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AN EVALUATION OF TREATMENT ALTERNATIVES TO COMPLIANCE TRAINING WITH CHILDREN WITH AUTISM SPECTRUM DISORDER IN THE CLINICAL SETTING

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AN EVALUATION OF TREATMENT ALTERNATIVES TO COMPLIANCE TRAINING WITH CHILDREN WITH AUTISM SPECTRUM DISORDER IN THE CLINICAL SETTING

by

Hannah Chellino White

B.A., Lewis University, 2019

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the

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AN EVALUATION OF TREATMENT ALTERNATIVES TO COMPLIANCE TRAINING WITH CHILDREN WITH AUTISM SPECTRUM DISORDER IN THE CLINICAL SETTING

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A Research Paper Submitted in Partial

Fulfillment of the Requirements

for the Degree of

Master of Science

in the field of Behavior Analysis and Therapy

Approved by:

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CHAPTER 1

INTRODUCTION

Applied behavior analysis (ABA) is an evidence-based treatment for individuals with an array of needs, behaviors, and backgrounds, rooted in the science of human behavior (Yu et al., 2020). ABA is available for use for any number of individuals ranging from children, adults, and geriatric clients, incarcerated individuals, or neurotypical children in a school setting (Behavior Analyst Certification Board [BACB], 2022); however, the most common use of ABA is in treating individuals with autism spectrum disorder (ASD), along with other comorbid behavioral disorders that may be present in this population (BACB, 2022). Providing ABA therapy to individuals with ASD by credentialed professionals gained popularity in the 1970s (Johnston et al., 2017). ABA therapy is based on research in the field of psychology primarily within the scope of behaviorism, or the philosophy of the study of behavior (Dixon et al., 2012). Pioneers in the field of psychology such as B. F. Skinner and Ivar Lovaas created a new way of understanding human behavior and allowed for ABA to grow into the field it is today. In fact, Lovaas dedicated much of his professional career conducting research to benefit children with autism (Smith & Eikeseth, 2010). Lovaas' research paved the way for more specific research to be conducted and applied for practical and clinical use directly with clients. In today's ABA, progress towards inclusion, diversity, and ethical practices are made possible through the emphasis of positive reinforcement over other more restrictive methods (Boutot & Hume, 1970).

Diagnostics

Diagnostic services are typically recommended when the child reaches two years of age due to the increased reliability of the diagnostic results obtained after the individual has reached or surpassed this age (Lord et al., 2006). The diagnostic process reviews findings from an array

of categories including developmental monitoring, developmental screenings, and ultimately reaching a developmental diagnosis (Center for Disease Control and Prevention [CDC], 2022). According to the CDC, roughly 1 in every 44 children has been identified to meet diagnostic criteria for ASD. According to the Diagnostic and Statistical Manual (DSM-5; American Psychiatric Association [APA], 2013), an individual must have a persistent and severe delay or deficit in social communication and interactions as well as exhibit restrictive and/or repetitive behaviors. Severity is ranked from Level 1 being the least severe to Level 3 being the most severe case which require significant supports. A diagnosis of ASD is not a one-size-fits-all diagnosis. Everyone who receives an ASD diagnosis has a unique set of behavioral characteristics that fall within the umbrella of ASD symptoms (Mukherjee, 2017). Most observed in individuals with a diagnosis of ASD are noticeable differences in social and communication impairments as well as increased rigidity, restriction, and repetitive behaviors (Brentani et al., 2013). Many behavioral and developmental traits observed in children diagnosed with ASD can be observed at the time of the initial evaluations, assessments, and diagnostic processes; however, it is not uncommon for these behaviors to evolve, devolve, or for new behaviors to be observed over the course of that individual's life (Hyman et al., 2020). Additionally, some behavioral traits that are commonly observed in an individual diagnosed with ASD are communication deficits, motor skill deficits, social deficits, and behavioral deficits (Yu et al., 2020), with additional stereotypical or self-stimulatory behaviors also occurring (e.g., hand flapping or other repetitive motions, repetitive lining up or specific organizational patterns of objects, or echolalia in the form of repeating words or phrases; APA, 2013).

Maladaptive Behavior

Maladaptive behaviors are a common occurrence amongst those diagnosed with ASD

(Laurent & Rubin, 2004). Maladaptive behaviors are typically defined as socially significant behaviors that can be classified as disruptive to others, causing destruction, aggressive behaviors towards oneself or others, as well as repetitive behaviors commonly observed as self-stimulatory behaviors (Fulton et al., 2014). Maladaptive or problem behaviors that a client engages in are often of great social significance the individual and stakeholders such as parents (Dawson et al., 1998; Hartley et al., 2008), although the severity and type of socially unacceptable behaviors vary from individual to individual (Hall & Graff, 2012). Some maladaptive behaviors such as physical aggression or self-injurious behaviors (SIB) can cause great bodily harm and, as such, must be treated with urgency and high importance (Dawson et al., 1998).

Before determining an appropriate treatment of behaviors such as SIB, first the function must be determined. With the help of assessments such as a functional behavioral assessment (FBA), the function of maladaptive behaviors can be identified with the intention of creating an effective intervention and treatment protocol which can be adapted to treat or even prevent the onset of maladaptive behaviors in the form of a behavior intervention plan (BIP; Collins & Zirkel, 2016). Additionally, Iwata et al., (1994) published research on determining the function of SIB through a functional analysis (FA). The results from this research state that the majority of participants' behaviors were maintained by socially mediated reinforcers. According to Vollmer et al., (1994), functional analysis (FA) have been used in some cases as a pretreatment method of determining the maintaining variable (e.g., attention, escape, tangibles, etc.). Similarly, Vollmer et al., (1995) states that FA's can be emphasized by utilizing differential reinforcement procedures to address the aforementioned reinforcers that have been identified to be maintaining the behaviors. Maladaptive behaviors can also impair the individual's ability to meet skill acquisition goals and essential life skills especially if the behaviors are highly intrusive

or occur frequently or for excessive durations of time (Dawson et al., 1998). Interfering behaviors are important targets for intervention and can be reduced or eliminated using strategies and a series of procedures designed specifically to address the function of the behavior.

