\Delta R^2 = .00$].

In summary, Time-Out Number and Duration in Time-Outs were the only significant predictors of children's post-treatment self-regulation scores. Counter to study hypotheses, number of and duration in successful time-outs experienced by children over the course of PDI were inversely related to post-treatment HTKS scores, such that children who experienced more time-outs and spent more time in time-out demonstrated lower behavioral regulation. No additional PDI-specific process variables were found to predict variance in children's post-treatment self-regulation outcomes after accounting for covariates.

Testing Impact of Session-by-Session Declines in Time-Out Number and Duration on Children's Self-Regulation Outcomes

Given the patterns observed in the number of and duration in successful time-outs over the course of PDI, exploratory analyses were conducted to examine: 1) whether the number of and duration in time-outs children experienced over the course of PDI demonstrated linear or quadratic patterns of change and 2) whether these changes, rather than session averages tested in the above regression models, would significantly predict children's post-treatment self-regulation outcomes. To test these hypotheses, latent growth curve models within a structural equation modeling (SEM) framework (Preacher et al., 2008) were utilized to examine the longitudinal relationships between in-session time-out processes and children's self-regulation outcomes.

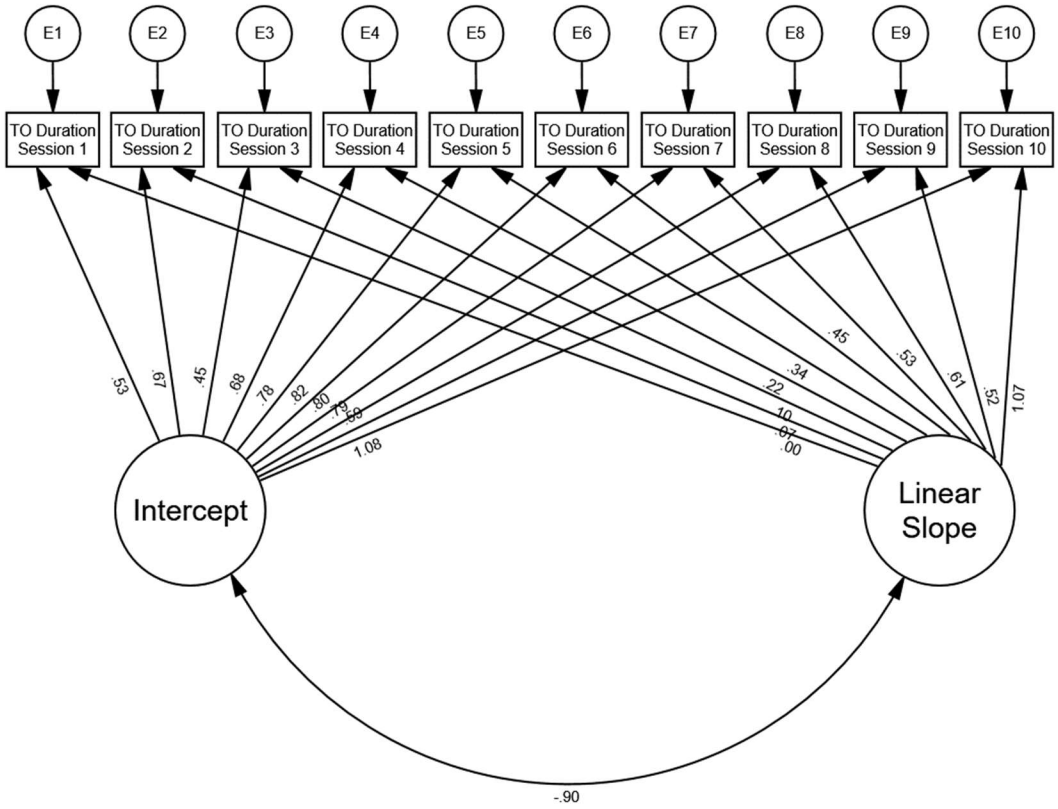
First, models were specified examining whether Time-Out Number and Duration in Time-Outs demonstrated a linear pattern of change across the first 10 sessions of PDI. The first model examining linear change in Time-Out Number produced an inadmissible solution. Inadmissible solutions include those that produce negative variance estimates and estimated covariance matrices for exogenous variables that are not positive definite. Such results can occur due to small sample size (Jöreskog & Sörbom, 1984), which was a factor in the present study ($N = 50$). Path diagrams for models producing inadmissible solutions are not presented, given estimates produced by such models cannot be reliably interpreted.

Next, a model was tested assessing latent growth in the Duration in Time-Outs across the first 10 sessions of PDI. The model produced an admissible solution and is presented in Figure 10 with standardized path coefficients. The model demonstrated poor model fit (χ

^{2} = 102.11, *df* = 50, *p* < .001, CFI = .09, RMSEA = .15), suggesting Duration in Time-Outs does not demonstrate a linear pattern of change across the first 10 sessions of PDI. Models examining quadratic growth in the Time-Out Number and Duration in Time-Outs were also assessed. However, both models produced inadmissible solutions.

Figure 10

Path Diagram of Linear Latent Growth Curve Model for Duration in Time-Outs Across the First 10 Sessions of PDI



Note. Model fit: χ^2 = 102.11, *df* = 50, *p* < .001, CFI = .09, RMSEA = .15; standardized path coefficients are presented.

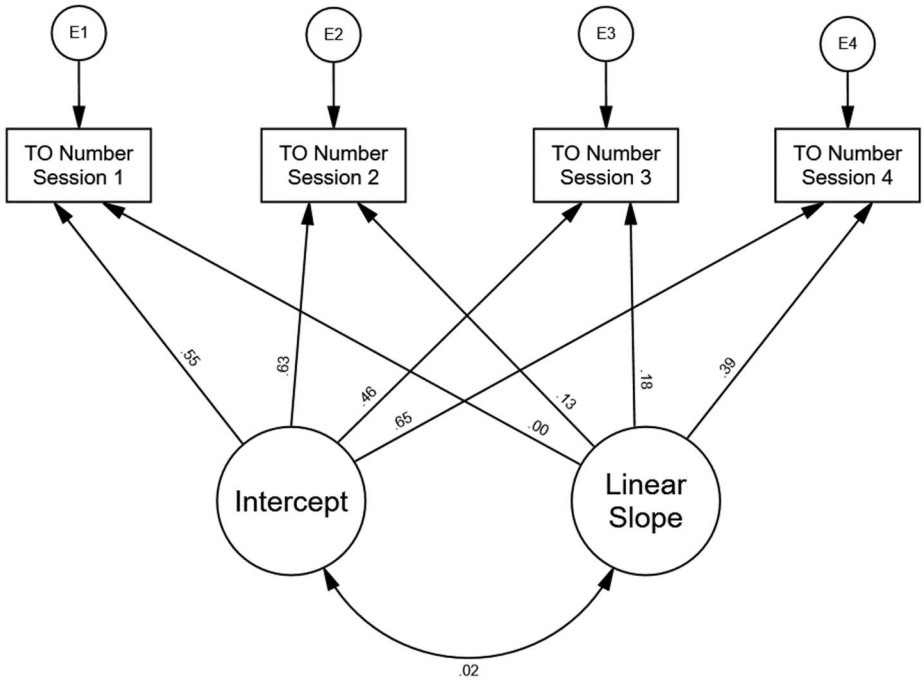
Given results from the full 10-session models produced inadmissible results and poor model fit suggested that Duration in Time-Outs does not demonstrate linear change across the first 10 sessions of PDI, abbreviated models examining linear and quadratic change in Time-Out Number and Duration in Time-Outs across the first four sessions of PDI were examined as an exploratory follow-up analysis. The first four sessions were chosen as the focus of these analyses due to the large decline in Time-Out Number and Duration in Time-Outs observed between sessions four and five. Specifically, 39.53% of participants experienced one or more time-outs in session four, while the number experiencing a time-out dropped to just 14.63% in session five and remained low in all subsequent sessions (see Table 5 for more information on session-by-session changes in the number of time-outs). There was also a noticeable decline in the average duration in time-outs from session four (M = 5.17, SD = 9.23 minutes) to session five (M = 1.84, SD = 5.63 minutes), further supporting the selection of sessions 1 through 4 for examining patterns of change in time-outs (see Table 4 for more information on session-by-session changes in the duration in time-outs). Additionally, past research indicating a majority of increases in positive parenting and decreases in negative parenting occur during the first 3-4 sessions of CDI (Hakman et al., 2009; Lieneman et al., 2019) provided additional rationale for examining patterns of change during the initial 4 PDI treatment sessions.

First, models were specified examining whether Time-Out Number and Duration in Time-Outs demonstrated linear patterns of change across the first four sessions of PDI. First, a model was tested assessing linear declines in Time-Out Number across the first four sessions of PDI. The model demonstrated poor model fit (χ^2 = 9.21, df = 5, p = .10, CFI = .82, RMSEA = .13), suggesting that the number of time-outs experienced does not

demonstrate a linear pattern of change across the first four sessions of PDI. The model with standardized path coefficients is presented in Figure 11.

Figure 11

Path Diagram of Linear Latent Growth Curve Model for Number of Time-Outs Across the First Four Sessions of PDI



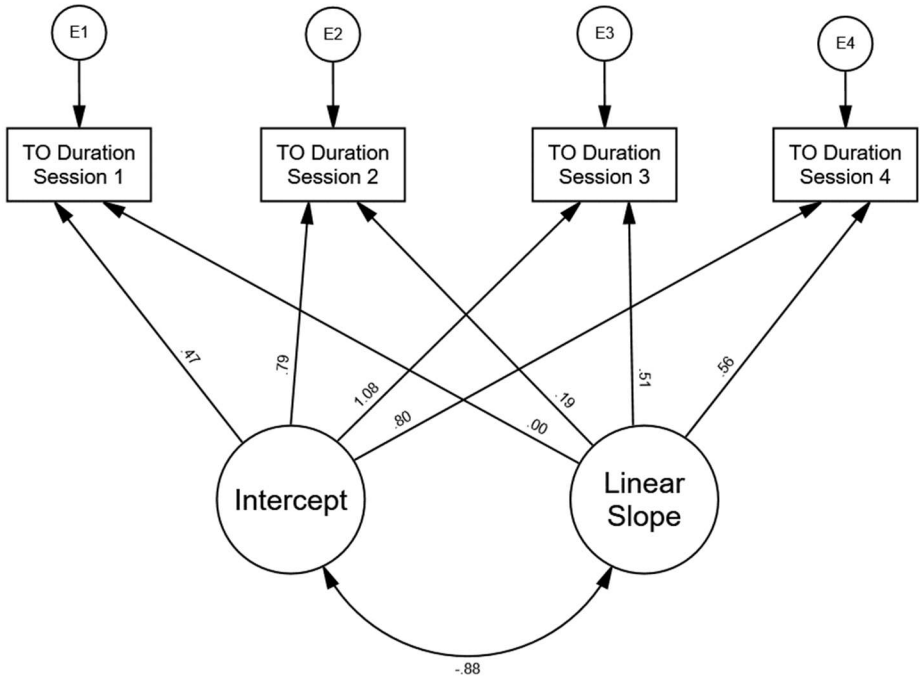
Note. Model fit: $\chi^2 = 9.21$, $df = 5$, $p = .10$, CFI = .82, RMSEA = .13; standardized path coefficients are presented.

Next, a model was tested assessing linear declines in Duration in Time-Outs across the first four sessions of PDI. The model demonstrated acceptable model fit ($\chi^2 = 5.40$, $df = 5$, $p = .37$, CFI = .96, RMSEA = .04), suggesting that Duration in Time-Outs

does demonstrate a linear pattern of change across the first four PDI sessions. The model with standardized path coefficients is presented in Figure 12.

Figure 12

Path Diagram of Linear Latent Growth Curve Model for Duration in Time-Outs Across the First Four Sessions of PDI



Note. Model fit: $\chi^2 = 5.40$, $df = 5$, $p = .37$, CFI = .96, RMSEA = .04; standardized path coefficients are presented.

