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Pre-Session Pairing Impacts on Compliance

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PRE-SESSION PAIRING IMPACTS ON COMPLIANCE

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TITLE: PRE-SESSION PAIRING IMPACTS ON COMPLIANCE

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Autism Spectrum Disorder (ASD) is a developmental disability with persistent deficits in communication, social interactions, and the occurrence of repetitive or restricted patterns of behavior. Individuals with ASD also commonly engage in challenging behaviors. Early intensive behavioral intervention (EIBI), based on applied behavioral analysis (ABA), is a recommended treatment for children with ASD to address these deficits and excesses. Challenging behaviors emitted by those with ASD have been derived by the presentation of instructions. To circumvent challenging behaviors during instruction periods, research has recommended that pre-session pairing should occur prior to initiating demands. In the present study, three children diagnosed with ASD participated in four pre-session pairing conditions to determine which duration of pre-session pairing results in higher occurrences of compliance and lower levels of challenging behaviors. Pairing conditions consisted of 0/control, 15 min, 30 min, and 45 min followed by a 20-question instructional period. The present study determined that 15 min of pre-session pairing resulted in higher occurrences of compliance and lower levels of challenging behaviors consistently across all participants.

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a developmental condition with persistent deficits in communication, social interactions, and repetitive or restricted patterns of behavior (American Psychiatric Association [APA], 2013). Individuals with ASD also commonly engage in challenging behaviors, such as aggression and self-injury (SIB), due to deficits in a variety of areas, specifically communication (Kelley et al., 2007; Kelly et al., 2015; Smith, 2001). Early intensive behavioral intervention (EIBI), based on applied behavioral analysis (ABA), has become the recommended treatment for children with ASD to help address these deficits and behavioral problems (e.g., Eikeseth et al., 2011; Reichow, 2012). EIBI is an evidence-based intervention that consists of teaching strategies such as discrete trial training (DTT), natural environment teaching (NET), and incidental teaching (IT) to help increase learning opportunities for those with ASD (Klintwall & Eikeseth, 2014). DTT, the main component of EIBI, is a brief instructional period that consists of an instruction, a prompt, a response, a consequence, and an intertrial interval (e.g., Eikeseth et al., 2014; Smith, 2001). DTT is considered an intensive intervention because of the volume of demands placed, the repetition of demands, the one-on-one structure and the high recommended hours for successful outcomes (Gormely et al., 2020; Eldevik et al., 2009). The intensity of DTT has shown evidence for teaching a variety of skills to children aged 3-11 years with ASD (Wong et al., 2014); however, challenging behaviors have also been derived by the presentation of instructions during the high volume of demand requirements of DTT (e.g., Carbone et al., 2007; Kelly et al., 2015; Shillingsburg et al., 2019). The implementation of DTT may create the same conditions that typically evoke challenging behaviors in children with ASD. Children with ASD may try to escape and or avoid teaching

situations and demands that are placed on them by the behavioral therapist (BT) or instructors (Carbone et al., 2007). To circumvent challenging behaviors during instruction periods, research has recommended that pre-session pairing occur prior to initiating demands (e.g., Kelly et al., 2015; Shillingsburg et al., 2014; Smith, 2001; Sundberg & Partington, 1998). To this author's knowledge, there is no recommended pairing duration that has been consistently recommended or indicated by present research.

Autism Spectrum Disorder

ASD, per the APA, is a complex developmental condition that consists of persistent challenges with core deficits in social communication, restricted interests, and repetitive behavior (APA, 2013). These core deficits are often identified before the age of three years old and are accompanied by at least one challenging behavior in 94% of children with ASD (e.g., APA, 2013; Matson & Nebel-Schwalm, 2007; Matson et al., 2009). Children with limited communication skills and/or poor social development, such as children with ASD, are especially at risk for engaging in challenging behaviors (Horner et al., 2002; Jang et al., 2011). Unlike the three core deficits, challenging behaviors are not required for diagnosis (e.g., 2013; Matson & Nebel-Schwalm, 2007). Although ASD is considered a lifelong disorder, the level of impairment varies across individuals (APA, 2013). The three severity levels of core deficits of ASD, per the APA (2013), are Level 1 (requiring support), Level 2 (requiring substantial support), and Level 3 (requiring very substantial support). The severity level of ASD is an important variable in the presence of challenging behaviors (e.g., Matson et al., 2009; Jang et al., 2011).

Matson et al. (2009) examined potential causal factors of challenging behaviors in children with ASD. Children with ASD exhibited more challenging behaviors than typically developing peers or children with other diagnoses, such as anxiety disorder or attention deficit

hyperactivity disorder (ADHD; Matson et al., 2009). Challenging behaviors were also found to be positively correlated with the severity of ASD (Matson et al., 2009), meaning that the likelihood of challenging behaviors increases with the severity of ASD. Self-injurious behaviors (SIB) were more common in those with ASD and intellectual disability (ID), whereas aggression and stereotypic behavior were related to the severity of ASD (Matson & Shoemaker, 2009). Comorbidity of ASD and ID is estimated to be about 70% in children (Matson & Nebel-Schwalm, 2007). The inclusion of challenging behaviors, along with the three core deficits in ASD, amplifies interference in the development of educational, social, and community opportunities, as well as poses a danger to the child with ASD and their stakeholders (Horner et al., 2002). Once challenging behaviors are observed, they are not likely to cease without intervention and typically intensify with age (Horner et al., 2002, Matson et al., 2009). Challenging behaviors are barriers to successful educational, social, and community opportunities for those with ASD (e.g., Horner, et al., 2002; Jang et al., 2011; Matson et al., 2009). Early intervention should address the core deficits of ASD as well as implement interventions based on the function of challenging behaviors because these behaviors impede learning opportunities (Horner et al., 2002).

Early Intensive Behavioral Intervention

Early Intensive Behavioral Intervention (EIBI), an empirically supported intervention based on applied behavioral analysis (ABA), is a highly recommended and requested comprehensive treatment program for preschool-aged children with ASD (e.g., Reichow, 2012; Reichow et al., 2014). EIBI should be given strong consideration when deciding treatment options for young children with ASD (Reichow, 2012). EIBI is an intervention that lasts two or more years and involves comprehensive programming for upwards of 40 hours per week (e.g.,

Lovaas 1987; McEachin et al., 1993; Reichow, 2012; Smith et al., 2000). EIBI, also known as the Lovaas model (Reichow, 2012), is the construction of a special, intense, and comprehensive learning environment for young children with autism by including one-on-one behavioral treatment and parent training (Lovaas, 1987; McEachin et al., 1993). EIBI began in 1970 as a behavioral-intervention project led by Ivar Lovaas at the University of California, Los Angeles (UCLA) and has been replicated extensively, demonstrating that intensive intervention consistently has better outcomes over less intensive intervention methods (e.g., Cohen et al., 2006; Eikeseth et al., 2011; Lovaas, 1987; McEachin et al., 1993; Remington et al., 2007; Smith et al., 2000).

EIBI is an intervention that maximizes behavioral treatment gains during the recommended 40 hours per week by increasing teaching opportunities (Lovaas, 1987). Lovaas (1987) hypothesized that creating a special, intense, and comprehensive learning environment for children with ASD would allow them to perform at a level equal to their neurotypical peers, whose environment does not need to be as heavily arranged to acquire skills. Each child participating in EIBI has individual interventions that are based on their chronological age, assessment results, and developmental milestones (Klintwall & Eikeseth, 2014). Children with ASD and developmental delays benefit from EIBI in acquiring adaptive and functional skills. Targeted areas include communication, play, social, emotional, cognitive, and self-help skills (Eikeseth & Klintwall, 2014). The goal of EIBI is for those with ASD to perform at a level equal to their typically developing peers, be in regular mainstream settings, as well as fade out of the intervention services (Klintwall & Eikeseth, 2014; Lovaas, 1987).

Components of EIBI

The main and most supported component of EIBI is DTT (Eikeseth et al., 2014;

Shillingsburg et al., 2014). DTT is one of the most studied and used ABA-based procedures (Eikeseth et al.,2014; Roxburgh & Carbone, 2012) and uses a one-to-one, teacher-child-directed instruction that individualizes, simplifies, and structures teaching in a specified way to maximize learning (Eikeseth & Klintwall, 2014; Smith, 2001). DTT teaches skills in a planned, controlled, and systematic way and has been effective in teaching a variety of skills to children aged 3-11 (Wong et al., 2013). Furthermore, the DTT instructional period is modeled from Skinner's (1969) three-term contingency. The three-term contingency is when a stimulus is presented, a response occurs, and a consequence follows the response (Carbone et al., 2014). In general, DTT contains five main components (Eikeseth et al., 2014; Smith, 2001). The first component is a trial. DTT consists of a series of trials that last 5-15 seconds each. Trials are to be kept short, simple, and often repeated systematically (Eikeseth et al., 2014). The second component is the antecedent stimulus. The antecedent stimulus is also known as a cue, task, instruction, or discriminative stimulus (S^D). An S^D is when a brief, clear instruction or question is presented. The third component is prompt. The prompt helps with the production of a correct response to the antecedent stimulus. Using a prompt is important for skill acquisition; however, it is equally as important that all prompts are faded out so that responses are under the stimulus control of the antecedent stimulus only. The fourth component is the response. A response is either a correct or incorrect answer to the specific antecedent stimulus (S^D). The fifth component is the consequence, either a reinforcer (S^R) or a correction. Eikeseth et al. (2014) also referred to a 6^{th} component of DTT of differential reinforcement. During this component, responses to antecedent stimuli are differentially reinforced to increase the likelihood of correct responses. After the consequence, an intertrial interval occurs where a brief pause is implemented prior to presenting the next trial (Eikeseth et al., 2014; Smith, 2001).

Another component of EIBI is NET. NET is less structured than DTT and has shown to be effective in generalization and increasing communication skills in children with ASD by incorporating natural consequences, diverse training environments, and peer mediators (Cowen & Allen, 2007; Delprato, 2001). A common intervention in NET is called pivotal response training (PRT). The goals of PRT are to teach a child to respond to multiple learning opportunities in different environments, increase the child's spontaneity, increase initiation, create independence, and decrease the need to be removed from natural environments (Koegel et al., 1999). Teaching pivotal behaviors is achieved both by motivation and teaching multiple examplars of stimuli (Koegel et al., 1999). Teaching multiple examplars of a stimulus decreases the likelihood of a child with ASD attending to incorrect or irrelevant stimuli and increases the likelihood of contacting natural reinforcers from the environment (Koegel et al., 1999). NET emphasizes a developmental approach of teaching through the acquisition of prerequisite skills prior to addressing more advanced behaviors (Frazier et al., 2021). Responses are guided by the child's interests, which maximizes the child’s engagement and motivation and ultimately results in learning (Dunlap, 1984). With motivation for the client being maximized, natural reinforcement strategies are easily used (Koegel et al., 1999; Koegel & Williams, 1980) and embedded into the child’s natural environment.