According to Madzharova et al. (2018), behavior intervention plans are instrumental in creating positive behavior change when implemented with a high level of high treatment integrity across all providers and staff implementing the plan. Without doing so, maladaptive behaviors have the potential to be devastating and incredibly destructive in some instances (Cook et al., 2010). Additionally, Cook et al., (2010) goes on to state that the preliminary findings concluded that, by effectively implementing the BIP, the participants' identified problem behaviors were reduced, replacement and otherwise socially appropriate behaviors, such as improved academic performance, increased. When the FBA and BIP have been completed, a behavior analyst can create corresponding interventions to assist the client in developing more appropriate skills, based specifically on the identified functions of the maladaptive behaviors, which are often referred to as replacement behaviors (Scott et al., 2008). Replacement behaviors serve the same function of the original maladaptive behavior but achieve the goal in a socially acceptable or appropriate manner. For example, if a client engages in the behavior of becoming physically aggressive towards adults when a preferred item has been removed, teaching the replacement behavior of manding for the return of the item with their preferred mode of communication would be an acceptable replacement behavior as it targets access as the function of the maladaptive behavior (e.g., vocal mands, PECS; Scott et al., 2008).

Compassionate Care

Treatment for symptoms associated with ASD goes beyond individual child sessions and includes interpersonal relationships with the families of those receiving services (Leaf et al.,

2021). The understanding of interpersonal relationships, upholding the Code of Ethics (BACB, 2022), and ensuring that the care we are giving our clients and stakeholders are rooted in the premises of compassionate care (Rohrer & Weiss, 2022). Taylor et al. (2018) explains that compassionate care takes empathy to a more intense level where action is required in the compassionate response. Furthermore, the authors state that sympathy includes showing care and sorrow for the situation another is in but does not attempt to imply that their pain is a shared experience. Taylor et al. (2018) goes on to explain that sympathy can, at times, be interpreted by stakeholders as condescending or insincere. Alternatively, having empathy towards a person and their situation is a much more appropriate way to express our care and concern towards another's hardships especially when working towards solutions for a client and their loved ones (Taylor et al., 2018). Compassionate care can be defined as an intensification of empathy that we show towards others and their suffering (Post et al., 2014). Rather than just showing empathy towards others which, compassionate care allows practitioners to show compassion towards more specific situations or needs that arise with clients and their families (Post et al., 2014). Although Post et al. (2014) reviews compassionate care in the medical setting, the information is still widely applicable to the field of behavior analysis and compassionate care is relevant and important for professionals across disciplines.

Compassionate care is the empathetic concern towards others while also feeling motivated to provide care and support for others (Goetz & Simon-Thomas, 2017). There is a scientific importance and necessity for behavior analysts to explore and understand compassion because compassion is both a universal concept that is shared amongst all groups and essential to effectively teach compassion to clients (Goetz & Simon-Thomas, 2017). Understanding compassion means understanding the discrete positive emotions that come along with the

feelings of nurturing and caring for others despite any suffering they may be experiencing (Goetz & Simon-Thomas, 2017). Compassionate care is beneficial for the client, according to Riess (2015), with a client receiving compassionate care being more likely to comply with treatment and experience a reduction in stress while receiving services. Although Riess (2015) speaks to compassionate care in medical professionals (similar to Post et al., 2014), the same can be applied to the field of behavior analysis. Explaining to stakeholders the importance of an intervention is likely to create buy-in the same way a doctor would achieve buy-in from a patient as they explain why, for example, a particular surgery is necessary. Compassionate care extends to clients but also includes how practitioners interact with and work towards solutions with the stakeholders of the clients. Similarly, the BACB (2022) notes that stakeholders, per the ethics code, should be involved in an individual's therapeutic process. The ethics code further specifies that allowing stakeholders to have and express their opinions, limitations, or concerns, regarding any part of recommended intervention (Rohrer et al., 2021) is a necessary treatment component. Compassionate care exceeds feeling empathy towards the stakeholders or the learner and continues to be a necessary aspect of the therapeutic process in its entirety.

Applied Behavior Analysis in Autism

Although ABA therapy is utilized across different fields and for numerous purposes, (BACB, 2022) treatment for those diagnosed with ASD is the most common application of ABA (BACB, 2022). In fact, ABA has been recognized as an essential and effective treatment for the management of behaviors and education of those diagnosed with ASD (Simpson, 2001). Foxx (2008) cites the effectiveness of ABA therapy in the treatment of individuals with ASD over other non-evidence-based interventions. Foxx (2008) goes on to explain how the use of non-behavioral interventions have disastrous effects when used in place of behavior analytic

interventions. Not only are the interventions used in behavior analytic protocol effective, but they are also considered essential in the treatment of individuals with ASD in need of long term, positive behavior change (Simpson, 2001). Yu et al. (2020) cites literature comparing common behavior analytic procedures such as discrete trial training (DTT), Picture Exchange Communication System (PECS), and the Early Start Denver Model (ESDM). Yu and colleagues systematically evaluated the effectiveness of interventions for participants in a meta-analysis. The conclusions of the Yu et al. (2020) meta-analysis found that each of the above-mentioned interventions (e.g., PECS, ESDM) were successful in increasing participant socialization, communication, and expressive language skills. Additionally, Yu et al. (2020) stated that ABA-based interventions were found to be beneficial to the lifelong development for children with ASD when participants were exposed to these interventions in a comprehensive and intensive manner per the Virués-Ortega (2010) study. Virués-Ortega (2010) found that long-term and intensive ABA therapy was successful in creating socially significant positive behavior changes for individuals with ASD who previously were deficient in essential skills such as language and social skill development.