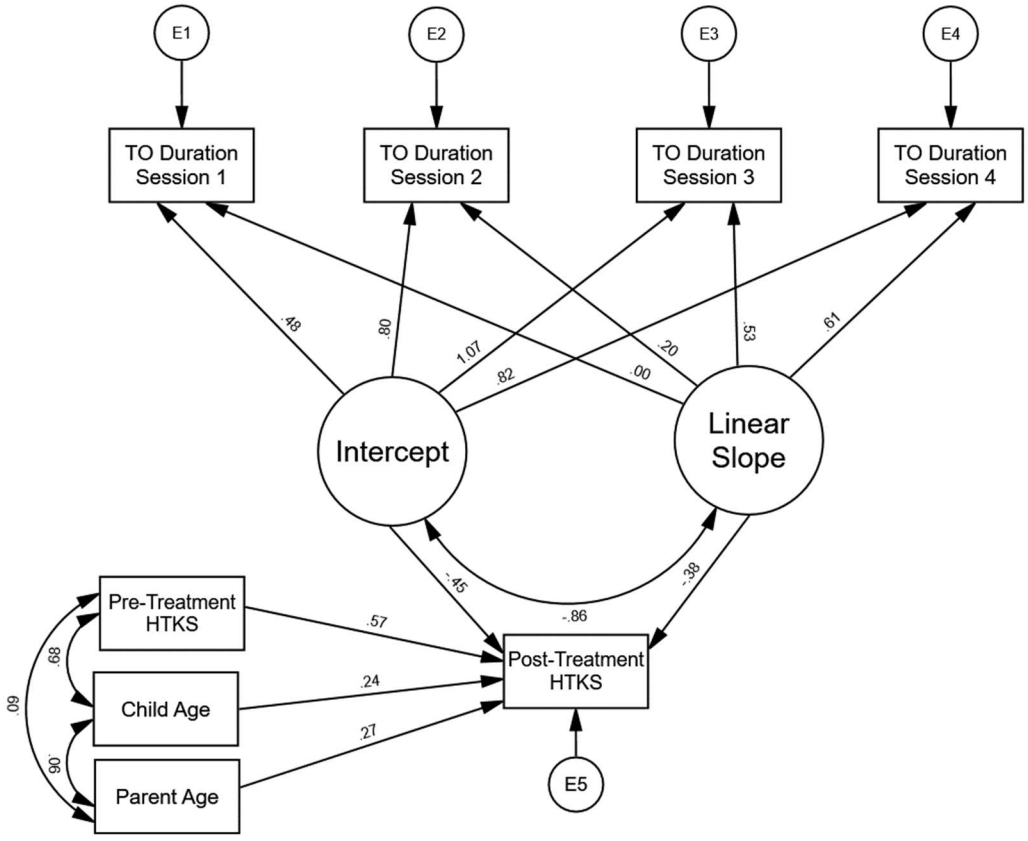
Models examining quadratic change in Time-Out Number and Duration in Time-Outs across the first four sessions were also assessed. However, both models produced inadmissible solutions. Given the acceptable fit of the model examining linear decline in

Duration in Time-Outs across the first four sessions of PDI, next-step exploratory analyses were conducted to examine whether linear change in Duration in Time-Outs predicted children's post-treatment self-regulation outcomes. Each outcome was tested in an individual model with relevant covariates.

HTKS. A conditional model allowing for interindividual variability in intercept and linear change trajectories was used to examine whether declines in Duration in Time-Outs across the first four sessions of PDI significantly predicted children's post-treatment HTKS scores. Child age, parent age, and pre-treatment HTKS scores were included in the model as time-invariant covariates. Model results with standardized path coefficients are presented in Figure 13. The model was found to demonstrate acceptable model fit (χ^2 = 15.32, *df* = 19, *p* = .70, CFI = .1.00, RMSEA < .00). However, pre-treatment HTKS scores (β = .59, *p* < .001), child age (β = 4.88, *p* = .03), and parent age (β = 1.05, *p* < .003) were found to be the only significant predictors of children's post-treatment HTKS scores. Neither the intercept (β = -1.65, *p* = .55) or linear slope (β = -5.64, *p* = .71) of Duration in Time-Outs were found to significantly predict children's post-treatment HTKS scores. Results suggest that the intercept and linear slope of Duration in Time-Outs during the first four sessions of PDI do not predict children's post-treatment HTKS scores.

Figure 13

Path Diagram of Linear Latent Growth Curve Model for Duration in Time-Outs Across the First Four Sessions of PDI Predicting Post-Treatment HTKS, Controlling for Pre-Treatment HTKS, Child Age, and Parent Age



Note. Model fit: $\chi^2 = 15.32$, $df = 19$, $p = .70$, CFI = .1.00, RMSEA < .00; standardized path coefficients are presented.

Zoo Go-No-Go dPrime. A conditional model allowing for interindividual variability in intercept and linear change trajectories was used to examine whether declines in Duration in Time-Outs across the first four sessions of PDI significantly predicted children's post-treatment Zoo GNG dPrime scores. Pre-treatment Zoo GNG

dPrime scores and child age were included in the model as time-invariant covariates. Model results with standardized path coefficients are presented in Figure 14. The model was found to demonstrate acceptable model fit ($\chi^2 = 13.01$, $df = 15$, $p = .60$, CFI = .1.00, RMSEA < .001). However, pre-treatment Zoo GNG dPrime scores ($\beta = .82$, $p < .001$) were found to be the only significant predictor of children's post-treatment Zoo GNG dPrime scores. Child age ($\beta = -.03$, $p = .76$), the intercept of Duration in Time-Outs, ($\beta = -.004$, $p = .97$) and the linear slope of Duration in Time-Outs ($\beta = .05$, $p = .93$) were not found to significantly predict children's post-treatment Zoo GNG dPrime scores. Results suggest that the intercept and linear slope of Duration in Time-Outs during the first four sessions of PDI do not predict children's post-treatment Zoo GNG dPrime scores.

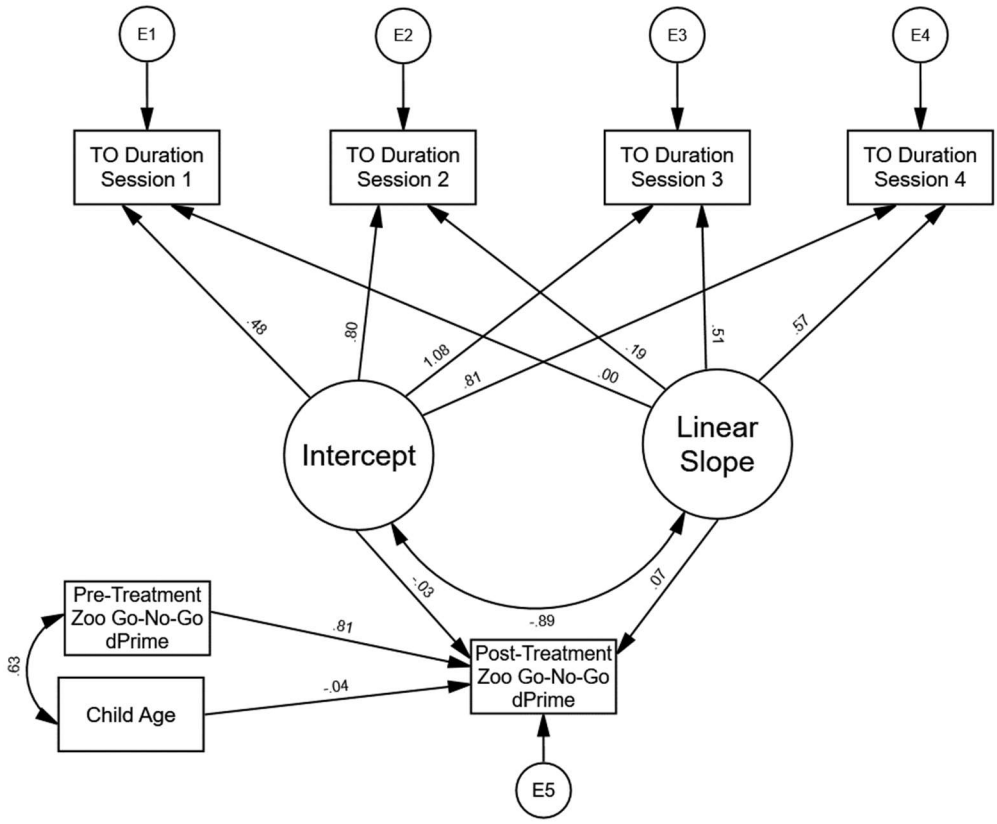
BRIEF Inhibit. A conditional model allowing for interindividual variability in slopes and change trajectories was used to examine whether declines in Duration in Time-Outs across the first four sessions of PDI significantly predicted children's post-treatment HTKS scores. Child age, parent age, and pre-treatment HTKS scores were included in the model as time-invariant covariates. The model produced an inadmissible solution, and thus a path diagram for the model is not presented.

BRIEF Shift. A conditional model allowing for interindividual variability in intercept and linear change trajectories was used to examine whether declines in Duration in Time-Outs across the first four sessions of PDI significantly predicted children's post-treatment BRIEF Shift scores. Child age, child sex, parent age, and pre-treatment BRIEF Shift scores were included in the model as time-invariant covariates. Model results with standardized path coefficients are presented in Figure 15. The model was found to demonstrate poor model fit ($\chi^2 = 32.87$, $df = 23$, $p = .08$, CFI = .76, RMSEA = .09).

Results suggest that the intercept and linear slope of Duration in Time-Outs during the first four sessions of PDI do not predict children's post-treatment BRIEF Shift scores.

Figure 14

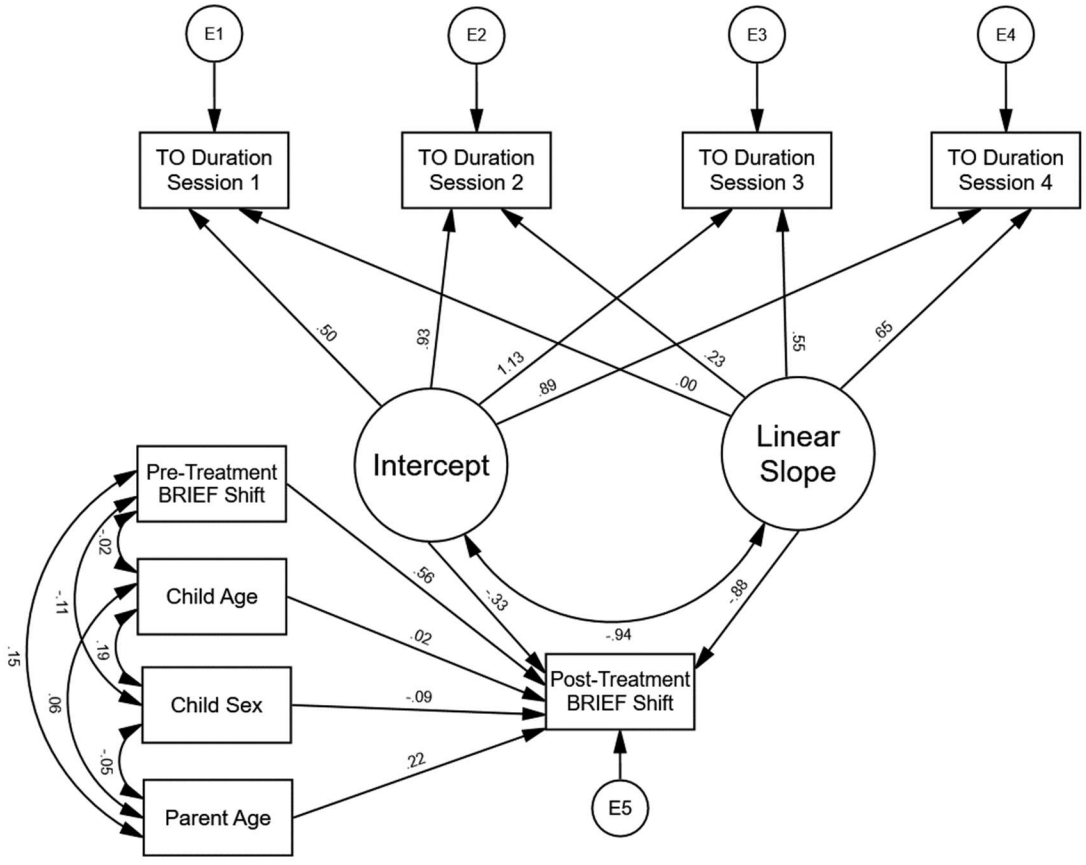
Path Diagram of Linear Latent Growth Curve Model for Duration in Time-Outs Across the First Four Sessions of PDI Predicting Post-Treatment Zoo Go-No-Go dPrime, Controlling for Pre-Treatment Zoo Go-No-Go dPrime and Child Age



Note. Model fit: $\chi^2 = 13.01$, $df = 15$, $p = .60$, CFI = .1.00, RMSEA < .00; standardized path coefficients are presented.

