Impact of Mindfulness-Enhanced Pivotal Response Group Treatment on Parenting Stress:
A Randomized Controlled Trial

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ABSTRACT

One of the core features of Autism Spectrum Disorder (ASD), social communication impairment, presents in a variety of ways, including reduced functional language use and social initiations, which often warrant intensive intervention services. Additionally, parents of children with ASD demonstrate increased levels of parenting stress when compared to parents of typically developing children and children with developmental delays (Hayes & Watson, 2013). Elevated parenting stress has been shown to diminish positive treatment outcomes (Osborne et al., 2008), which lends support to develop methodologies to concomitantly target child and parent behaviors. The current randomized control trial (RCT) uses a dual-pronged approach to directly target both child communication deficits and parenting stress within a group format. This RCT combined an empirically supported behavioral therapy, Pivotal Response Treatment (PRT), with components from Acceptance and Commitment Therapy and Mindful Parenting for reducing parenting stress. Fifteen pairs of caregivers and their minimally or pre-verbal child with diagnosed or suspected ASD were randomly assigned to one of the following supplemental conditions: mindfulness-enhanced PRT (mPRT; $n = 8$) or psychoeducation-enhanced PRT (pPRT; $n = 7$) as an active control condition. Of these, five pairs completed each condition. The current study assessed feasibility and acceptability in addition to demonstrating proof of concept in regard to additive effects of mPRT compared to pPRT. Results provided mixed support for feasibility and efficacy of a multi-component group treatment approach. There was a low retention rate and the small sample sizes significantly decreased power. However, parents

endorsed high satisfaction, demonstrated fidelity of PRT implementation, and children significantly increased their expressive language abilities. In regard to group-level analyses for primary and exploratory aims, the mPRT group showed significant decreases in parenting stress and increases in mindfulness. At the individual level, some parents in both groups showed positive changes in mindfulness, positive feelings toward child, and child problem behavior. Future directions should continue to explore the additive effects of mindfulness-based intervention on group-based parent-mediated treatments using larger sample sizes.

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GENERAL AUDIENCE ABSTRACT

Social communication difficulties are one of the core components of Autism Spectrum Disorder (ASD) and many treatments are specifically designed to target these challenges. Additionally, parents of children with ASD report higher levels of parenting stress when compared to parents of typically developing children and children with developmental delays (Hayes & Watson, 2013). High parenting stress has been shown to decrease the likelihood of positive treatment outcomes (Osborne et al., 2008). As a result, creating a treatment that targets both parent and child difficulties simultaneously may lead to important outcomes for the family unit. The current study combined treatments that have been shown to increase child language and decrease parenting stress. Fifteen pairs of caregivers and their child with language delays and ASD were randomly assigned (i.e., similar to a flip of a coin) to receive Pivotal Response Treatment (PRT) and one of the following: mindfulness (mPRT; $n = 8$) or psychoeducation (pPRT; $n = 7$). Ten total families completed the treatment (5 per group). The current study measured the practicality and usefulness of adding either mindfulness or psychoeducation to PRT. Results provided mixed support for the practicality of a group treatment approach that combined two treatments. Approximately two-thirds of the families who started treatment finished treatment. The parents who completed treatment showed high satisfaction ratings and demonstrated that they could accurately perform the treatment techniques taught in group sessions. In addition, children increased their language abilities. Parents in the mindfulness group showed significant decreases in parenting stress and increases in mindfulness. At the individual level, some parents in both

groups showed positive changes in mindfulness, positive feelings toward child, and child

problem behavior. Future directions include measuring these changes with a larger number of

families.

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Chapter 1- Introduction

Autism Spectrum Disorder (ASD) presents with core deficits in social communication as well as restrictive and repetitive behaviors (APA, 2013). These heterogeneous impairments may manifest in a variety of ways including delayed speech acquisition, stereotyped phrases and specific interests, which appear unusual in their intensity. Individuals with ASD and communication difficulties may cause increased distress for him or herself (e.g. emotional outburst resulting from not communicating needs effectively) as well as others (e.g. parents, siblings, treatment providers). In addition, parents of young children with ASD are viewed as an integral component of treatment, adding to the demands placed on the individual. As a result, intervening at a parent level may yield positive implications for the individual, child, and family system as a whole.

It is important to study coping strategies for parenting stress and the effects on the parent-child relationship. Mindfulness was examined in this study as one potential coping mechanism that can impact how parents respond to stressors. The current randomized control trial uses a dual-pronged approach to target child communication deficits and parenting stress by using an empirically supported child-focused group behavioral therapy, Pivotal Response Treatment (PRT), along with components from Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and Mindful Parenting (Bögels, Lehtonen, & Restifo, 2010) for reducing parenting stress. The aims of this study are twofold: 1) to examine feasibility and acceptability of implementing the dual-pronged treatment approach from the caregiver perspective and from observational measures, and 2) examine proof of concept by assessing preliminary efficacy of a group-based parent mediated intervention on child utterances, fidelity of PRT implementation, and parenting stress. Additionally, exploratory analyses included

comparisons of caregivers receiving mindfulness-enhanced PRT (mPRT) to those receiving psychoeducation enhanced PRT (pPRT) in regard to levels of mindfulness and positive affect toward child.

Interventions for Young Children with ASD

A plethora of interventions for individuals with ASD have been developed to target all ages, ranging from infancy to adulthood. Recent studies demonstrate that early behavioral interventions can lead to more normative trajectories and outcomes (Dawson et al., 2012). Research also consistently reveals that parents can effectively learn intervention strategies, which in turn positively impacts child development (Brookman, Frazee & Koegel, 2004). More specifically, parent involvement in ASD treatment has been shown to lead to increased insight into child's behaviors and moods (Koenig, De Los Reyes, Cicchetti, Scahill, & Klin, 2009), employment of strategies in the home and naturalistic environment (Schreiber, 2010) and increases generalization of skills (Matson, Mahon, & Matson, 2009). Pivotal Response Treatment (PRT), an evidence-based, naturalistic, developmental, and behavioral intervention, focuses primarily on parent education as the core framework for service delivery. PRT has been delivered effectively in home and clinical environments with families and more recently, in a group model (Hardan et al., 2014; Minjarez, Mercier, Williams & Hardan, 2013; Minjarez, Williams, Mercier, & Hardan, 2011). Results from a group-model RCT demonstrate that 84% of parents reached fidelity criteria for implementing PRT by the end of group treatment (Hardan et al., 2014), with long-term benefits documented up to three months post treatment (Gengoux et al., 2015). As a result, group dissemination of PRT strategies appears to be both effective and efficient, as more families can be targeted through a group format as compared to traditional one-on-one implementation.

PRT embeds motivational techniques within Applied Behavior Analysis principles in order to target "pivotal" areas, such as engagement and joint-attention. As a result, children demonstrate broad improvements in multiple areas of functioning that are not directly targeted through highly specified intervention techniques (Koegel, Koegel, & Brookman, 2005). A systematic review of studies teaching PRT demonstrates a broad range of positive impacts ranging from increases in self-initiations, functional language, and play skills, as well as decreases in problem behavior (Verschuur, Didden, Lang, Sigafoos, & Huskens, 2014).

While the majority of intervention studies for young children with ASD focus on child improvements and outcomes, Karst and Van Hecke (2012) call for the examination of treatment effects on parent and family. A few studies have measured change in parenting stress for parents of newly diagnosed children with ASD participating in initial treatment services. Although reductions in stress have been noted without specifically targeting them in treatment, post-treatment levels of parenting stress often remain elevated (Keen, Couzens, Muspratt, & Roger, 2010; Minjarez et al., 2013), demonstrating the need for parent-focused interventions to target not only child characteristics but also parent challenges (e.g., stress). As parent mediated interventions become more commonplace, the need to understand parent influence of treatment implementation can yield important results for improved child outcomes.

Parenting Stress

One important and unique factor for parents participating in treatment interventions consists of the added stress that accompanies the parenting role. These pressures and tension may arise from the external demands of parenting, quality of the relationship between parent and child, as well as the emotional and social wellbeing of the parent and child. Abidin's (1992) model of parenting stress illustrates the direct and indirect influence of parent beliefs and

expectations on parenting behavior and subsequent child outcomes. According to this perspective, all parents encounter a variety of stressors (e.g., child characteristics, life events) that are relevant to the parenting role. Each parent appraises their unique stressors subjectively, which in turn results in a level of arousal. An increase in arousal then acts as a motivational force for the parent to seek resources in an effort to mitigate the level of stress or arousal, which in turn effects how the parent views and acts toward the child and ultimately influences child outcome.

Increased levels of parenting stress have been shown to result in a host of negative parenting outcomes. For example, many parents report increased rejecting attitudes and reactive behaviors as well as less warm feelings and involvement with their children when under increased levels of parenting stress (e.g., Belsky, 1984; McBride & Mills, 1994; Webster-Stratton, 1990). Deater-Deckard and Scarr (1996) report that parents who experience elevated parenting stress are more likely to demonstrate negative and authoritarian parenting techniques. Additionally, cumulative parenting daily hassles predicted decreased maternal positivity in interactions with their 5-year-old children (Crnic et al., 2005). Dumas (2005) proposed that "automatized transactional procedures" perpetuate patterns of disagreement and conflict between caregivers and children. These negative interactions then become overlearned to the point of automaticity due to repetition in practice, thus creating a negative cycle that can lead to negative and critical parenting behaviors toward his or her child.

In regard to treatment efficacy, Nock and Kazdin (2001) found a relationship between high parenting stress and low treatment attendance and dropout in multiple studies on child-focused therapy. Parenting stress may also impact parental self-efficacy and the development of mental health problems, two important factors that can contribute to decreased treatment response.

Parenting Stress in ASD

Parents of children with ASD consistently demonstrate increased levels of parenting stress, above and beyond parenting stress for parents of typically developing children and those with other psychological conditions such as Attention Deficit Hyperactivity Disorder and other developmental disabilities (Hayes & Watson, 2013; Rao & Beidel, 2009). Parents of children with ASD face unique stressors in regard to child behavior and environmental demands (e.g., specialized treatments, ongoing assessments). Past research focused on highlighting the influence of child cognitive impairment on parenting stress (Bebko, Konstantareas, & Springer, 1987); however, recent studies do not demonstrate support for communication or stereotyped behavior to significantly impact parenting stress for parents of children with ASD (Davis & Carter, 2008; Tomanik, Harris & Hawkins, 2004). Rather, the combination of emotional, social and behavior problems appears to influence parenting stress, especially for parents of children with ASD. Although mothers of children with ASD have generally reported higher levels of parenting stress in comparison to fathers, the level of parenting involvement has been suggested to mediate this relationship (Tehee, Honan, & Hevey, 2009).

While studies have attempted to tease apart the direction of influence between parenting stress and child characteristics, most support the idea of a bidirectional relationship (Deater-Deckard, 1998). This reciprocal relationship often creates a continuous cycle of frustration in the family system that not only impacts the parents but also the child with ASD, siblings, and others. Bluth and colleagues (2013) present a parenting stress model specific to parents of children with ASD. Stressors include the objective child behavior problems as well as to parent perception of these behaviors. In addition to a direct relationship between parenting stress and child problem behaviors, parenting stress has also been identified as a mediator of the relationship between

child problem behavior and parenting self-efficacy (Rezendes & Scarpa, 2011). Regardless, providing coping strategies for parenting stress appears to serve as an important treatment target and warrants additional resources.

A variety of protective and perpetuating factors have been posited to contribute to parenting stress, specifically for parents of children with ASD. On the one hand, increased social support appears to buffer the levels of parenting stress; on the other hand, increased social isolation and depressed mood correlate with higher levels of parenting stress. Mindfulness, the ability to nonjudgmentally bring awareness to the present moment, may serve as a cognitive tool to positively influence one's stress response. Bluth and colleagues (2013) suggest that mindfulness training positively impacts both individual resources and couple satisfaction.

Mindfulness

The practice of mindfulness, especially through meditation, originated from the Buddhist discipline and has been increasingly used in current treatment modalities (Brown, Ryan, & Creswell, 2007). Mindfulness has been defined as both a state and trait-like quality that can be cultivated through formal and informal practice. The construct of mindfulness includes components of present-moment focused attention, intentionality, and a non-judgmental attitude regarding the unfolding of sensations, thoughts and emotions. Fundamentally, mindfulness practice targets the relationship an individual has with his or her internal experiences (i.e., thoughts, emotions) and the regulation of the underlying responses across modalities (e.g., attentional, behavioral).

Mindfulness has been incorporated into multiple treatment modalities and has demonstrated robust results in clinical and non-clinical samples (Brown, Ryan, & Creswell, 2007; Khoury et al., 2013). Interventions such as dialectical behavior therapy (DBT; Linehan,

1993), mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982), mindfulness-based cognitive therapy (MBCT; Segal, Teasdale, & Williams, 2004) and ACT (Hayes, Strosahl, & Wilson, 1999) focus on developing mindfulness in the service of increasing well-being and reducing the impact of psychological symptoms (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

Research supporting the efficacy of ACT posits psychological flexibility as the mechanism that influences change in positive health and well-being outcomes. Psychological flexibility refers to the ability to bring mindfulness qualities to thoughts and feelings and engage in behaviors that align with individual values and goals (Hayes, Luoma, Bond, Masuda & Lillis, 2006). In regard to psychopathology, the antithesis of psychological flexibility is experiential avoidance, also known as one's attempt to alter negatively perceived internal experiences (e.g., thoughts, feelings, physiological responses). Taken together, mindfulness-based strategies may be instrumental in promoting psychological flexibility and thereby decrease experiential avoidance, which is thought to reduce emotional reactivity to stressful situations (Grossman, Niemann, Schmidt, & Walach, 2004).

In addition to intervention studies, correlational studies and brief laboratory inductions of mindfulness reveal positive and ameliorative effects. For example, researchers show that increased levels of mindfulness facilitates a reduction in negative reactions to distressing situations (Feltman, Robinson, & Ode, 2009; Bergomi, Ströhle, Michalak, Funke, & Berking, 2013). As such, mindfulness may serve as an adaptive coping strategy during the experience of aversive situations, such as parenting stress, resulting in a more effective recovery from perceptions of distressing events. By changing an individual's relationship with the appraisal of stressful events, one can expect to see changes in emotional response and resulting behavior.

Mindful Parenting

Mindful parenting applies mindfulness to the parenting role and has been increasingly studied in prevention and treatment modalities (Bögels, Lehtonen, & Restifo, 2010; Singh et al., 2007). Specifically, mindful parenting extends the definition of mindfulness (i.e., present-moment awareness or attention, intentionality, and non-judgmental attitude) to interactions with one's child, focusing on both on child and parenting behaviors (Kabat-Zinn & Kabat-Zinn, 1997). In this parenting context, mindfulness techniques help parents diminish impulsive reactions to child problem behaviors and focus on acting in accordance with values.