ABA therapy for individuals with ASD focuses partially on the evaluation of functions of behavior emitted by an individual and subsequently determining a function of the behavior (Lewis et al., 2015) as well as encouraging independence when teaching for skill acquisition by introducing prompt-fading procedures (Cengher et al., 2017). ABA programs require a detailed description of any factors that may be influencing the individual’s behavior which may include medical or biological factors (e.g., medications or comorbid diagnoses; Fernandes & Amato, 2013). Likewise, Klintwall et al. (2011) states that there is a connection between the therapeutic outcomes for a client depending on the practitioner's level of allegiance to treatment fidelity and

principles of ABA. If there is no buy in to fidelity of treatment, there will likely be a disruption in the client's progress because of the integral role treatment fidelity plays in treatment.
In addition to behavior reduction, skill acquisition is of equal importance and social significance.

A common method of achieving both aims is to use a differential reinforcement procedure (Vladescu & Kodak, 2010). Differential reinforcement procedures are useful in encouraging independent responses while in the process of skill acquisition (Vladescu & Kodak, 2010). Although skill acquisition often requires the assistance of a variety of prompts while teaching new skills, introducing prompt fading procedures assist with encouraging independence and reducing excessive prompt dependence (Cengher et al., 2015). Skill acquisition occurs when fluency begins to occur and the development of new skills are acquired, mastered, and generalized to all environments (Cengher et al., 2015).

Assessments, such as FBAs, can be utilized in the beginning stages of developing individualized treatment for a learner under the care of ABA professionals such as a Board Certified Behavior Analysts (BCBA). Evidence-based assessment tools like the Verbal Behavior Milestones Assessment Placement Program (VB-MAPP) or the Assessment of Functional Living Skills (AFLS) assist in evaluating skill deficiencies or excesses in the learner's skills before implementing any interventions or behavior change models (Dixon et al., 2014). ABA therapy related to individuals with ASD typically takes place in a home setting, a clinic or center-based setting, or a school setting (Dixon et al., 2016). A client will be under the direct care of professional-level consultant (e.g., BCBA) and, in some cases, will have one or more direct service providers (e.g., behavior technicians) implementing the treatment under consistent supervision of a consultant overseeing the case. BCBAs implementing the care and treatment for those with ASD adhere to the BACB Code of Ethics (2022) which assists in ensuring that

interventions that are put into effect for a client are evidence-based, adhere to the seven dimensions of ABA Baer et al. (1987) and create positive behavior changes that are socially significant to the client and their stakeholders (Leaf et al., 2021).

Early Intervention

Historically, early intensive behavioral intervention (EIBI) is one of the most recommended and used behavior-analytic interventions for children with ASD (Reichow et al., 2012). EIBI has been proven to be much more effective in the treatment of maladaptive behaviors as well as increasing skill acquisition in children when intensity and frequency of ABA services (e.g., Eldevik et al., 2012) along with beginning services during the first three to five years of a child's life when compared to traditional special education services (Peters-Scheffer et al., 2011). Peters-Scheffer et al. (2011) found that an average of 12.5 to 38.6 hours of ABA therapy a week was instrumental in the progress and success children make in ABA therapy. Notably, the authors also found that participants who maintained 10 or fewer hours of ABA therapy made less progress in their therapy goals. According to Eldevik et al. (2011), there is an association between the intensity of therapeutic services and positive outcomes such as significant accomplishments in behavior change, communication, and socialization. Additionally, when measuring the effects of EIBI on children as young as 24 months, research has found effectiveness in behavior and skill changes in areas such as communication, motor skills, and social-emotional skills in a classroom setting when the child underwent at least 30 hours of ABA therapy per week for at least 2 years (Vietze & Lax, 2018). This level of participation in ABA therapeutic services is considered "comprehensive" ABA treatment (The Council of Autism Service Providers [CASP], 2020). EIBI also conforms to ABA's overarching requirement to intervene on socially significant skills (Matson & Smith, 2008). Socially

significant behaviors are worked into a client's programming from the onset of treatment to ensure the most effective and intensive intervention necessary for that client to gain independence with skills (Matson & Smith, 2008). Overall, data is still evolving to show the most appropriate age to begin EIBI (Reichow et al., 2012); however, the consensus thus far is showing effective treatment outcomes when therapy begins at the earliest stages of ASD diagnosis (Reichow et al., 2012). Although there are many procedures utilized in EIBI, several specific procedures related to responsiveness in treatment are notable, such as compliance training. In comparison to comprehensive ABA treatment, "focused" ABA treatment differs slightly. Focused ABA treatment would benefit those who need intervention on fewer, or less severe behaviors (CASP, 2020). Some learners may benefit from fewer hours despite the "traditional" EIBI pathway literature. Vietze & Lax (2018) cites Lovass (1987) which found that children who received 10 hours of ABA therapy a week (as opposed to the traditional comprehensive model consisting of 40 hours of ABA therapy a week) were reported to have no significant differences. Vietze & Lax (2018) goes on to say that although it is better and common practice to begin EIBI as early as possible, there is simply not enough data to support this claim.

Compliance Training

Compliance is defined as an individual following through with or successfully completing a task that has been presented to them within a reasonable and/or previously determined amount of time (Schoen, 1983). Alternatively, noncompliance is the direct refusal to follow previously stated directions within an appropriate amount of time and/or in the presence of maladaptive behaviors (Fischetti et al., 2012). Compliance training is an essential part of ABA therapy (Russo et al., 1981) and lends itself to the effectiveness of treatment when implemented ethically (Rosenberg & Schwartz, 2018). Although client autonomy, consent, and assent are held

to a high priority, client safety is also equally as important (Rosenberg & Schwartz, 2018); therefore, compliance training should not be used as a tool for complete control over the client's behavior in a way that supersedes their own choices and independence (Frank-Crawford et al., 2021). As an intervention, compliance training should be used as a tool in maintaining client safety as well as allowing the client to acquire skills such as tolerating non-preferred activities (Killu,1999). Monitoring the effects of compliance training on individuals receiving ABA services is extremely important to avoid potential exploitation. According to Sandoval-Norton et al., (2019), individuals with disabilities have been reported to fall victim to sexual abuse at almost three times the rate as those without disabilities. Behavior analysts have an ethical obligation to ensure that compliance training is only used in circumstances that warrant such behavior (e.g., teaching an individual to comply to an adult saying, "Stop!" before crossing a busy street) while simultaneously programming for self-advocacy skills (Leadbitter et al., 2021).