Figure 15

Path Diagram of Linear Latent Growth Curve Model for Duration in Time-Outs Across the First Four Sessions of PDI Predicting Post-Treatment BRIEF Shift, Controlling for Pre-Treatment BRIEF Shift, Child Age, Child Sex, and Parent Age



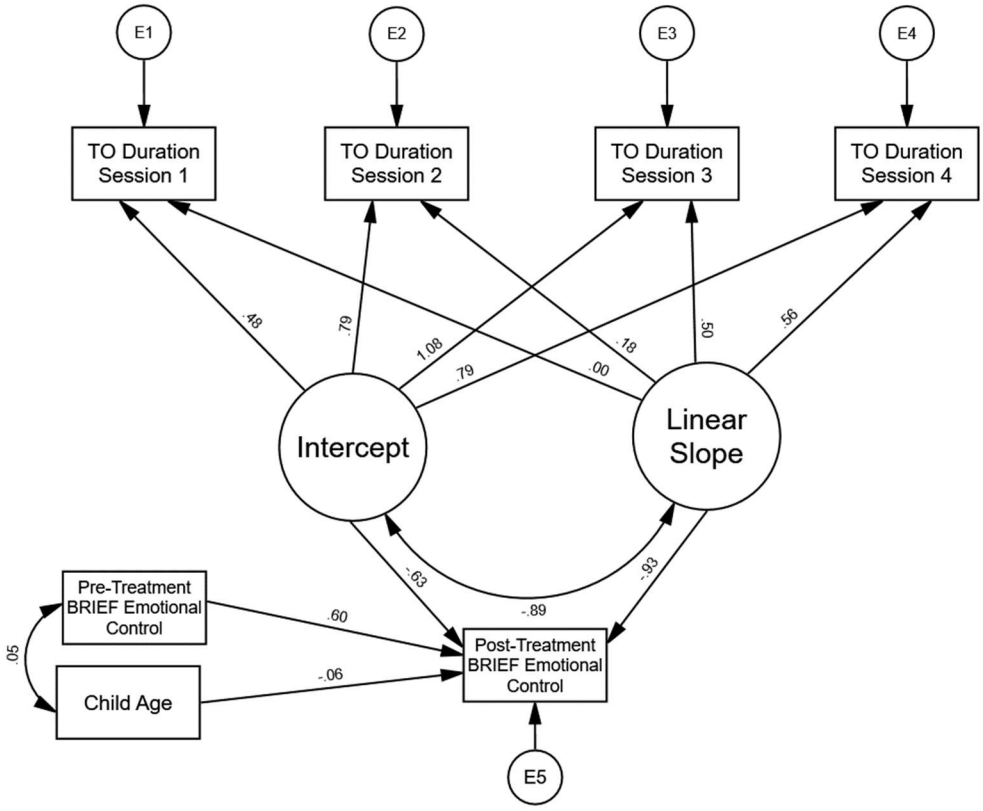
Note. Model fit: $\chi^2 = 32.87$, $df = 23$, $p = .08$, CFI = .76, RMSEA = .09; standardized path coefficients are presented.

BRIEF Emotional Control. A conditional model allowing for interindividual variability in intercept and linear change trajectories was used to examine whether declines in Duration in Time-Outs across the first four sessions of PDI significantly predicted children's post-treatment BRIEF Emotional Control scores. Child age and pre-

treatment BRIEF Emotional Control scores were included in the model as time-invariant covariates. Model results with standardized path coefficients are presented in Figure 16. The model was found to demonstrate poor model fit ($\chi^2 = 21.93$, $df = 15$, $p = .11$, CFI = .80, RMSEA = .10). Results suggest that the intercept and linear slope of Duration in Time-Outs during the first four sessions of PDI do not predict children's post-treatment BRIEF Emotional Control scores.

Figure 16

Path Diagram of Linear Latent Growth Curve Model for Duration in Time-Outs Across the First Four Sessions of PDI Predicting Post-Treatment BRIEF Emotional Control, Controlling for Pre-Treatment BRIEF Emotional Control and Child Age



Note. Model fit: $\chi^2 = 21.93$, $df = 15$, $p = .11$, CFI = .80, RMSEA = .10; standardized path coefficients are presented.

In summary, the Duration in Time-Outs experienced by children was found to decline in a linear fashion over the first four sessions of PDI. Other models examining linear and quadratic change in Time-Out Number and Duration in Time-Outs over the first 10 and four sessions of PDI were not found to demonstrate good fit to the data. Follow-up models conducted to examine whether these linear declines in Duration in Time-Outs across the early sessions of PDI predicted children's self-regulation outcomes were non-significant. Neither the intercepts, nor linear slopes for Duration in Time-Outs predicted children's self-regulation at outcome. In the two models that demonstrated acceptable fit, only the covariates (pre-treatment HTKS scores, child age, and parent age for HTKS; pre-treatment Zoo GNG dPrime scores for post-treatment Zoo GNG dPrime) were significant predictors of post-treatment self-regulation scores.

CHAPTER IV

DISCUSSION

The purpose of the present study was twofold. First, the study aimed to characterize patterns of in-session parenting processes across the course of the PDI phase of PCIT, which focuses on helping caregivers learn developmentally appropriate child management skills and to apply consistent, appropriate consequences in response to their child's behavior. PCIT has been consistently shown to promote positive outcomes for children, including reductions in disruptive behavior and increased compliance with parent directives in diverse client populations (Cooley et al., 2014; Eisenstadt et al., 1993; Thomas & Zimmer-Gembeck, 2007). PCIT has also been shown to increase positive parenting skills and reduce the prevalence of maladaptive parenting behaviors among child welfare-involved families (Chaffin et al., 2004; Chaffin et al., 2011; Thomas et al., 2017; Thomas & Zimmer-Gembeck, 2007; Thomas & Zimmer-Gembeck, 2011). However, despite the well-documented efficacy of PCIT, process-oriented research conducted on PCIT has focused on the CDI phase of PCIT, during which parents learn positive parenting techniques and reduce harsh, aversive parenting behaviors. No published studies to date have examined PDI-phase specific parenting processes and their impact on child outcomes. Thus, the present study first aimed to characterize PDI phase patterns of positive parenting skills, negative parenting behavior, effective commands, command sequences, and time-out utilization as parents and children learned and practiced safe, effective child compliance strategies.

Second, the study aimed to assess whether PDI-specific parenting skills predicted children's post-treatment self-regulation outcomes. I hypothesized parents' use of

positive parenting skills, reduced negative parenting behaviors, delivery of compliable commands, navigation of successful command sequences concluding with child compliance, and successful implementation of time-outs while receiving PCIT therapist coaching would each support gains in children's self-regulatory outcomes at post-treatment.

Aim 1: Characterizing Patterns of PDI-Phase Parenting Processes

First, patterns of Positive Parenting Skills, Negative Parenting Behavior, Non-Compliable Commands, Total Compliable Commands, Compliable Direct Commands, Total Successful Command Sequences, and Successful Direct Command Sequences were found to be relatively stable over the course of treatment. Next, nearly all time-outs implemented over the course of PDI were found to be successful, while unsuccessful time-outs were found to be extremely rare (n = 7) and occurred for only five families. The Number of Successful Time-Outs implemented and Duration in Successful Time-Outs during a given session demonstrated general patterns of decline over the course of treatment, indicating that children experienced fewer times-outs and spent less time in time out for non-compliance as treatment progressed. Further, latent growth curve modeling confirmed that there was a linear decline in the Duration in Successful Time-Outs during the first four sessions of PDI, indicating that children spent significantly less total time in as families moved through the early sessions of PDI.

Positive Parenting Skills and Negative Parenting Behavior

It is not surprising that both Positive Parenting Skills and Negative Parenting Behaviors remained relatively stable during the PDI phase of treatment Thus, while

parents focus on practicing safe, effective child behavior management skills during PDI (i.e., using positively stated, developmentally appropriate direct commands delivered one at a time, following through after giving a command to support child compliance, and implementing time-outs effectively), findings suggest that parents also maintain a consistent level of positive PRIDE skills and a relatively low level of don't skills, as learned during CDI. This finding is important in that it suggests parents appear to maintain skills acquired during CDI while actively working on child compliance training during PDI.

Effective Commands and Successful Command Sequences

The proportion of effective commands that parents issued and the proportion of command sequences navigated successfully also remained stable over PDI sessions, a finding that was unexpected given that honing parents' PDI skill use is a major focus of PDI-phase work. While some past research has indicated PCIT increases children's compliance behavior (Eisenstadt et al., 1993; Galanter et al., 2012), findings from the present study indicate that when examining sample-wide averages, parents' effective command use and navigation of successful command sequences, which require child compliance, did not appear to change significantly over time. It is important to note that therapists do not code parents' independent use of effective commands or navigation of successful command sequences until the third PDI session at the earliest. Thus, it is possible that by the time therapists assess parents as ready to independently practice these skills during PDI coding, the effectiveness of commands delivered by parents and their ability to navigate command sequences successfully may have already improved during

the first several sessions where PDI coding was not conducted. Therefore, parents may not demonstrate much variability or increased use of these skills in PDI sessions 3-10.

It is also possible that stability in the proportion of effective commands issued and command sequences navigated successfully may be indicative of the types of commands parents are encouraged to give over the course of the PDI phase of treatment. Per the PCIT protocol, the types of commands therapists direct parents to deliver, and the associated difficulty of compliance for children, gradually progress over the course of PDI. Parents are initially directed to begin with easier play commands, such as asking the child to hand the parent a toy that the child is not currently playing with. As treatment progresses, parents shift to delivering more challenging commands, including asking their child to share a toy they are currently playing with or transition to a new, less-preferred play activity. Towards the end of treatment, caregivers learn to deliver commands that are typically the most challenging for children, including asking the child to clean-up the toys they are playing with and other "real-life" commands, such as putting on their shoes or jacket before leaving the therapy session. As the commands issued by parents increase in complexity, it may be increasingly more difficult for parents to issue effective commands and follow through successfully with command sequences. For example, asking a child to hand the parent a toy is relatively straight-forward and provides an easy opportunity for the parent to assess their child's compliance and react accordingly. In contrast, when working to give a more complex command, such as asking their child to clean-up, a parent may be more likely to issue commands that are not compliable (e.g., "Please clean up the blocks, then clean up the trains and put away the crayons," would render the first two commands to clean up the blocks and trains non-compliable). Additionally, parents

may have more difficulty assessing their child's compliance in such situations and responding accordingly. For example, if a parent gives their child a broad command to clean up the toys and the child only puts away the toy they are playing with, they may struggle with whether to praise their child, issue another command, or simply wait for their child to continue cleaning up. Thus, while the number of effective commands delivered and successful command sequences did not change significantly over the course of treatment in the present study, it may be that the nature of the commands being practiced increase significantly in terms of level of difficulty for both the parent and child over the course of PDI. While commands in the present study were not coded in terms of their focus and associated level of challenge (e.g., play, sharing, clean-up, etc.), characterizing commands in this manner and investigating 1) whether parents do shift from delivering easier, play-based commands to more challenging real-life commands over the course of treatment and 2) whether progression to more challenging commands over the course of PDI predicts child outcomes, including child self-regulation, is an important next step for future research.

Time-Out Utilization

Next, patterns in the number of and duration in time-outs implemented over the course of PDI were examined. Notably, this is the first time time-outs implemented during the PDI phase of PCIT have been observationally coded and examined. Time-outs that occurred any time during the PDI session were coded, and thus reflect parents' implementation of time-outs with therapist support. Importantly, nearly all time-outs were found to be successful, while unsuccessful time-outs were found to be extremely rare (n = 7), occurring in only five study families. Thus, in the present study, therapists

were able to guide parents in implementing successful time-outs during the vast majority of the time-outs that occurred. The frequent opportunities provided through PCIT for parents to engage in consistent practice and gain familiarity with how to successfully navigate time-outs in session should support their success in implementing the same disciplinary procedure in the home. In turn, implementing the time-out procedure successfully in the home would constitute an increase in parents' use of appropriately scaffolded disciplinary techniques.