A model of mindful parenting, proposed by Duncan, Coatsworth and Greenberg (2009), illustrates the positive influence of mindful parenting on increased parental well-being, positive parent-child interactions and parenting skills in regard to child management. This model includes five dimensions of mindful parenting (i.e., listening with full attention, nonjudgmental acceptance of self and child, emotional awareness of self and child, self-regulation in the parenting relationship and compassion for self and child). Higher levels of mindful parenting contribute to increases in effective parenting skills (e.g., emotion regulation in parenting role) and decreases in negative parenting behaviors (e.g., self-blame when parenting expectations or goals not reached).

Several studies have examined the effects of mindful parenting programs across populations and report increases in satisfaction with parenting role, parent-child interactions, decrease in child problem behavior and increase in overall quality of life (e.g., Bögels, Lehtonen, & Restifo, 2010; Singh et al., 2007). Mindful parenting programs have been particularly useful for parents of children with ASD. Cachia, Anderson and Moore (2016) conducted the first systematic review of mindfulness-based interventions for parents of children with ASD,

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demonstrating support for long-term stress reduction, increases in psychological well-being, and decreased child problem behavior. Studies using the ACT training for parents of children with ASD showed improvements in psychological flexibility and experiential avoidance, parent psychological symptoms such as depression, and physiological responding in the presence of aversive stimuli (Blackledge & Hayes, 2006; Hahs, 2013).

Overall, parents of children with ASD face a multitude of competing challenges. Research identifies parents as integral components to behavioral treatments, showing increased gains and generalization of skills from parent-implemented treatments (Hassenfeldt, Lorenzi, & Scarpa, 2015). However, a combination of parents utilizing important resources for child treatment (e.g., monetary, time), demonstrating heightened parenting stress unique to ASD, in addition to the findings that higher levels of parenting stress can serve as treatment interference, lend support for developing unique methods to target parenting stress in this population.

Although studies support the positive influences of mindful parenting programs for parents of children with ASD, some studies have revealed increased levels of dropout rates (Dykens, Fisher, Taylor, Lambert, & Miodrag, 2014), which may reflect the difficulty of a parent to create additional time to seek services for personal benefit. As such, grounding parent-focused strategies within child-focused interventions may increase retention levels while simultaneously targeting parental difficulties. Given the elevated levels of parenting stress, increased financial expenditures on treatment, and limited time, the need for treatment to concomitantly target parent and child difficulties appears to be imperative. Singer and colleagues (2007) reviewed group interventions that were designed to relieve psychological distress in parents of children with a developmental disorder and concluded that multiple-component interventions demonstrated increased effectiveness for reducing parenting stress.

The current study addresses the need to concomitantly target parent and child difficulties within a single treatment modality. Parenting stress not only affects the wellbeing of parents, it impacts the positive influence of treatment and plays a role in child behavior. The purpose of the current study was twofold: 1) to analyze the feasibility and acceptability of the multicomponent treatment approach and 2) demonstrate preliminary efficacy of a group-based parent-mediated intervention on child utterances, fidelity of implementation of PRT techniques, and parenting stress. Due to small sample size and subsequently low power, exploratory analyses included group and individual level comparisons of caregivers receiving mPRT to those receiving pPRT with respect to levels of mindfulness, positive affect toward child, and child behavior problems.

Chapter 2 – Method

Participants

A total of 15 caregivers (4 fathers) and children (M = 3.2 years; SD = 1.08 years; 14 boys) participated in the pre-treatment assessment, were determined eligible for the study, and were randomly assigned to mPRT or pPRT groups. As described in further detail in Table 2, the sample was racially diverse, with 60% White, 20% Asian, 13.3% Hispanic/Latina and 6.7% Black. Additionally, 40% of families spoke languages other than English in the home environment. Parents ranged in education level; 60% of participating caregivers graduated from college or graduate school. Sixty-seven percent of participating caregivers were employed outside the home. Inclusion criteria for children included the following: 1) current or suspected ASD diagnosis, verified by ADOS-2, brief clinical interview, and expert clinical opinion using DSM-5 criteria; 2) demonstrate ability to make meaningful vocalizations; 3) no active medical problems (e.g., unstable seizure disorder). Inclusion criteria for participating caregiver included the following: 1) no severe mental health problems (e.g., suicidal intent; psychosis); 2) willingness to record weekly videos and share in a group setting.

Participants were recruited from Southwest Virginia via multiple methods (e.g., university and non-university clinics, registries, local ASD support groups, parent resource centers, local service agencies or schools). A two-stage eligibility process was used. First, caregivers who expressed interest in the study completed a phone interview to screen for study eligibility. Caregiver and child dyads who appeared to meet eligibility criteria and who were still interested in the study based on the phone screen were then scheduled for a two-session assessment appointment to confirm diagnosis and eligibility. Twenty caregivers completed the phone screen, and 15 caregiver and child dyads were found to be eligible to participate in the

study. Participants were classified as treatment completers if they attended more than 75% of group and individual sessions combined.

Procedure

All interested families completed a phone screen to determine initial eligibility criteria. Those who qualify were invited to participate in two screening visits at the VT Autism Clinic (approximately 3.5 hours total). Parents were provided with the option to complete all components in one day; however, all parents opted to complete the tasks over two days to decrease child demands and frustration. During these visits, a clinician administered the ADOS-2 to the child and the participating caregiver, to confirm the child's diagnosis of ASD, as well as the Mullen Scales of Early Learning, a measure of cognitive ability.

Parents engaged in a 15-minute task with their child to measure baseline levels of child utterances and baseline fidelity of PRT techniques. This task is called the Structured Laboratory Observation (SLO; see Appendix G) and was modeled from Hardan et al. (2014). During the first five minutes, parents were simply instructed to sit quietly and watch their child play (i.e. do not initiate interactions; however, parents can respond if child initiates). This period allowed the child to become acquainted with the room and materials. Then, parents were instructed to elicit language from the child for 10 minutes, using whatever strategies they wanted. Immediately following the SLO, parents were asked to provide self-reported perceptions of positive and negative mood and stress levels during the parent and child interaction. In addition to measuring baseline child utterances with a caregiver, all children engaged in a 10 minute SLO with a trained PRT clinician to control for baseline levels of fidelity of PRT techniques. Finally, parents completed paperwork to determine demographic information, child language and social behaviors, as well as levels of parenting stress, parent feelings toward child, and mindfulness.

Data were collected over the course of four time points (pre-treatment, mid-treatment, post-treatment, 3 month follow-up) and weekly. See Table 1 for the complete battery at each timepoint. All questionnaire data were collected either via paper and pencil or sent from and stored electronically through an online system called Research Electronic Data Capture (REDCap; Harris, Taylor, Thielke, Payne, Gonzalez, & Conde, 2009), hosted at Virginia Tech. REDCap is a secure, web-based application designed to support data collection for research studies. Weekly measures included a 10-minute home video of a participating parent interacting with his or her child while implementing PRT strategies and eliciting language. These videos were used in treatment to review strengths, areas of growth, and barriers encountered in the naturalistic settings as well as in research to monitor changes in child utterances and percentage of fidelity of implementing PRT strategies. In an effort to decrease demands from parents, we provided families with Android tablets and instructions on how to upload the videos.

Randomization. Eligible families were randomly assigned to either the mindfulness enhanced mPRT or to pPRT as the control condition. The Randomization Module in REDCap was completed by a research assistant and was blind to the clinician completing the pre-treatment assessment. For the first four groups run, stratified randomization was used to control for the gender of participating caregivers within groups within a block of four, meaning for every block of 4 people, 1 male was assigned to mPRT, 1 male to pPRT, 1 female to mPRT, and 1 female to mPRT. Groups were matched on gender of caregiver to control for gender differences previously reported in parenting stress literature (Davis and Carter, 2008). Both caregivers were permitted to attend groups; however, one caregiver had to identify as the primary reporter (i.e. individual who completes all self- and parent-report questionnaires, attends sessions regularly, and participates in all home videos).

Due to challenges with recruitment, low group sizes in the first four groups, and limited clinician availability, randomization rules were adjusted. That is, for groups 5 and 6, once the period of recruitment had commenced and 3 or more families had completed the pre-assessment condition, a random number generator was used to determine the group for the individuals. As a result, group 5 was assigned to the mPRT condition and group 6 was assigned to the pPRT condition.

Treatment (see Appendix L). All families received the same dose of PRT parent training delivered in a previously studied package (e.g., Hardan et al., 2014) that included 16 hours of group sessions and 4 hours of individual sessions, delivered over a 12-week timeframe. The format for teaching PRT techniques and abilities were replicated from Hardan et al. (2014), who adapted the material from the manual, "How to Teach Pivotal Behaviors to Children with Autism" (Koegel et al., 1989) and has been previously implemented in a feasibility study by the current researchers.

Additionally, all parents received 6 hours total of group supplemental treatment that specifically targeted parenting stress either by mindfulness-based techniques or by psychoeducation (depending on random assignment). Materials from the psychoeducation group included didactic training on a variety of topics focusing on the parent, child and family outcomes. For example, literature on general parenting stress as well as parenting stress in parents of children with ASD was one topic presented in an informational manner, without providing instruction regarding specific skills training.

The mindfulness-enhanced treatment, on the other hand, provided specific skills as well as didactic information about applying mindfulness to the parenting role. Components from ACT

as well as Mindful Parenting were incorporated into the weekly sessions in a manner that applied the mindfulness skills to the newly learned PRT skills.

Measures

  Eligibility and sample characterization.

  Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al., 2012). The ADOS-2 (see Appendix I) is a semi-structured, observational assessment of ASD characteristics and is considered to be one of the gold standard tools used to assess social communicative and repetitive behaviors in children who are suspected of having ASD. The ADOS-2 consists of multiple modules, which are determined by age and language ability. The Toddler Module and Module 1 are administered to children with no or little verbal language and Module 2 is used for children with phrase, but not verbally fluent, speech. The ADOS-2 demonstrates moderate to high levels of internal consistency, moderate test-retest reliability, and acceptable interrater reliability (McCrimmon & Rostad, 2014). For the current study, 2 children were administered the Toddler Module, 12 children were administered Module 1, and one child was administered Module 2.

  Mullen Scales of Early Learning (MSEL; Mullen, 1995). The MSEL measures developmental functioning for young children, specifically in visual, linguistic, and motor domains. Additionally, the MSEL distinguishes between receptive and expressive language abilities. The MSEL demonstrates good internal consistency and high test-retest reliability (Mullen, 1995).

  Treatment feasibility and acceptability.

  Parental adherence to treatment. Treatment adherence was measured by the number of weekly videos provided, as these were crucial components of treatment in regard to teaching and

providing feedback. Parents also received weekly questionnaires inquiring how often they

practiced PRT techniques during the past week and ranged from 0 (Not at all) to 4 (Every day).

Averages were calculated for 8 participants accounting for the amount of questionnaires they

completed. The data from the 2 remaining families (both in the same mPRT group) were not

included due to research team error (i.e., not labeled with correct week and ID for multiple

weeks).

Treatment satisfaction (see Appendix J). The participants' satisfaction with the

treatment components was assessed at the post-treatment time point. First, participating

caregivers rated their satisfaction with the overall program. Then, parents rated their perceived

difficulty and helpfulness of the treatment components (i.e., PRT specific concepts as well as the

individual's assigned supplemental group). For example, those in mPRT were asked about ACT

specific skills such as acceptance and present-moment awareness. Those in the pPRT group were

asked about the topics covered during psychoeducation such as learning about ASD and co-

occurring comorbidities. The satisfaction survey also included open-ended responses to better

understand the components that parents viewed as most helpful, least helpful, and

recommendations for future groups.

Treatment efficacy: Primary outcome variables.

Therapist fidelity of treatment implementation (see Appendix K). A licensed clinical

psychologist trained in PRT viewed 5-6 group sessions out of the 11 total group sessions (i.e., 45

to 54% of the total group sessions) to assess for therapist fidelity of treatment implementation.

The videos were randomly assigned for viewing before all groups commenced and the

randomization was blind to treatment providers. Fidelity was assessed on completion of specific

session goals, therapeutic relationship, and level of group engagement.

Child utterances (see Appendix M). The level or amount of child utterances during in-laboratory semi-structured tasks and in-home naturalistic environments were coded by trained undergraduate research assistants using *Noldus The Observer XT* (version 12.0 software, Noldus Information Technology, Leesburg, VA, USA). All videos were double-coded by undergraduate research assistants who were blinded to treatment condition and treatment phase. Three total coders completed double coding for all videos. Interrater reliability was assessed by Kappa and Rho, due to the complexity of the coding system. The averaged Kappa value was .26, suggesting poor interrater reliability; however, the averaged Rho value was .75, $p = .02$. Taken together, raters were significantly correlated to one another but showed low exact accuracy on final codes. As a result, after videos were double-coded, the two research assistants who coded that particular video segment met together to complete final consensus coding. All research assistants attended group training in behavioral coding and child utterances and attained above 80% fidelity with sample videos coded by a master's level clinician. As modeled in Hardan et al. (2014), child utterances consist of the following: unintelligible (e.g., sound produced by child that does not appear to demonstrate an attempt at a meaningful utterance; "lalalala"), imitative (e.g., parent models the word and encourages child to imitate exact word), verbally prompted (e.g., parent asks a question with open-ended response), nonverbally prompted (e.g., parent presents an opportunity for language by holding an object in sight and out of reach) and spontaneous (i.e., not prompted by the parent). To reduce variability, the amount of child utterances was expected to increase in both groups from pre SLO to post and follow-up SLO. Amount of child utterances were examined to determine effectiveness of treatment across groups.

In the current study, differences in child utterances were first calculated using changes in SLO; however, technical issues led to 11 videos being recorded without sound leaving the

following sample sizes available for analyses (i.e., $n = 7$ for SLO 1, $n = 6$ for SLO 3, $n = 5$ for SLO 4). Only five participants had available data for both SLO 1 and 3 and four participants had data for both SLO 1 and 4. As a result, in addition to SLO videos, weekly videos were also used to estimate changes in average utterances from weeks 1 and 2 to weeks 9 and 10. The same coding system was applied to the weekly home videos. Due to increased variability introduced through home videos, weeks 1 and 2 were averaged and weeks 9 and 10 were averaged to calculate a more robust pre to post change. Because frequency/total counts were used for analyses, weekly videos were excluded from analyses if they were less than 9 minutes in length. Seven videos (17.5%) were less than 9 minutes in length and therefore excluded from the analyses; for the instances in which only one week of the averaged weeks was available, that value was used instead of dropping the individual completely from the time point (e.g., 008's week 9 video was an acceptable length but week 10 videos was 7.53 minutes; the values for the week 9 video were used for the week 9 and 10 average). Additionally, despite multiple prompts from clinicians, one pPRT family continued to provide videos that were not consecutively filmed (e.g., 3 minutes in one activity at a specific time, 2 minutes of another activity at a different time, 5 minutes of a third activity at another time); none of the videos from this family were used in the current analyses. The final number of participants whose videos were acceptable and used in the current analyses include 7 participants for weeks 1 and 2 average and 9 participants for weeks 9 and 10 average.