As previously stated, compliance training has its place in ABA when it comes to concepts such as health and safety (Leadbitter et al., 2021). But a growing body of research has suggested practitioners focus more on *cooperation* rather than *compliance* (e.g., Liebal et al., 2007). Cooperation may be seen as foundational in the human experience and is believed to be one of the reasons that evolution has created a social human race (Liebal et al., 2007). Furthermore, cooperation allows for motivation to be derived from shared goals and intentions with one's peers. If possible, utilizing cooperative skills rather than resorting to compliance training may be helpful for some learners.

Several behavioral strategies can be used to increase and gain compliance during instruction. For example, a common procedure used to increase compliance in clients with ASD is the Premack Principle or a "first, then" statement (O'Neill, 2014). The Premack Principle

increases the likelihood of compliance via motivation in that a high probability behavior will reinforce the client engaging in a low probability behavior (Mcnamee-Mcgrory & Cipani, 1996). For example, by stating, “First eat your vegetables, then you can have dessert” to a child, the likelihood that they will complete Response A (eating vegetables) to contact the reinforcement of Response B (obtaining dessert) increases substantially. In addition, recognizing “high-p” and “low-p” instructions is extremely useful in establishing instructional control and increasing compliance. In short, high-p (high probability) instructions are those that an individual can complete with ease and very little response effort. Low-p (low probability) instructions can be explained as instructions that do not typically result in compliance or successfully completed tasks by the individual high-p instructions are extremely helpful in gaining behavior momentum, or gradually priming the client to complete more difficult instructions (Zuluaga & Normand, 2008).

Another interesting aspect of compliance training is the language we use when teaching compliance. For example, rather than using negative phrases or saying, “Stop that!” or “Don’t,” using positive phrases (e.g., “Great job keeping your feet on the floor,” “hands to your side”) is a much more effective way of teaching compliant behavior (Neef et al., 1983). By using a statement prompting a client with the correct behavior, they can contact reinforcement with less response effort and are more likely to comply (Neef et al., 1983). Despite the varied procedures that can be implemented to increase compliance, research suggests a critical aspect is the individualization of treatment.

Fischetti et al. (2012) examined the effects of an array of procedures to establish stable compliance in individuals with ASD. The procedures (i.e., reduction in response effort, differential reinforcement, and guided compliance) were compared across 3 participants via a

reversal design. The authors concluded that although each of the treatments varied in the effectiveness for each subject involved in the study (e.g., differential reinforcement more effective for one participant and the reduction in response effort more effective for another participant), each treatment did show positive behavior change in some capacity. For example, one participant responded most effectively (i.e., increased compliance) to a reduction in response effort combined with differential reinforcement and guided compliance. Another participant responded most effectively to differential reinforcement. The third participant responded most effectively to guided compliance and differential reinforcement (Fischetti et al. 2012). Fischetti et al. (2012) further established that treatment should be an individualized process catered to the needs of that specific client, not a definitive one-size-fits-all approach. Additional intervention procedures are also consistently incorporated in ABA treatment and may be alternatives to the use of compliance training.

Functional Communication Training

Another procedure aimed at decreasing problematic behavior and increasing responding to instruction is functional communication training. Functional communication training (FCT) is a procedure during which the function of the client's behavior is hypothesized and reinforcement of an alternative, but functionally equivalent, behavior (Lalli et al., 1995). FCT is a differential reinforcement procedure that allows for an alternative, and more appropriate, response to be emitted by the learner after the maintaining variable or source of reinforcement has been identified (Tiger et al., 2008). Functional communication training can come in several modes such as using vocal or spoken language, an augmentative and alternative communication device (AAC), picture exchange communication system (PECS), American sign language (ASL), or a combination thereof (Tiger et al., 2008). Regardless of the mode of communication the

individual is utilizing, functional communication is key in the elimination of maladaptive behaviors (Fuhrman et al., 2016) because it mitigates the maladaptive behaviors it is being used to replace.

During an FCT procedure, the schedule of reinforcement must be considered. Betz et al. (2013) highlights the use of both dense and lean schedules of reinforcement depending on the need. For example, when first teaching FCT, a dense schedule of reinforcement may be necessary while a lean schedule or beginning to thin the reinforcement is more appropriate as the client nears mastery of their functional responses (Betz et al., 2013). FCT has been named one of the most effective interventions for severe maladaptive behaviors (Tiger et al., 2008). For example, FCT was found to be an appropriate intervention for individuals who engage in behaviors that are maintained by a variety of functions, with some research indicating up to 90% reductions in maladaptive behaviors in learners for which the intervention was implemented (Hagopian et al., 1998).

Similarly, the effects of FCT and different schedules of reinforcement on the frequency of functional language emitted by a learner were observed for clients emitting SIB (Hanley et al., 2001). The results of Hanley et al. (2001) found that high amounts of SIB were observed when reinforcement was withheld until the FCT response was emitted. In this case, the reinforcement was contingent on the problem behavior occurring which unintentionally maintained the SIB. When NCR was paired with FCT, the rates of SIB were greatly reduced as the reinforcement that would otherwise maintain the behavior was available throughout the session. When FCT is used in this context, Hanley noted that his research has shown that the use of NCR paired with gradually increasing the schedules of reinforcement has increased the functional use of FCT. In short, by decreasing the individual's ability to contact reinforcement during each occasion of

FCT, it became more realistic or functional to a real-life scenario where reinforcement will not be available in every social setting (Hanley et al., 2001).