A third component of EIBI is IT. IT uses environmental arrangements to increase the communicative behavior of a child in a natural setting (Cowen & Allen, 2007; Delprato, 2001; Eikeseth et al., 2014). In IT, reinforcing and motivating items are typically present in the natural environment, and delivery of the reinforcer or motivating item is contingent on the child requesting for the item (Cowen & Allen, 2007). Smith (2001) discussed that during IT, a teacher sets up the environment in a way that encourages the child to initiate an activity, such as having a

toy in sight but out of reach, and the teacher prompting the child to mand for the item before it is given (Smith, 2001). This formula of discrete learning trials may appear like DTT; however, IT is guided by the child's interests, relies on natural consequences, and occurs in a natural, not controlled, environment, making IT a naturalistic procedure (Cowen & Allen, 2007).

DTT is the most supported component of EIBI even though most EIBI interventions contain a combination of varied teaching procedures (e.g., NET; Eikeseth et al., 2014). An EIBI package entails both DTT and naturalistic teaching approaches to decrease dependency and increase generalization and spontaneity. Even though DTT has been shown to produce skill acquisition the most efficiently, during follow-up, IT and naturalistic methods have shown equal spontaneity and greater generalization, deeming all teaching procedures important for the application of EIBI (Eikeseth et al., 2014; Miranda-Linne & Melin, 1992) to individuals with ASD.

Treatment Modalities

EIBI

EIBI is an evidence-based intervention that follows the principles and procedures of ABA and uses simple, structured instructions to teach preschool-aged children with ASD. EIBI encompasses antecedent stimuli (instruction), responses (behavior), consequences (reinforcement), prompts (help), task analyses, and teaching procedures such as discrete trial training (DTT), natural environment teaching (NET), and incidental teaching (IT; Eikeseth & Klintwall, 2014).

DTT consists of one-to-one, instructor-child-directed instruction that individualizes, simplifies, and structures teaching in a specific way to maximize learning (Klintwall & Eikeseth, 2014; Smith, 2001). DTT is one of the most effective instructional tools for teaching important

skills and developing new responses in those with ASD (Bogin et al., 2010; Roxburgh & Carbone, 2012). Additionally, DTT has been used to teach a multitude of skills such as motor imitation, verbal imitation, communication, matching, receptive and expressive language, social academics, school readiness, adaptive skills, and self-help skills (Eikeseth & Klintwall, 2014; Wong et al., 2013). In the context of EIBI, the structure of DTT trial blocks (e.g., 2-5 minutes of instruction) are interspersed with play breaks, with typical DTT sessions lasting between 10 minutes and 2 hours (Eikeseth et al., 2014).

NET helps increase generalization and maximize learning by incorporating all parts of a child's day, such as during mealtimes, daily living tasks, play, and social interactions. NET occurs in environments that a child encounters throughout their day and therapists teach through play. NET is less structured and more organic than DTT and teaches behaviors in situations where they would naturally occur (Cowen & Allen, 2007; Klintwall & Eikeseth, 2014).

IT is a child-selected situation that is commonly used to teach and or increase the use of language by the child requesting for items or assistance in their current environment (Cowen & Allen, 2007; Hart & Risley, 1975). IT is a way to contrive situations in the natural environment using the child's interests and natural motivation to increase generalization and to teach communicative initiatives (Klintwall & Eikeseth, 2014). To ensure initiation, often preferred items are in sight but out of reach (Eikeseth et al., 2014) to promote manding. IT utilizes the child's interests to create learning opportunities in the natural environment.

Early Start Denver Model

Another type of early intervention for children with ASD is the Early Start Denver Model (ESDM), this model has similar outcome goals to EIBI; however, the intervention is naturalistic and is done with an interactive style using daily activities and play, rather than intensive

instruction (Aaronson et al., 2022). Both EIBI and ESDM interventions are grounded in ABA by following the seven dimensions of behavior analysis (Baer et al., 1968), which include: (a) applied, (b) behavioral, (c) analytic, (d) technological, (e) conceptually systematic, (f) effective, and (g) generality (Eikeseth & Klintwall, 2014; Vivanti & Stahmer, 2020). The ESDM is an early intervention for children with ASD aged 1-4 years of age. The focus of ESDM is active experiential learning, early interaction, and social motivation for learning and development (Aaronson et al., 2022). A meta-analysis was conducted by Fuller et al. (2020) across 12 studies that overall showed promise in ESDM being an effective practice in improving outcomes in young children diagnosed with ASD especially in language and cognitive outcomes (Fuller et al., 2020).

Outcomes

Intensive instruction has shown positive outcomes and is well documented in showing significant gains in communication (Howard et al., 2005; Kelley et al., 2007; Smith et al., 2000), academic skills (Eikeseth et al., 2011; Smith et al., 2000), and social skills (Taubman et al., 2001) for children with ASD. By 2012, at least five meta-analyses had been conducted discussing EIBI for young children with ASD (e.g., Reichow, 2012). Out of these meta-analyses, four of the five (i.e., Eldevik et al., 2009; Makrygianni & Reed, 2010; Reichow & Wolery, 2009; Virues-Ortega, 2010) concluded that EIBI is an effective intervention for children with ASD in increasing intelligence quotient (IQ) and adaptive behavior (Reichow, 2012). In 2015, Wong et al. conducted a comprehensive review of evidence-based practices for ASD. The authors found 182 outcome studies related to communication, 165 studies related to social skills, 158 studies related to challenging behaviors, and 77 studies related to school readiness. Smith et al. (2000), one of the studies examined during the meta-analyses, conducted a study comparing intensive

early intervention delivered for 30 hours weekly to children with a Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS) compared to parent delivery of intervention. Results indicated that children who received an average of 24.52 hours per week of services outperformed children in a parent training group whose parents received 5 hours of parent training per week for 3-9 months across intelligence, language, and academic achievement. Children from the intensive treatment group also had less restrictive school placements (Smith et al., 2000). Howard et al. (2005), another study reviewed in the meta-analysis, also conducted a comparison study evaluating intensive behavior analysis and eclectic treatments for young children with ASD. Eclectic treatment is a combination of interventions such as DTT, TEACCH-based procedures, sensory integration therapy, and applied behavioral analysis (ABA). Interventions such as eclectic treatment are commonly used with children with ASD who attend public school (Eikeseth et al., 2002; Howard et al., 2005). Similar outcomes to Smith et al. were found by Howard et al., where children in the intensive behavior analytic treatment group outperformed the eclectic intervention group during follow-up measures in IQ, language, and adaptive skills. These example studies are consistent with other investigations which found that at least 30 hours of intensive behavior analytic interventions for preschool-age children with ASD resulted in improvements in intellectual functioning, communication skills, and adaptive behavior (Howard et al., 2005).

Considerations of Intensive Instruction

DTT has successful outcomes with children with ASD because of its alternative approach to everyday experiences (Roxburgh & Carbone, 2012); however, much of the success of DTT may depend on a child's ability to attend to instructor-directed activities for reasonable periods of time each day (Carbone et al., 2007; Roxburgh & Carbone, 2012). Even though ABA-based

procedures have well-documented positive outcomes (e.g., increases in intelligence, communication), the effects of intensive and repetitive instruction need to be considered. Intensive and repetitive instruction used in EIBI and DTT can evoke negative behavior due to the intensive high-demand requirements (Carbone et al., 2007; Kelley et al, 2007; Roxburgh & Carbone, 2012). Many children with ASD exhibit challenging behaviors when presented with demands and intensive instruction (Kelly et al., 2015). The high-demand intensity of instruction presented during DTT is often the same condition that evokes challenging behaviors (Carbone et al., 2007). Similarly, certain discriminative stimuli (S^D) such as academics, work, and social demands can trigger challenging behavior (McLaughlin & Carr, 2005). Because demands can trigger challenging behaviors, it is common that teaching situations, demands, requests, or the person placing demands can trigger challenging behavior (Carbone et al., 2007; McLaughlin & Carr, 2005). Interventions such as escape extinction and differential reinforcement of compliance have been identified to help reduce problem behaviors during instruction, though these interventions may also associate the instructional setting and therapist with demands (Shillingsburg et al., 2019). Challenging behaviors interfere with skill acquisition, which can interfere with intervention outcomes. Research has shown that the likelihood of a client engaging in challenging behaviors increases in the presence of non-preferred staff or in the presence of unfamiliar staff members, especially during intensive instruction (Parsons et al., 2016), creating an increased likelihood that challenging behaviors will occur consistently.

Instruction-based procedures, such as DTT, may create a reflexive conditioned motivating operation (CMO-R). CMO-Rs occur when a previously neutral event is repeatedly followed by a worsening or improving set of conditions (e.g., Carbone et al., 2007; Michael, 1993; Shillingsburg, 2014). In the implementation of DTT, the instructor or behavioral therapist

(BT) becomes a signal for demands. The BT then becomes a CMO-R indicative of a worsening condition, and challenging behavior may occur in attempt to avoid or escape the interactions with the BT and the demands. To prevent the CMO-R indicative of a worsening condition from forming, establishing rapport may be effective in the manipulation of the CMO-R (Shillingsburg et al., 2014; Smith, 2001; Sundberg & Partington, 1998). McLaughlin and Carr (2005) discussed the importance the three-term contingency (S^D-response-consequence) has in reducing problem behavior.

The three-term contingency is influenced by physical, social, and biological variables, known as setting events, that determine what response pattern will occur (McLaughlin & Carr, 2005). Regarding the social variable, this setting event is concerned with the quality of the relationship between two people and the influence the relationship has on problem behaviors (McLaughlin & Car, 2005). Suggestive evidence has shown that challenging behaviors are more likely to occur with a nonpreferred staff member than a preferred staff member suggesting that rapport may function as a setting event (McLaughlin & Car, 2005; Parsons et al., 2016). Good rapport acts to weaken the aversiveness of task demands, thereby decreasing the likelihood of escape-motivated problem behavior, whereas poor rapport exacerbates the aversiveness of task demands, thereby increasing the likelihood of escape-motivated motivated problem behavior (McLaughlin & Carr, 2005).