   Parent fidelity of PRT implementation (see Appendix N). Parent fidelity of PRT implementation was coded by trained undergraduate research assistants using *Noldus The Observer XT* to measure changes in level of fidelity in-laboratory semi-structured tasks and in-home naturalistic environments over the course of treatment. All videos, including SLOs at all 4

timepoints as well as weekly videos (averaged for weeks 1-2 and weeks 9-10) were coded by two research assistants separately (i.e., each research assistant coded all the videos separately). The average Kappa for all videos coded was .90. After videos were double-coded, the two research assistants met together to complete final consensus coding. All research assistants attended group training in behavioral coding, behavioral management, and PRT techniques; they attained above 80% fidelity with two sample videos coded by PhD and master's level clinicians who were certified in PRT. Standardized measures of PRT fidelity (e.g., Bryson, Koegel, Koegel, Openden, Smith, & Neft, 2007; Minjarez et al., 2011) were adapted for the current project to accommodate measurement every 30 seconds (as opposed to 1 or 2 minute intervals).

Fidelity of PRT implementation included 5 total over-arching techniques (i.e., shared control, providing clear opportunities, interspersing maintenance trials, reinforcing attempts, and contingent/natural reinforcement of appropriate behavior), which could be further divided into 10 total components (i.e., following child's lead/child choice, natural reinforcer, attending to task, clear instructions, maintenance, task variation, natural, immediate, appropriate and attempts).The *Noldus* system was automatically programmed to stop a video after every 30 seconds and prompt the research assistant to input fidelity information for all 10 components in a binary form (i.e., parent either achieved correct performance of component for the entire interval or did not, coded as 1 or 0 respectively). Total correct percentages were calculated for each component and then averaged over the number of intervals to create a final correct percentage for total PRT fidelity. Because final percentages were individually calculated based on the total time they were coded, videos that ranged in length from 5 minutes to 10 minutes were used for the current set of analyses.

Parenting Stress Index, Fourth Edition (PSI-4; Abidin, 2012). The PSI-4 is the most widely used measure of parenting stress, not only in ASD but all parenting literature. The PSI-4 focuses on three domains of parenting stress: those relating to child characteristics, those attributed to parent characteristics as well as situational and life stressors. The PSI demonstrates strong internal consistency (alpha .96 or greater for each domain and test-retest reliability ranging from .65 to .96 for the Total Stress score). The PSI-4 child domain was measured at four time points to measure change in parenting stress relating to child characteristics as a result of treatment and showed good internal consistency in the current sample at pre (α = .93), post (α = .82), and follow-up (α = .89)

Autism Parenting Stress Index (APSI; Silva & Schalock, 2012). The APSI (see Appendix H) consist of questions specific to parenting stress for parents of young children with ASD, such as behavioral symptoms and core deficits. Parents rate how much stress specific aspects of their child's health yield, ranging from "Not stressful" to "So stressful sometimes we feel we can't cope." The original validation of the measure was completed with a sample of children with ASD, other developmental disorders, and typical development. The APSI demonstrated good internal consistency (α = .83) within the ASD population as well as high test-retest reliability (r = .88) for parents of children with ASD over a 4-month period of time. Within the current study, the APSI demonstrated acceptable internal consistency at each timepoint (pre α = .73, post α = .76, follow-up α = .86).

Subjective Units of Parenting Stress Scale (see Appendix D). An adaptation of the Subjective Units of Distress Scale, previously utilized in Singh et al., 2007, was used to assess for levels of parenting stress immediately following all 10 minute SLOs.

Exploratory outcome variables.

Positive parent feelings toward child.

Parent Feelings Questionnaire (PFQ; Deater-Deckard, 2000). The PFQ (see Appendix

B) consists of 24 items rated on a 5-point Likert-type scale and measured self-report of personal

negative and positive feelings toward the child participating in treatment. The items included

statements about feelings toward the child participating in the study. For example, "Sometimes

my child can really test my patience" and "I find it easy to praise and compliment my child,

especially for good behavior" are questions from the negativity sub-scale and positivity subscale

respectively. Previous literature demonstrates good internal consistency for both the positivity

scale (Cronbach's alpha = .88) and negativity scale (Cronbach's alpha = .90; Wang, Deater-

Deckard, & Bell, 2013). The positivity scale was used to assess group differences over time and

demonstrated good internal consistency at pre-treatment (α = .84) and acceptable reliability at

follow-up treatment (α = .73), but unacceptable internal consistency at post-treatment (α = -.15)

Positive and Negative Affect Schedule (PANAS; Crawford & Henry, 2004). The PANAS

(see Appendix C) is a reliable and valid measure of positive and negative affect in adults.

Previous literature demonstrates good internal consistency for the Positive Affect scale (α = .89)

and .Negative Affect scale (α = .85). For the current study, the instructions for the PANAS were

adapted to assess level of parent affect during parent-child interactions in clinic (i.e., during each

SLO). The positive affect scale was used to measure changes over time and showed good

internal consistency at pre-treatment (α = .88), post-treatment (α = .87) and follow-up (α = .93).

Parent mindfulness.

Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). The FFMQ (see

Appendix A) is a 39-item self-report measure that assesses one's general propensity towards

mindfulness in daily life. The FFMQ consists of 5 subscale scores (i.e. non-reactivity to inner

experience, observing, describing, acting with awareness, and non-judging of inner experience) that load onto a total mindfulness score. Parents endorsed statements on a 5-point Likert scale ranging from 1 (Never or Rarely True) to 5 (Very Often or Always True), with higher scores reflecting increased levels of mindfulness. Good internal consistency was observed at each timepoint within the current sample (pre α = .89, post α = .86, follow-up α = .78).

   Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). The AAQ-II (see Appendix E) is a seven-item measure designed to capture a person's level of experiential avoidance, where each item is ranked on 7 point scale ranging from "never true" to "always true". Higher scores on the measure reflect increased levels of experiential avoidance, the antithesis of psychological flexibility. The AAQ-II demonstrates good internal consistency (i.e. ranging from .78 to .87 across three samples) and acceptable test-retest reliability (i.e., .78 - .88). The AAQ-II was administered at all time points and demonstrated good internal consistency at pre-treatment (α = .81) and excellent internal consistency at post-treatment (α = .92) and follow-up (α = .93)

   Child problem behavior. The Child Behavior Checklist for Ages 1.5-5 (CBCL/1.5-5; Achenbach & Rescorla, 2001) is a parent report measure on child emotional and behavioral characteristics. Previous research suggests a bidirectional relationship between parent stress and child problem behaviors. Although the treatments in the current study focused on increasing child utterances and reducing parenting stress, changes in child problem behavior were also included to better understand baseline differences and change as a result of treatment. The CBCL demonstrates good internal consistency in general populations (.89 for internalizing and .92 for externalizing; Achenbach & Rescorla, 2001) as well as ASD specific populations (.80 for internalizing, .90 for externalizing; Pandolfi, Magyar, & Dill, 2009). In the current study, the

following Cronbach's alphas were as follows: .61 for internalizing and .88 for externalizing at pre-treatment; .54 for internalizing and .83 for externalizing at post-treatment; .74 for internalizing and .86 for externalizing at follow-up.

Data Analysis

All data were checked for normality, skewness, and kurtosis. Due to small sample size and non-normal distributions, non-parametric analyses were used to compare groups and changes over time.

Treatment feasibility and acceptability.

Parental adherence to treatment. Retention rate was calculated by dividing the number of participants who were considered treatment completers by the total number of participants who were randomly assigned to a group. Because weekly videos were a crucial and core component of the PRT treatment package, the total number of videos submitted by parents were calculated as a measure of adherence. Finally, parent weekly ratings of the amount of time spent implementing PRT skills in the home environment were averaged to compare between groups.

Treatment satisfaction. The sections on perceived level of difficulty and helpfulness for PRT strategies were averaged separately for each group. Because several families did not answer the difficulty and helpfulness questions in regard to their supplemental treatment condition, these averages were presented separately.

Treatment efficacy and exploratory analyses.

Group differences. Given the non-normal distributions of the small samples, Mann-Whitney U tests were used to make baseline comparisons to compare independent samples (i.e. completers versus non-completers; mPRT versus pPRT). Using G*Power3 (Faul, Erdfelder, Lang, & Buchner, 2007), power analyses revealed significantly low power for group

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comparisons, suggesting that the sample size was too small to detect even a large effect. Post hoc analyses with the current sample and $\alpha = .05$, revealed power of .23 for comparing completers versus non-completers and .19 for comparing parents in mPRT versus pPRT. A sample size of 95 would have been necessary to detect a large effect ($r = .5$). Group comparisons were also made at post-treatment to analyze differences in parent fidelity of PRT techniques and treatment satisfaction. To calculate effect size, the following formula was used ($r = Z/sqrt(N)$). The interpretation of r values are as follows: .5 = large effect, .3 = medium effect, .1 = small effect (Coolican, 2009; Fritz, Morris, & Richler, 2012).

In addition, to test within-group changes, non-parametric Wilcoxon Signed Rank Test (equivalent to a dependent t-test) were utilized to compare baseline and endpoint/follow-up scores for each group across variables of interest. When full data were available, achieved power was .41. A sample size of 27 would have been necessary to detect a large effect ($r = .5$) and 648 for a small effect ($r = .1$). Due to low power, effect sizes were also calculated when determining change as a result of treatment.

Single-Subject Analyses. In addition to group change over time, individual level change was calculated for parenting stress, parent mindfulness, and parent positive feelings toward child using Reliable Change Index (RCI; Jacobson & Truax, 1991). RCIs were calculated in order to determine the magnitude of change needed to show meaningful change above and beyond standard error. RCI calculations were completed by dividing the difference of scores between two timepoints (i.e., either pre-treatment and post-treatment or pre-treatment and follow-up), divided by the standard difference, which includes test-retest reliability and standard deviation of the original measure. RCI values above 1.96 are suggested to infer statistically significant and meaningful change. The test-retest reliabilities and standard deviations used to compute the S_{diff}

score were obtained from the literature. If test-retest reliability was not previously reported in literature, then Cronbach's alpha was used (from the literature).

Chapter 3 – Results

Data Check and Clinical Circumstances

In the current study, there were 3 groups of parents who participated in the mPRT condition and 3 groups of parents in the pPRT condition. In the final count, 5 out of 8 parents completed mPRT and 5 out of 7 parents completed pPRT. For mPRT group 1, although two people started in the group, after the first session, only one member in the group remained. For mPRT groups 2 and 3, three families began each group and 2 families completed each group. For pPRT groups 1 and 2, two families started and completed the treatment in each group. For pPRT group 3, three families began treatment and only one family completed treatment. Due to difficulties with recruitment and retention, one family in mPRT (003) and pPRT (013) completed the "group" individually.

Personal circumstances regarding the participants were noted throughout the intervention phase in order to have a record of mitigating factors that may have influenced treatment progress and outcome. As noted above, two parents participated in "groups" that only consisted of themselves. One mother in the mPRT group (PRT_011) gave birth to a sibling during the middle of treatment; however, she only missed two weeks and continued to participate consistently after that time. One mother in the pPRT group (PRT_007) was pregnant throughout treatment. Both mothers may have experienced situations leading to even more parenting stress than expected.

Treatment Feasibility and Acceptability

Treatment Adherence. Fifteen parent and child dyads completed the pre-treatment assessment and were randomly assigned to treatment condition. Two families randomly assigned to pPRT dropped out of the study (i.e., one family discontinued participation before the first session due to a family emergency requiring the family to leave town and another family

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attended two sessions and dropped out due to an "unpredictable work schedule" and previous

obligations with church and home). Three families randomly assigned to mPRT dropped out of

the study (i.e., two families attended one session and discontinued due to difficulties with time

commitment and deciding that it was not a good fit; one family did not attend any sessions and

noted that they were too busy to attend all of the sessions). Of the 10 families who completed

treatment, 5 were randomly assigned to mPRT and 5 to pPRT.

Parents were asked to submit weekly videos that were then reviewed during session to

discuss strengths and areas of improvement. The total number of videos submitted represents an

important outcome measure in feasibility as the majority of sessions focused around this

component for understanding of concepts. For the parents in pPRT groups, an average of 8.2

videos (out of 10) were submitted (ranging from 6 to 10). For the mPRT groups, an average of 8

videos (out of 10) were submitted (ranging from 5 to 10). The average rating for weekly practice

of PRT skills for the pPRT group ($n = 5$) was 3.09 (SD = .47) and 2.62 (SD = 1.0) for the mPRT

group ($n = 3$).

Treatment satisfaction. When asked about whether the participating parent would

recommend this treatment to friends or family, 80% of mPRT parents reported "Strongly

recommend," and one parent selected "Recommend." For pPRT parents, 80% of mPRT parents

reported "Strongly recommend," and one parent selected "Slightly Recommend."

Parents were asked to rank the level of perceived difficulty and helpfulness of general

PRT strategies as well as mindfulness strategies or psychoeducation topics covered during

treatment. There were no significant differences between group in perceived helpfulness of PRT

techniques (U = 9.00, $p = .456$) or perceived difficulty (U = 3.50, $p = .059$), although the mean

level of perceived difficulty for PRT techniques within the mPRT group (M = 3.975, SD = .845)

was lower than the pPRT group (M = 4.75, SD = .42), suggesting those in the pPRT group found the PRT techniques less difficult to understand and learn. There were no differences between perceived level of difficulty or helpfulness in the supplemental treatments (i.e., mindfulness or psychoeducation); however, only 3 parents in the pPRT condition and 4 in the mPRT group completed these specific supplemental group questions.

For those who completed the pPRT group, 60% of parents (*n* = 3) felt that the number of group sessions was "just right." One parent reported that it was "too few" and one said it was "too many." The exact same breakdown was noted for the parents who completed the mPRT group (i.e., 60% just right, 20% too few, 20% too many). In regard to length of group sessions, 80% of parents who completed the pPRT and mPRT group reported that it was "just right." One parent from each group noted that it was "too long." When asked about how the parent felt about the number of individual PRT training sessions (i.e., 4 sessions), 40% of parents in pPRT groups noted that it was "just right" compared to 80% of parents in mPRT groups. Sixty percent of pPRT parents and 20% of mPRT parents reported that it was "too few."

Treatment Efficacy: Primary Outcome Measures

Baseline comparisons of demographic variables.