It is important to note that in the present study, therapists received ongoing weekly remote consultation and regular live supervision of therapy sessions from master PCIT trainers from the University of Oklahoma. Research suggests that live coaching supervision is associated with greater reductions in child behavior challenges for families participating in PCIT (Funderburk et al., 2014). Thus, it is possible that other outcomes for families participating in PCIT may also be positively supported via live coaching of therapists. Implementation of successful time-outs may demonstrate particularly strong associations with the receipt of live coaching support, given that expert supervisors might be able to support therapists in successfully navigating particularly challenging time-outs which they may have struggled to guide parents through independently. Therefore, the high rates of successful time-outs and extremely low rates of unsuccessful time-outs in the present study may be partially attributable to the intensive live support and consultation therapists received. It will be important to investigate whether high success rates of time-outs are unique to samples where therapists receive live coaching during therapy sessions, or whether similar patterns of successful and unsuccessful time-outs also emerge in samples where therapists do not receive ongoing live supervision.

In addition to the overall prevalence of successful time-outs, the present study also identified important new findings regarding patterns of change in time-out usage over the course of PDI. The number of successful time-outs initiated and the time that children spent in time-out during a given session demonstrated general patterns of decline over the course of treatment. Further, latent growth curve modeling confirmed that there was a linear decline in the time children spent in time-outs during the first four sessions of PDI. These patterns of change suggest parents gain the most experience providing safe and effective child management in the form of time-out with support from their PCIT therapist during initial PDI sessions. In subsequent sessions, reductions in both the number of and duration in time-outs successfully implemented suggest parents are able to effectively manage their child's behavior with less need to use time-outs to do so. This may be due to parents' use of effective commands, reinforcement of their child's compliance through praise, and consistent follow through when needed, including delivering the time-out warning for non-compliance, with support and guidance from the therapist. Simultaneously, children receive the most scaffolded support for managing their behavior via-time-out during the first four sessions of PDI. Following initial sessions, reductions in the number of time-outs and time spent in time-outs suggest children learn to comply with their parents' directives more often without the need for more scaffolded support in the form of time-out.

Associations Between Demographic Characteristics and PDI-Specific Parenting Processes

Preliminary analyses also identified several notable associations between PDI-specific parenting processes and key parent and child demographic characteristics. First,

child age was found to be significantly associated with the number of and duration in successful time-outs, such that older children experienced shorter and fewer time-outs compared to younger children. These findings are consistent with past research indicating that children's ability to comply with their parents' directives improves significantly over the course of early childhood (Kochanska et al., 2001). This finding is notable given that younger children not only experienced more and longer time-outs, but also entered the study with lower baseline self-regulation skills. Results suggest that it may be particularly important to prepare caregivers of younger children for the possibility of implementing multiple, lengthy in-session time-outs before beginning the PDI phase of treatment. Because time-outs in the present study were only measured in session, it cannot be ascertained whether younger children also experienced more and longer time-outs during at-home practice. It is possible that parents of younger children implemented fewer time-outs during home practice, due to lengthier and more frequent in-session time-outs potentially seeming overwhelming or overly time-consuming to implement in the home. Differences in the number of and duration in time-outs implemented during home practice based on child age would be beneficial to examine in future studies to determine whether caregivers of younger children might benefit from more in-session time-out practice before being asked to practice time-out independently in the home, without therapist support.

Perhaps more surprisingly, parent age was also associated with several of the PDI-specific parenting processes. This is particularly notable given that parent and child age were not significantly related for participants in the present study. Overall, younger parents were found to demonstrate better command-based parenting skills over the course

of PDI. Namely, parent age was significantly associated with the proportion of compliable direct commands, the proportion of total (direct and indirect) compliable commands, and the proportion of non-compliable commands, such that younger parents were more likely to issue compliable commands (e.g., "Please hand me the pink crayon," "Please put away the three cars in your hand," etc.) and less likely to issue non-compliable commands ("Settle down," "Clean up all the cars, then put the blocks away, and then come tell me when you're done," etc.). Additionally, parent age was significantly associated with the proportion of successful direct command sequences and the proportion of total (direct and indirect) successful command sequences, such that younger parents were more likely to navigate command sequences successfully. Thus, younger parents were more likely to obtain their child's compliance after issuing a command, constituting a successful command sequence. There was also a subthreshold association between parent age and negative parenting ($r = 0.23$, $p = .13$), indicating younger parents demonstrated marginally less negative parenting behavior during CDI coding.

The finding that older child welfare-involved parents displayed more negative parenting contrasts with other studies indicating that older parents tend to engage in more positive, sensitive parenting and demonstrate fewer negative interactions with their children (Camberis et al., 2015; Fox et al., 1995; Thomson et al., 2014). However, it is notable that past research examining associations between parent age and parenting practices has focused primarily on more affluent samples. Compared to parents in the present study, participants in prior studies were more likely to be married, employed, and had obtained higher levels of education (Camberis et al., 2015; Fox et al., 1995; Thomson

et al., 2014). Thus, findings from prior research may not generalize to higher-risk families, including parents in the present study. However, the findings that older parents were more likely to give their children commands that were impossible to comply with (e.g., by issuing multiple commands in a row, engaging in actions incompatible with the child's completion of the command, or delivering commands that are too ambiguous for the child to comply with) and less successful at obtaining their child's compliance, together with the finding that parent and child age in this sample were unrelated, were still unexpected. It will be important to identify whether age-based differences in PDI parenting skills are replicable, or whether the results are unique to participants in the present study. It will also be important to identify whether associations between parent age and PDI skills are specific to child welfare-involved families, or whether associations also emerge for families without prior involvement in the child welfare system. If results replicate specifically for child welfare-involved families, this may indicate younger child welfare-involved parents may be more open to therapist coaching and feedback, and more willing to try new parenting techniques, than older child welfare-involved parents. This might suggest that caregivers involved in the child welfare system may benefit most from PCIT or other parenting interventions early on in their child welfare involvement. If caregivers demonstrate more flexibility in their ability to adjust parenting behaviors when they are younger, parenting interventions delivered during this time may be particularly effective in promoting adaptive parenting skills that lead to better outcomes for both parents, and perhaps reduce out of home placements for children, thereby promoting family preservation.

Replication of parent age-based differences in PDI skill use may also have important implications for treatment approach. If similar results are observed in other samples, older parents participating in PCIT may require more practice delivering effective commands and successfully navigating command sequences in order to meet mastery, compared to younger parents. Older parents may benefit from more frequent use of coaching techniques that have previously been found to support parent skill acquisition in PCIT. Use of responsive coaching that focuses on positively reinforcing parents' appropriate use of skills (e.g., "Excellent labeled praise") has been found to support parents' skill acquisition in CDI (Barnett et al., 2014; Barnett et al., 2015). In contrast, directive coaching, which provides explicit instruction to the parent (e.g., "Tell her she did a great job coloring her picture") did not predict parents' CDI skill acquisition (Barnett et al., 2014; Barnett et al., 2015). However, the effect of these coaching approaches on parent skill acquisition has not yet been examined during the PDI phase of treatment. While the PCIT protocol encourages therapists to frequently positively reinforce parents' skill use via responsive coaching during CDI, use of more directive coaching is emphasized during PDI in order to support parents in consistently delivering effective commands and following through contingently based on their child's compliance. Thus, directive coaching may represent a more common and helpful form of coaching in PDI, particularly during early phase sessions when parents are learning to master PDI-specific skills. It will be important to investigate whether directive coaching does in fact support parents' skill acquisition during PDI. If directive coaching is found to support parents' independent use of PDI-specific skills, older parents may benefit from more frequent directive coaching to support their ability to deliver effective commands

and follow through based on their child's compliance. In addition to targeted coaching in-session, older caregivers may also benefit from having additional support via adjunct in-home coaching, which has previously been shown to improve parent skill acquisition in PCIT (Timmer et al., 2009). Future research should also examine whether the number of children being cared for in the home has an impact on parents' use of parenting skills in PDI, above and beyond parent age. If this is the case, parents caring for more children at home may also benefit from increased use of coaching techniques found to support parent skill acquisition during PDI and additional in-home coaching practice.

Interestingly, no associations were found between parent age and the number of and duration in time-outs implemented during the therapist-coached segments of PDI sessions. Overall, the lack of association between parent age and time-outs in the present study is promising, as it suggests that therapists were able to successfully guide parents in implementing successful time-outs during sessions, regardless of parent age. It will be important to replicate these results to confirm whether parent age and time-out implementation are in fact unrelated, or whether results are unique to the present sample. If results are found to replicate in other samples, it will be important to examine whether time-out implementation is unrelated to parent age only in contexts where parents have access to therapist coaching. Time-outs examined in the present study occurred throughout the session, and therefore parents consistently had access to therapist support and guidance while putting their child in time-out. This stands in contrast to the assessment of parents' effective commands and successful navigation of command sequences, which were examined during 5-minute segments where parents practiced these skills independently, while therapists observed only. Thus, it is possible that in

addition to being less likely to demonstrate effective command-based parenting skills, older parents may also be less likely to independently implement successful time-outs. However, this cannot be ascertained from the present study, as therapist support was consistently available for all time-outs implemented. Given that the PCIT protocol specifies therapists should intervene to support parents with time-out implementation as needed, it may be difficult to assess parents' independent implementation of time-outs in future research. However, it would be possible to examine whether older parents are less likely to engage in contingent responding during PDI coding that is required to initiate a time-out, such as delivering a time-out warning. Issuing a time-out warning represented one potential component of the successful command sequences examined in the present study. However, examining specifically whether older parents are less likely to issue a time-out warning in response to their child's non-compliance might provide further insight into whether older parents may be less likely to implement time-outs, in addition to demonstrating fewer effective commands and navigation of successful command sequences.

Aim 2: Testing Associations Between Observed Parenting and Child Self-Regulation

Virtually no support was found for the hypothesis that PDI-specific parenting processes lead to improvements in children's post-treatment self-regulation. Results for a majority of the linear regression models examining the impact of observed parenting processes on children's post-treatment self-regulation produced null results. Additionally, latent growth curve models documented significant linear declines in duration in time-outs during the first four sessions of PDI but did not predict children's post-treatment self-regulation outcomes. One significant finding did emerge that ran counter to study

hypotheses – specifically, children who experienced more time-outs and spent more time in time-out over the course of PDI entered the study with lower behavioral regulation scores on the HTKS and demonstrated lower HTKS behavioral regulation at post-treatment.

For children in the present study, experiences with time-out did not improve their post-treatment behavioral regulation, as measured by the HTKS task. There are several potential explanations for this finding. It is possible that other parenting processes that take place during PDI played a role in this association. In the present study, children who demonstrated lower post-treatment HTKS scores experienced significantly less positive parenting over the course of PDI (r = -.31, p < .05). Children with lower post-treatment HTKS scores also experienced marginally fewer compliable direct commands (r = -.20, p = .20), total successful command sequences (r = -.29, p = .07), and successful direct command sequences (r = -.25, p = .13). Thus, it is possible that children who demonstrated lower post-treatment self-regulation via the HTKS task not only experienced more and longer time-outs over the course of PDI, but also experienced less positive parenting, fewer effective commands, and fewer successfully navigated command sequences. It is possible that time-outs may be beneficial for children's self-regulatory skills only in contexts where parents are also independently utilizing higher levels of positive parenting, issuing effective commands, and following through appropriately with contingent responding to commands, based on their child's compliance. This is consistent with past research indicating reduced positive parenting and parental scaffolding are consistently associated with deficits in self-regulation for children (Fay-Stammbach et al., 2014; Valcan et al., 2018). Thus, parents who

consistently implement time-outs without also providing their child with warm, positive interactions and successfully scaffolding their child's behavior through the delivery of effective commands and appropriate contingent responding may consequently establish caregiver relationships in which children are less likely to develop their self-regulatory skills.