Noncontingent Reinforcement

Noncontingent reinforcement (NCR) can be defined as delivering reinforcement on a fixed schedule regardless of the behavior emitted by the individual (Holden, 2005). Alternatively, contingent reinforcement requires an individual to emit a desired behavior to contact reinforcement (Goh et al., 2000). The effectiveness of NCR occurs because it weakens the response-reinforcement contingency for the individual by allowing the individual to contact reinforcement consistently and independent of appropriate or inappropriate behavior (Fisher et al., 2000). Ultimately, the goal of NCR is to maintain reinforcement even when the targeted appropriate behavior is not emitted, allowing the individual to contact reinforcement regardless of whether they are engaging in desired behaviors (Lindberg et al., 2003). Holden (2005) states that one of the reasons for the effectiveness of NCR reducing maladaptive behaviors is due to satiation and habituation because of a dense schedule of reinforcement. However, if NCR is used on a lean schedule of reinforcement, extinction is more likely to cause behavior change (Holden, 2005). NCR uses different schedules of reinforcement that are independent of the function of the behavior that is being targeted. Reinforcement schedules are important because NCR is a "time sensitive" or time based in its delivery of reinforcement (Carr et al., 2000). However, it is also important to note that NCR is most effective when used in the maintenance of behavior rather than the acquisition of a skill (Hagopian et al., 1994). Some researchers argue that NCR is also helpful with the reduction of maladaptive behaviors if implemented correctly (Lalli et al., 1997).

Purpose

The purpose of the present study was to determine the effects of three common (but

fundamentally different) treatment protocols that are used to target behaviors for skill acquisition and positive behavior changes for maladaptive behaviors. The purpose of this study was to examine the effects that compliance training, FCT, and NCR have on client skill acquisition rates and occurrences of maladaptive behavior during EIBI with young children diagnosed with ASD in a clinic-based setting. The three interventions were compared using a multielement design to determine which, if any, were the most effective in achieving the goals of this research.

CHAPTER 2

METHODOLOGY

Participants and Recruitment

Inclusion criteria for participants included the following: 1) had a diagnosis of ASD, 2) were between the ages of 3-6 years, 3) engaged in maladaptive behaviors specifically for escape (as identified during informed consent/intake procedures) and 4) attended ABA therapy sessions at least three days per week. Individuals who could complete one-word FCT requests with or without an AAC device also met inclusion criteria for this study. However, potential participants who had FCT procedures specific to escape maintained behavior in their current active treatment/intervention plan were excluded from the study. Potential participants that were observed to engage in high-intensity and/or dangerous escape-maintained behaviors (e.g., escape-maintained self-injury, elopement from the building) were excluded from this study.

Parents at a small center-based program were contacted via email by administrative staff for initial recruitment and an in-person (or virtual) meeting were available to explain information regarding their child's participation in this study. Informed consent occurred during the in-person or virtual meeting. A second researcher was an RBT at the center-based program where participants were recruited and conducted data collection and research trial implementation to provide both the participant's typical EIBI services and implement the three intervention strategies (see below).

Participant Assent

Participant assent was attained prior to every research session and was monitored closely throughout the session. To obtain assent, the researcher approached the participant and told them (in language individualized to the participant) it was time for a research session. The researcher

then told the participant which activity the participant would be completing (see procedures below related to S^Ds to indicate which research condition will be occurring, e.g., "It is time for a research session, we are going to play the purple game" while showing the participant a purple token board). Assent was confirmed by the participant by walking to the research area in the absence of major problematic behaviors or by indicating "yes" in some way (e.g., PECS, vocally). If assent was not given (or major problematic behaviors occurred, such as elopement or tantrums), the participant was redirected to a neutral activity before attempting to gain assent once more after at least 5 minutes had elapsed. If assent was declined a second time, the participant was not required to participate in research sessions until the following day.

Safety Information

To ensure that client safety was a priority, foam mats were located near the research area in all research sessions in the event of self-injurious behaviors. Additionally, all research materials that could have posed a risk in the event of a high-intensity behavior were removed from the research area (see training procedures). Participant and researcher safety was monitored on a session-to-session basis. If high-intensity problematic behaviors (or self-injury) occurred during research sessions, study procedures were followed (unless safety could not be maintained, in which case the session was terminated) and a determination of continued participation was made prior to additional research sessions. Discontinuation of study participation was based on the level of problem behavior displayed by the participant, the ability for the researcher to maintain safety, and previous displays of problematic behaviors by the participant during typical treatment sessions. Informed consent procedures were clear for parents/caregivers to indicate the potential for their child to engage in high-intensity problematic behaviors. No participants were discharged from the study due to high intensity problematic behaviors.

Settings and Materials

All research sessions were completed during participant's typical direct ABA therapy sessions in a center-based setting, in a quiet room. The room contained child-sized tables, chairs, and shelving. The participant's typical therapy materials and reinforcers were in a bin and brought into the room to use as needed. Participant therapy materials were specific to their plan of care/treatment plan and included individualized reinforcers. The materials that were used for research sessions were unique to the study and were not utilized in any way outside of research sessions.

Research materials included flashcards that are approximately 3x5 inches in size with pictures of arbitrary images. The images shown on the cards portrayed arbitrary images that the participant had no prior learning history with, as evidenced by 0% accuracy on probes (see Appendix B for an example stimulus). A token economy was also used during designated research sessions (i.e., FCT, compliance training) as a source of reinforcement. The token economy materials was determined by the participant's schedule of reinforcement per their regular treatment services and the schedule of reinforcement for all participants was an FR 1 per token, with five tokens for a break (e.g., four high-p responses followed by one low-p response such that the low-p response produced the terminal token). No other individuals were present during research sessions. Three token boards were used to signal changes in the condition of the study and served as discriminative stimuli. Each token board was structured in the same way (based on the participants typical token economy) but each condition was assigned a different color board (i.e., blue = compliance training; red = FCT; green = NCR; see experimental design).