Completers versus Non-Completers (Tables 2 and 3). Those who attended more than 75% of sessions were labeled as treatment completers (*n* = 10), leaving the remaining families as non-completers (*n* = 5). Unless otherwise specified, the previously stated *n*'s apply to the following analyses. In regard to demographic variables, there was no significant difference between completers and non-completers in participating caregiver's age (*U* = 6, *p* = .16, r = .40, *n* = 12 [3 non-completers]), child age (*U* = 19, *p* = .40, r = .22), income (*U* = 11, *p* = .84, r = .06, *n* = 11 [3 non-completers]), and caregiver education (*U* = 16.5, *p* = .61, r = .14, *n* = 14 [4 non-

completers]). In regard to sample characteristics, there was a significant difference in total ASD characteristics that equated to a large effect (as measured by the SRS-2; $U = 1.0$, $p = .02$, r = .66, $n = 13$ [3 non-completers]) but not cognitive ability (as measured by Mullen Early Learning Composite Standard Score; $U = 9.0$, $p = .22$, r = .34, $n = 13$ [3 non-completers]).

mPRT versus pPRT completers (Tables 2 and 3). The following analyses assume n's of 5 per group unless otherwise stated. When comparing demographic variables, there were no significant differences between groups in participating caregiver's age ($U = 4.5$, $p = .18$, r = .43), child's age ($U = 10.0$, $p = .52$, r = .20), income ($U = 4.0$, $p = .28$), and caregiver education ($U = 10.0$, $p = .58$). In regard to sample characteristics, there were no significant differences between groups in ASD characteristics (as measured by the SRS-2; ($U = 6.0$, $p = .17$, r = .43), and cognitive ability (as measured by the Mullen Early Learning Composite Standard Score; ($U = 10.5$, $p = .64$, r = .15).

Therapist fidelity of treatment implementation. Throughout the course of these 6 groups, there were a total of 8 different clinicians who assisted with this treatment study and participation ranged from running 1 to 3 groups total. Per observer ratings, therapeutic relationship was rated "good" (M = 4.00, SD = .00) for both groups. In regard to parent engagement in group, the pPRT group mean was 4 (SD = .00) and mPRT group mean was 3.72 (SD = .289) and they were not significantly different from one another (U = 99.00, $p = .22$). Finally, the mean percentage of objectives accomplished for each session ranged in the pPRT group from 50% to 100%; however, the therapists viewed for all three mPRT groups completed all session objectives 100% of the time.

Child Utterances.

Baseline comparisons. In regard to child utterances elicited by a PRT therapist at baseline, there were no group differences between those who completed treatment ($n = 10$) versus not ($n = 5$) for total utterances ($U = 24.0$, $p = .90$), unintelligible verbalizations ($U = 17.0$, $p = .32$), imitated prompts (U = 24, $p = .90$), nonverbal prompts (U = 20.5, $p = .57$), and spontaneous utterances ($U = 24.5$, $p = .95$). Similarly, there were no group differences between those who completed mPRT and those who completed pPRT for total utterances, unintelligible verbalizations, imitated prompts, nonverbal prompts, and spontaneous utterances during the therapist implemented SLO (see Table 3).

Comparisons of child utterances between completers and non-completers as well as those who completed mPRT versus pPRT were also calculated during parent implemented baseline SLO and weekly videos. There were no significant group differences for parent implemented baseline SLO for total utterances ($U = 2.0$, $p = .16$, $n = 7$ [4 mPRT]), unintelligible vocalizations ($U = 1.0$, $p = .07$), and spontaneous utterances ($U = 4.0$, $p = .48$). Although not significantly different, the mean total unintelligible vocalizations during baseline for mPRT was 21.25 (SD = 11.44), compared to pPRT mean of 8.00 (SD = 3.61). There were no significant group differences for the average of week 1 and 2 home videos for total utterances ($U = 5.0$, $p = .39$, $n =$ 8 [4 mPRT]), unintelligible vocalizations ($U = 7.0$, $p = .77$), and spontaneous utterances ($U = 6.0$, $p = .55$).

Pre- to post-treatment change. To test the efficacy of the group PRT treatment, both groups were combined to explore the change in child utterances to examine efficacy of the PRT treatment component. When analyzing change in child utterances from SLO 1 to SLO3 ($n = 6$), there were no significant changes in total utterances (Z = -1.1, $p = .27$, r = .35), unintelligible verbalizations (Z = -.67, $p = .50$, r = .21), imitated prompts (Z = -1.1, $p = .27$, r = .35), nonverbal

prompts (Z = -1.3, p = .18, r = .42) or spontaneous utterances (Z = -1.8, p = .07, r = .58).

Although not significant, the increase in spontaneous utterances from SLO 1 to SLO 3 was a

large effect. When analyzing change in child utterances using weekly videos (n = 7 pairs),

significant differences emerged. Specifically, the total amount of child utterances significantly

increased (Z = -2.37, p = .02, r = .63), as well as utterances from non-verbal prompts (Z = -2.20,

p = .03, r = .59), and spontaneous utterances (Z = -2.12, p = .03, r = .57). All increases from the

average of weeks 1 and 2 to weeks 9 and 10 were large effects.

Pre- to follow-up treatment change. Change in child utterances were also calculated to

compare levels from SLO 1 to SLO 4; only four participants' data were available for these

analyses. There were no significant changes in total utterances (Z = -.36, p = .72, r = .13),

unintelligible verbalizations (Z = -.36, p = .72, r = .13), utterances from imitated prompts (Z = -

1.5, p = .14, r = .52), utterances from nonverbal prompts (Z = -.37, p = .71, r = .13) or

spontaneous utterances (Z = -.54, p = .59, r = .19). Of the increases from SLO 1 to SLO 4, the

changes in utterances from imitated prompts equated to a large effect.

Parent fidelity of PRT implementation.

Baseline comparisons. There were no differences between those parents who completed

treatment versus non-completers in parent fidelity of implementing PRT techniques during SLO

at baseline (U = 17, p = .94, n = 12 [5 non-completers]). Similarly, there were significant

differences between parents in mPRT versus pPRT at baseline SLO (U = 3.0, p = .29).

Post-treatment. When measuring post-treatment rates of parent fidelity of PRT

implementation during SLO, six videos were available (3 mPRT and 3 pPRT). At this timepoint,

50% of the parents reached above 80% fidelity. More specifically, 33.3% of pPRT parents and

66.6% of mPRT parents. When analyzing percent of parent fidelity of PRT implementation using

weekly videos, 80% of all parents met fidelity (i.e., above 80%; *n* = 8 out of 10) when averaging

the levels of parent fidelity from weeks 9 and 10. The two parents who did not achieve above

80% when their week 9 and 10 videos were averaged were both in the pPRT group.

Follow-up to treatment. Six videos were available at the follow-up assessment (SLO 4; 4

mPRT and 2 pPRT), and 83.3% of all 6 parents demonstrated fidelity of PRT techniques above

80% (i.e., *n* = 5 out of 6). The individual who did not reach 80% was in the pPRT group and

demonstrated 75.8% accuracy.

Parent stress.

Baseline comparisons. Comparisons between participants who completed treatment

versus non-completers yielded significant baseline differences in parent stress as measured by

the APSI (*U* = 4.5, *p* = .03, *n* = 14 [4 non-completers]), Child Domain from PSI (*U* = 2.0, *p* =

.03, *n* = 12 [3 non-completers]), and SUPSS (*U* = 7.5, *p* = .03, *n* = 15 [5 non-completers]); that

is, those who completed treatment rated higher stress on these measures than those who did not

complete treatment. There were no significant baseline differences between participants in

mPRT versus pPRT groups.

Pre- to post-treatment change. Wilcoxon Signed Ranks Test were run to compare

changes in parenting stress from pre to post treatment (*n* = 9 pairs), first in the mPRT group (*n* =

5 pairs). Regarding changes in parenting stress, there was no significant change when measured

by SUPSS (Z = -1.34, *p* = .18, r = .55) or by APSI (Z = -1.10, *p* = .27, r = .35), although the total

APSI score decreased from pre-treatment (M = 21.40, SD = 3.13, median = 20) to post-treatment

(M = 18.20, SD = 6.72, median = 14). There were significant reductions in parenting stress

related to child stressors as measured by the PSI Child Domain (Z = -2.02, *p* = .04), with a large

effect size (r = .90). Within the pPRT group (*n* = 4 pairs), there were no significant changes from pre-treatment to post-treatment on any measure of parenting stress.

In regard to individual-level changes in parenting stress, 3 families within mPRT condition (60%) and 1 parent in the pPRT condition (20%) showed reliable decreases in total stress as measured by PSI total T-Score. One parent in mPRT group (20%) and one parent in the pPRT group (20%) showed reliable change in parenting stress when measured by the APSI.

Pre- to follow-up treatment change. Wilcoxon Signed Ranks Test were also run to compare changes in parenting stress from pre-treatment to three-month follow-up (*n* = 8 pairs for SUPSS and APSI, 7 pairs for PSI Child Domain), first in the mPRT group. There were non-significant decreases found in SUPSS (Z = -1.60, *p* = .11, r = .57), APSI (Z = -.73, *p* = .46, r = .26), or PSI Child Domain (Z = -1.46, *p* =.14, r = .52). For the pPRT group, there were also non-significant decreases in parenting stress as measured by the SUPSS (Z = -1.84, *p* = .07, r = .65), APSI (Z = -1.47, *p* = .14, r = .52), or PSI Child Domain (Z = -1.34, *p* = .18, r = .55). Overall, large effects were found for both groups in measuring change via SUPSS and PSI Child Domain. In addition, a large effect was found within the pPRT for changes in APSI.

In regard to individual-level changes in parenting stress at follow-up, 1 family within mPRT condition (20%) and 1 parent in the pPRT condition (20%) maintained reliable decreases in total stress as measured by PSI total T-Score. One parent in mPRT group (20%) and one parent in the pPRT group (20%) maintained reliable change in parenting stress when measured by the APSI.

Exploratory Analyses

Positive parent feelings toward child.

Baseline comparisons. When comparing levels of positive feelings toward child, there were no statistically significant differences between parents who completed treatment versus not as measured by the PFQ ($U = 14.0$, $p = .39$, $n = 14$ [4 non-completers]) and PANAS Positive Affect Total ($U = 10.0$, $p = .06$, $n = 15$ [5 non-completers]).There were also no differences in baseline levels of positive parent feelings toward child between mPRT ($n = 5$) and pPRT group ($n = 5$) when measured by either PFQ (U = 10.5, $p = .67$, r = .13) or PANAS Positive Affect (U = 6.5, $p = .21$, r = .40).

Pre- to post-treatment change. Within the mPRT group ($n = 5$), there were no significant changes in positive feelings toward child as measured by PFQ (Z = -.14, $p = .89$, r = .04) and PANAS Positive Affect Total (Z = -1.34, $p = .18$, r = .54). Within the pPRT group ($n = 5$), there were also no significant changes from pre-treatment to post-treatment on PFQ (Z = -.18, $p = .85$, r = .06) or PANAS Positive Affect Total (Z = -1.1, $p = .27$, r = .35). In regard to effect sizes, there was a large effect for increases in PANAS Positive Affect in mPRT compared to medium in pPRT.

When examining individual level changes in positive parent feelings toward child, one parent in mPRT (20%) and one parent in pPRT (20%) conditions showed reliable change as measured by the PFQ Likert Positive Scale and no parents showed reliable change in PANAS Positive Affect from pre to post treatment.

Pre- to follow-up treatment change. At the group level, there were no significant changes from pre-treatment to follow-up in the mPRT group ($n = 4$ pairs) for both measures of positive parent feelings toward child as measured by the PFQ (Z = -.44, $p = .65$, r = .06) and PANAS Positive Affect Total (Z = -1.83, $p = .07$, r = .65). Similar non-significant findings were noted in the pPRT group ($n = 4$ pairs) for PFQ (Z = -1.0, $p = .32$, r = .35) and PANAS (Z = -

1.60, $p = .11$, r = .57). Although all findings were non-significant, large effect sizes were noted for changes in PANAS scores from pre- to follow-up treatment in both groups.

At an individual level, one parent in pPRT group (20%) showed reliable change (increase) in positive affect as measured by the PANAS from pre- to follow-up treatment condition. No parents in either group maintained or showed reliable changes in PFQ.

Parent mindfulness.

Baseline comparisons. On measures of parent mindfulness, there were mixed findings regarding baseline differences between completers and non-completers. There were significant differences in psychological flexibility (as measured by AAQ-II; ($U = 5.5$, $p = .04$, $n = 14$ [4 non-completers]), with those parents who completed treatment reporting more inflexibility. Levels of total mindfulness (as measured by FFMQ Total Score), however, were not significantly different between groups ($U = 12.0$, $p = .25$, $n = 14$ [4 non-completers]). No significant differences were noted between parents in mPRT ($n = 5$) versus pPRT group ($n = 5$) at baseline measurements of mindfulness as measured by AAQ-II (U = 9.0, $p = .46$, r = .23) or FFMQ Total (U = 12.0, $p = .92$, r = .03).

Pre- to post-treatment change. In regard to changes in mindfulness for the mPRT group ($n = 5$), there was a significant increase in psychological flexibility as measured by the AAQ-II (Z = -2.03, $p = .04$) from pre-treatment (M = 15.20, SD = 8.64, median = 15) to post treatment (M = 12.20, SD = 8.82, median = 13); however, there was no significant changes in total mindfulness levels measured by FFMQ (Z = -.36, $p = .72$, r = .13). Within the pPRT group ($n = 5$), there were no significant changes from pre-treatment to post-treatment on the AAQ-II (Z = -.948, $p = .34$, r = .30), or FFMQ Total (Z = -1.62, $p = .10$, r = .51).

In regard to person-level changes in mindfulness from pre- to post-treatment, one parent in mPRT condition (20%) and one parent in pPRT (20%) condition showed reliable changes (increases) in mindfulness as measured by the FFMQ Total Score. When measuring change in AAQ-II, no parents in the mPRT condition demonstrated reliable change and one pPRT parent (20%) showed reliable change from pre-treatment to post-treatment.

Pre- to follow-up treatment change. Group level changes were calculated for each condition to compare changes in mindfulness from pre-treatment to follow-up. Changes within the mPRT group (*n* = pairs) were nonsignificant for both measures of mindfulness (i.e., Z = -.82, *p* = .41, r = .29 for AAQ-II changes and Z = -.730, *p* = .46, r = .26 for FFMQ Total changes). Similarly, there were non-significant changes noted in the pPRT group (*n* = 4 pairs) from pre to follow-up when measured by the AAQ-II (Z = -1.83, *p* = .07, r = .64) and FFMQ Total (Z = -.73, *p* = .46, r = .26). Findings within both groups were non-significant; however, increases noted in the pPRT group for AAQ-II demonstrated a large effect compared to a small effect for the mPRT group.

At an individual level, one parent in pPRT group (20%) showed reliable change (increase) in psychological flexibility as measured by the AAQ-II from pre- to follow-up treatment condition; no parent in mPRT condition showed reliable change in AAQ-II. No parents in either group maintained or showed reliable changes in FFMQ at follow-up.