It is possible that the combination of lower positive parenting skills, fewer effective commands, fewer successful command sequences, and more time-outs observed among children with lower post-treatment HTKS scores in the present study is associated with the present study utilizing a session-limited rather than mastery-based approach to treatment. Parents in the present study were not required to meet phase-specific mastery criteria prior to completing CDI or PDI (i.e., achieved when 75% of commands delivered are effective and parents demonstrate 75% successful follow through with command sequences during PDI coding). Instead, parents moved onto PDI after either achieving CDI mastery or participating in a maximum of 8 CDI coaching sessions, and concluded PDI after either meeting mastery or participating in a maximum of 10 PDI coaching sessions. While limiting the maximum number of sessions families can receive is a common approach in randomized clinical trials of PCIT (Thomas & Zimmer-Gembeck, 2007), it is possible that treatment length and the associated ability of parents to achieve skills mastery during each treatment phase played a role in children's self-regulation outcomes. Past research indicates that children experience greater reductions in their externalizing behavior challenges when parents are required to meet phase-specific mastery criteria, as opposed to when parents are not required to meet mastery (Thomas et al., 2017). Thus, it is possible that children's self-regulation outcomes may also be best

supported through mastery-based PCIT. Conversely, it is also possible that parents of children who demonstrated more self-regulation challenges on the HTKS task at pre- and post-treatment and experienced more and longer in-session time-outs may have dropped out early rather than continuing in PCIT until they achieved mastery. Thus, it will be important for future research to examine the impact of treatment dosage on both PDI-phase parent skill acquisition and child post-treatment self-regulation by comparing these outcomes for families completing session-limited versus mastery-based PCIT.

It is also possible that factors outside the session play a role in explaining the finding that children who experienced more and longer time-outs demonstrated lower post-treatment self-regulation outcomes on the HTKS task. For example, perhaps children who experience more frequent and longer time-outs in session also have parents who are less likely to implement positive parenting skills, use effective commands, follow through successfully with command sequences, and implement time-outs successfully in the home. This could potentially be due to parents finding in-session processes of PDI-specific parenting skills overwhelming or overly time-consuming, reducing their likelihood of implementing time-out and other PDI-phase skills in the home. If children are not consistently experiencing effectively scaffolded parent management in the home via effective commands, parent responding, and implementation of time-outs when needed, they would not receive the necessary caregiver support to learn to regulate their own behavior. This may also result in more and longer time-outs in session, given that children would essentially ‘re-learn’ the process of listening to their parent during each session, resulting in a higher probability of experiencing a time-out in session. This pattern of ongoing child non-compliance and

consequent experiences of longer, more frequent time-outs among families with lower rates of homework completion would be consistent with past research indicating that in PCIT, children whose parents complete less homework demonstrate greater behavioral challenges (Ros et al., 2016). Further, research has shown higher rates of homework completion in PCIT are related to better positive parenting skills and lower negative parenting skills (Ros et al., 2016, 2017; Stokes et al., 2016), suggesting that consistent completion of PDI homework may also result in better in-session PDI skills for caregivers. Future research might assess whether homework completion plays a role in the relation between more frequent and longer in-session time-outs and children's post-treatment self-regulation outcomes. Specifically, it may be beneficial to examine specific aspects of PDI homework completion, including the number of and duration in time-outs experienced by children during home practice, as moderators of the relation between in-session time-out experiences and children's post-treatment self-regulation outcomes. Perhaps experiencing more and longer in-session time-outs leads to improvements in children's self-regulation only for families who also report implementing longer and more frequent time-outs in the home. Thus, examining home practice of time-outs may provide further insight into how practice of PDI-specific processes at home, in addition to in-session processes, impact children's self-regulation outcomes.

Finally, it is possible that PDI parenting processes initially impact other aspects of children's behavioral functioning, but only impact children's self-regulation after ongoing implementation of these skills following treatment completion. Past research indicates that children who participate in PCIT demonstrate reductions in their disruptive behavior challenges and increases in compliance following treatment (Eisenstadt et al.,

1993; Thomas et al., 2017). Given this, it is possible that the number of and duration in time-outs experienced by children during PDI play a role in reducing their post-treatment disruptive behavior concerns. Although not examined in the present study, it will be important for future research to examine whether more experiences with successful in-session time-out processes may positively impact children's externalizing behavior challenges immediately following treatment completion. Longer-term impacts of PDI processes on children's self-regulation may take place via sleeper effects, during which improvements in post-treatment outcomes are observed at a later follow-up point rather than immediately following treatment (van Aar et al., 2017). It is possible that children require more practice and experience with PDI-specific skills in order for these processes to influence their independent behavior regulation. With repeated exposure to PDI parenting processes in the home following conclusion of treatment, children may internalize these regulatory processes and begin to engage in self-regulation independently (Wertsch et al., 1980). Given what is known about scaffolding (e.g., children learn to first regulate their behavior with assistance from a caregiver and then, with repeated practice, gradually learn to regulate themselves independently), it is possible that children who experience more frequent/longer time-outs throughout treatment are still in need of significant caregiver scaffolding to support their behavior, and thus are limited in their ability to regulate their behavior independently immediately following treatment (Valcan et al., 2018). Studies of other parenting interventions have identified sleeper effects in children's behavior following treatment, consisting of ongoing reductions in children's disruptive behavior challenges 8-12 months following treatment completion (Jouriles et al., 2009; Somech & Elizur, 2012). Notably, Somech &

Elizur (2012) identified long-term improvements in children's effortful control one year following intervention participation, which parallels the self-regulatory domains examined in the present study. Thus, it is possible that similar processes may take place following completion of PCIT, with ongoing practice of PDI-specific processes in the home resulting in improvements in children's self-regulation over time. Long-term follow-up of children's self-regulatory skills following completion of PDI via assessment of children's self-regulation 6-12 months following treatment completion may help identify whether time-out experiences and other PDI-specific parenting processes might predict long-term post-treatment self-regulation outcomes for children.

Associations Between Demographic Characteristics and Child Self-Regulation

Several notable associations also emerged between parent and child demographic characteristics and children's self-regulation at pre- and post-treatment. Child age was positively associated with their performance on the HTKS and Zoo GNG dPrime tasks at both pre- and post-treatment, such that older children demonstrated better self-regulatory skills on each of these tasks both before and after participating in PCIT. These results are consistent with past research indicating children's self-regulation abilities improve drastically with age during preschool and early childhood (Kochanska et al., 2001). Notably, child age was only associated with pre- and post-treatment behavioral self-regulation scores and was not associated with parent report of children's regulation via the BRIEF.

Parent age was also significantly associated with several child self-regulation variables. Specifically, parent age at pre-treatment was significantly associated with children's HTKS and BRIEF Shift scores at post-treatment, such that children of older

parents demonstrated better inhibitory control on the HTKS task and demonstrated more parent-reported regulation challenges on the BRIEF Shift subscale. These associations are particularly notable, given child age was not significantly associated with parent age, suggesting associations between parent age and child self-regulatory outcomes are not simply reflective of older parents being likely to have older children. Overall, research specifically linking parent age to child regulation outcomes is limited, and research examining associations between parent age, child self-regulation, and behavioral outcomes broadly has produced mixed results. The finding that older parents were likely to rate their child as having more challenges on the BRIEF Shift subscale is somewhat consistent with one past research study, which found older parents rated their children as having more difficulties with effortful control and emotion regulation (Moreno-Giménez et al., 2021). Given that both the present study and past research with comparable findings have relied on parent report, it is possible that older parents are more likely to perceive their children as less regulated. In contrast, research examining maternal age and child behavioral outcomes more broadly has found that children of older mothers generally demonstrate fewer externalizing behavior problems, suggesting that children of older mothers may in fact demonstrate better behavior regulation (Tearne, 2015). It is important to note that a majority of this research has focused on comparing children of teenage mothers (19 and younger) to children of older mothers (age 20+), and thus may not accurately represent behavioral regulation of children associated with continuous differences in maternal age (Tearne, 2015). Given this, future research should confirm whether continuously measured maternal age is associated with children's self-regulation abilities in other samples. Further, it will be important to identify whether older parents

have less positive perceptions of their child's regulation abilities, as assessed via parent report. Comparing parents' report of their child's self-regulation abilities with children's regulation as assessed by laboratory-based tasks will help to determine whether older parents' reports of their child's self-regulation abilities are accurate, or whether children of older parents do in fact demonstrate better regulation abilities compared to children of younger parents.

Strengths and Limitations

The present study has several strengths. Notably, this is the first study to characterize and described patterns of PDI-specific parenting processes in PCIT. In order to conduct the present study, a PDI Time-Out Coding system was developed to examine parents' use of time-outs in-session. Thus, the development of this coding system provides an important tool for future researchers to examine time-outs in PCIT and examine whether findings from the current study replicate to other samples. A related strength of the present study is the assessment of observed parenting behaviors over the course of treatment. Parenting behaviors in the present study were assessed using the well-validated DPICS-IV (Eyberg et al., 2013) in addition to the newly developed PDI Time-Out Coding system. Using the DPICS-IV, assessment of observed parenting was conducted during brief intervals where parents were asked to utilize their skills without support from the therapist (e.g., CDI and PDI coding). Examination of parents' skills in these contexts provides unique insight into parents' independent skill use and development over time. Finally, the operationalization of self-regulation in the present study also constitutes a strength, given that children's self-regulation was assessed both through structured laboratory tasks (e.g., HTKS, McClelland et al., 2014; Zoo Go-No-Go

dPrime, Grammer et al., 2014), as well as parent-report via the BRIEF (Gioia et al., 1996, 2000; Sherman & Brooks, 2010).

A major limitation of the present study is the small sample size. Given that only 50 families participated in one or more PDI coaching session, the present study had limited power to detect associations between variables. Results that were produced should be interpreted with caution, given the small sample size. Limited power also impacted the ability to test and compare latent growth curve models, as none of the quadratic models assessed produced admissible solutions. Thus, it is unknown whether quadratic, rather than linear change, might better characterize patterns of change in duration in time-outs over the first four sessions of PDI. Additionally, although the development of the PDI Time-Out Coding system represents a strength of a present study, it should be noted that this coding system has not been previously used or validated. Further validation of the coding system via use in other research studies will help to confirm its ability to accurately characterize in-session time-outs and may assist with improving the clarity and utility of the coding system through ongoing adaptation and revision.

Future Directions

It will be important to assess PDI parenting processes in larger samples to determine whether similar patterns in stability of positive parenting, negative parenting, effective commands, and successful command sequences, along with declines in the number of and duration in time-outs experienced by children, are consistent across samples. Studies with larger samples would be better equipped to assess additional patterns of change (e.g., quadratic) in duration in time-outs across the first four sessions

of PDI to determine whether linear change best characterizes these declines. Although larger sample sizes would help better elucidate mechanisms of change, it is important to note that implementing PCIT as part of a large-scale research study, particularly with high-risk families, presents several challenges in terms of retaining families through treatment completion and for follow-up assessment (Danko et al., 2016; Lieneman et al., 2019). Thus, another approach to examining these processes with more power would be to conduct parallel analyses of parenting processes and child self-regulation outcomes within similarly sized randomized clinical trials of PCIT, and then utilize data sharing frameworks to support meta-analyses of these processes (Bauchner et al., 2019). Such data pooling would support a better understanding of how parenting processes change over the course of PDI and would allow researchers to examine how these processes impact children's post-treatment outcomes, including self-regulation.

Future studies should also examine moderating effects of pre-treatment demographic characteristics, such as parent and child age, and other treatment processes that may impact links between PDI-phase parenting skills and associated outcomes. For example, future studies should examine whether younger parents and/or parents with less caregiving experience consistently demonstrate higher average levels of PDI-phase specific skills in PCIT, or whether these findings were unique to the present sample. If results are found to replicate in other samples, such that older parents and parents with more caregiving experience demonstrate lower use of PDI-phase specific parenting skills, these findings may have important implications for working with older parents in PCIT. Namely, therapists may be able to use strategies such as targeted coaching or additional in-home skills practice to help support PDI skill acquisition for older parents. Further, it

will be beneficial to examine whether other PDI-phase factors, including the constellation of parenting skills used by parents (including positive parenting, negative parenting, effective command use, navigation of successful command sequences, and time-out implementation) and homework completion might moderate the impact of time-out experience on children's post-treatment self-regulation outcomes. Finally, research should investigate potential sleeper effects by conducting follow-up assessments of children's self-regulatory skills 6-12 months following completion of PDI.