Experimental Design

A multi-element design is regularly used to compare the effects of at least two

independent variables (Hains & Baer, 1989). A multi-element experimental design was used and consisted of alternating compliance training, FCT, and NCR (see procedures below). Additionally, multi-element designs can reliably alternate independent variables rapidly (Hains, 1991), allowing the evaluation of multiple treatment conditions without requiring an extensive period of time in each condition. Interferences noted in some multi-element research designs are alternation effects, sequence effects, and carryover effects (Miller et al., 1981). Alternation and sequence effects occur due to the rate of alternating variables that occur in a specific order and the order of condition presentation (Miller et al., 1981). This was addressed in two ways. First, conditions were alternated in random order. Second, a "break" period of natural environment teaching (NET) of 15 minutes between conditions was implemented. Lastly, carryover effects (Miller et al., 1981) were addressed by implementing stimulus signals (see Settings and Materials) that assisted in the participants distinguishing between conditions.

The dependent variables for the present study were child rate of responding to low-probability and high-probability trials during research sessions (primary DV), and percentage of trials with problem behaviors during low-probability and high-probability (secondary DV; specific to each client and related to an escape function).

Procedures

Training

Training for the second researcher assisting with sessions preceded any implementation of baseline or intervention conditions. A series of training sessions took place during which study procedures and materials were reviewed with the second researcher. The researcher was trained on how to arrange the environment, to obtain an attending response before placing a instruction, to implement the schedule of reinforcement, and to collect data and implement the

intervention conditions across research sessions. A behavioral skills training (BST) approach was used to train the second researcher on the procedures of the present study. Mastery criteria during training required the second research to implement the entire procedure without any errors over three consecutive practice sessions. Additional training was available if deemed necessary, but this need did not arise. Although potential participants who emit dangerous behaviors were excluded from the study (see participants and recruitment), the second researcher could have received additional safety training if deemed necessary. See the treatment fidelity checklist in Appendix A for information related to the components trained.

Preassessment

Before baseline or interventions were implemented with participants, a preassessment period occurred. A list of the participant's mastered targets was reviewed prior to beginning research to determine their skill level. Additionally, all research targets were individualized to the participant to best fit their specific abilities (e.g., receptive versus expressive communication targets, matching). The function of specific behaviors was reviewed and behaviors occurring for escape were placed into data collection. An FCT response was individualized to the participant's communication level (see FCT below). Any considerations on compliance training and NCR were also reviewed during preassessment.

Baseline

During baseline, no compliance training, FCT, or NCR procedures were utilized. Participants were required to engage in instructional trials with study materials. Bland social praise was used for on task behavior and tokens on a neutral-colored token board were delivered for attending/on-task behaviors (and not attempts to respond or accuracy) in order to access a break of 30 s. Breaks were delivered following the receipt of five tokens, with each token being

delivered on an FR1 schedule. Following the 30 s break, high-p instructions resumed (four high-p) followed by one low-p instruction (for the final token). If problem behavior occurred, a gentle redirection was provided to the participant to prompt on-task behavior. Following an appropriate attending response, the participant was immediately given a token to reinforce on-task behavior. Data was collected during problem behavior.

All dependent variables were measured during baseline. The baseline condition continued until stable data or on a countertherapeutic trend was evident in the participant's rate of responding (and not for rates of problem behavior). The average rate per minute of problem behavior was used to determine the noncontingent reinforcement schedule (NCR; see below). The time frame was approximately 50% of calculated seconds between instances of problem behavior to ensure consistent reinforcement during the NCR condition. For example, if a participant engaged in four instances of targeted problem behavior per minute (an average of once every 15 seconds), the NCR schedule was set at reinforcement delivery on a FI 7 s schedule of reinforcement.

Intervention

The intervention condition consisted of alternating FCT, NCR, and CT procedures in random order. During research sessions, participants were taken, with their therapy materials, into the quiet room. Following a preference assessment, participants were required to engage in instructional trials as outlined below in each condition. A NET session (no data collection) occurred for 15 min following each research session. Following the 15-min NET session, another research session was conducted. Each research session lasted 10 min. The sequence of research session and then NET session occurred throughout the participants' typical treatment session. High-p instructions consisted of previously mastered skills from the participants existing

treatment plan (as identified during preassessment) that the participant could complete with little to no instruction. After presenting three-to-five high-p instructions, the research assistant or researcher then presented a low-p instruction (i.e., an instruction using the arbitrary stimuli).

Intervention 1: Functional Communication Training. The FCT condition consisted of the researcher placing three-to-four high-p instructions on the client, followed by a low-p-instruction. An FCT response (i.e., mand for escape) was available to, and/or in view of, the participant via a visual support or cue card or a verbal prompt (e.g., "Remember, if you want to stop, tell me by touching /giving me/ grabbing this card," while pointing to the card). The participant had the opportunity to request escape and was permitted to leave the table for 30 s before continuing with instructions. If the participant did not provide an FCT response and instead engaged in problem behavior, the researcher physically or verbally prompted the participant to engage in the FCT response, and then permitted the participant to leave the table for 30 s.

Intervention 2: Noncontingent Reinforcement. NCR consisted of reinforcement (i.e., escape) being delivered on a fixed interval schedule customized for each participant based on baseline data findings. For example, the participant was provided 30 s of escape alternated with 15 s of work time on a fixed schedule. In total, three-to-four high-p instruction were provided followed by one low-p instruction consistently throughout the research session. If problem behavior occurred during this intervention, the NCR procedure continued as planned by providing escape on a predetermined schedule based on participant baseline data.

Intervention 3: Compliance Training. Compliance training consisted of the researcher placing three-to-four high-p instructions on the client, followed by a low-p instruction. Following the completion of low-p instruction, the client was given access to the reinforcer for up to 30 s.