Rapport Building

Rapport building between therapist and client has often been suggested as an important variable influencing the occurrence of challenging behaviors such as non-compliance, aggression, and self-injurious behaviors (SIB; McLaughlin & Carr, 2005). Rapport building prior to placing demands has also been suggested to circumvent CMO-Rs indicative of a worsening

condition from being established (Shillingsburg et al., 2014; Smith, 2001; Sundberg & Partington, 1998). The importance of a good relationship between the therapist and the client has been emphasized and the relationship that the client has with the therapist could represent an establishing operation (EO) that alters either the reinforcing or aversive properties of the therapist (Parsons et al., 2016). A therapist conditioned as an EO suggests that rapport quality may influence the relationship between instructions and compliance. Research has suggested that compliance is differentially affected when instructions are presented by staff with good rapport versus poor rapport (McLaughlin & Carr, 2005, Parsons et al., 2016). Clients were more likely to comply with demands when preferred staff members presented the instruction, whereas clients were more likely to engage in responses that are incompatible with compliance, such as non-compliance or challenging behaviors, when non-preferred or unfamiliar staff members presented instruction (McLaughlin & Carr, 2005; Parsons et al., 2016).

The importance of rapport building has been emphasized in addressing challenging behaviors as well as the core symptoms of ASD. Although rapport itself has not been operationalized to lend itself to empirical analysis, sparing research has been conducted on rapport (Shillingsburg et al., 2019). Rapport has often been defined as “likeability” (Aronson, 1984) or “empathy” (Roberts & Bouchard, 1989). Creating an operational definition of rapport would help with precision and specificity, allowing practitioners to better determine if good rapport had been established. With a lack of a definition, Dunlap et al. (1995) created descriptors to provide information related to the quality of relationships between people with ASD and their caregivers (Dunlap et al., 1995; Dunlap & Koegel, 1980; Koegel et al., 1987), which was later modified into a Likert-style rating scale by McLaughlin and Carr (2005) for use in a study conducted to identify if staff members were unsatisfied, satisfied, or highly satisfied with their

relationship with their client to determine if good rapport had been established. The scale was comprised of one overall question where caregivers could rate (on a scale of 0-5) how they perceived their relationship with the participant. The rating system included an overall summary of the perceived level of rapport. Scores between 0-3 indicated “poor rapport” (or “unsatisfied”), and scores between 4-5 indicated “good rapport” (or “satisfied;” Dunlap et al., 1995; McLaughlin & Carr, 2005; see Appendix A).

Having the ability to evaluate the quality of rapport is potentially useful in determining an association with problem behavior. Other studies on rapport have been conducted as well. For example, Shillingsburg et al. (2014) conducted a study where preschool-aged children with ASD displayed fewer problematic behaviors during sessions with therapists who had built rapport compared with therapists who did not. In this study, Shillingsburg et al. examined children diagnosed with ASD and their social approach to their therapists and social avoidant type behaviors of elopement and negative vocalization in a pairing intervention and a demand intervention. During the demand intervention, demands with tasks related to sorting, imitation, and fine motor were presented for 10 minutes in duration either at a worktable or the client's location such as working on the floor. Social and verbal reinforcers were provided contingent on compliant behavior and all challenging behaviors were ignored. During the pairing intervention, the therapist would pair for approximately 20 minutes in a zero-demand and high-density reinforcement environment. In this study, social approach behaviors increased, and social avoidant behaviors decreased during the pairing intervention. Avoidance during task demands was diminished when pairing was conducted prior to demands which agreed to their hypothesis that the manipulation of the CMO-R via a pairing procedure increased social approach behaviors and reduced social avoidance behaviors. For the purpose of the present study, rapport is a

blanket term for the relationship between a behavioral therapist (BT) and the client.

Rapport, or the relationship with a client, consists of behavioral principles such as conditioned reinforcement, discriminative stimuli (S^D) signaling the availability of reinforcement, and stimulus delta ($S^{D)}$ signaling the absence of reinforcement. To build rapport, a practitioner should observe clients' preferences, identify what motivates the client, and spend time with them to allow a relationship to form (Taylor & Fisher, 2010). BTs establishing rapport with their client may be essential in effective treatment because it signals the availability of or absence of reinforcement. Challenging behaviors, even in the presence of S^D, are less likely to occur when good rapport has been established (McLaughlin & Carr, 2005; Parsons et al., 2016).

Conditioned Reinforcement

A conditioned reinforcer is when a previously neutral stimulus has been repeatedly paired with a primary reinforcer and strengthens and maintains responding (Mazur, 2006). Access to reinforcers guides learning, leading to the development of language acquisition and other skills (Clo & Dounavi, 2020). Examples of conditioned reinforcers include attention, eye contact, verbal praise, tokens, or money (Clo & Dounavi, 2020). When no rapport or poor rapport has been established between a BT and client, it is important to effectively improve rapport by establishing the BT as a generalized or conditioned reinforcer (McLaughlin & Carr, 2005). Establishing this relationship would be to pair the BT with a wide variety of highly preferred activities and existing primary and/or secondary reinforcers (Lugo et al., 2017; McLaughlin & Carr, 2005). When the BT has been paired with highly reinforcing items, they become an S^D for approach and social interaction, rather than escape through problem behavior (McLaughlin & Carr, 2005). Sundberg and Partington (1998) discussed how establishing a BT as a conditioned reinforcer can be done through pre-session pairing. Developing rapport through pairing may be

helpful in reducing challenging behavior by developing a positive environment prior to introducing aversive (Lugo et al., 2017, Smith, 2001; Sundberg & Partington, 1998) or demanding components.

Pre-Session Pairing

Pre-session pairing was described by Sundberg and Partington (1998) as approaching a child, presenting a reinforcer, and engaging with the client and reinforcer (e.g., engaging with toys, narrating an activity enthusiastically, making eye contact, and providing edibles). The relationship between a BT and client is established when the BT is consistently paired with the delivery of reinforcers, and instruction should not occur until this has been established (Sundberg & Partington, 1998). For the purpose of the present study, pre-session pairing is a conditioning procedure that attempts to make the BT a conditioned reinforcer. Pre-session pairing can be easy to implement and has been shown to lead to a general reduction of challenging behavior during subsequent instruction (Kelly et al., 2015, Shillingsburg et al., 2019).

Pre-session pairing is especially important for new BTs, as unfamiliar BTs have not become a conditioned reinforcer (Parsons et al., 2016). It is important that the unfamiliar BT withholds placing demands during this pairing period to ensure they become established as a conditioned reinforcer (Sundberg & Partington, 1998). Once the BT has become a conditioned reinforcer by successfully being paired with the delivery of reinforcement, instructional trials can begin (Sundberg & Partington, 1998). The objective of pairing is to associate BTs and their therapeutic context with preferred items and activities, in the absence of demands, so that the therapeutic context signals “improving conditions” rather than “worsening conditions” (Carbone et al., 2007; Sundberg & Partington, 1998). Studies such as McLaughlin and Carr (2005) and Kelly et al. (2015) have emphasized how important pairing is; however, to this author’s

knowledge, no studies have consistently determined how long pre-session pairing should occur before placing demands.

Purpose

EIBI is a comprehensive treatment intervention with a large amount of empirical support that is used with clients who have ASD. EIBI uses DTT along with NET and IT teaching procedures to help those with ASD gain adaptive and functional skills. The intensity of instructions during EIBI has shown success in teaching these adaptive and functional skills; however, the intensity of intervention can also evoke challenging behaviors. Pre-session pairing may circumvent the occurrence of challenging behaviors during instructional periods. The present study seeks to determine which duration of pre-session pairing results in higher occurrences of compliance and lower levels of challenging behaviors in children diagnosed with ASD receiving EIBI services.

CHAPTER 2

METHODS

Participants

Child Participants

Three children with ASD were recruited for the present study at an autism clinic in the suburbs of Chicago, Illinois. The main inclusion criteria for participants included: 1) displayed at least one challenging behavior (e.g., aggression, self-injury, property destruction, elopement) when demands were placed and 2) demonstrated compliance (responding to instruction within 3-5 seconds with a correct or attempted response) with at least one therapist on their treatment team (past or present). Additional participation criteria included having an ASD diagnosis in accordance with the *Diagnostic and Statistical Manual of Mental Disorder, Fifth Edition* (DSM-5; APA, 2013) based on either historical records and/or parent report of a comprehensive ASD diagnosis. Potential participants were required to receive a minimum of 9-12 hours per week of ABA therapeutic services to ensure experimenter/client availability. No criteria for gender, age, or skill level of the child were selected. Depending on the skill level and repertoires of the child participants, either new targets were created to expand upon skills already in their repertoire, such as a new receptive body part, or, targets were created for the acquisition of these skills, such as modeling touching a card in an array of one before placing S^D to teach receptive ID. All clients at the center were under the age of 18, so no child participants were over the age of 18. The participants needed to have received services for a minimum of 6 months to participate in the study.

Behavioral Therapist

Three BTs were recruited for the present study. The BT participants worked with the

recruited child participants for a minimum of six hours per week. BTs were identified after child participants were recruited (i.e., BTs on the child participant's therapy team) and were chosen for the study either after 1) being identified as having poor rapport with the child participant by completing a "self-rating" using a Likert-type scale containing descriptors developed in previous research (i.e., McLaughlin & Carr., 2005) and/or 2) being a novel BT to the child participant with less than two weeks of experience on the child participant's treatment team.

Setting and Materials

This study took place at an autism clinic in a suburb of Chicago, Illinois that provides ABA therapy to children ages 2-14 years. Baseline and intervention took place in the play area of the center which contained swings, slides, and a variety of toys, as well as a workroom that contained one worktable, three chairs, and a bin that contains any work materials or reinforcers that are designated for each child participant. Specific work items were identified after recruitment occurred and were based on the child participant's current skill level. Materials for instructional tasks included items such as flashcards (approximately 3x3 inches) for receptive and expressive identification or other communication/visual perception tasks, and lists of vocal S^Ds for imitation, receptive instructions, or intraverbal responding (see Table 1 for a list of tasks). Prior to intervention, the consultant (i.e., Board Certified Behavior Analyst) overseeing the treatment team conducted a preference assessment to ensure potential reinforcers were available during the pairing period of the present study. Data collection worksheets and a stopwatch were provided to the BT so that frequency of the occurrence of demands as well as latency to challenging behaviors could be recorded in live time. Prior to implementing intervention, the BTs completed a self-rating of rapport. The self-rating of rapport was on a 6-point scale, with 0-3 indicating poor rapport, and 4-5 indicating good rapport. BTs chose one

response from a series of statements that specify their level of agreement to the quality of their relationship. The rating scale used in this study was adopted from McLaughlin and Carr (2005; refer to Appendix A for the "self-rating" scale).