Concluding Remarks

In sum, initial CDI-phase work in PCIT emphasizes increasing use of positive parenting skills and reducing negative parenting behavior. Caregivers then transition to PDI-phase work, where they learn to deliver effective commands, follow through contingently based on their child's compliance, and implement the use of a consistent, non-harsh time-out procedure when needed. Results in the present study illustrated that the positive parenting skills and negative parenting behaviors addressed during CDI remain relatively stable over the PDI phase of treatment. This study characterized PDI-specific parenting processes, revealing that parents demonstrated general declines in the number of and duration in successful time-outs implemented in session over the course of treatment, and relatively stable patterns of effective command use and successful navigation of command sequences. The present study did not find any significant positive associations between observed parenting behavior and improved post-treatment self-regulation for children as predicted. However, the lack of associations in the present study could be due to the influence of other PDI-specific parenting processes, the impact of homework completion, or sleeper effects, and therefore these factors should be

investigated further in future research. Overall, further investigation is needed to continue elucidating whether PDI phase processes may have a positive impact on children's self-regulation outcomes following treatment.

REFERENCES CITED

Abidin, R. R. (1995*). Parenting stress index: Professional manual*. Lutz, FL: Psychological Assessment Resources.

Allan, N. P., Hume, L. E., Allan, D. M., Farrington, A. L., & Lonigan, C. J. (2014). Relations between inhibitory control and the development of academic skills in preschool and kindergarten: A meta-analysis. *Developmental Psychology, 50*(10), 2368-2379. https://doi.org/10.1037/a0037493

Arbuckle, J. L. (2014). Amos (Version 23.0) [Computer Program]. Chicago: IBM SPSS.

Ateah, C. A., & Durrant, J. E. (2005). Maternal use of physical punishment in response to Child misbehavior: Implications for child abuse prevention. *Child Abuse & Neglect, 29*(2), 169-185. https://doi.org/10.1016/j.chiabu.2004.10.010

Baer, J. C., & Martinez, C. D. (2006). Child maltreatment and insecure attachment: A meta-analysis. *Journal of Reproductive and Infant Psychology, 24*(3), 187-197. https://doi.org/10.1080/02646830600821231

Bagner, D. M., Graziano, P. A., Jaccard, J., Sheinkopf, S. J., Vohr, B. R., & Lester, B. M. (2012). An initial investigation of pre-treatment respiratory sinus arrhythmia as a moderator of treatment outcomes for young children born premature with externalizing behavior problems. *Behavior Therapy, 43*(3), 652-665. https://doi.org/10.1016/j.beth.2011.12.002.

Barnett, M. L., Niec, L. N., Peer, S. O., Jent, J. F., Weinstein, A., Gisbert, P., & Simpson, G. (2015). Successful therapist-parent coaching: How in vivo feedback relates to parent engagement in parent-child interaction therapy. *Journal of Clinical Child & Adolescent Psychology, 46*(6), 895-902. https://doi.org/10.1080/15374416.2015.1063428

Barnett, M. L., Niec, L. N., & Acevedo-Polakovich I. D. (2014). Assessing the key to Effective coaching in parent-child interaction therapy: The therapist-parent interaction coaching system. *Journal of Psychopathology and Behavioral Assessment, 36*(2), 211-223. https://doi.org/10.1007/s10862-013-9396-8

Batzer, S., Berg, T., Godinet, M. T., & Stotzer, R. L. (2018). Efficacy or chaos? Parent-child interaction therapy in maltreating populations: A review of research. *Trauma, Violence, & Abuse, 19*(1), 3-19. https://doi.org/10.1177/1524838015620819

Bauchner, H., Golub, R. M., & Fontanarosa, P. B. (2019). Data Sharing: An ethical and Scientific imperative. *JAMA, 315*(12), 1238-1240. https://doi.org/10.1001/jama.2016.2420

Bell, M. A., & Deater-Deckard, K. (2007). Biological systems and the development of self-regulation: Integrating behavior, genetics, and psychophysiology. *Journal of Developmental & Behavioral Pediatrics, 28*(5), 409-420. https://doi.org/10.1097/DBP.0b013e3181131fc7

Bernier, A., Carlson, S. M., Deschenes, M., & Matte-Gagné, C. (2012). Social factors in the development of early executive functioning: A closer look at the caregiving environment. *Developmental Science, 15*(1), 12-24. https://doi.org/10.1111/j.1467-7687.2011.01093.x

Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development, 81*(1), 326-339. https://doi.org/10.1111/j.1467-8624.2009.01397.x

Bindman, S. W., Hindman, A. H., Bowles, R. P., & Morrison, F. J. (2013). The contributions of parental management language to executive function in preschool children. *Early Childhood Research Quarterly, 28*(3), 529-539. https://doi.org/10.1016/j.ecresq.2013.03.003

Birmingham, R. S., Bub, K. L., & Vaughn, B. E. (2017). Parenting in infancy and self-regulation in preschool: An investigation of the role of attachment history. *Attachment & Human Development, 19*(2), 107-129. https://doi.org/10.1080/14616734.2016.1259335

Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist, 57*(2), 111-127. https://doi.org/10.1037/0003-066X.57.2.111

Calkins, S. D. (1997). Cardiac vagal tone indices of temperamental reactivity and behavioral regulation in young children. *Developmental Psychobiology, 31*(2), 125-135. https://doi.org/ 10.1002/(sici)1098-2302(199709)31:2<125::aid-dev5>3.0.co;2-m.

Calkins, S. D., Blandon, A. Y., Williford, A. P., & Keane, S. P. (2007). Biological, behavioral, and relational levels of resilience in the context of risk for early childhood behavior problems. *Development and Psychopathology, 19*(3), 675-700. https://doi.org/10.1017/S095457940700034X

Calkins, S. D., & Dedmon, S. E. (2000). Physiological and behavioral regulation in two-year-old children with aggressive/destructive behavior problems. *Journal of Abnormal Child Psychology, 28*(2), 103-118. https://doi.org/10.1023/A:1005112912906

Calkins, S. D., & Keane, S. P. (2004). Cardiac vagal regulation across the preschool period: Stability, continuity, and implications for childhood adjustment. *Developmental Psychobiology, 45*(3), 101-112. https://doi.org/10.1002/dev.20020

Camberis, A. L., McMahon, C. A., Gibson, F. L., & Boivin, J. (2015). Maternal age, psychological maturity, parenting cognitions, and mother-infant interactions. *Infancy, 21*(4), 396-422. https://doi.org/10.1111/infa.12116

Cecil, C. A., Barker, E. D., Jaffee, S. R., & Viding, E. (2012). Associations between maladaptive parenting and child self-control over time: Cross-lagged study using a monozygotic twin difference design. *British Journal of Psychiatry, 201*(4), 291-297. https://doi.org/10.1192/bjp.bp.111.107581

Cerezo, M. A., & D'Ocon, A. (1999). Sequential analyses in coercive mother-child interaction: The predictability hypothesis in abusive versus nonabusive dyads. *Child Abuse & Neglect, 23*(2), 99-113. https://doi.org/10.1016/S0145-2134(98)00115-X

Chaffin, M., Funderburk, B., Bard, D., Valle, L. A., & Gurwitch, R. (2011). A combined motivation and parent-child interaction therapy package reduces child welfare recidivism in a randomized dismantling field trial. *Journal of Consulting and Clinical Psychology, 79*(1), 84-95. https://doi.org/10.1037/a0021227

Chaffin, M., Silovksy, J. F., Funderburk, B., Valle, L. A., Brestan, E. V., Balachova, T., Jackson, S., Lensgraf, J., & Bonner, B. L. (2004). Parent-child interaction therapy with physically abusive parents: Efficacy for reducing future abuse reports. *Journal of Consulting and Clinical Psychology, 72*(3), 500-510. https://doi.org/0.1037/0022-006X.72.3.500

Colman, R. A., Hardy, S. A., Albert, M., Raffaelli, M., & Crockett, L. (2006). Early predictors of self-regulation in middle childhood. *Infant and Child Development, 15*(4), 421-437. https://doi.org/10.1002/icd.469

Cooley, M. E., Veldorale-Griffin, A., Petren, R. E., & Mullis, A. K. (2014). Parent-child Interaction therapy: A meta-analysis of child behavior outcomes and parent stress. *Journal of Family Social Work, 17*(3), 191-208. https://doi.org/10.1080/10522158.2014.888696

Crouch, J. L., & Behl, L. E. (2001). Relationships among parental beliefs in corporal punishment, reported stress, and physical child abuse potential. *Child Abuse & Neglect, 25*(3), 413-419. https://doi.org/10.1016/S0145-2134(00)00256-8

Dadds, M. R., Mullins, M. J., McAllister, R. A., & Atkinson, E. (2003). Attributions, affect, and behavior in abuse-risk mothers: A laboratory study. *Child Abuse & Neglect, 27*(1), 21-45. https://doi.org/10.1016/S0145-2134(02)00510-0

Danko, C. M., Garbacz, L. L., & Budd, K. S. (2016). Outcomes of parent-child interaction therapy in an urban community clinic: A comparison of treatment completers and dropouts. *Children and Youth Services Review*, *60*, 42-51. https://doi.org/10.1016/j.childyouth.2015.11.007

DePrince, A. P., Weinzierl, K. M., & Combs, M. D. (2009). Executive function performance and trauma exposure in a community sample of children. *Child Abuse & Neglect, 33*(6), 353-361. https://doi.org/10.1016/j.chiabu.2008.08.002

Dodge, K. A., Coie, J. D., & Lynam, D. (2006). Aggression and antisocial behavior in youth. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (6th ed; pp.719-788). Hoboken, NJ: John Wiley.

Eisenberg, N., Cumberland, A., Spinrad, T. C., Fabes, R. A., Shepard, S. A., Reiser, M., Murphy, B. C., Losoya, S. H., & Guthrie, I. K. (2001). The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child Development, 72*(4), 1112-1134. https://doi.org/10.1111/1467-8624.00337

Eisenberg, N., Hofer, C., & Vaughan, J. (2007). Effortful control and its socioemotional consequences. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 287-306). New York, NY: The Guilford Press.

Eisenberg, N., Sadovsky, A., Spinrad, T. L., Fabes, R. A., Losoya, S. H., Valiente, C., Reiser, M., Cumberland, A., & Shepard, S. A. (2005). The relations of problem behavior status to children's negative emotionality, effortful control, and impulsivity: concurrent relations and prediction of change. *Developmental Psychology, 41*(1), 193-211. https://doi.org/10.1037/0012-1649.41.1.193

Eisenberg, N., Valiente, C., Morris, A. S., Fabes, R. A., Cumberland, A., Reiser, M., Gershoff, E. T., Shepard, S. A., & Losoya, S. (2003). Longitudinal relations among parental emotional expressivity, children's regulation, and quality of socioemotional functioning. *Developmental Psychology, 39*(1), 3-19. https://doi.org/10.1037/0012-1649.39.1.3

Eisenberg, N., Valiente, C., Spinrad, T. C., Cumberland, A., Liew, J., Reiser, M., Zhou, Q., & Losoya, S. H. (2009). Longitudinal relations of children's effortful control, impulsivity, and negative emotionality to their externalizing, internalizing, and co-occurring behavior problems. *Developmental Psychology, 45*(4) 988-1008. https://doi.org/10.1037/a0016213

Eisenstadt, T. H., Eyberg, S., McNeil, C. B., Newcomb, K., & Funderburk, B. (1993). Parent-child interaction therapy with behavior problem children: Relative effectives of two stages and overall treatment outcome. *Journal of Clinical Child Psychology, 22*(1), 42-51. https://doi.org/10.1207/s15374424jccp2201_4

Euser, S., Alink, L. R., Stoltenborgh, M., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2015). A gloomy picture: A meta-analysis of randomized controlled trials reveals disappointing effectiveness of programs aiming at preventing child maltreatment. *BMC Public Health, 15*, 1068. https://doi.org/10.1186/s12889-015-2387-9

Eyberg, S. (1988). Parent-child interaction therapy: Integration of traditional and behavioral concerns *Child & Family Behavior Therapy, 10*(1), 34-46. https://doi.org/10.1300/J019v10n01_04

Eyberg, S. (2019, August 28). 2019 PCIT International Biennial Convention, Chicago, IL, United States.