Child problem behaviors.

Baseline comparisons. There were no statistically significant differences in either child internalizing behavior (as measured by the CBCL; *U* = 8.0, *p* = .09) or externalizing behaviors (as measured by the CBCL; *U* = 13.5, *p* = .36) when comparing those who completed treatment (*n* = 10) to those who did not complete treatment (*n* = 4). In regard to sample characteristics,

there were no significant differences between groups in child internalizing behaviors (as measured by the CBCL; $U = 10.5$, $p = .67$), externalizing behaviors (as measured by the CBCL; $U = 11.5$, $p = .83$),

 $\quad$ ***Pre- to post-treatment change.*** Group level differences were computed individually for each group. Within the mPRT group ($n = 5$), there were non-significant findings from pre- to post-treatment in externalizing ($Z = 0.0$, $p = 1.0$) and internalizing child behaviors ($Z = -1.07$, $p = .28$, r = .34). In the pPRT (n = 5), there were significant decreases in internalizing behaviors ($Z = -2.03$, $p = .04$, r = .64) but not externalizing behaviors ($Z = -.54$, $p = .59$, r = .19).

 $\quad$ ***Pre- to follow-up treatment change.*** There were no significant changes in externalizing or internalizing child behaviors from pre-treatment to follow-up for either group.

Chapter 4 - Discussion

As rates of ASD continue to rise, the need for empirically supported interventions increases in demand. Previous research supports ameliorative effects of child outcome trajectories through intensive and early intervention programs using ABA approaches, such as PRT. Embedding stress-reduction strategies within these empirically supported treatment models may serve as an important preventative measure to buffer the impact of parenting stress heightened in parents of children with ASD. Results from the current study provide mixed support for supplementing child-focused group therapy with parent-focused techniques.

In the current study, fifteen families were randomly assigned to treatment condition and 10 families successfully completed treatment, demonstrating a 66.67% retention rate. Those who completed treatment reported high levels of satisfaction. Children in both groups demonstrated significant increases in child utterances, when measured via weekly videos recording in naturalistic environments versus clinic setting. Although gains made from pre-treatment to follow-up were not statistically significant, they demonstrated a large effect size. Similarly, when parent rating of fidelity was assessed via weekly home videos, 80% of parents achieved above 80% of fidelity in PRT implementation as opposed to 50% when measured in laboratory setting. However, at a three-month follow-up assessment in the laboratory setting, 83.33% of parent demonstrated above 80% fidelity. At the group level, only the mPRT group showed significant group decreases in parent stress and increases in mindfulness and only the pPRT group showed significant decreases in internalizing child behavior. At the individual level, more than half of the parents in mPRT reported significant change in parenting stress; however, these gains were not maintained into follow-up. Overall, parents in mPRT and pPRT showed similar low levels of improvement when measured at the individual level of change in regard to mindfulness and

positive parent feelings toward child. The current study provides provisional support the addition of mindfulness-based techniques to PRT instruction in a group format; however, hypotheses regarding larger changes in parenting stress, mindfulness, and positive feelings toward child for parents assigned to mPRT versus pPRT were not supported.

The results presented above provide mixed support for Aim 1 (i.e., feasibility and acceptability of treatment approach). The retention rates observed in the current study are significantly lower compared to a similar group model (Hardan et al., 2015) and other parent-mediated interventions (Bearss et al., 2015). However, when compared to drop-out rates observed in child psychotherapy, attrition rates were comparable (Armbruster & Kazdin, 1994). Although time and schedules were often cited as reasons for discontinuing treatment, other barriers such as distance of the clinic from home town and rural nature of the sample may have made participation difficult for families. Those who remained in treatment reported high levels of satisfaction and the majority stated that they would strongly recommend this treatment modality to others. Caregivers ranged in the amount of videos they submitted for in-group review as well as data analysis. However, it is interesting to note that more parents met fidelity of PRT implementation when the home videos were observed compared to observations at a clinic setting. During these weekly videos, parents were specifically told to practice PRT techniques; however, during the SLOs, parents were only instructed to elicit language from their child, using whatever strategies they deemed helpful. Despite these differences at post treatment, there is some evidence to suggest that parents continued to use the PRT techniques after treatment given the high rate of parents who reached fidelity at follow-up assessment.

Although small sample size greatly reduced power for examining Aim 2 (i.e., preliminary efficacy of group-based parent-mediated intervention on primary and exploratory measures),

some positive findings emerged. In regard to child utterances, significant differences were noted from the first weeks of treatment to the final weeks of treatment when observations from home environment were used and not when laboratory observations were analyzed. On the one hand, we would expect utterances to significantly increase in both settings. On the other hand, smaller sample size in SLO analyses as well as prioritizing naturalistic settings should be considered, as the home setting in which the weekly videos were recorded constitute the day-to-day activities and interactions for caregivers and children. Additionally, only the mPRT group demonstrated significant decreases in parent stress and increases in mindfulness from pre-treatment to post-treatment; however, these findings were not maintained into follow-up. When analyzed on an individual level, some of the caregivers demonstrated meaningful changes in parenting stress, mindfulness, and positive attitude toward child; however, the majority of changes observed in parents did not reach significance.

The comparisons of those who completed treatment versus those who dropped out reveal significant differences at baseline that may have influenced treatment retention. The parents who completed two or fewer sessions reported significantly lower levels of social responsiveness as measured by SRS-2 Total T-Score, lower levels of parenting stress as measured by the APSI, PSI-4 Child Domain and SUPSS, and higher levels of psychological flexibility and mindful non-reactivity as measured by the AAQ-II and FFMQ Non-Reactivity subscale respectively. In other words, those parents who did not remain in treatment may not have perceived treatment as necessary or helpful, above and beyond the status quo. Interestingly, three of the five families that decided not to participate in the treatment noted difficulties with time commitment and scheduling. As a result, the perception of heightened parenting difficulty (e.g., parenting stress)

and child behavior may have served as motivation to commit to and remain invested in treatment completion.

At first glance, these findings contradict previous research that suggests higher parenting stress levels lead to greater dropout. On the other hand, Abidin's model of parenting stress (1992) as well as the Yerkes-Dodson law may help make sense of the seemingly opposite findings. As discussed in the introduction, appraisals of stressors lead to arousal or stress which motivates a parent to seek resources. Those parents who discontinued treatment may have re-appraised their unique stressors as no longer needing the resources offered through the current treatments outlined above. In a similar note, the stressors the accompanied treatment engagement may have outweighed the stressors leading them to seek treatment in the first place. In addition, the Yerkes-Dodson model suggests that there exists an inverted second-order polynomial relationship between stress or arousal levels and performance, such that increasing rates of arousal leads to optimal performance but only to a certain point before it begins to decline. Lower levels of arousal (as found in the current study) may not reach the level of motivation to engage in a task whereas higher levels of arousal (as found in previous literature) may overtax the system and lead to inability to engage in tasks due to limited resources available. Those parents who remained in the study demonstrated increased levels of parenting stress compared to those who did not stay in treatment; however, these levels did not exceed their capacity or motivation to engage in treatment.

Additionally, the current sample showed lower baseline levels of parenting stress compared to the current literature (e.g., Feinburg et al., 2014; Minjarez et al., 2012). Specifically, Minjarez and colleagues (2012) examined the change in parenting stress as a result of participation in group PRT treatment. Baseline levels of parenting stress, albeit measured by a

different form (i.e., Parenting Stress Index-Short Form), revealed that over three-fourths of the sample initially reported clinically significant levels of total parenting stress. Within the current sample, only 16.7% of all parents who completed baseline measures fell in the clinically significant range for total stress, as measured by the PSI-4 Total Stress Percentile. This percentage remained lower than the total number of parents who remained at clinically significant levels of parent stress at post PRT group treatment in the Minjarez et al., 2012 study.

Results from the current study differ in other ways from previous findings examining the impact of group-based PRT. When comparing the current sample to Hardan and colleagues (2015) RCT of group PRT, both baseline samples showed similar child age and total utterances. The current treatment consisted of 22 hours of group therapy and 4 hours of individual or family therapy, whereas the treatment package in Hardan et al (2015) was 16 hours (eight 1.5 hour groups; four 1 hour individual). Additionally, the average group size for the current study was 1.67 primary caregivers versus 4 to 6 parents. Despite these differences, both groups demonstrated similar amounts of gain in child utterance (average change in total utterances for current sample = 19.75 total utterances compared to 18.8).

Limitations

Although this study presents many strengths, it is not without notable limitations. Firstly, our group sizes were small and on two occasions turned into individual/family therapy. Relatedly, missing data due to technical issues and participant responses limited sample sizes. Overall, small total and group samples significantly limited power and the ability to detect meaningful change as a result of treatment. Other limitations related to the treatment design and implementation, including the active nature of the control group and the variability in treatment providers. Previous studies have shown that psychoeducation of ASD and engaging in PRT have

both led to decreases in parent stress. As a result, in order to see true differences between groups, we would require a sample size large enough to detect small effects. Across the six groups run, there were a total of 8 different graduate-level clinicians that served as group facilitators and varied in regard to training in PRT techniques, mindfulness, and ASD population in general. One standard of quality in intervention research, as highlighted by Cadogan and McCrimmon (2015), is the inclusion of provider fidelity of treatment implementation. Although the current study assessed the parents' level of fidelity of PRT implementation and therapist fidelity of group treatment components, the therapists providing care receiving initial training and ongoing supervision but not documented reliability of PRT implementation (i.e., core components of PRT treatment).

Future Directions

The impact of ASD on caregivers and families is often direct and lifelong. As a result, intervening early can result in immediate and long-term benefits for parents, children and families. First and foremost, future directions necessitate further exploration of this proof of concept in a larger sample size (i.e., both in total amounts of parents completing the treatment and larger group sizes). From a clinical perspective, the group structure of this treatment provided the opportunity for parents not just to learn the skills to implement for themselves in their home environment. It encouraged parents to apply their knowledge to other parents with children who may be facing similar or different challenges. In addition, for some parents in the current groups who did not provide a video of PRT for a specific week, group instruction for that week was greatly impacted. Overall, bigger sample sizes would allow for more robust analyses and conclusions to be made.

Given the small sample size, a more optimal treatment design would have focused more on analyzing change at the item level. Methods, such as multiple baseline design, could have better delineated the true effects of treatment compared to an established baseline of functioning. In an ideal world, an AB design would be helpful for understanding mechanisms (i.e., seeing if the mindfulness-based instruction truly lowered parenting stress during the A treatment condition before moving to the B treatment condition of PRT). In reality, parents who participated in the current groups appeared most motivated to learn the skills in an effort to best help their child. Regardless, future directions also include a better understanding of the mechanisms of treatment. Additionally, decreases in parenting stress, as a result of treatment, may serve as a mechanism for additional positive child, parent and family outcomes. A strength of the current study design is the longitudinal nature of child and parent measures over the course of treatment; however, due to small sample size, mediation analyses could not be implemented to understand the influence of multiple factors on other variables. We would anticipate that those caregivers who demonstrate larger decreases in parenting stress as well as increased positive parent-child interactions may also reach fidelity of treatment implementation earlier in treatment or show a larger decrease in child problem behaviors.

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Table 1
Assessment Schedule

Construct/ Measure	Pre-Tx	Mid	Weekly	Post-Tx	Follow-up
Sample Characterization					
ADOS-2	X				
Child History Form	X				
Mullen	X				
Child Behavior Checklist	X				
Treatment Efficacy					
SLO Child Utterances	X	X	X	X	X
Treatment Satisfaction				X	
Therapist Fidelity of Treatment Implementation			X		
Parenting Stress					
PSI-4 (Child)	X	X		X	X
APSI	X	X		X	X
SUPSS	X	X		X	X
Positive Parent/Child Interactions					
PANAS	X	X		X	X
PFQ	X	X		X	X
Parent Mindfulness					
AAQ-II	X	X		X	X
FFMQ	X	X		X	X

Notes. PSI-4 = Parenting Stress Index Fourth Edition; APSI = Autism Parenting Stress Index; SUPSS = Subjective Units of Parenting Stress Scale (completed after 10 minute parent/child interaction); SLO = Structured Laboratory Observation; PANAS = The Positive and Negative Affect Schedule; PFQ = Parent Feelings Questionnaire; ADOS-2 = Autism Diagnostic Observation Schedule Second Edition; SRS-2 = Social Responsiveness Scale Second Edition; AAQ-II = Acceptance and Action Questionnaire; FFMQ = Five Facet Mindfulness Questionnaire

Table 2

Demographic Information and Sample Characterization

	mPRT		pPRT		
	All Randomized M (SD), $n = 8$	Completers M (SD), $n = 5$	All Randomized M (SD), $n = 7$	Completers M (SD), $n = 5$	Group Comparison (Completers)
Child Age	3.38 (1.19)	3.00 (0.00)	3.00 (1.00)	3.00 (1.22)	$U = 10.0, p = .52$
CG Age		36.60 (8.14)		29.75 (2.22)	$U = 4.5, p = .18$
Family Income	$84000 ($52057)	$88000 ($60372)	$85000 ($31885)	$91666 (35472)	$U = 4.0, p = .28$
	N (%)	N (%)	N (%)	N (%)	
Child Gender					--
Male	7 (87.5%)	5 (100%)	7 (100%)	5 (100%)	
Female	1 (12.5%)	0	0	0	
Child Ethnicity					$X^2 = .40, p = .53$
White	5 (62.5%)	2 (40%)	3 (42.9%)	3 (60%)	
Black	0	0	1 (14.3%)	0	
Asian	1 (12.5%)	1 (20%)	2 (28.6%)	2 (40%)	
Hispanic/Latina	2 (25%)	2 (40%)	0	0	
Previous ASD dx					--
Yes	5 (62.5%)	4 (80%)	5 (71.4%)	4 (80%)	
No	3 (37.5%)	1 (20%)	2 (28.6%)	1 (20%)	
CG Gender					$X^2 = .48, p = .49$
Male	3 (37.5)	2 (40%)	1 (14.3%)	1 (20%)	
Female	5 (62.5%)	3 (60%)	6 (85.7%)	4 (80%)	
CG Education Level					$X^2 = 3.33, p = .50$
HS Graduate	2 (25%)	1 (20%)	0	0	
Spec. Training*	0	0	1 (14.3%)	1 (20%)	
Assoc. Degree	1 (12.5%)	0	1 (14.3%)	1 (20%)	
College Graduate	2 (25%)	2 (40%)	3 (42.9%)	2 (40%)	
Graduate School	3 (37.5%)	2 (40%)	1 (14.3%)	1 (20%)	
Employment outside home					$X^2 = 2.06, p = .15$
Yes	5 (75%)	3 (60%)	5 (71.4%)	4 (80%)	
No	2 (25%)	2 (40%)	0	0	
English only language at home					--
Yes	4 (50%)	3 (60%)	4 (57.1%)	3 (60%)	
No	4 (50%)	2 (40%)	2 (29.6%)	2 (40%)	