Experimental Design

A two-phase multielement design was used to evaluate the effects of different pairing durations on compliance with novel instructions. A multielement design rapidly alternates between at least 2 intervention conditions in a short period of time (Byiers et al., 2012). The multielement design contained four conditions: no pairing/ control, 15 min of pairing, 30 min of pairing, and 45 min of pairing. With limited research discussing how long pre-session pairing durations should last, these values were determined based on previous recommendations from BCBA's during direct therapy sessions. In the clinical setting, 10-15 minutes of pairing was often suggested, however, with no research to confirm this amount, longer durations were included in this study to determine if the pairing recommendations in clinical practice were sufficient to circumvent concerns associated with the implementation of demands. A multielement design was used to demonstrate if pre-session pairing led to compliance and decreased challenging behaviors, with varying intensities providing differentiated data (i.e., demonstrating the most effective pairing duration). Carryover effects may have occurred session to session as the child participant acclimated to the BT and/or the change in pre-session pairing; however, it was anticipated that one condition would stay differentiated across participants. Furthermore, pairing durations occurred in a random order, with no duplicated starting duration across child participant-BT dyads. Randomized order of pairing conditions was anticipated to allow differentiated data consistently prior to effects of carryover occurring.

Independent Variable

The independent variable was the duration of pairing prior to placing demands. Training was provided on how to conduct pre-session pairing with all BTs. The training for BTs was conducted using Relias Learning (Relias Learning, 2022). This training was selected because it went into detail explaining "accidental demands" that occur often throughout pairing sessions. This training provided clear examples and non-examples of what demands are and when they are often accidentally and unknowingly presented. This training took 10-15 minutes to complete, and a 5-question quiz was required after the completion of training and a passing grade of 80% was required. The quiz consisted of multiple-choice and true or false questions. After completing the training, the BT was immediately prompted to take the quiz. Unlimited attempts were allowed to complete the quiz with mastery criteria and had to be completed 24 hours after completing the training.

Dependent Variable

The dependent variables were compliance with novel instructions and latency to identified challenging behaviors for child participants. Compliance was defined as the child participant initiating a response to an instruction within 3-5 seconds from the time the instruction was given. A correct response was not necessary for the purposes of this study to qualify as "compliance." For example, if the SD was "touch cat" during receptive identification program and the child participant touched the dog, this was still counted as a response because the focus was on compliance, not correct responding. Non-compliance was defined as no response to an instruction within 3-5 seconds from the time the instruction was given or the occurrence of challenging behaviors. Measurement was conducted using the percentage of opportunities to comply with tasks (i.e., number of instructions with compliance / total instructions provided *

100). The percentage of opportunities was recorded by the BT using a data sheet that contained three categories: response to demand within 3-5 seconds, no response to demand within 3-5 seconds, and challenging behaviors within 3-5 seconds. This data was collected throughout the 20 demands placed during instructional periods (see procedures below). Challenging behaviors were individually defined for the child participant following recruitment. Latency to challenging behavior was collected during research trials. During research instructions, the BT started a timer after the delivery of the first research instruction and stopped the timer when either the onset of the first instance of challenging behavior occurred or the research session ended (i.e., all 20 questions were presented, and no challenging behaviors occurred). The maximum amount of time for a research trial was 300 seconds and if no challenging behaviors occurred during research instruction a latency of 300 was scored. Refer to Appendix B for datasheets.

Procedures

Pre-Assessment

Information from the child participant's intake assessment and their assessment information (Verbal Behavior Milestones Assessment and Placement Program [VB-MAPP], Assessment of Basic Language and Learning Skills- Revised [ABLLS-R], PEAK Relational Training System) were reviewed, as well as probing for novel instructions when determining tasks for baseline and intervention. This was done to ensure that the instructions given were appropriate for the child participant but represent novel instructions. Targets chosen for this study were novel to the child participant and at a difficulty level similar to their current programming level (see Table 1 for a list of tasks identified). Five tasks were selected (from the list) and assigned to each child participant. Each task contained a minimum of 10 targets (i.e., 10 targets run twice during research sessions, or 20 targets run once during research sessions).

During research sessions, tasks were randomly selected for implementation.

Baseline

For baseline sessions, no pairing occurred. At the beginning of each hour, the BT randomly selected one of the research tasks and ran 20 DTT instructional trials while recording data on compliance to instruction (see above) and latency to challenging behavior (see above). During baseline, no reinforcement was given for correct responding. After the 20 instructions, the BT continued the session as they typically would during the child participant's typical treatment services. This process was repeated every hour for a minimum of five research sessions.

Intervention

Intervention sessions were conducted identical to baseline (with the inclusion of pre-session pairing procedures), embedded once every hour (at the beginning of each hour) in the child participant's typical treatment services. During the intervention, the BT followed pairing procedures (see Appendix C) based on the current intervention condition (e.g., no pairing, 15 min of pairing). Pairing conditions for each research session was randomly assigned, with all four conditions being rotated through prior to repeating any one condition. Following pre-session pairing duration requirements, a random number generator was used to randomly select one of the five tasks and the BT required the participant to engage in 20 instructions. The BT collected data on both dependent measures. If correct responding occurred, the BT provided verbal praise to the child participant. This process was repeated every hour of each treatment session until differentiated data was observed. During treatment fidelity checks, if the BT scored below a 95% fidelity, they were required to complete more intensive training (using a behavioral skills training model) on how to properly engage in pre-session pairing. Fidelity checks were taken at least

twice per week.

Behavioral Skills Training

Behavioral Skills Training (BST) is an active-response training procedure that effectively teaches individuals new skills and is effective in teaching staff skills such as how to conduct specific behavioral assessments (Lerman et al., 2015). BST involves instruction, modeling, rehearsal, and feedback. During this study, clear and brief instructions were orally given on pairing such as how to pair and how long to pair. Instructions were also given on how to run instructional trials and how to score compliance (response) non-compliance (no-response) and challenging behaviors (specific operational definitions were given for the specific child participants). The modeling portion of BST involved a 2-minute pairing example with the child participant and or placing 3-5 instructional task demands. After the researcher modeled the pairing and or instructional period of the intervention, the BT rehearsed with the child participant while the researcher observed the rehearsed trial. Feedback of the BT's performance was given, and if needed the researcher would model how to implement the intervention again.

Interobserver Agreement

Interobserver agreement (IOA) data was taken for 33% of sessions with each BT across baseline and intervention. CITI training was completed by another observer assisting with IOA data. IOA data was calculated for both compliance with instructions and latency to challenging behavior. IOA data for compliance with instructions was collected using trial-by-trial IOA. Trial-by-trial IOA was calculated by dividing the number of trials with agreement by the total number of trials presented (total trials/agreement; Cooper et al., 2019). IOA data for latency to challenging behavior was collected using total duration IOA. Total duration IOA was calculated by the shorter duration being divided by the longer duration multiplied by 100 (shorter

duration/longer duration * 100; Cooper et al., 2019); refer to Appendices D and E for data collection sheets for IOA).

Treatment Integrity

A second observer collected data on treatment integrity during baseline and intervention via a task analysis (see Appendix F) for 33% of baseline and intervention sessions. The observer observed participant dyads and marked whether the BT completed the steps as written (e.g., pre-session pairing requirements, instructional trials, completing the datasheet) or whether steps were added, omitted, or completed out of order.

Social Validity

A questionnaire was completed by the BTs post-study at the autism center where the study was conducted. The questionnaire contained nine questions related to how the BT felt (Strongly disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Disagree) about the intervention and the related outcomes. The purpose of this questionnaire was to determine the appropriateness and acceptability of the intervention as both the process and the outcome measures (see Appendix G).

CHAPTER 3

RESULTS

Participant's information and characteristics

Child Participants

Pete was a 5-year-old White male diagnosed with ASD in 2021 who started with the company in 2022. There were no complications during pregnancy and Pete was not on any medication and had no known allergies. Pete received 30 hours of ABA services weekly as well as speech therapy services. Pete displayed challenging behaviors of elopement, property destruction, and non-compliance when demands were placed and when access was denied. Elopement was defined as any time Pete attempted or successfully left his seat or designated area without adult permission for any duration of time. An example of elopement included when Pete was asked to complete a task at the table, and he left the area. A non-example of elopement was if Pete went to throw his trash away when he was done eating or if he was on a break and had free choice. Property destruction was defined as either attempted or successful destruction of personal or public property, such as ripping or throwing work materials or toys that were not intended to be thrown. Episodes of property destruction were scored as a single response unless a delay of at least 5 seconds occurred between episodes. An example of property destruction was if Pete threw or slapped work materials, such as picture cards, off the table during receptive identification tasks. A non-example of property destruction was if Pete accidentally dropped an item, such as work materials, when handing them to the therapist or throwing an item, such as a ball, thats function was to be thrown. Non-compliance was defined as any occurrence of Pete saying "no" to demands or if no response was given to an instruction within 3-5 seconds from the time the instruction was given. An example of non-compliance was Pete repeatedly saying or

yelling “no” when a demand was placed or laying on the floor and turning his body away from the therapist when a demand was placed. A non-example of non-compliance was if Pete said “no” when offered an item.

Elliot was a 4-year-old White male diagnosed with ASD in 2020 who started ABA services within the company in 2022. There were no complications during pregnancy and Elliot was on no medication and had no known allergies. Elliot received 15 hours of ABA services weekly as well as speech therapy services. Elliot displayed challenging behavior of elopement, SIB, flopping, and non-compliance when demands were placed as well as when his routine was disrupted. Elopement was defined as any time Elliot attempted or successfully left his seat or designated area without adult permission for any duration of time. An example of elopement was if Elliot left his seat when a demand was placed, and a non-example was if Elliot left the table after he manded for a break. SIB was defined as any time Elliot used any aggressive force towards himself such as hitting his head with his hand or hitting his head on the wall. A non-example was if Elliot touched his head when asked “touch head” or scratched his head. Flopping was defined as any time Elliot fell to the floor either on his knees or lying down vertically when not instructed to do so. The topography of this behavior was when Elliot dropped to the floor either falling on his knees or lying down on the ground and refusing to move. This often occurred when being physically guided by hand to a new location by his therapist. A non-example was if Elliot was on a break and chose to lay down. Non-compliance was defined as any instance of Elliot not responding to a demand within 3-5 seconds, looking away from his therapist during demands, pinching the screen of his AAC device during demands and or whined during demands.