This process continued for the duration of the research session. If the participant engaged in problem behaviors or noncompliance, the researcher followed compliance training procedures. First, after problem behavior ended, the participant was prompted to complete instructions and the S^D was presented until compliance had been established. Then, after the participant stopped engaging in the behavior for at least 5 s, the researcher placed high-p instructions in order to gain behavioral momentum. This step was then followed by the original low-p instruction.

CHAPTER 3

RESULTS

Participants

Three children were recruited for the present study. Participant 1 was a 4-year-old African American male diagnosed with ASD. At the time of the present study, Participant 1 was enrolled in ABA therapy services for 30 hours a week at the research site prior to being recruited for participation. Participant 1's caregivers expressed interest in the study due to their child's, at times, high-intensity escape-maintained behaviors. Participant 1's problem behaviors included elopement, whining, crying, physical aggression, property destruction, and dropping weight. Participant 2 was a 3-year-old Hispanic female diagnosed with ASD. At the time of the present study, Participant 2 was enrolled in ABA therapy services for 25 hours a week at the research site prior to being recruited for participation. Participant 2's caregiver's expressed interest in the study with some concern over their child's behaviors, namely dropping weight and physical aggression. Participant 2's other behaviors included elopement, whining, crying, physical aggression, property destruction, and dropping weight. Participant 3 was a 3-year-old Hispanic male diagnosed with ASD. At the time of the present study, Participant 3 was enrolled in ABA therapy services for 22 hours a week at the research site prior to being recruited for participation. Participant 3's caregivers expressed interest in the study due to their child's escape-maintained behaviors that they see most often in the home setting. Participant 3's problem behaviors included elopement, whining, crying, physical aggression, property destruction, and dropping weight. Each participant's behaviors were closely monitored throughout the study to ensure that the interventions being implemented during research were not adversely affecting the participants in any way. Assent was obtained before beginning any research sessions and closely

monitored during the entirety of each research session as well.

Intake and Preassessment

During the intake process, a review of previously mastered skills also took place during this time. The preassessment period took place immediately after determining a list of mastered skills that could be utilized for behavior momentum trials as well as high-p trials during research sessions. Based on reports of previously mastered skills, a series of targets were probed with each participant to select effective targets to be used during high-p trials in intervention.

Baseline

As previously mentioned, no instruction, prompts, or reinforcement were present during the baseline phase. Baseline data was collected to provide information on the level of responding and problem behavior in the absence of active intervention. Additionally, baseline provided an opportunity for participants to adjust to the arrangement of the study as it was outside their typical routine. Baseline data are presented in each graph for each participant (see Figure 1-4). During baseline, Participant 1 had an average rate of 0.02 responses with compliance in low-p and 1.56 responses with compliance in high-p (see Figure 1 Panel 1 and Figure 2 Panel 1, respectively), and their average percentage of trials with problem behavior were 100% for low-p and 17% for high-p (see Figures 3 and 4 Panel 1 respectively). During baseline, Participant 2 had an average rate of 0.3 responses with compliance in low-p and 1.62 responses with compliance in high-p (see Figure 1 Panel 2 and Figure 2 Panel 2respectively), and their average percentage of trials with problem behavior were 82% for low-p and 23% for high-p (see Figure 3 Panel 2 and Figure 4 Panel 2 respectively). During baseline, Participant 3 had an average rate of 0.84 responses with compliance in low-p and 1.7 responses with compliance in high-p (see Figure 1 Panel 3 and Figure 2 Panel 3and their average percentage of trials with problem behavior were

43% for low-p and 8% for high-p (see Figure 3 Panel 2 and Figure 4 Panel 3, respectively).

Noncontingent Reinforcement Calculations

The average rate of responses per minute for Participant 1 during baseline trials was 2.1 with the average time between instances of problem behavior at 118.6 seconds. The NCR condition was arranged such that reinforcement occurred every 56.8 seconds (approximately 50% of calculated baseline seconds). The average rate of responses per minute for Participant 2 during baseline trials was 1.4 with the average time between instances of problem behavior at 79.0 seconds. The NCR condition was arranged such that reinforcement occurred every 37.0 seconds (approximately 50% of calculated baseline seconds). The average rate of responses per minute for Participant 3 during baseline trials was .8 with the average time between instances of problem behavior at 41.8 seconds. The noncontingent reinforcement condition was arranged such that reinforcement occurred every 18.4 seconds (approximately 50% of calculated baseline seconds).

Participant 1

Data for Participant 1 are displayed in Figures 1-4 (Panel 1 in each figure), which include the FCT, NCR, and CT data. During low-p trials, the average rate of responses with compliance was 0.34 during FCT, 0.24 during NCR, and 0.14 during CT (Figures 1-2, Panel 1). The highest rates of trials with compliance overall were observed in the FCT condition. Data began to differentiate by session 16, with FCT and NCR following similar upward trends and CT having a downward trend (indicating lower rates of responding, comparatively). During high-p trials, the average rate of responses with compliance was 2.54 during FCT, 1.81 during NCR, and 1.54 during CT (Figures 1-2, Panel 1). The highest rates of trials with compliance overall were observed in the FCT condition. Data began to differentiate by session 18, with FCT and NCR

following similar upward trends and CT having a downward trend (indicating lower rates of responding, comparatively).

During low-p trials, the average percentage of problem behavior was, 10% during FCT, 18% during NCR, and 32% during CT (Figures 3-4, Panel 1). The highest levels of problem behavior were observed during the CT condition. Data began to differentiate by session 20, with FCT and NCR following similar downward trends and CT having an upward trend (indicating higher percentages of problem behavior, comparatively). During high-p trials, the average percentage of problem behavior was, 60% during FCT, 56% during NCR, and 78% during CT (Figures 3-4, Panel 1). The highest levels of problem behavior were observed during the CT condition. Data began to differentiate by session 13, with FCT and NCR following similar downward trends and CT having an upward trend (indicating higher percentages of problem behavior, comparatively).