*Graduated from trade school, business school, or specialized training program

Table 3
Baseline Comparison of Variables of Interest

	mPRT		pPRT		
	Non-Completers M (SD), *n* = 3	Completers M (SD), *n* = 5	Non-Completers M (SD), *n* = 2	Completers M (SD), *n* = 5	Group Comparison (Completers)
Sample Characterization					
SRS-2 Total T-Score	48.50 (9.19)	71.40 (7.30)	62.00	66.20 (5.22)	$U = 6.0, p = .17$
Mullen	49.00 (0)	58.80 (17.33)	49.00	50.20 (1.79)	$U = 10.5, p = .64$
CBCL-Ext. T-Score	54.00 (5.29)	59.40 (8.85)	50.00	58.40 (10.26)	$U = 11.5, p = .83$
Child Utterances					
Total SLO-BL Utterances	38.33 (29.90)	50.60 (38.51)	42.50 (51.62)	35.80 (19.27)	$U = 10.0, p = .60$
SLO-BL Unintelligible	1.67 (2.89)	6.60 (5.68)	5.50 (4.95)	4.00 (2.55)	$U = 9.5, p = .53$
SLO-BL Spontaneous	2.00 (2.00)	4.20 (6.57)	1.50 (2.12)	1.80 (2.49)	$U = 12.5, p = 1.0$
Parent Stress					
APSI Total	11.33 (4.04)	21.40 (3.13)	14.00	17.80 (8.70)	$U = 8.5, p = .40$
PSI Child Domain	42.50 (2.12)	63.80 (4.21)	53.00	56.50 (6.61)	$U = 4.0, p = .14$
PSI Parent Domain	38.50 (4.95)	61.80 (12.22)	50.00	48.00 (10.39)	$U = 3.0, p = .08.$
PSI Total Stress	40.00 (4.24)	63.60 (8.99)	51.00	52.50 (5.97)	$U = 3.0, p = .08$
PSI Life Stress		47.60 (6.35)	46.00	48.00 (6.68)	$U = 9.5, p = .90$
SUPPS	5.00 (5.00)	35.00 (28.50)	17.50 (10.61)	32.60 (12.40)	$U = 11.5, p = .83$
Mindfulness					
AAQ-II	5.00 (2.00)	15.20 (8.65)	8.00	11.80 (4.97)	$U = 9.0, p = .46$
FFMQ-Non-Reactivity	26.00 (2.00)	21.20 (2.05)	24.00	22.00 (4.85)	$U = 9.0, p = .46$
FFMQ-Non-Judgment	32.67 (7.02)	26.20 (10.50)	30.00	24.60 (7.44)	$U = 10.0, p = .60$
FFMQ-Observe	26.00 (3.00)	25.20 (5.54)	23.00	18.80 (5.80)	$U = 6.5, p = .21$
FFMQ-Act with Awareness	29.33 (2.08)	26.40 (7.02)	26.00	27.60 (7.83)	$U = 12.0, p = .92$
FFMQ-Describe	29.00 (4.58)	24.60 (5.13)	27.00	28.40 (7.50)	$U = 9.5, p = .53$
FFMQ-Total	143.00 (4.58)	123.6 (19.59)	130.00	121.40 (18.78)	$U = 12.0, p = .92$
Positive Affect Toward Child					
PANAS-PA	34.33 (1.53)	27.80 (8.23)	40.00 (2.83)	35.20 (10.13)	$U = 6.5, p = .21$
PFQ-Likert Positive	52.67 (3.21)	49.00 (6.96)	54.00	50.60 (5.18)	$U = 10.5, p = .67$

*n = 2 for SRS-2 and Mullen for mPRT non-completers; for sample characterization measures for pPRT non-completers, n = 1

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Table 4
Reliable Change Index for mPRT Participants

	Stress		Mindfulness		Parent Feeling Toward Child	
	APSI	PSI	AAQ	FFMQ	PFQ-P	PANAS-PA
PRT_003						
T1	20	65	26	99	52	23
T3	14	61	25	119	48	30
T4	18	64	23	103	50	35
RCI	-1.18/-.39	-1.30/-.32	-.22/-.92	2.62*/.52	-1.56/-.78	0.95/1.63
PRT_008						
T1	20	52	3	139	55	35
T3	25	42	1	137	51	--
T4	25	46	3	131	--	43
RCI	.99/.99	-3.24*/-1.94	-.43/0	-.26/-1.3	-1.56/--	--/1.09
PRT_009						--
T1	18	61	12	130	51	--
T3	14	55	8	116	53	--
T4	--	--	--	--	--	--
RCI	-.79/--	-1.94/--	-.86/--	-1.83/--	.78/--	--
PRT_010						
T1	23	63	15	143	50	38
T3	12	56	14	138	49	38
T4	13	52	16	128	50	40
RCI	-2.17*/-1.97*	-2.27*/-3.57*	-.22/.31	-.65/-1.96	-.39/0	0/.27
PRT_011						
T1	26	77	20	107	37	19
T3	26	70	13	--	48	29
T4	25	74	19	113	42	28
RCI	0/-.20	-2.27**/-.97	-1.51/-.34	--/.79	4.27*	1.36/1.22

Table 5

Reliable Change Index for pPRT Participants

|	Stress		Mindfulness		Parent Feeling Toward Child	
	APSI	PSI	AAQ	FFMQ	PFQ-P	PANAS-PA
PRT_001						
T1	6	44	6	132	54	46
T3	11	48	2	133	52	46
T4	7	44	4	121	54	46
RCI	.98/.20	1.29/0	-.86/-.61	.13/-1.44	-.78/--	--/--
PRT_002						
T1	23	58	17	110	50	21
T3	11	50	15	113	49	29
T4	11	50	13	120	50	24
RCI	-2.68*/-2.37*	-2.59*/-2.59*	-.43/-1.22	.39/1.31	-.39/--	1.09/.41
PRT_005						
T1	29	--	17	144	55	29
T3	22	51	7	143	55	30
T4	24	54	2	145	55	49
RCI	-1.38/-.99	--/--	-2.16*/-4.8*	-.13/.13	--/--	.13/2.72*
PRT_007						
T1	15	54	9	125	42	38
T3	13	45	5	155	51	42
T4	10	55	6	137	44	43
RCI	-.39/-.99	-2.92**/.32	-.86/-.92	3.93*/1.57	3.50*/.78	
PRT_013						
T1	16	54	10	96	52	42
T3	12	54	16	104	53	39
T4	--	--	--	--	--	--
RCI	-.79	0/--	1.29/--	1.05/--	.39/--	-.42/--

Figure 1
CONSORT Diagram
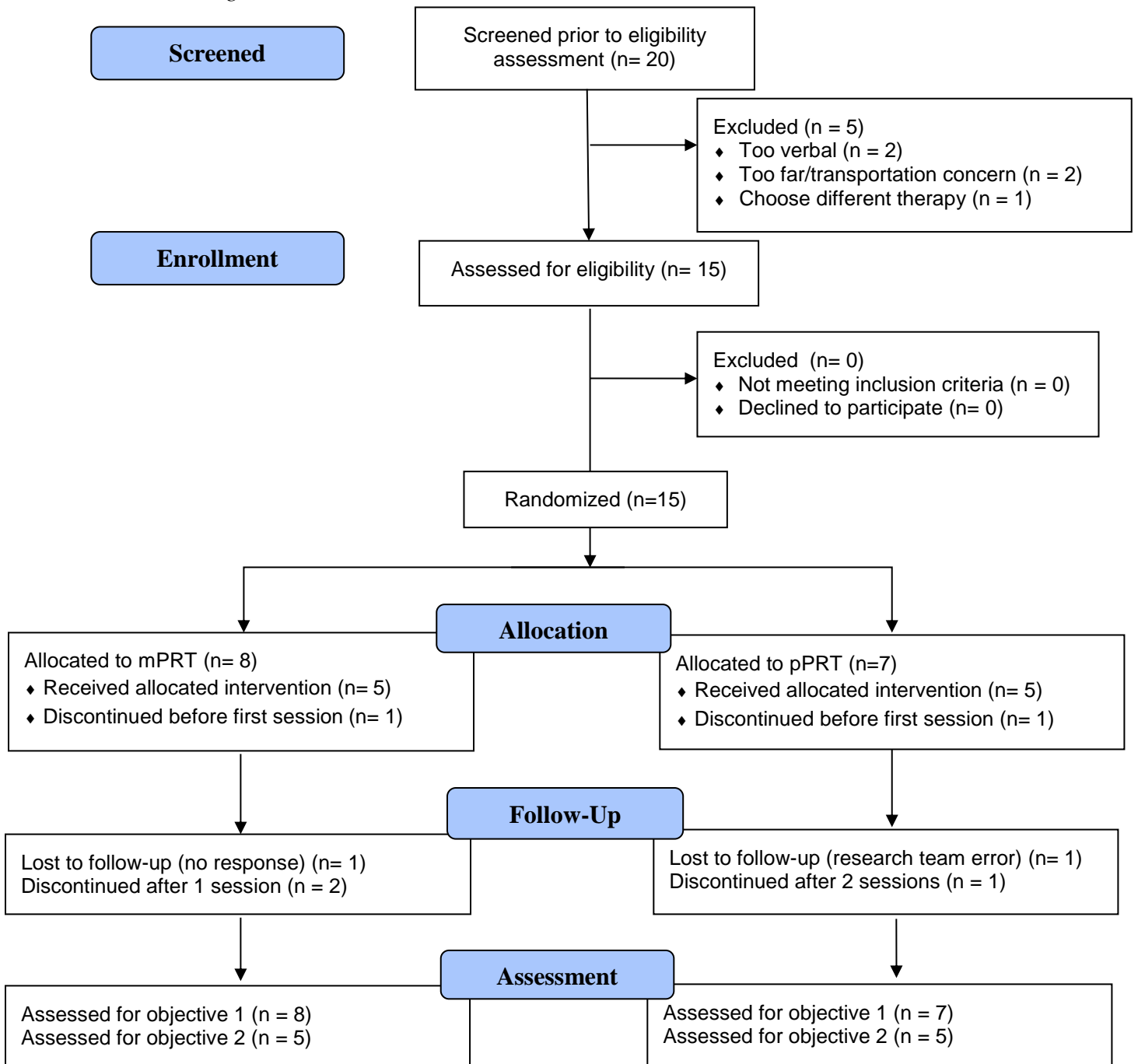
Figure 2
Change in Child Utterance
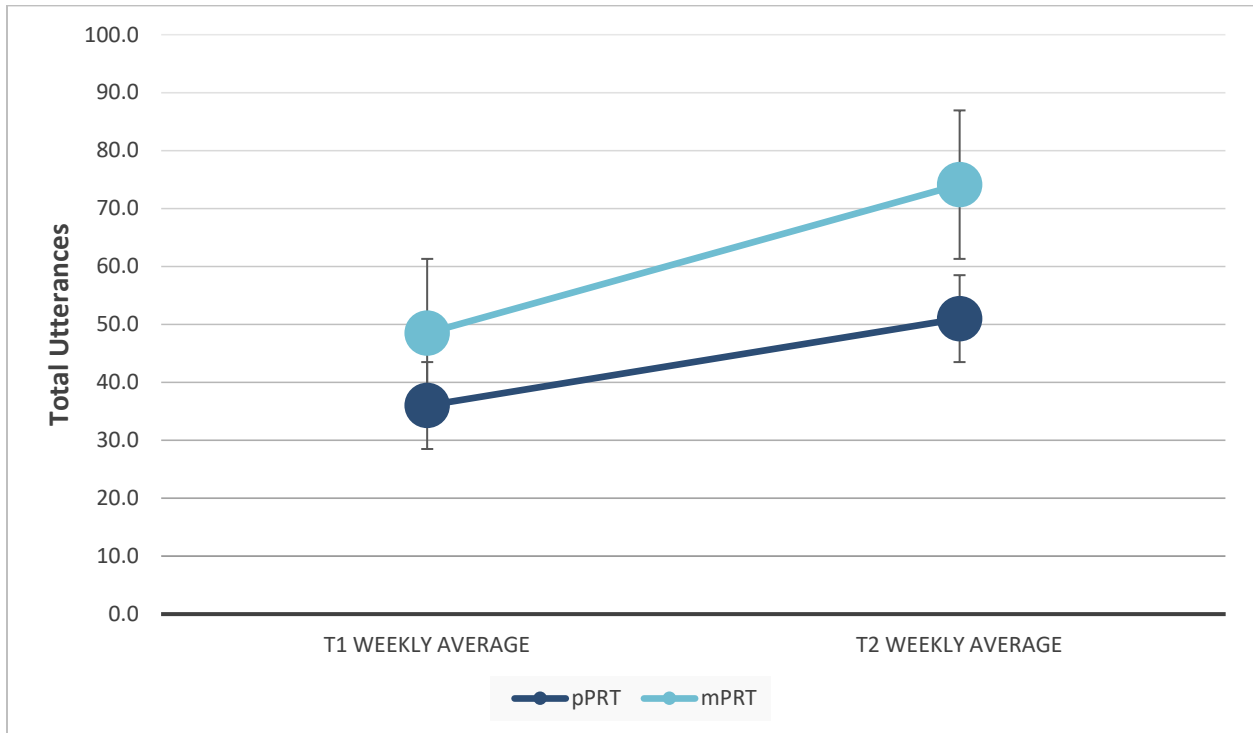
FIVE FACET MINDFULNESS QUESTIONNAIRE

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

1	2	3	4	5
never or very rarely true	rarely true	sometimes true	often true	very often or always true

_____ 1. When I'm walking, I deliberately notice the sensations of my body moving.

_____ 2. I'm good at finding words to describe my feelings.

_____ 3. I criticize myself for having irrational or inappropriate emotions.

_____ 4. I perceive my feelings and emotions without having to react to them.

_____ 5. When I do things, my mind wanders off and I'm easily distracted.

_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.

_____ 7. I can easily put my beliefs, opinions, and expectations into words.

_____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or

otherwise distracted.

_____ 9. I watch my feelings without getting lost in them.

_____ 10. I tell myself I shouldn't be feeling the way I'm feeling.

_____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

_____ 12. It's hard for me to find the words to describe what I'm thinking.

_____ 13. I am easily distracted.

_____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

_____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.

_____ 16. I have trouble thinking of the right words to express how I feel about things

_____ 17. I make judgments about whether my thoughts are good or bad.

_____ 18. I find it difficult to stay focused on what's happening in the present.

_____ 19. When I have distressing thoughts or images, I "step back" and am aware of the

thought or image without getting taken over by it.