Eyberg, S. M., Nelson, M. M., Ginn, N. C., Bhuiyan, N, & Boggs, S. R. (2013). *Dyadic parent child interaction coding system (DPICS): Comprehensive manual for research and training* (4th edition). Gainesville, FL: PCIT International.

Fabes, R. A., Eisenberg, N., Jones, S., Smith, M., Guthrie, I., Poulin, R., Shepard, S., & Friedman, J. (1999). Regulation, emotionality, and preschoolers' socially competent peer interactions. *Child Development, 70*(2), 432-442. https://doi.org/10.1111/1467-8624.00031

Fabes, R. A., Martin, C. L., Hanish, L. D., Anders, M. C., & Madden-Derdich, D. A. (2003). Early school competence: The roles of sex-segregated play and effortful control. *Developmental Psychology, 39*(5), 848-858. https://doi.org/10.1037/0012-1649.39.5.848

Fay-Stammbach, T., Hawes, D. J., & Meredith, P. (2014). Parenting influences on Executive function in early childhood: A review. *Child Development Perspectives, 8*(4), 258-264. https://doi.org/10.1111/cdep.12095

Fay-Stammbach, T., Hawes, D. J., & Meredith, P. (2016). Child maltreatment and emotion socialization: Associations with executive function in the preschool years. *Child Abuse & Neglect, 64*, 1-12. https://doi.org/10.1016/j.chiabu.2016.12.004

Fay-Stammbach, T., Hawes, D. J., & Meredith, P. (2017). Child maltreatment and emotion socialization: Associations with executive function in the preschool years. *Child Abuse & Neglect, 64*, 1-12. https://doi.org/10.1016/j.chiabu.2016.12.004

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine, 14*(4), 245-258. https://doi.org/10.1016/S0749-3797(98)00017-8

Forgatch, M. S., & Patterson, G. R. (2010). Parent management training - Oregon model: An intervention for antisocial behavior in children and adolescents. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (p. 159-177). The Guilford Press.

Fox, R. A., Platz, D. L., & Bentley, K. S. (1995). Maternal factors related to parenting practices, developmental expectations, and perceptions of child behavior problems. *The Journal of Genetic Psychology, 156*(4), 431-441. https://doi.org/10.1080/00221325.1995.9914835

Funderburk, B., Chaffin, M. Bard, E., Shanley, J., Bard, D., & Berliner, L. (2014). Comparing client outcomes for two evidence-based treatment consultation strategies. *Journal of Clinical Child & Adolescent Psychology, 44*(5), 730-741. https://doi.org/10.1080/15374416.2014.910790

Galanter, R., Self-Brown, S., Valente, J. R., Dorsey, S., Whitaker, D. J., Bertuglia-Haley, M., & Prieto, M. (2012). Effectives of parent-child interaction therapy delivered to at-risk families in the home setting. *Child & Family Behavior Therapy, 34*(3), 177-196. https://doi.org/10.1080/07317107.2012.707079

Gioia, G. A., Andrews, K., & Isquith, P. K. (1996). Behavior rating inventory of executive function – preschool version (BRIEF-P). Odessa, FL: Psychological Assessment Resources.

Gioia, G. A., Isquith, P. K., Guy, S. C., & Kenworthy, L. (2000). Behavior rating inventory of executive function: BRIEF. Odessa, FL: Psychological Assessment Resources.

Grammer, J. K., Carrasco, M., Gehring, W. J., & Morrison, F. J. (2014). Age-related changes in error processing in young children: A school-based investigation. *Developmental Cognitive Neuroscience, 9*, 93-105. https://doi.org/10.1016/j.dcn.2014.02.001

Graziano, P. A., Bagner, D. M., Sheinkopf, S. J., Vohr, B. R., & Lester, B. M. (2012). Evidence- based intervention for young children born premature: Preliminary evidence for associated changes in physiological regulation. *Infant Behavior and Development, 35*(3), 417-428. https://doi.org/10.1016/j.infbeh.2012.04.001

Grolnick, W. S., & Farkas, M. (2002). Parenting and the development of children's self-regulation. In M. H. Bornstein (Ed.), *Handbook of parenting: Practical issues in parenting* (pp. 89-110). Mahwah, NJ: Lawrence Erlbaum Associates.

Hakman, M., Chaffin, M., Funderburk, B., & Silovsky, J. F. (2009). Change trajectories for parent-child interaction sequences during parent-child interaction therapy for child physical abuse. *Child Abuse & Neglect, 33*(7), 461-470. https://doi.org/10.1016/j.chiabu.2008.08.00

Hinnant, J. B., & El-Sheikh, M. (2009). Children's externalizing and internalizing symptoms over time: The role of individual differences in patterns of RSA responding. *Journal of Abnormal Child Psychology, 37*, 1049-1061. https://doi.org/10.1007/s10802-009-9341-1

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55. https://doi.org/10.1080/10705519909540118

IBM Corp., (2019). IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.

Jöreskog, K. G., & Sörbom, D. (1984). *Advances in factor analysis and structural equation models*. Lanham, MD: Rowman & Littlefield Publishers.

Jouriles, E. N., McDonald, R., Rosenfield, D., Stephens, N., Corbitt-Shindler, D., & Miller, P. C. (2009). Reducing conduct problems among children exposed to intimate partner violence: A randomized clinical trial examining effects of project support. *Journal of Consulting and Clinical Psychology, 77*(4), 705-717. https://doi.org/10.1037/a0015994

Kaminski, J. W., & Claussen, A. H. (2017). Evidence base update for psychosocial treatments for disruptive behaviors in children. *Journal of Clinical Child & Adolescent Psychology. 46*(4), 477-499. https://doi.org/10.1080/15374416.2017.1310044

Kaminski, J. W., Valle, L. A., Filene, J. H., & Boyle, C. L. (2008). A meta-analytic review of components associated with parent training program effectiveness. *Journal of Abnormal Child Psychology, 36*(4), 567-589. https://doi.org/10.1007/s10802-007-9201-9

Kavanagh, K. A., Youngblade, L., Reid, J. B., & Fagot, B. I. (1988). Interactions between children and abusive versus control parents. *Journal of Clinical Child Psychology, 17*(2), 137-142. https://doi.org/10.1207/s15374424jccp1702_5

Kennedy, S. C., Kim, J. S., Tripodi, S. J., Brown, S. M., & Gowdy, G. (2016). Does parent-child interaction therapy reduce future physical abuse? A meta-analysis. *Research on Social Work Practice, 26*(2), 147-156. https://doi.org/10.1177/1049731514543024

Kirke-Smith, M., Henry, L. A., & Messer, D. (2016). The effect of maltreatment type on adolescent executive functioning and inner speech. *Infant and Child Development*, *25*(6), 516–532. https://doi.org/10.1002/icd.1951

Kochanska, G. (1997). Mutually responsive orientation between mothers and their young children: Implications for early socialization. *Child Development, 68*(1), 94-112. https://doi.org/10.2307/1131928

Kochanska, G., Coy, K. C., & Murray, K. T. (2001). The development of self-regulation in the first four years of life. *Child Development, 72*(4), 1091-1111. https://doi.org/10.1111/1467-8624.00336

Kochanska, G., & Knaack, A. (2003). Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality, 71*(6), 1087-1112. https://doi.org/10.1111/1467-6494.7106008

Kochanska, G., & Murray, K. T. (2000). Mother-child mutually responsive orientation and conscience development: From toddler to early school age. *Child Development, 71*(2), 417-431. https://doi.org/10.1111/1467-8624.00154

Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36*(2), 220-232. https://doi.org/10.1037/0012-1649.36.2.220

Kopp, C. B. (1982). Antecedents of self-regulation: A developmental perspective. *Developmental Psychology, 18*(2), 199-214. https://doi.org/10.1037/0012-1649.18.2.199

Lewis, C., & Carpendale, J. I. M. (2009). Introduction: Links between social interaction and executive function. *New Directions in Child and Adolescent Development, 123*, 1-15. https://doi.org/10.1002/cd.232

Lewit, E. M., & Baker, L. S. (1995). School readiness. *The Future of Children, 5*(2), 128-139. https://doi.org/10.2307/1602361

Lieneman, C. C., Quetsch, L. B., Theodorou, L. L., Newton, K. A., & McNeil, C. B. (2019). Reconceptualizing attrition in parent-child interaction therapy: "Dropouts" demonstrate impressive improvements. *Psychology Research and Behavior Management, 21*543-555. https://doi.org/10.2147/PRBM.S207370

Macmillan, N. A., & Creelman, C. D. (2004). *Signal detection theory: A user's guide* (2nd edition). Mahwah, NJ: Lawrence Erlbaum Associates.

Mash, E. J., Johnston, C., & Kovitz, K. (1983). A comparison of the mother-child interactions of physically abused and non-abused children during play and task situations. *Journal of Clinical Child Psychology, 12*(3), 337-346. https://doi.org/10.1080/15374418309533154

Matte-Gagné, C., & Bernier, A. (2011). Prospective relations between maternal autonomy support and child executive functioning: Investigating the mediating role of child language ability. *Journal of Experimental Child Psychology, 110*(4), 611-625. https://doi.org/10.1016/j.jecp.2011.06.006

McCabe, L. A., Cunnington, M., & Brooks-Gunn, J. (2004). The development of self-regulation in young children: Individual characteristics and environmental contexts. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 340-356). New York: Guilford Press.

McClelland, M. M., & Cameron, C. E. (2011). Self-regulation and academic achievement in elementary school children. *New Directions for Child and Adolescent Development, 2011*(133), 29-44. https://doi.org/10.1002/cd.302

McClelland, M. M., Cameron, C. E., Duncan, R., Bowles, R. P., Acock, A. C., Miao, A., & Pratt, M. E. (2014). Predictors of early growth in academic achievement: The head-toes-knees-shoulders task. *Frontiers in Psychology, 5*(599). https://doi.org/10.3389/fpsyg.2014.00599

McClelland, M. M., Cameron, C. E., Wanless, S. B., & Murray, A. (2007). Executive function, behavioral self-regulation, and social-emotional competence: Links to school readiness. In O. N. Saracho & B. Spodek (Eds.), *Contemporary perspectives on social learning in early childhood education* (pp. 83-108). Charlotte, NC: Information Age Publishing.

Mezzacappa, E., Kindlon, D. & Earls, F. (2001). Child abuse and performance task assessments of executive functions in boys. *Journal of Psychology and Psychiatry*, *42*(8), 1041–1048. https://doi.org/10.1111/1469-7610.00803

Moreno-Giménez, A., Campos-Berga, L., Nowak, A., Sahuquillo-Leal, R., D'Ocon, A., Hervás, D., Navalón, P., Vento, M., & García-Blanco, A. (2021). Impact of maternal age on infants' emotional regulation and psychomotor development. *Psychological Medicine,* 1-12. https://doi.org/10.1017/S0033291721000568

Nekkanti, A. K., Jeffries, R., Scholtes, C. M., Shimomaeda, L., DeBow, K., Wells, J., Lyons, E. R., Giuliano, R. J., Gutierrez, F. J., Woodlee, K. X., Funderburk, B. W., & Skowron, E. A. (2020). Study protocol: The Coaching Alternative Parenting Strategies (CAPS) study of Parent-Child Interaction Therapy in child welfare families. *Frontiers in Psychiatry, 11*, 839. https://doi.org/10.3389/fpsyt.2020.00839

Norman Wells, J., Skowron, E. A., Scholtes, C. M., & DeGarmo, D. S. (2019). Differential physiological sensitivity to child compliance behaviors in abusing, neglectful, and non-maltreating mothers. *Development and Psychopathology, 32*(2) 531-543. https://doi.org/10.1017/S0954579419000270

O'Connor, T. G. (2002). The 'effects' of parenting reconsidered: Findings, challenges, and applications. *Journal of Child Psychology and Psychiatry, 43*(5), 555-572. https://doi.org/10.1111/1469-7610.00046

Parpal, M., & Maccoby, E. E. (1985). Maternal responsiveness and subsequent child compliance. *Child Development, 56*(5), 1326-1334. https://doi.org/10.2307/1130930

Patterson, G. R. (1982). *Coercive family process*. Eugene, OR: Castalia.