Nathan was a 10-year-old White male who was diagnosed with ASD in 2018 who started

ABA services at the company in 2022. Nathan received 20 hours of ABA weekly. Nathan was born prematurely due to severe pre-eclampsia and weighed 1 pound 6 ounces at birth. Nathan stayed in the NICU for 6 months before he was able to leave the hospital. In 2018 Nathan had an electroencephalogram performed which showed a tendency for a seizure disorder partial type, however, no seizures had been observed. Nathan was also medicated and took Risperdal and Abilify for irritability associated with his ASD. Nathan displayed challenging behaviors of SIB, flopping, aggression, property destruction, and non-compliance when demands were placed as well as when his routine was disrupted. SIB was defined as any instance of Nathan hitting his head or another body part with his hand forcefully with either an open or closed fist or hitting his head against an item such as a wall, cabinet, or the floor forcefully. A non-example was when Nathan was clapping his hands or laying his head down on the floor if tired or playing. Flopping was defined as deliberately going down by either suddenly sitting or falling on his knees or lying down on the floor and refusing to move. A non-example was if Nathan chose to lie down during a break. Aggression for this client included hitting and kicking. Hitting was defined as any attempt or occurrence of Nathan contacting any part of another person's body with an open or closed fist. Kicking was defined as any attempt or occurrence of Nathan contacting any part of another person's body using his foot. Non-examples were if Nathan was giving a high-five or if his foot accidentally touched another while sitting in circle time. Property destruction was defined as any attempt or occurrence of Nathan damaging personal or public property such as ripping or throwing an object that is not intended to be ripped or thrown. Episodes of property destruction were scored as a single response unless a delay of at least 5 seconds had occurred between episodes of property destruction. An example of this was when Nathan throws work materials when a demand was placed or throws an electronic toy that is not functioning as

expected, a non-example was if Nathan threw a ball while playing catch. Non-compliance was defined as Nathan not responding to a demand within 3-5 seconds from the time the instruction was given.

Behavioral Therapists

Caroline was a 24-year-old RBT who had worked at the clinic location for 6 months but was an RBT for 2 years. She was a graduate student in an ABA program. Rapport was determined by using a self-rating Likert scale for rapport, adopted by McLaughlin and Carr (2005) where a score of 4-5 was considered "good rapport" and a score of 0-3 was considered "poor rapport" Caroline reported having "poor rapport" with Pete by scoring a "1" on the self-report form. Caroline reported having "poor rapport" with Elliot by scoring a "0" on the self-report form. Caroline reported having "poor rapport" with Nathan by scoring a "0" on the self-report form. Prior to collecting baseline data, Caroline completed the Relias training and scored 100% on her pairing quiz. Mary was a 23-year-old RBT who had worked at this clinic location for 1 year but had been an RBT for 2 years. Mary was a graduate student in an ABA program. Mary reported having "poor rapport" with Pete by scoring a "2" on the self-report form. Mary reported having "poor rapport" with Elliot by scoring a "3" on the self-report form. Mary reported having "poor rapport" with Nathan by scoring a "1" on the self-report form. Prior to collecting baseline data, Mary completed the Relias training and scored 100% on her pairing quiz.

Gabby was a 27-year-old RBT who had worked at this clinic location for 6 months but had been an RBT for 1 year. She was a graduate student in an ABA program. Gabby reported having "poor rapport" with Pete by scoring a "2" on the self-report form. Gabby reported having "poor rapport" with Elliot by scoring a "3" on the self-report form. Gabby reported having "poor

rapport" with Nathan by scoring a "2" on the self-report form. Prior to collecting baseline data, Gabby completed the Relias training and scored 100% on her pairing quiz.

Kailey was a 23-year-old RBT who had worked at this clinic location for 6 months and had been an RBT for 6 months. She was accepted into graduate school for OT and was starting in the fall. Kailey reported having "poor rapport" with Pete by scoring a "2" on the self-report form. Kailey reported having "poor rapport" with Elliot by scoring a "3" on the self-report form. Kailey reported having "poor rapport" with Nathan by scoring a "1" on the self-report form. Prior to collecting baseline data, Kailey completed the Relias training and scored 100% on her pairing quiz.

Katherine was a 26-year-old RBT who had worked at this clinic location for 6 months and had worked as an RBT for 3 years. Katherine completed her masters in ABA and was preparing to sit for the BACB exam. Katherine reported having "poor rapport" with Pete by scoring a "3 on the self-report form. Katherine reported having "poor rapport" with Elliot by scoring a "2" on the self-report form. Katherine reported having "poor rapport" with Nathan by scoring a "2" on the self-report form. Prior to collecting baseline data, Katherine completed the Relias training and scored 100% on her pairing quiz.

Dependent Variables

Compliance

Figures 1 and 3 display the data for Pete's compliance to instruction. During baseline, Pete had an average of 49% compliance to instructions (range= 40%-65%). During intervention, the average compliance was 62%, 96%, 79%, 86%, for 0 min, 15 min, 30 min, and 45 min, respectively. The most stable levels of compliance occurred in the 15 min condition.

Figures 5 and 7 display the data for Elliot's compliance to instructions. During baseline,

Elliot had an average of 36% compliance to instructions (range= 25%-50%). During intervention, the average compliance was 47%, 90%, 83%, 83%, for 0 min, 15 min, 30 min and 45 min, respectively. The most stable levels of compliance occurred in the 15 min condition.

Figures 9 and 10 display the data for Nathan's compliance to instructions. During baseline, Nathan had an average of 91% compliance to instructions (range=80%-95%). With this high rate of compliance, a second baseline was implemented with more challenging research questions. During this second phase of baseline, Nathan had an average of 64% compliance to instructions (range=55%-75%). During the intervention, the average compliance was 68%, 98%, 83%, 78%, for 0 min, 15 min, 30 min, and 45 min, respectively. The most stable levels of compliance occurred in the 15 min condition.

Latency to Challenging Behaviors

Figures 2 and 4 display the data for latency to challenging behavior for Pete. During baseline data, Pete engaged in challenging behavior on average 25 sec (range= 10-45 sec) after the initial research question was presented. During intervention, Pete engaged in challenging behavior on average 205 sec, 300 sec, 242 sec, 237 sec, for 0 min, 15 min, 30 min, and 45 min respectively. The most stable levels of latency to challenging behavior occurred in the 15 min condition.

Figures 6 and 8 display the data for latency to challenging behavior for Elliot. During baseline data, Elliot engaged in challenging behavior on average 96 sec (range=30-180) after the initial research question was presented. During intervention, Elliot engaged in challenging behavior on average 106 sec, 300 sec, 231 sec, 237 sec, for 0 min, 15 min, 30 min, and 45 min respectively. The most stable levels of latency to challenging behavior occurred in the 15 min condition.

Figures 10 and 12 display the data for latency to challenging behavior for Nathan. During baseline data, Nathan engaged in challenging behavior on average 229 sec (range= 180-300) after the initial research question was presented. With the long latency to challenging behavior occurring in the original baseline condition, a second baseline was implemented with more challenging research questions. During this second phase of baseline, Nathan engaged in challenging behavior on average 170 sec (range 110-300) after the initial research question was presented. During the intervention, the average compliance was 185 sec, 296 sec, 272 sec, 224 sec, for 0 min, 15 min, 30 min, and 45 min, respectively. The most stable levels of latency to challenging behavior occurred in the 15 min condition.

IOA section

IOA was taken for a total of 33% of sessions for Pete for compliance to instructions and latency to challenging behavior. Overall, the average IOA scores were 96.66% and 99.74% respectively. IOA was taken for a total of 33% of sessions for Elliot for compliance to instructions and latency to challenging behavior. Overall, the average IOA scores were 965 and 956 respectively. IOA was taken for a total of 33% of sessions for Nathan for compliance to instructions and latency to challenging behavior. Overall, the average IOA scores were 98% and 94% respectively.

Treatment Fidelity

Treatment fidelity was scored for 33% of Pete's sessions with an average score of 98%. Treatment fidelity was scored for 33% of Elliot's sessions, with an overall score of 100%. Treatment fidelity was scored for 33% of Nathans's sessions with an average score of 97%.

Social Validity Section

Social validity scores are displayed in Table 2. The average score across all BTs was 5.44

(out of a possible score of 6). Caroline scored an average of 6 across items on the social validity measure. Mary scored an average of 5.1 across items on the social validity measure. Gabby scored an average of 6 across items on the social validity measure. Kailey scored an average of 5 across items on the social validity measure. Katherine scored an average of 5.1 across items on the social validity measure.

CHAPTER 4

DISCUSSION

Overall Summary

Many studies have examined the importance of pre-session pairing to build rapport as a method of increasing compliance and reducing challenging behaviors prior to demands, especially during intensive instruction, (e.g., DTT; McLaughlin & Carr, 2015), however, the current data represent an evaluation of differing pre-session pairing durations aimed at determining which duration is the most effective in increasing engagement in treatment services. Overall, results from this study provide support for implementing 15 min of pre-session pairing prior to placing demands. Pre-session pairing of 15 min consistently had higher rates of compliance to demands when compared to other pairing conditions. Furthermore, pre-session pairing of 15 min also consistently had higher rates of latency to challenging behaviors when compared to other pairing conditions. Though increased compliance and increased latency to challenging behaviors occurred across other conditions, only the 15 min pairing condition demonstrated consistent data across sessions and across participants. The results of this study coincide with previous research demonstrating that pre-session pairing decreases challenging behaviors and increases compliance (McLaughlin & Carr, 2005; Parsons et al., 2016). Similarly, to McLaughlin & Carr (2015), the present study did not expect good rapport to eliminate challenging behavior in entirety, but instead sought to demonstrate that building good rapport through pre-session pairing is a component of an intervention strategy that can reduce challenging behaviors.