_____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

_____ 21. In difficult situations, I can pause without immediately reacting.

_____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't

1	2	3	4	5
never or very rarely true	rarely true	sometimes true	often true	very often or always true

_____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.

_____24. When I have distressing thoughts or images, I feel calm soon after.

_____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.

_____ 26. I notice the smells and aromas of things.

_____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.

_____ 28. I rush through activities without being really attentive to them.

_____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.

_____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

_____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

_____ 32. My natural tendency is to put my experiences into words.

_____ 33. When I have distressing thoughts or images, I just notice them and let them go.

_____ 34. I do jobs or tasks automatically without being aware of what I'm doing.

_____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

_____ 36. I pay attention to how my emotions affect my thoughts and behavior.

_____ 37. I can usually describe how I feel at the moment in considerable detail.

_____ 38. I find myself doing things without paying attention.

_____ 39. I disapprove of myself when I have irrational ideas.

Appendix B

Parent Feelings Questionnaire (Deater-Deckard, 2000)
Every parent experiences both positive and negative feelings toward his or her child. Listed below are statements describing some of these feelings that parents may experience. Read each statement carefully and circle the number that most closely reflects your feelings toward your child: **1 = definitely untrue for you**, to **5 = definitely true for you**. Try to provide an answer for each item without skipping or looking back.

Think about your child, and use this scale when circling the appropriate number for each item:

1	2	3	4	5
Definitely untrue for me	Somewhat untrue for me	Not really true for me	Somewhat true for me	Definitely true for me

I usually make an effort to praise my child for good behavior.	1 2 3 4 5
Sometimes I am not happy about my relationship with my child.	1 2 3 4 5
Every once in a while my child's behavior can bring out the worst in me.	1 2 3 4 5
Every once in a while I avoid talking or playing with my child, such as when I am angry with her/him	1 2 3 4 5
I enjoy hugging and cuddling with my child.	1 2 3 4 5
Sometimes I find it difficult to be around my child.	1 2 3 4 5
My child and I do not get along as I had hoped we would.	1 2 3 4 5
Most of the time, my child brings out the best in me.	1 2 3 4 5
Sometimes I do not enjoy being with my child.	1 2 3 4 5
My child and I fight or argue more than I would like to.	1 2 3 4 5
I enjoy being my child's parent.	1 2 3 4 5
Every once in a while I wish that my child would just go away for a few minutes.	1 2 3 4 5
Sometimes my child's behavior makes me so angry I can barely stand it.	1 2 3 4 5
Being around my child is more enjoyable than I ever thought it would be.	1 2 3 4 5
Every once in a while I feel some resentment toward my child.	1 2 3 4 5
Sometimes I do not get along well with my child.	1 2 3 4 5
I am usually affectionate with my child.	1 2 3 4 5
I find it easy to praise and compliment my child, especially for good behavior.	1 2 3 4 5
Sometimes I do not enjoy spending time alone with my child.	1 2 3 4 5
Sometimes I find it difficult to communicate with my child.	1 2 3 4 5
When I think about my child, it usually gives me warm feelings.	1 2 3 4 5
Sometimes I raise my voice with my child, especially after I've had a bad day.	1 2 3 4 5
Sometimes my child can really test my patience.	1 2 3 4 5
I usually feel quite happy about my relationship with my child.	1 2 3 4 5

Positive Affect Negative Affect Scale (Adapted)

INSTRUCTIONS: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you were feeling this way during the 10-minute interaction with your child. Use the following scale to record your answers.

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

1. _____ interested

2. _____ distressed

3. _____ excited

4. _____ upset

5. _____ strong

6. _____ guilty

7. _____ scared

8. _____ hostile

9. _____ enthusiastic

10. _____ proud

11. _____ irritable

12. _____ alert

13. _____ ashamed

14. _____ inspired

15. _____ nervous

16. _____ determined

17. _____ attentive

18. _____ jittery

19. _____ active

20. _____ afraid

Appendix D

Subjective Units of Parenting Stress Scale

INSTRUCTIONS: Please rate the level of stress you experienced during the 10-minute interaction with your child, with 0 signifying no stress and 100 signifying extreme stress.

0	50	100

Acceptance and Action Questionnaire, Second Edition

Below you will find a list of statements. Please rate how true each statement is for you by using the scale below to fill in your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My painful experiences and memories make it difficult for me to live a life that I would value.

2. I'm afraid of my feelings.

3. I worry about not being able to control my worries and feelings.

4. My painful memories prevent me from having a fulfilling life.

5. Emotions cause problems in my life.

6. It seems like most people are handling their lives better than I am.

7. Worries get in the way of my success.

TOTAL

Appendix F

CHILD HISTORY FORM

Child's name: _____

Date of Birth: _____ Age: _____ Gender: M_____ F_____

Race: Asian: _____ Black: _____ Hispanic: _____ White: _____ Other: _____

Is your child: Right handed: ____ Left handed: ____ Mixed handedness: _____
D/K_____

BACKGROUND INFORMATION

Please list all individuals who live in the home and their relationship to your child:

Name: Relationship: Age: Gender:_____

_____

_____

If both biological parents are not living in the home, please explain:
_____

If child is adopted, please describe circumstances of adoption, and provide any information regarding the biological parents:
_____

MOTHER'S NAME: _____ Date of Birth: _____

      Biological mother: ___ Stepmother:____ Adoptive Mother:___ Foster Mother:____
Other:____

      Education: ___ Completed 7th grade or less
          ___ Completed some high school
          ___ Graduated from high school
          ___ Graduated from trade school, business school or specialized training program
          ___ Completed an Associate degree
          ___ Graduated from college
          ___ Completed graduate school

      Employment: Is mother/caregiver employed outside the home? Yes _____ No _____

          If yes, what is her job title? _____

          No. of Hrs/Week: _____

FATHER'S NAME: _____Date of Birth: _____

Biological father: _____ Stepfather:_____ Adoptive Father:___ Foster Father:_____
Other:_____

Education: ___ Completed 7th grade or less
    ___ Completed some high school
    ___ Graduated from high school
    ___ Graduated from trade school, business school or specialized training program
    ___ Completed an Associate degree
    ___ Graduated from college
    ___ Completed graduate school

Employment: Is father/caregiver employed outside the home?   Yes _____ No _____

If yes, what is his job title? _____

No. of Hrs/Week: _____

Income: What is your estimated gross family income?
_____

Medications:
Please indicate whether or not your child has taken medication within the last 3 months and/or is currently taking any medications. Please then specify the name of the medication and the following: dosage, time of day the medicine is taken, and who prescribed the medication.

Type of Medication	Taken within last 3 months?	Currently taking?	Name of medication	Dosage & time of day	Who prescribed the medication
ADHD medication	Y / N	Y / N			
Anti-Depressant	Y / N	Y / N			
Anti-Anxiety	Y / N	Y / N			
Anti-Seizure	Y / N	Y / N			
Allergy/Asthma	Y / N	Y / N			
Other	Y / N	Y / N			
Other	Y / N	Y / N			

Food Restrictions:

1. Has your child been on any special diet or had food restrictions over the past 3 months?

Yes___ No___

    1.A. If yes, please specify:
    _____
    _____

2. Is your child currently on a special diet or have food restrictions?

Yes___ No___

_____

Family Medical History:

Do any members of the family have a medical or psychological problem?   Yes: _____ No: _____
    If yes, list this person's name and describe briefly:
    Name: _____ Concern: _____
    _____

    Name: _____ Concern: _____
    _____

    Name: _____ Concern: _____
    _____

Hearing, Speech & Language History:

Has your child's hearing been screened? Yes___ No___ Date of the last hearing screening: _____
    Please indicate if the testing was normal: Yes___ No____
    If not, what was found?
_____

Has your child's vision been screened? Yes___ No___ Date of last vision screening: _____
       Please indicate if the testing was normal: Yes _____ No_____
       If not, what was found?
_____

Is English the only language spoken in the home? Yes_____ No_____
If no, specify other languages:
_____

Did your child have difficulty with any of the following: Yes_____ No _____
      ____sucking   _____ nursing   _____ regurgitation of liquids/solids
      ____chewing   _____ choking/gagging   _____ excessive time to drink bottle
      If yes, please explain:
      _____
      _____

Did your child's speech learning ever seem to stop for a period of time? Yes, _____ No _____
Please explain:
      _____
_____

How does your child communicate his/her needs?
Gestures_____ Sounds_____ One or two words _____ phrases _____ sentences_____ Sign
language_____
Other: _____

Do you question your child's ability to understand directions and conversations? Yes_____ No_____
      If yes, please explain:
      _____
      _____
      _____

Does your child get 'stuck' on words and/or repeat sounds or words? Yes _____ No ___＿

      If so, describe:
      _____
      _____
Does your child have any other language/communication difficulties not listed above? Yes ___ No __
      If so, describe: _____
      _____

Do you think your child hears adequately? Yes___ No___
      If no, please explain: _____
      _____

Do you think his/her hearing is constant or does it vary? Yes ___ No___
      Please describe: _____
      _____

Does your child's voice seem normal to you? Yes___ No___
      If no, please describe:_____
      _____

Does your child have difficulty with coordination? Yes___ No___
　　　If yes, please describe:_____
　　　_____

Does your child lose balance or fall easily? Yes___ No___
　　　If yes, please describe:_____
　　　_____

Describe any other concerns you have about your child's behavior, including any current problems or concerns for which you would like help:

_____

_____

Please list professionals or clinics with whom you've consulted about the problem.
PSYCHIATRIC/EMOTIONAL
Has child previously been diagnosed (by anyone) with (please circle all that apply):

Autistic Disorder …………………………………………	Yes	No
Asperger Syndrome………………………………..………	Yes	No
Pervasive Developmental Disorder (PDD-NOS)… ………	Yes	No
Autism Spectrum Disorder……………………………..	Yes	No
Generalized Anxiety disorder …………………………...	Yes	No
Separation Anxiety disorder………………………………	Yes	No
Obsessive compulsive disorder…………………………...	Yes	No
Social anxiety disorder or social phobia…………………	Yes	No
Selective mutism ……….……………………………....	Yes	No
Specific phobia……………………………………………	Yes	No
Panic disorder…………………………………………...	Yes	No
Posttraumatic stress disorder…………………………….	Yes	No
Any other anxiety disorder………………………………	Yes	No
Oppositional anxiety disorder……………………………Yes		No
Conduct disorder…………………………………………Yes		No
Attention deficit hyperactivity disorder………………….	Yes	No
Depression/Dysthymia…………………………………….	Yes	No
Disruptive mood dysregulation disorder……………………Yes		No

Does child have any other psychiatric, neurodevelopmental, or medical diagnosis? Yes____ No___
If yes, please specify diagnosis:
_____

If your child has ever been treated or received special help for learning or emotional problems not listed elsewhere on this form, please describe. Please also indicate any past diagnosis that has been given.

Date:　　　　　Evaluated by:　　　　　　　　　Outcome/Diagnosis:

SERVICES

Please circle any special programs in which your child is currently enrolled in school:
- A. None
- B. Counseling
  Name: _____
- C. Learning disabled (LD) or resource Areas: _____
- Number of hrs/day _____
- D. Seriously emotionally disturbed (SED)
- E. Chapter 1 Reading
- F. Chapter 1 Math
- G. Other Health Impaired (OHI)
- H. Developmentally Delayed

Please complete the following for any therapies your child has received.

A.　　Speech/Language Therapy: Yes ☐ No ☐
For what reasons/problems_____
Of hrs per week_____ Date it started: _____ Date it ended _____
Group_____ and/or Individual_____ Private_____ and/or School system _____
Was it Effective?_____
Provider: _____

B.　　Occupational Therapy: Yes☐　No☐
For what reasons/problems_____
Of hrs per week_____ Date it started: _____ Date it ended _____
Group_____ and/or Individual_____ Private_____ and/or School system _____
Was it effective?_____
Provider: _____

C.　　Applied Behavioral Analysis: Yes ☐ No ☐
For what reasons/problems_____
Of hrs per week_____ Date it started: _____ Date it ended _____
Group_____ and/or Individual_____ Private_____ and/or School system _____
Was it effective?_____
Provider: _____

D.　　Play Therapy: Yes ☐　No ☐
For what reasons/problems_____
Of hrs per week_____ Date it started: _____ Date it ended _____
Group_____ and/or Individual_____ Private_____ and/or School system _____
Was it effective?_____
Provider: _____

E.　　Music Therapy: Yes ☐　No ☐
For what reasons/problems_____
Of hrs per week_____ Date it started: _____ Date it ended _____
Group_____ and/or Individual_____ Private_____ and/or School system _____
Was it effective?_____
Provider: _____

F.　　Social Skills Therapy: Yes ☐　No ☐

For what reasons/problems_____
Of hrs per week_____ Date it started: _____ Date it ended _____
Group_____ and/or Individual_____ Private_____ and/or School system _____
Was it effective?_____
Provider: _____

G.   Individual Therapy: Yes ☐ No ☐
For what reasons/problems_____
Of hrs per week_____ Date it started: _____ Date it ended _____
Private_____ and/or School system _____
Was it effective?_____
Provider: _____

H.   Other services:

Structured Laboratory Observation Instructions

We will knock after each time interval as an indication to move on to the next step

Step 1: Five Minutes Attending

Sit quietly and watch your child play. Do not initiate any interactions with them. However, if your child initiates with you, you may finish the interaction.

Step 2: Ten Minutes Language

Please try to get your child to verbally communicate with you as much as possible for ten minutes. You can ask questions, ask your child to imitate you, etc.

Step 3: Parent Leaves the Room

Step 4: Ten Minutes PRT

The therapist now enters the room and does 10 minutes of PRT with your child.

Appendix H

Autism Parenting Stress Index

Please rate the following aspects of your child's <u>health according to how much stress it causes you and/or your family</u> by placing an X in the box that best describes your situation.	Not Stressful	Sometimes creates stress	Often creates stress	Very stressful on a daily basis	So stressful sometimes we feel we can't cope
1. Your child's social development	0	1	2	3	5
2. Your child's ability to communicate	0	1	2	3	5
3. Tantrums/meltdowns	0	1	2	3	5
4. Aggressive behaviors (siblings, peers)	0	1	2	3	5
5. Self-injurious behavior	0	1	2	3	5
6. Difficulty making transitions from one activity to another	0	1	2	3	5
7. Sleep problems					
8. Your child's diet	0	1	2	3	5
9. Bowel problems (diarrhea, constipation)	0	1	2	3	5
10. Potty training	0	1	2	3	5
11. Not feeling close to your child	0	1	2	3	5
12. Concern for the future of your child being accepted by others	0	1	2	3	5
13. Concern for the future of your child living independently	0	1	2	3	5

Appendix I

Autism Diagnostic Observation Schedule, Second Edition

ADOS-2

Module 1 — David A.