Patterson, G. R., & Reid, J. B. (1984). Social interactional processes within the family: The study of the moment-by-moment family transactions in which human social development is embedded. *Journal of Applied Developmental Psychology, 5*(3), 237-262. https://doi.org/10.1016/0193-3973(84)90021-2

Pearl, E., Thieken, L., Olafson, E., Boat, B., Connelly, L., Barnes, J., & Putnam, F. (2012). Effectiveness of community dissemination of parent-child interaction therapy. *Psychological Trauma: Theory, Research, and Policy, 4*(2) 204-213. https://doi.org/10.1037/a0022948

Pemberton, J. R., Borrego, J., & Sherman, S. (2013). Differential attention as a mechanism of change in parent-child interaction therapy: Support from time-series analysis. *Journal of Psychopathology and Behavioral Assessment, 35*(1), 35-44. https://doi.org/10.1007/s10862-012-9312-7

Pointz, C. C., McClelland, M. M., Matthews, J. S., & Morrison, F. J. (2009). A structured observation of behavioral self-regulation and its contribution to kindergarten outcomes. *Developmental Psychology, 45*(3), 605-619. https://doi.org/10.1037/a0015365

Porges, S. W., Doussard-Roosevelt, J. A., Portales, A. L., & Greenspan, S. I. (1996). Infant regulation of the vagal "brake" predicts child behavior problems: A psychobiological model of social behavior. *Developmental Psychobiology, 29*(8), 697-712. https://doi.org/10.1002/(SICI)1098-2302(199612)29:8<697::AID-DEV5>3.0.CO;2-O.

Preacher, K. J., Wichman, A. L., MacCallum, R. C., & Briggs, N. E. (2008). *Latent growth curve modeling*. Thousand Oaks, CA: Sage.

Riggins-Caspers, K. M., Cadoret, R. J., Knutson, J. F., & Langbehn, D. (2003). Biology-environment interaction and evocative biology-environment correlation: Contributions of harsh discipline and parental psychopathology to problem adolescent behaviors. *Behavior Genetics, 33*(3), 205-220. https://doi.org/10.1023/A:1023434206261

Robinson, E. A., Eyberg, S. A., & Ross, A. W. (1980). The standardization of an inventory of child conduct problem behaviors. *Journal of Clinical Child Psychology, 9*(1), 22-28. https://doi.org/10.1080/15374418009532938

Ros, R., Graziano, P. A., & Hart, K. C. (2017). Parental homework completion and treatment knowledge during group parent-child interaction therapy. *Journal of Early Intervention, 39*(4), 299-320. https://doi.org/10.1177/1053815117718491

Ros, R., Hernandez, J., Graziano, P. A., & Bagner, D. M. (2016). Parent training for Children with or at risk for developmental delay: The role of parental homework completion. *Behavior Therapy, 47*(1), 1-13. https://doi.org/10.1016/j.beth.2015.08.004

Roskam, I., Meunier, J. C., Stievenart, M., & Noel, M. P. (2013). When there seem to be no predetermining factors: Early child and proximal family risk predicting externalizing behavior in young children incurring no distal family risk. *Research in Developmental Disabilities, 34*(1), 627-640. https://doi.org/10.1016/j.ridd.2012.10.002

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon, R. M. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology* (6th ed; pp. 105-176). New York, NY: Wiley.

Rothbart, M. K., Ellis, L. K., Rueda, M. R., & Posner, M. I. (2003). Developing mechanisms of temperamental effortful control. *Journal of Personality, 71*(6), 1113-1143. https://doi.org/10.1111/1467-6494.7106009

Rueda, M. R., Posner, M. I., & Rothbart, M. K. (2005). The development of executive attention: Contributions to the emergence of self-regulation. *Developmental Neuropsychology, 28*(2), 573-594. https://doi.org/10.1207/s15326942dn2802_2

Sanders, M. R. (1999). Triple-p positive parenting program: Towards an empirically validated multilevel parenting and family support strategy for the prevention of behavior and emotional problems in children. *Clinical Child and Family Psychology Review, 2*(2) 71-90. https://doi.org/10/1023/a:1021843613840

Shanley, J. R., & Niec, L. N. (2010). Coaching parents to change: The impact of in vivo feedback on parents' acquisition of skills. *Journal of Clinical Child & Adolescent Psychology, 39*(2), 282-287. https://doi.org/10.1080/15374410903532627

Sherman, E. M., & Brooks, B. L. (2010). Behavior rating inventory of executive function - preschool version (BRIEF-P): Test review and clinical guidelines for use. *Child Neuropsychology, 16*(5), 503-519. https://doi.org/10.1080/09297041003679344

Skowron, E. A., & Funderburk, B. W. (2021). In vivo social regulation of high-risk parenting: A conceptual model of parent-child interaction therapy for child maltreatment prevention. https://doi.org/10.31234/osf.io/agxd3

Skowron, E. A., Loken, E., Gatzke-Kopp, L. M., Cipriano-Essel, E. A., Woehrle, P. L., Van Epps, J. J., Gowda, A., & Ammerman, R. T. (2011). Mapping cardiac physiology and parenting processes in maltreating mother-child dyads. *Journal of Family Psychology, 25*(5), 663-674. https://doi.org/10.1037/a0024528

Somech, L. Y., & Elizur, Y. (2012). Promoting self-regulation and cooperation in pre-kindergarten children with conduct problems: A randomized controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry, 51*(4), 412-422. https://doi.org/10.1016/j.jaac.2012.01.019

Spinrad, T. L., Eisenberg, N., Cumberland, A., Fabes, R. A., Valiente, C., Shepard, S. A., Reiser, M., Losoya, S. H., & Guthrie, I. K. (2006). Relation of emotion-related regulation to children's social competence: A longitudinal study. *Emotion, 6*(3), 498-510. https://doi.org/10.1037/1528-3542.6.3.498

Spinrad, T. L., Eisenberg, N., Gaertner, B., Popp, T., Smith, C. L., Kupfer, A., Greving, K., Liew, J., & Hofer, C. (2007). Relations of maternal socialization and toddlers' effortful control to children's adjustment and social competence. *Developmental Psychology, 43*(5), 1170-1186. https://doi.org/10.1037/0012-1649.43.5.1170

Stokes, J. O., Jent, J. F., Weinstein, A., Davis, E. M., Brown, T. M., Cruz, L., & Wavering, H. (2016). Does practice make perfect? The relationship between self-reported treatment homework completion and parental skill acquisition and child behaviors. *Behavior Therapy, 47*(4), 538-549. https://doi.org/10.1016/j.beth.2016.04.004

Tearne, J. E. (2015). Older maternal age and child behavioral and cognitive outcomes: A review of the literature. *Fertility and Sterility, 103*(6), 1381-1391. http://dx.doi.org/10.1016/j.fertnstert.2015.04.027

Tempel, A. B., Wagner, S. M., & McNeil, C. B. (2013). Behavioral parent training skills and child behavior: The utility of behavioral descriptions and reflections. *Child and Family Behavior Therapy, 35*(1), 25-40. https://doi.org/10.1080/07317107.2013.761009

Thomas, R., Abell, B., Webb, H. J., Avdagic, E., & Zimmer-Gembeck, M. J. (2017). Parent-child interaction therapy: A meta-analysis. *Pediatrics, 140*(3). https://doi.org/10.1542/peds.2017-0352

Thomas, R., & Zimmer-Gembeck, M. J. (2007). Behavioral outcomes of parent-child interaction therapy and triple-p positive parenting program: A review and meta-analysis. *Journal of Abnormal Child Psychology, 35*(3), 475-495. https://doi.org/10.1007/s10802-007-9104-9

Thomas, R., & Zimmer-Gembeck, M. J. (2011). Accumulating evidence for parent-child interaction therapy in the prevention of child maltreatment. *Child Development, 82*(1), 177-192. https://doi.org/10.1111/j.1467-8624.2010.01548.x

Thomson, R. M., Allely, C. S., Purves, D., Puckering, C., McConnachie, A., Johnson, P. C., Golding, J., Gillberg, C., & Wilson, P. (2014). Predictors of positive and negative parenting behaviours: Evidence from the ALSPAC cohort. *BMC Pediatrics, 14*(247). https://doi.org/10.1186/1471-2431-14-247

Timmer, S. G., Zebell, N. M., Culver, M. A., & Urquiza, A. J. (2009). Efficacy of adjunct in-home coaching to improve outcomes in parent-child interaction therapy. *Research on Social Work Practice, 20*(1), 36-45. https://doi.org/10.1177/1049731509332842

Tully, L. A., & Hunt, C. (2016). Brief parenting interventions for children at risk of externalizing behavior problems: A systemic review. *Journal of Child and Family Studies, 25*(3), 705-719. https://doi.org/10.1007/s10826-015-0284-6

Valcan, D. S., Davis, H., & Pino-Pasternak, D. (2018). Parental behaviours predicting early childhood executive functions: A meta-analysis. *Educational Psychology Review, 30*(3), 607-649. https://doi.org/10.1007/s10648-017-9411-9

Valentino, K., Cicchetti, D., Toth, S. L., & Rogosch, F. A. (2006). Mother-child play and emerging social behaviors among infants from maltreating families. *Developmental Psychology, 42*(3), 474-485. https://doi.org/10.1037/0012-1649.42.3.474

Valentino, K., Cicchetti, D., Toth, S. L., & Rogosch, F. A. (2011). Mother-child play and maltreatment: A longitudinal analysis of emerging social behavior from infancy to toddlerhood. *Developmental Psychology, 47*(5), 1280-1294. https://doi.org/10.1037/a0024459

Valiente, C., Eisenberg, N., Fabes, R. A., Shepard, S. A., Cumberland, A., & Losoya, S. H. (2004). Predictions of children's empathy-related responding from their effortful control and parents' expressivity. *Developmental Psychology, 40*(6), 911-926. https://doi.org/10.1037/0012-1649.40.6.911

Valiente, C., Lemery-Chalfant, K., & Castro, K. S. (2007). Children's effortful control and academic competence: Mediation through school liking. *Merrill-Palmer Quarterly, 53*(1), 1-25. https://doi.org/10.1080/10409289.2010.505259

Valiente, C., Lemery-Chalfant, K., Swanson, J., & Reiser, M. (2008). Prediction of children's academic competence from their effortful control, relationships, and classroom participation. *Journal of Educational Psychology, 100*(1), 67-77. https://doi.org/10.1037/0022-0663.100.1.67

van Aar, J., Leijten, P., Orobio de Castro, B., & Overbeek, G. (2017). Sustained, fade-out, or sleeper effects? A systemic review and meta-analysis of parenting interventions for disruptive child behavior. *Clinical Psychology Review, 51*, 153-163. https://doi.org/10.1016/j.cpr.2016.11.006

Vygotsky, L. (1978). Interaction between learning and development. In M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds.), *Mind and society: The development of higher psychological processes* (pp. 79-91). Cambridge, MA: Harvard University Press.

Wahler, R. G., & Dumas, J. E. (1986). Maintenance factors in coercive mother-child interactions: The compliance and predictability hypotheses. *Journal of Applied Behavior Analysis, 19*(1), 13-22. https://doi.org/10.1901/jaba.1986.19-13

Webster-Stratton, C. (2001). The incredible years: Parents, teachers, and children training series. *Residential Treatment for Children & Youth, 18*(3), 31-45. https://doi.org/10.1300/J007v18n03_04

Wertsch, J. V., McNamee, G. D., McLane, J. B., & Budwig, N. A. (1980). The adult-child dyad as a problem-solving system. *Child Development, 51*(4), 1215-1221. https://doi.org/10.2307/1129563

Wiebe, S. A., Sheffield, T. D., & Espy, K. A. (2012). Separating the fish from the sharks: A longitudinal study of preschool response inhibition. *Child Development, 83*(4), 1245-1261. https://doi.org/10.1111/j.1467-8624.2012.01765.x

Wierzbicki, M., & Pekarik, G. (1993). A meta-analysis of psychotherapy dropout. *Professional Psychology: Research and Practice*, *24*(2), 190-195. https://doi.org/10.1037/0735-7028.24.2.190