DTT has successful outcomes in increasing adaptive and functional skills in children with ASD (Roxburgh & Carbone, 2012); however, the success of DTT may depend on a child's

ability to attend to instructor-directed activities (Carbone et al., 20017; Roxburgh & Carbone, 2012). The number of instructor-directed activities, instructions placed during DTT and certain S^D such as academics, work, social demands, and or the person placing demands commonly trigger challenging behavior (Carbone et al., 2007; McLaughlin & Carr, 2005). Addressing how to decrease challenging behaviors during instructional periods helps ensure the best outcomes for those with ASD receiving EIBI services. The current results provide more evidence to indicate that pre-session pairing decreases challenging behavior because the therapist is a CMO-R, indicating improving conditions rather than worsening conditions (Carbone et al., 2007; Michael, 1993; Shillingsburg, 2014). When a therapist becomes a CMO-R, they become an SD for approach and positive social interaction to access/contact reinforcement, rather than escape from aversive situations via challenging behavior (McLaughlin & Carr, 2005). The current data also provides more support to previous research that has indicated establishing a good rapport with clients is effective in manipulating the CMO-R (Shillingsburg et al., 2014; Smith, 2001; Sundberg & Partington, 1998), reducing challenging behaviors by creating a positive environment prior to introducing demands.

Surprisingly, the longest duration of pre-session pairing (i.e., 45 min) did not result in more stable rates of compliance or challenging behaviors. Variable data observed in the 30- and 45- min conditions throughout the study may indicate that extended periods with no demands might contribute to increased challenges when demands are subsequently introduced. Furthermore, variable data in compliance and latency to challenging behavior in the 30- and 45-min conditions may have been due to unrestricted access to preferred items (reinforcing activities), making transitioning to work tasks and demands more difficult once required. Pre-session pairing may represent an important procedure in the management of challenging

behaviors during instructional sessions; however, when pairing, one should be mindful of the duration of pairing, as extended pairing conditions without any demands could ultimately cause unwanted behaviors.

The result of this study also provides valuable information on instructional time throughout the participants' sessions. Optimal pairing duration prior to placing demands being 15 min, rather than 30 or 45 min, results in higher compliance, longer latency to challenging behavior, and more instructional time. Children receiving EIBI have individualized interventions and goals that are based on their chronological age, assessment results, and developmental milestones (Klintwall & Eikeseth, 2014) and EIBI helps those with ASD acquire adaptive and functional skills by targeting communication, play, social, emotional, cognitive, and self-help skills. Pairing for 15 min rather than 45 min before placing demands means that more time is available to work on these targets and goals, possibly allowing the participants to reach and complete goals faster than they would be able to if pre-session pairing of 45 min was required prior to placing demands. The ultimate goal of EIBI is for those with ASD to perform at a level equal to their typically developing peers, be in regular mainstream settings, as well as fade out of intervention services (Klintwall & Eikeseth, 2014; Lovaas, 1987), and knowing that 15 min of pre-session pairing, rather than a longer duration of pairing, results in good outcomes could potentially help meet these goals in a timely manner.

Limitations

The present study is not without limitations. First, the pairing conditions were run with different BTs every hour on a random rotational cycle, and the child participants did not respond to the same BT in all conditions for all sessions. Specifically, pairing apart if rapport with the BT was the reason for the change in behaviors or if the duration of pairing was the reason for the

change in behaviors is difficult. However, the change in BT every hour may have contributed to better differentiation in the data because child participants would not have experienced large amounts of rapport building activities with only one BT consistently during their research sessions. Rotating BTs every hour also reduced the risk of the child participant acclimating to the BT. Given the consistently random BT schedule, it is more likely the data are more directly related to actual pairing time periods.

Second, interventions and schedules that were present throughout the child participants' typical therapeutic session (such as bathroom intervals, lunchtime, and circle time) where demands or directions needed to be placed were in place during research sessions. This limitation was particularly relevant for Pete, who was on a toileting schedule to go to the bathroom every hour. Pete often engaged in challenging behavior when prompted to go to the bathroom, which may have interfered with results of pairing conditions as the sessions were embedded into his normal treatment schedule and occurred at regular intervals, regardless of overarching schedule. His schedule was manipulated to allow the BT would take him to the bathroom after the research trial had already occurred so that their pre-session pairing condition was over; however, occasionally the wait out of going into the bathroom would extend into the next condition. When this occurred, demands were placed by a BT who was not in the pairing condition in an attempt to reduce the association of the aversive situation with the BT pairing with Pete for the condition. The purpose of the present study was not related to compliance to *all* demands in the child participant's environment, but future research may consider a comparison between contrived work settings or isolated work settings (e.g., 20 demands at a table) versus naturalistic instruction.

Lastly, peer interaction and presence appeared to impact pre-session pairing and research

trials. Transitioning from pairing conditions to research trials was difficult for child participants depending on which peers were present and when other clients (not in the study) were engaged in either reinforcing activities or challenging behaviors. The research environment was not a tightly controlled setting, allowing for extraneous environmental variables to be present consistently, though a tightly controlled environment is not as conducive to generalization. Despite the other clients/individuals in the immediate environment, consistent data was observed across all three participants and the effects of other clients/individuals appears to have only contributed a small amount to potential variability in the data.

Future Research

Future research should continue to evaluate the effects of varied pairing lengths on compliance and challenging behaviors. As previously mentioned, BTs were different every hour and for each condition consistently. Additional information related to duration of pairing effects may also be of benefit to clinical practice (e.g., does compliance break down at a consistent point in time following different durations of pairing). Future research should evaluate the effects of having only one BT implement all four pairing conditions to better determine if behaviors are due to actual increased rapport from pairing rather than just the duration of pairing that took place prior to demands. Either scenario would perhaps be informative, as it would be much easier for new BTs or those with poor rapport to implement pairing conditions consistently. Additional future research may also address the concern of contrived versus naturalistic compliance and challenging behaviors.

Conclusion

The intensity of instructions during EIBI has shown success in teaching many adaptive and functional skills to young children with ASD (Eikeseth & Klintwall, 2014).; however, the

intensity of instructions during this intervention can also evoke challenging behaviors (Carbone et al., 2007; Kelley et al, 2007; Roxburgh & Carbone, 2012). Evidence has shown that pre-session pairing is a solution for circumventing the occurrence of challenging behaviors during instructional periods (e.g., Kelly et al., 2015, Shillingsburg et al., 2019) . The present study extended previous research by addressing what duration of pre-session pairing is necessary to increase compliance and circumvent the occurrence of challenging behaviors. The present study determined that 15 min of pre-session pairing resulted in higher occurrences of compliance and lower levels of challenging behaviors consistently when compared to other, longer durations of pre-session pairing in children diagnosed with ASD receiving EIBI services.

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APPENDIX A

Self-rating scale for rapport

Home:_____ Date:_____ Staff member:_____

Please circle the number that best represents the overall quality of the relationship between you and _____ *as of today.*

UNSATISFYING		SATISFYING
0----------1----------2----------3----------4----------5		
The majority of my interactions with this person are awkward, unpleasant, and stressful. I do not feel particularly close to this person, and oftentimes, it is difficult for us to find any "common ground." (Score 0 or 1, depending on the extent to which you find the relationship unsatisfying.)	The majority of my interactions with this person are neutral, that is, not particularly good or bad. While I like this person, I don't feel particularly close or "connected" to this person in any meaningful way. (Score 2 or 3, depending on perceived level of connectedness.)	The majority of my interactions with this person are enjoyable, satisfying, and interesting. Together, we share a warm, open, balanced relationship. I find that we have a lot in common and enjoy each other's company. (Score 4 or 5, depending on the extent to which you find the relationship satisfying.)

The scale used in the present study was adopted from McLaughlin and Carr (2005).

APPENDIX B

Data Sheets

BT: _____
Client: _____
Condition: _____
Date: _____

Instructions	Response within 3-5 sec. No response within 3-5 sec. Challenging BX.			Correct or Incorrect Response	
1.	Response	No Response	Challenging BX	+	-
2.	Response	No Response	Challenging BX	+	-
3.	Response	No Response	Challenging BX	+	-
4.	Response	No Response	Challenging BX	+	-
5.	Response	No Response	Challenging BX	+	-
6.	Response	No Response	Challenging BX	+	-
7.	Response	No Response	Challenging BX	+	-
8.	Response	No Response	Challenging BX	+	-
9.	Response	No Response	Challenging BX	+	-
10.	Response	No Response	Challenging BX	+	-
11.	Response	No Response	Challenging BX	+	-
12.	Response	No Response	Challenging BX	+	-
13.	Response	No Response	Challenging BX	+	-
14.	Response	No Response	Challenging BX	+	-
15.	Response	No Response	Challenging BX	+	-

16.	Response	No Response	Challenging BX	+	-
17.	Response	No Response	Challenging BX	+	-
18.	Response	No Response	Challenging BX	+	-
19.	Response	No Response	Challenging BX	+	-
20.	Response	No Response	Challenging BX	+	-
Instructions with compliance/total instructions*100 =					
Latency to challenging BX =					

APPENDIX C

Pairing conditions

Condition A	No pairing prior to instruction
Condition B	15 min pairing prior to instruction
Condition C	30 min pairing prior to instruction
Condition D	45 min pairing prior to instruction

APPENDIX D

Trial by trial IOA for Compliance

BT: _____
Client: _____
Condition: _____
Date: _____

Trial	Observer 1	Observer 2	Agree or Disagree
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			

19			
20			
Number of Occurrence:			
Number of Agreements:			
Percent %:			

APPENDIX E

Duration-Based IOA for Latency of Challenging BX

BT: _____
Client: _____
Condition: _____
Date: _____

Session Condition	Observer 1	Latency for observer 1	Observer 2	Latency for observer 2	Shorter duration/Longer duration* 100= % IOA
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

APPENDIX F

Treatment Integrity

BT: _____
Client: _____
Condition: _____
Date: _____

	Completion
1. BT knows what condition they are in (pairing duration).	+ -
2. BT has reinforcers present at the start of the session (unless in no pairing condition).	+ -
3. BT places no demands during pairing conditions.	+ -
4. BT completes appropriate pairing duration.	+ -
5. BT transitions to work after the pairing condition ends.	+ -
6. BT has datasheet and timer to record behaviors.	+ -
7. BT completes 20 instructions.	+ -
8. BT repeats demands every hour.	+ -

APPENDIX G

Social Validity Checklist

Circle one answer

1. The level of rapport between the BT and the client is an important variable for intervention.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

2. The intervention was easy to implement.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

3. The importance of pre-session pairing was emphasized before this intervention.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

4. Pre-session pairing was effective in reducing challenging behaviors.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

5. Pre-session pairing was effective in increasing compliance.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

6. I feel as though my relationship with the client is stronger after the intervention.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

7. I will use pre-session pairing in the future to help build rapport with future clients.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

8. I will use pre-session pairing in the future when faced with non-compliance behavior.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

9. I will use pre-session pairing in the future when faced with challenging behaviors.

Strongly Disagree, Disagree, Slightly Disagree, Slightly Agree, Agree, Strongly Agree

0 1 2 3 4 5 6

Additional Comments:

Table 1. Pool of novel tasks.