Pre-Verbal / Single Words

Age Recommendation:
31 Months and Older

Child ID: _David A._

Gender: Female ☐   Male ☒

Date of Birth: _____

Date of Evaluation: _____

Chronological Age: _4 years, 7 months_

Examiner: _Catherine Lord_

Other Information: _____

_____

_____

_____

Observation/Coding

1. Free Play

2. Response to Name

3. Response to Joint Attention

4. Bubble Play

5. Anticipation of a Routine With Objects

6. Responsive Social Smile

7. Anticipation of a Social Routine

8. Functional and Symbolic Imitation

9. Birthday Party

10. Snack

W-605OV(CD1)   **WPS.**   ADOS-2 MODULE1   1

Pivotal Response Training Group Evaluation

A. Overall Program - Please select the response that best expresses how you honestly feel.

	Considerably Worse	Worse	Slightly Worse	The Same	Slightly Improved	Improved	Greatly Improved
1. The major problem(s) that originally prompted me to begin treatment for my child is (are) at this point	○	○	○	○	○	○	○

	Considerably Worse	Worse	Slightly Worse	The Same	Slightly Improved	Improved	Greatly Improved
2. My child's problems that have been treated at this clinic are at this point	○	○	○	○	○	○	○

	Considerably Worse	Worse	Slightly Worse	The Same	Slightly Improved	Improved	Greatly Improved
3. My child's problems that have not been treated at this clinic are	○	○	○	○	○	○	○

	Very Dissatisfied	Dissatisfied	Slightly Dissatisfied	Neutral	Slightly Satisfied	Satisfied	Very Satisfied
4. My feelings at this point about my child's progress are that I am	○	○	○	○	○	○	○

	Hindered Much More than Helped	Hindered	Slightly Hindered	Neither Helped nor Hindered	Helped Slightly	Helped	Helped Very Much
5. To what degree has the treatment program helped with other general personal or family problems not directly related to your child?	○	○	○	○	○	○	○

	Very Pessimistic	Pessimistic	Slightly Pessimistic	Neutral	Slightly Optimistic	Optimistic	Very Optimistic
6. At this point, my expectation for a satisfactory outcome of the treatment is	○	○	○	○	○	○	○

	Very Inappropriate	Inappropriate	Slightly Inappropriate	Neutral	Slightly Appropriate	Appropriate	Very Appropriate

7. I feel the approach to increasing child language skills in the home by using this type of parent training program is	○	○	○	○	○	○	○

	Strongly Not Recommend	Not Recommend	Slightly Not Recommend	Neutral	Slightly Recommend	Recommend	Strongly Recommend
8. Would you recommend the program to a friend or relative?	○	○	○	○	○	○	○

	Very Unconfident	Unconfident	Slightly Unconfident	Neutral	Slightly Confident	Confident	Very Confident
9. How confident are you currently in your ability to implement PRT in the home on your own?	○	○	○	○	○	○	○

	Very Unconfident	Unconfident	Slightly Unconfident	Neutral	Slightly Confident	Confident	Very Confident
10. How confident are you in your ability to implement PRT in the home in the future using what you learned from this program?	○	○	○	○	○	○	○

	Very Negative	Negative	Slightly Negative	Neutral	Slightly Positive	Positive	Very Positive
11. My overall feeling about the treatment program for my child and family is	○	○	○	○	○	○	○

B. Teaching Format (Difficulty) In this section, we

	Extremely Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Extremely Easy
1. Information obtained during parent group	○	○	○	○	○	○	○
2. Practice of skills at home on your own	○	○	○	○	○	○	○
3. Homework assignments	○	○	○	○	○	○	○
4. Learning child choice and following the child	○	○	○	○	○	○	○
5. Learning about shared control	○	○	○	○	○	○	○
6. Learning about maintenance and acquisition tasks	○	○	○	○	○	○	○
7. Learning about task variation (e.g. different prompts)	○	○	○	○	○	○	○
8. Learning about responsivity to multiple cues	○	○	○	○	○	○	○
9. Learning about contingent reinforcers	○	○	○	○	○	○	○
10. Learning about natural reinforcers	○	○	○	○	○	○	○
11. Learning about rewarding attempts	○	○	○	○	○	○	○

	Extremely Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Extremely Easy
12. Learning about ASD and comorbidities	○	○	○	○	○	○	○
12. Learning about being present (e.g., attention to present moment, self-as-context)	○	○	○	○	○	○	○
13. Learning about ASD interventions	○	○	○	○	○	○	○
13. Learning about opening up (e.g., acceptance, watching your thoughts)	○	○	○	○	○	○	○
14. Learning about navigating ASD resources and the service system	○	○	○	○	○	○	○
14. Learning about doing what matters (e.g., values, committed action)	○	○	○	○	○	○	○
15. Learning about neurobiological and biomedical treatment information	○	○	○	○	○	○	○
15. Learning about mindfulness (in general)	○	○	○	○	○	○	○

Appendix K

Session Fidelity Rating Form

Date of session:

Length of session (timed): _____ min

Treatment visit #:   **Randomization group:**   mPRT   pPRT

Therapists (list all names):

Number of parents present:

1. How many of the stated objectives for the session did the therapist(s) complete?

   # of objectives met/ # of objectives stated for this session = _____ / _____

2. Was homework assigned from the previous session?
   0 = NO
   1 = YES

2a. IF YES → Did the therapist(s) review practice/homework assigned in previous session (even if homework was not completed)?
   0 = NO
   1 = YES

3. Did the therapist(s) explain or preview the session agenda at start of session?
   0 = NO
   1 = YES

4. How would you describe the therapeutic relationship during the session?
   1 = Very poor (e.g., no responding to questions or materials that are posed)
   2 = Less than ideal (e.g., partial responding to questions that are posed)
   3 = Average (e.g. responds to questions that are posed, seem to understand concepts covered)
   4 = Good (e.g., parent asks at least one question or provides elaboration or example, brings up new information or content)

5. Please rate how engaged the caregivers were in the group.
   1 = Unengaged
   2 = Minimally engaged
   3 = Moderately engaged
   4 = Actively engaged

Appendix L

mPRT and pPRT Treatment Outline

Wk#	Session	PRT Training Focus	Mindfulness Training Focus	Psycho-education Focus	Worksheets for Homework
Pre		Screening/ Assessment (~2 hr)			
1	Group 1 (2 hr)	Introduction/Administrative; Overview of behavioral treatment approach and PRT (1 hr 15 min)	Overview of ACT components; Define current struggles/difficulties (30 min)	Overview of parent stress research (30 min)	"Play Interest Survey"
2	Group 2 (2 hr)	Detailed review of PRT motivational strategies (1 hr 15 min); Homework review (15 min)	Mindful awareness ("being present") - attention focused (30 min)	Understanding ASD and overlapping conditions (30 min)	"Setting goals for your child" + "Parent values"
	Individual 1 (1 hr)	Individual PRT goals; Demonstrate PRT through therapist-child interactions	Individual check-in on values (10 min)	Individual check-in on info (10 min)	N/A
3	Group 3 (2 hr)	Structured PRT learning opportunities; Natural/incidental learning opportunities	Discuss valued living, committed action and barriers (30 min)	Understanding ASD perspectives (30 min)	"Structured Teaching Brainstorm"
4	Group 4 (2 hr)	In-depth review*: Following the child's lead and shared control	Defusion exercises (30 min)	ASD Interventions I (30 min)	"Maintenance vs. Acquisition"
5	Group 5 (2 hr)	In-depth review*: Maintenance vs. acquisition tasks	Self-compassion (30 min)	ASD Interventions II (30 min)	N/A (plan to revisit child goals during individual session)
6		Midpoint Assessment (30 min) Combine with Individual session			
	Individual 2 (1 hr)	Demonstrate PRT through therapist coached parent-child interactions	Practicing self-compassion before/after session (10 min)	Individual check-in on info (10 min)	"Reinforcing attempts"
7	Group 6 (2 hr)	In-depth review*: Reinforcing reasonable attempts to respond	Incorporating mindfulness into daily life (30 min)	ASD Interventions III (30 min)	N/A
8	Group 7 (2 hr)	In-depth review*: Contingent vs. natural reinforcers	Introduce "self-as-context" or "observing self" (30 min)	ASD Resources: Local/National (30 min)	"Behavior Monitoring Form"
9	Group 8 (2 hr)	Tackling disruptive/problem behaviors	Practicing non-judgment and acceptance attitude (30 min)	Navigating service system (30 min)	N/A (plan to revisit child goals during individual session)
	Individual 3 (1 hr)	Demonstrate PRT through therapist coached parent-child interactions	Apply non-judgment/accepting attitude to interaction (10 min)	Individual check-in on info (10 min)	N/A
10	Group 9 (2 hr)	Planning for future: Child initiations and question asking	Mindful awareness review: emotion focused (30 min)	Neurobiological research (30 min)	N/A
11	Group 10 (2 hr)	Review all PRT points & future target behaviors	Review all material (30 min)	Biomedical Treatment Research (30 min)	"Applying PRT to future situations"
12	Group 11 (2 hr)	Review all PRT points & future target behaviors	Planning for the future (30 min)	Review of all material (30 min)	N/A
12+	Individual 4 (1 hr)	Demonstrate PRT through therapist coached parent-child interactions	Answer questions about material	Answer questions about material	N/A
		Post Treatment Assessment			

Utterance Coding Sheet

	1—Unintelligible	2—Imitative (Model Prompt)	3—Verbally prompted	4—Non-verbally prompted	5—Spontaneous	Total Utterances
SLO 1						
SLO 4						
Total						

Operational Definitions

1—Unintelligible: The child produces a sound or syllable that is either prompted or unprompted but that is not for a functional purpose or does not constitute an attempt at a meaningful utterance (i.e. "lalalala" or other self-stimulatory repetitious speech)

2—Imitative (model) prompt: The child is responding directly to what the parent has said by imitating or attempts to imitate the word or phrase spoken. For example: Parent: "Ball" Child: "Ball" (or "Baa" or "Buh") Parent: "I want the ball" Child: "I want the ball" or "I wan Bah"

3—Verbally prompted: The child is responding directly to the prompt given by the parent, such as a fixed-choice prompt ("Do you want the red ball, or the green ball?" "Green ball"), a phrase completion prompt ("One, two, three…." "GO!"), or an open ended prompt ("What do you want?" "Ball"). The child responds by answering the question or completing the phrase, or provides an expressive verbal attempt to do so.

4—Non-verbally prompted: There is a clear non-verbal prompt from parent, in which they present a clear opportunity by doing something like holding up an item that the child could request, or deliberately pausing an activity and waiting for a response. The child responds with a reasonable attempt to get the desired outcome (i. e. saying "ball" to get the ball the parent is holding up, or "swing" to get to be pushed on the swing again).

5—Spontaneous: There is no intentional verbal or nonverbal effort of the parent or clinician to elicit a response from the child. The child makes a relevant utterance in order to achieve a desired outcome

Fidelity of Implementation Scoring Sheet

30 second Interval	Shared Control		Opportunities to Respond		Interspersing Tasks		Contingent			Attempts
	1. Follow Lead / Choice	2. Identify Natural Reinforcer	3. Attending to the Task	4. Clear Instructions	5. Maintenance	6. Task Variation	7. Natural	8. Immediate	9. Appropriate	10. Attempts
00:00 – 00:30										
9:30-10:00 or end of video clip										
%										

* Score each category as (+) or (-)	**TOTAL:**	%	
* Watch the whole 10 minute sequence, then score each 1 minute interval			
* Score entire 1 minute interval as (-) if no opportunities for language are provided			
* Parents' performance should be independent of child's response.			
* Opportunities for language: Verbal utterances from the parent, produced with the intention of eliciting functional expressive language from the child.			

Operational Definitions:

1. Follow Lead/ Choice: Parent does the following during the entire 30 second interval: follows the child's nonverbal or verbal initiations toward their preferred activity, allows the child to freely select or reject toys from the area, and allows the child to end play with a toy/activity.

2. Natural Reinforcer: During the entire 30 second interval, parent identifies and gains control of preferred object, preferred aspect of an object and/or the aspect of an activity that the child finds most motivating.

3. Attending to Task: During the entire 30 second interval, parent only provides opportunities for language when the child is attending to the task. If child is not attending, parent takes appropriate action to gain child's attention (e.g., covering the toy child is focused on, moving closer to child, non-verbally enticing with a toy, calling their name, etc.) Attending to the task includes, but is not limited to, child looking at the parent, child looking in direction of parent or object parent is holding, or reaching for object.

4. Clear instructions: During the entire 30 second interval, the parent provides opportunities for language that are short, simple, and related to the task. These opportunities can include, but are not limited to, a verbal model prompt, time delay, offering a choice, and/or asking a question. "Say" can only be used as a prompt under two circumstances: 1) if parent is modeling a replacement behavior (e.g. "Say: 'all done' if you are finished) and/or 2) if the child is stuck in echolalia or is unclear how to respond (e.g. Child says, "What do you want? Ball. Parent models "You can say, 'ball'.") Time delays must be clear as well. Parent should provide a model prompt 3-5 seconds after a time delay if the child cannot respond. Model prompt should maintain object-label correspondence. Recasting and labeling should be distinguishable from model prompts.

5. Maintenance: During the entire 30 second interval, parent clearly balances tasks the child already knows with new tasks. This can include a balance of receptive and expressive tasks. The level of prompts may also be used to balance maintenance and acquisition and should vary based on the motivation of child. If the child is non-verbal or does not have any maintenance tasks, the parent keeps the demands easy for the child (e.g. presenting single syllable, easy to pronounce words).

6. Task Variation: During the entire 30 second interval, parents must use a variety of prompting strategies (e.g., MP, TD, CP, Ch., Q, LS) and/or vary prompting within an activity (not always the same words within the same activity).

7. Natural: During the entire 30 second interval, parent provides a contingent reinforcer that is directly related to the child's expressive verbalizations. A parent scores (-), if they provide an arbitrary reinforcer for the child's expressive verbalization (e.g. child says "ball", parent gives a piece of candy). Parent does not provide reiforcement if the child does not respond.

8. Immediate: During the entire 30 second interval, parent provides primary and/or arbitrary reinforcement just as the child's verbal response is being completed or just after it has been completed (within 2-5 seconds). To be immediate the reinforcement must occur before a second response is made. (must account for intervals where child does not respond or parent is too contingent and no reinforcement is given during entire interval)

9. Appropriate: During the entire 30 second interval, parent never provides reinforcment if the child responds inappropriately. Inappropriate responses can include, but are not limited to, disruptive behaviors and/or self-stimulatory behaviors. Appropriate responses include verbal responses with intent in a clear and calmed voice which includes the child looking in the direction of the adult.

10. Attempts: During the entire 30 second interval, parent provides contingent reinforcment following the child's reasonable verbal attempt, unless otherwise specified (a specific shaping program in place). Reasonable: attending to the item/adult while producing a verbalization, word approximation, or correct word attempt.