Task	Materials
Receptive ID: Trees	Flashcards
Expressive ID: Trees	Flashcards
Receptive ID: Sea creatures	Flashcards
Expressive ID: Sea creatures	Flashcards
Receptive ID: Planets	Flashcards
Expressive ID: Planets	Flashcards
Receptive ID: Cats	Flashcards
Expressive ID: Cats	Flashcards
Receptive ID: Clothing	Flashcards
Receptive ID: Clothing	Flashcards
Intraverbal Responding	List of intraverbals for researchers
Personal Information	List of personal information targets for researchers; participant-specific responses
Matching Identical items	Matching flashcards
Fine motor imitation	List of fine motor movements for research
Gross motor imitation	List of gross motor movements for research
Receptive instructions of motor actions	List of different motor actions for research
Receptive instructions of body parts	List of different body parts for research
Tacting common items	Flashcards
Sorting task: Feature	Flashcards
Sorting task: Function	Flashcards
Sorting task: Class	Flashcards

Vocal Imitation	List of different sounds or words for research

Table 2. Social Validity

Questions	Caroline	Mary	Gabby	Kailey	Katherine	Average
1.The level of rapport between the BT and the client is an important variable for intervention.	**6**	**6**	**6**	**6**	**6**	**6**
2. The intervention was easy to implement.	**6**	**5**	**6**	**6**	**6**	**5.8**
3. Was pre-session pairing emphasized before this intervention?	**6**	**5**	**6**	**6**	**5**	**5.6**
5. Was pre-session pairing effective in increasing compliance?	**6**	**6**	**6**	**6**	**6**	**6**
6. Do you feel that your relationship with your client is stronger after this intervention	**6**	**6**	**6**	**5**	**6**	**5.8**
7. Are you more likely to use pre-session pairing to build strong rapport with future clients?	**6**	**6**	**6**	**6**	**6**	**6**
8. If faced with non-compliance in the future, how likely are you to increase pairing duration?	**6**	**6**	**6**	**5**	**6**	**5.8**
9. If faced with challenging behaviors in the future, are you likely to increase pairing duration?	**6**	**6**	**6**	**5**	**5**	**5.6**
	6	**5.1**	**6**	**5**	**5.1**	**5.44/6**

FIGURES

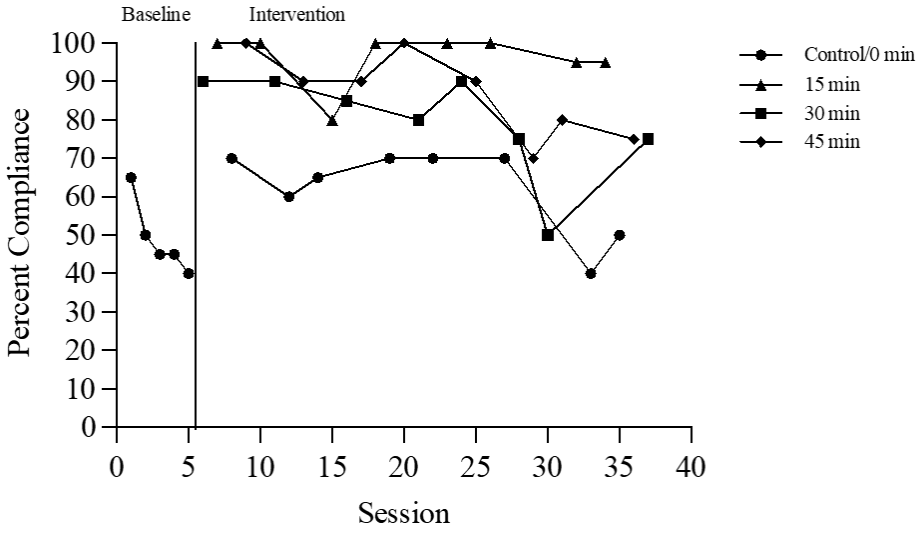

Figure 1. Pete's Compliance to Demands

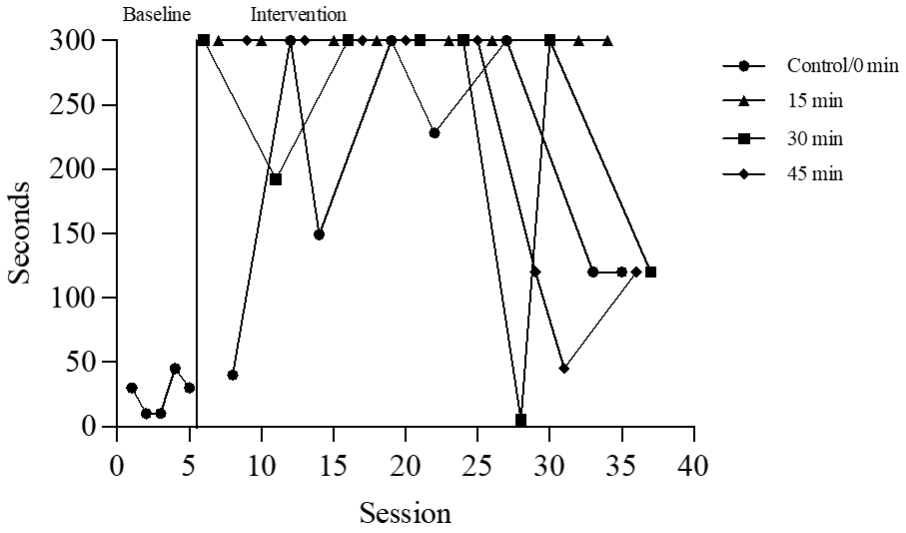

Figure 2. Pete's Latency to Challenging Behavior

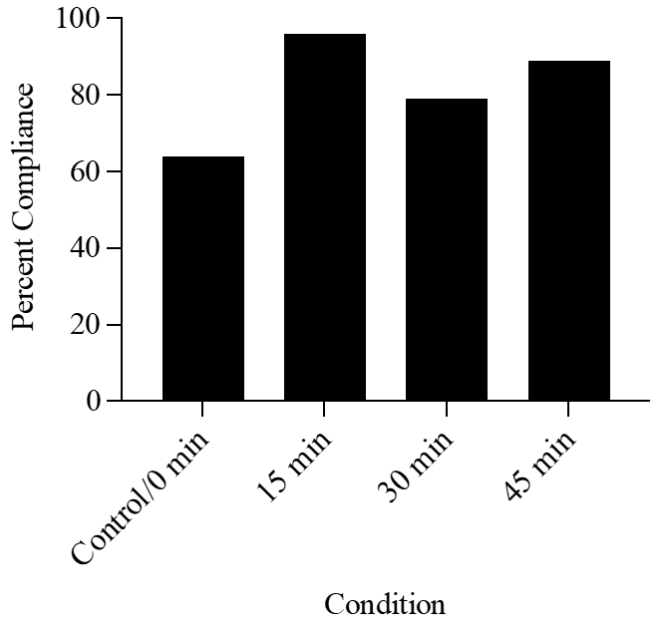

Figure 3. Pete's Compliance to Demands

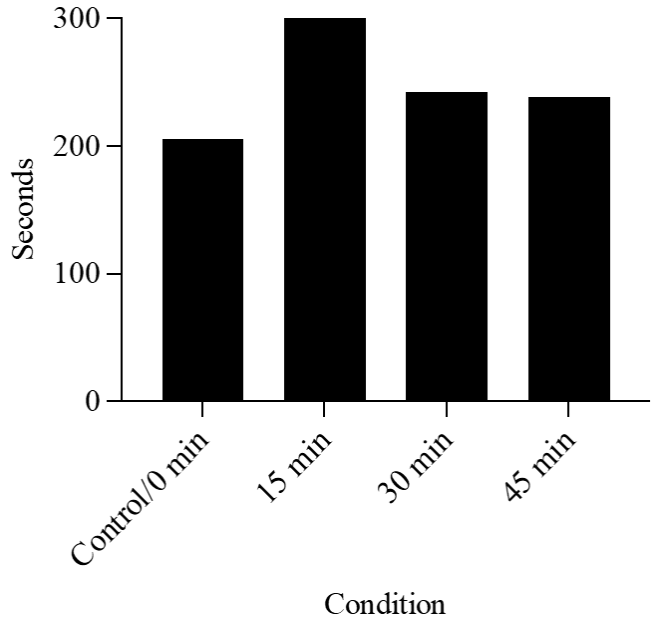

Figure 4. Pete's Latency to Challenging Behavior

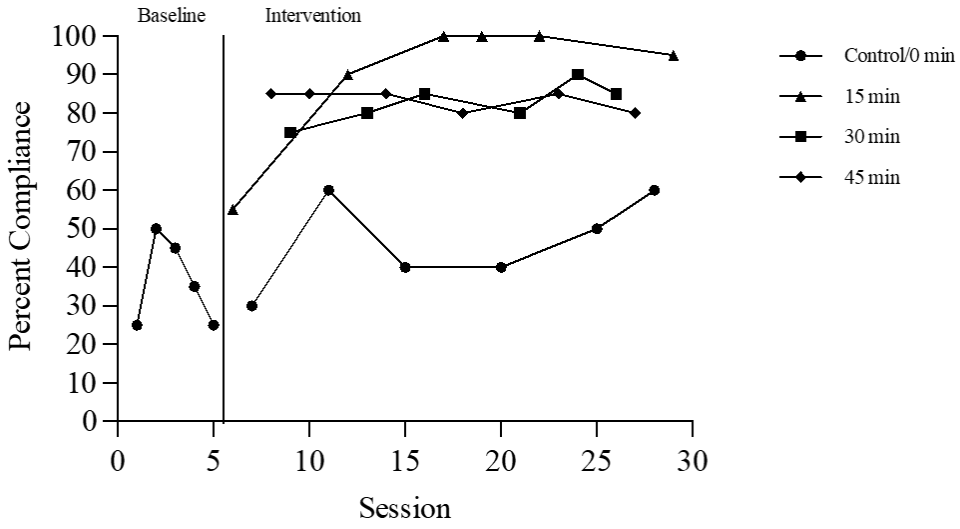

Figure 5. Elliot's Compliance to Demands

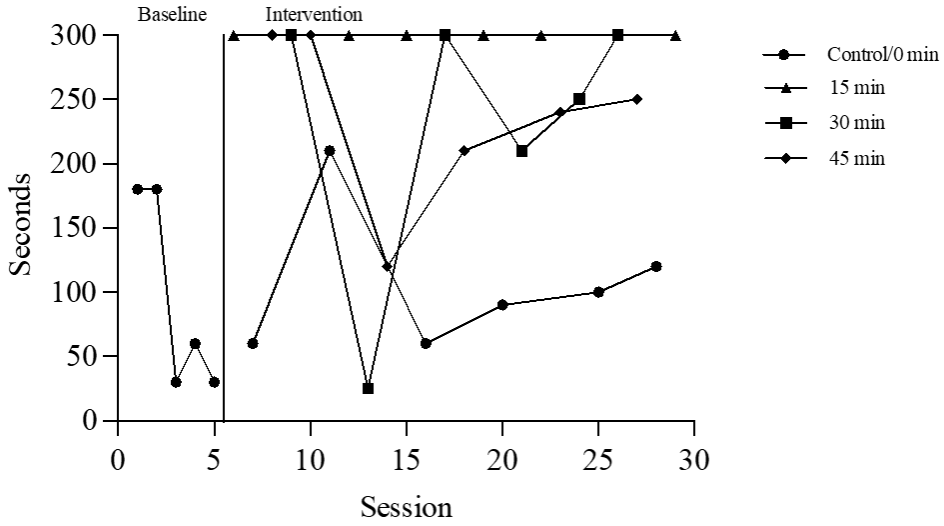

Figure 6. Elliot's Latency Challenging Behaviors

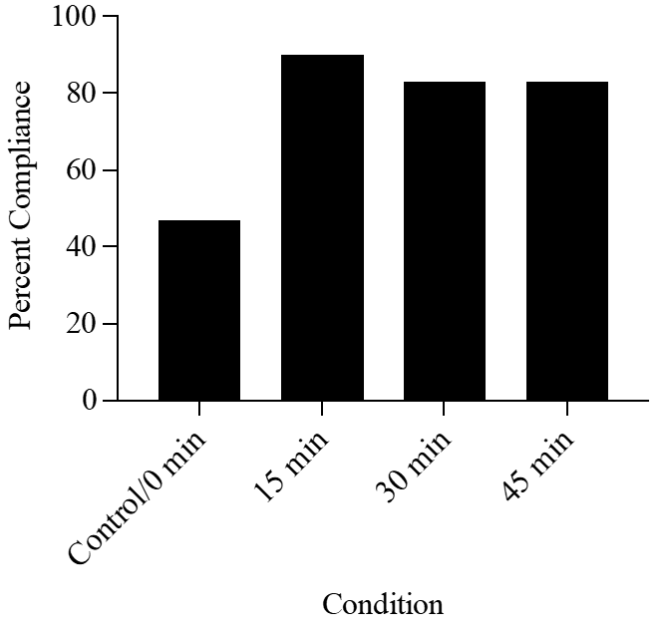

Figure 7. Elliot's Compliance to Demand

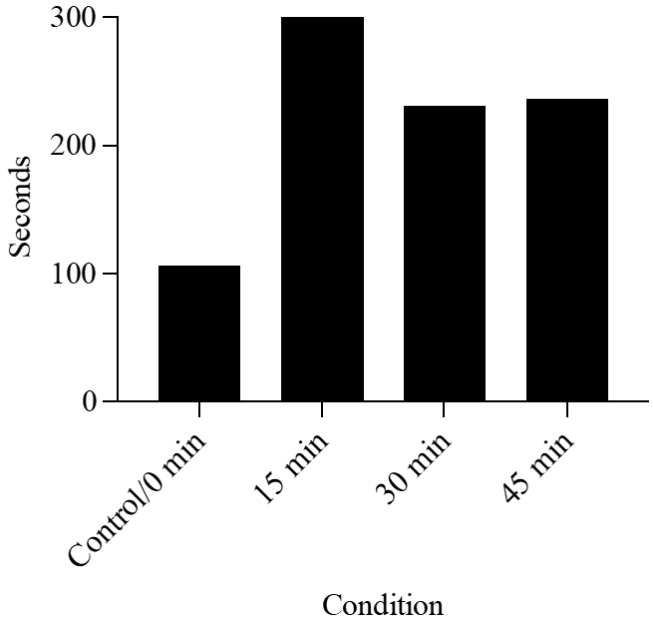

Figure 8. Elliot's Latency to Challenging Behavior

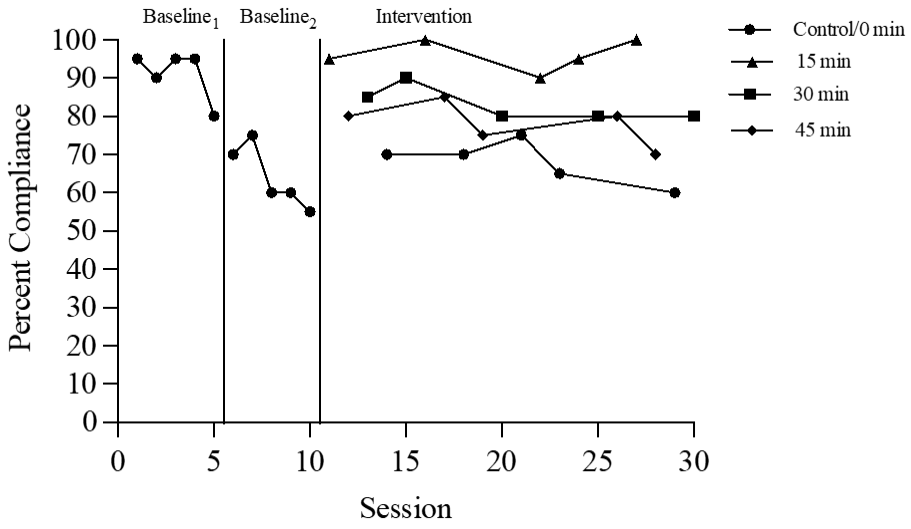

Figure 9. Nathan's Compliance to Demands

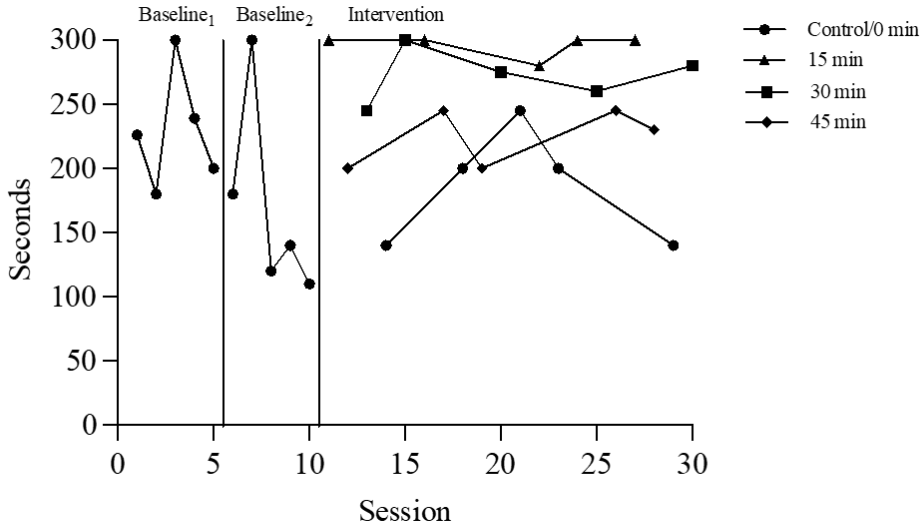

Figure 10. Nathan's Latency to Challenging Behavior

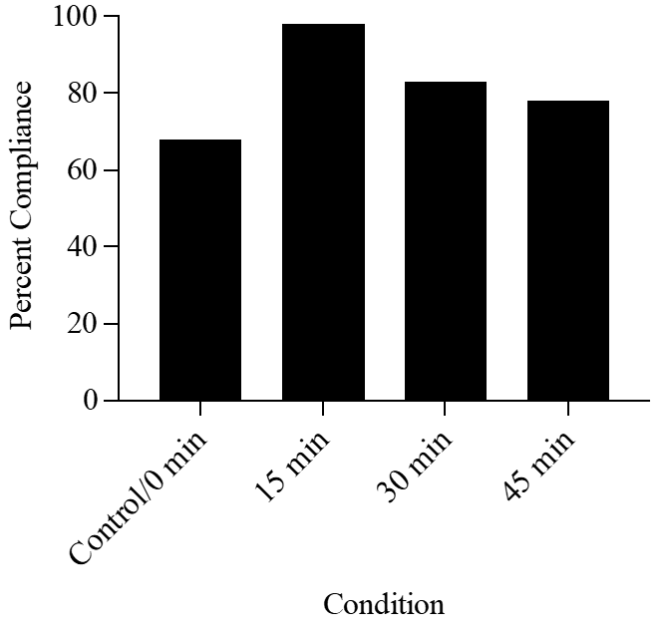

Figure 11. Nathan's Compliance to Demands

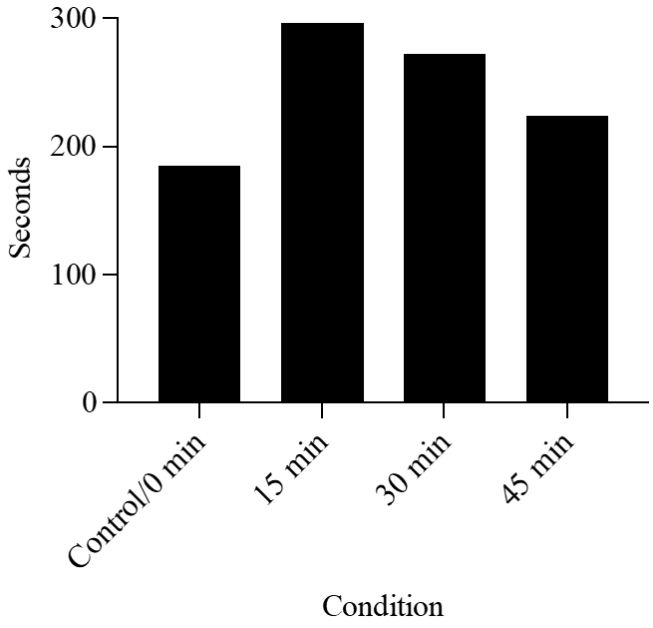

Figure 12. Nathan's Latency to Challenging Behaviors

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Research Paper Title:
Pre-session Pairing Impacts on Compliance

Major Professor: Dr. Paige Boydston