Participant 2

Data for Participant 2 are displayed in Figures 1-4 (Panel 2 in each figure), which include the FCT, NCR, and CT data. During low-p trials, the average rate of responses with compliance was 0.55 during FCT, 0.54 during NCR, and 0.19 during CT (Figures 1-2, Panel 2). The highest rates of trials with compliance overall were observed in the FCT condition. Data began to differentiate by session 17, with FCT and NCR following similar upward trends and CT having a downward trend (indicating lower rates of responding, comparatively). During high-p trials, the average rate of responses with compliance was 2.89 during FCT, 2.99 during NCR, and 1.77 during CT, (Figures 1-2, Panel 2). The highest rates of trials with compliance overall were observed in the FCT condition. Data began to differentiate by session 18, with FCT and NCR following similar upward trends and CT having a downward trend (indicating lower rates of

responding, comparatively).

During low-p trials, the average percentage of problem behavior was, 45% during FCT, 27% during NCR, and 64% during CT (Figures 3-4, Panel 2). The highest levels of problem behavior were observed during the CT condition. Data began to differentiate by session 17, with FCT and NCR following similar downward trends and CT having an upward trend (indicating higher percentages of problem behavior, comparatively). During high-p trials, the average percentage of problem behavior was, 12% during FCT, 16% during NCR, and 19% during CT (Figures 3-4, Panel 2). The highest levels of problem behavior were observed during the CT condition. Data began to differentiate by session 20, with FCT and NCR following similar downward trends and CT having an upward trend (indicating higher percentages of problem behavior, comparatively).

Participant 3

Data for Participant 3 are displayed in Figures 1-4 (Panel 3 in each figure), which include the FCT, NCR, and CT data. During low-p trials, the average rate of responses with compliance was 0.49 during FCT, 0.52 during NCR, and 0.31 during CT (Figures 1-2, Panel 3). The highest rates of trials with compliance overall were observed in the NCR condition. Data began to differentiate by session 23, with FCT and NCR following similar upward trends and CT having a downward trend (indicating lower rates of responding, comparatively). During high-p trials, the average rate of responses with compliance was 2.76 during FCT, 2.70 during NCR, and 2.01 during CT, (Figures 1-2, Panel 3). The highest rates of trials with compliance overall were observed in the FCT condition. Data began to differentiate by session 23, with FCT and NCR following similar upward trends and CT having a downward trend (indicating lower rates of responding, comparatively).

During low-p trials, the average percentage of problem behavior was, 45% during FCT, 27% during NCR, and 64% during CT (Figures 3-4, Panel 3). The highest levels of problem behavior were observed during the CT condition. Data began to differentiate by session 17, with FCT and NCR following similar downward trends and CT having an upward trend (indicating higher percentages of problem behavior, comparatively). During high-p trials, the average percentage of problem behavior was, 42% during FCT, 31% during NCR, and 43% during CT (Figures 3-4, Panel 3). The highest levels of problem behavior were observed during the CT condition. Data began to differentiate by session 26, with FCT and NCR following similar downward trends and CT having an upward trend (indicating higher percentages of problem behavior, comparatively).

CHAPTER 4

DISCUSSION

The purpose of the present study was to determine the effects of three different treatment protocols on increasing skill acquisition and decreasing challenging behaviors for children in EIBI services. Compliance training, an intervention based on following through with instructions and waiting out problem behaviors that might occur following a instruction (Schoen, 1983) was chosen as a condition for this study because of its typical use in treatment services commonly when teaching safety skills (Rosenberg & Schwartz, 2018). It was important to include in the present study to determine if the results encouraged or discouraged the use of compliance training based on the overall outcomes of the treatment and the outcomes of other common treatments (e.g., FCT, NCR). Specifically, the present study sought to investigate if the use of compliance training has a powerful impact on the skill acquisition and behavior reduction which negates the potential risks. Given the availability of varied interventions and procedures, it is imperative to continue to identify which procedures produce fast and efficient outcomes, while also minimizing the short and long-term risks to participants.

Behavior-analytic interventions have been noted to be effective in the treatment and maintenance of maladaptive behaviors and increasing skill acquisition (Simpson, 2001). The conditions used for the present study have been modeled after three well-known and widely used and accepted interventions used in ABA practices (Russo et al., 1981). However, despite the acceptance of compliance training procedures, one of the purposes of this study was to determine which of the interventions used can be implemented with clients and yield the best outcomes (i.e., increased rates of responding, decreased problem behavior). Due to the participants of the present study having been identified to engage in escape-maintained behaviors, the three

conditions chosen for this study were appropriate to address these behaviors (Lewis et al., 2015).

Condition one, CT, was selected as a condition in the present study to compare the effects between two other very different interventions. In this case, CT was presented by the researcher waiting out the occasion of problem behaviors when they did occur. The researcher did find that due to the nature of escape-maintained behaviors, this was potentially reinforcing for some participants. This could be an interesting comparison for future research if these results were compared to results of a CT condition utilizing the continued presentation of instruction, thereby not allowing potential reinforcement. Throughout this study, the data demonstrated that the CT condition was the least effective at creating positive behavior change in the form of increased rates of responding to low-p and high-p targets as well as the reduction of escape-maintained problem behaviors emitted by the participants during instructional trials. More specifically, Figures 6 demonstrates that the CT condition consistently provided the lowest rate of responses (top panel) and the highest percentage of escape-maintained problem behaviors (bottom panel) across all three participants. Overall, the CT condition was the least effective for all three participants.

FCT and NCR are examples of interventions practitioners may utilize when delivering services to a client, which typically range from 12-38 hours of therapy per week (Peters-Scheffer et al. 2011), when dealing with escape-maintained problem behavior. FCT is not only important as an intervention to reinforce appropriate, functionally equivalent replacement behaviors but it also allows for practitioners to encourage larger verbal repertoires for the client (Lalli et al., 1995). As FCT begins to reduce maladaptive behaviors, the opportunity for higher skill acquisition becomes more abundant. Indeed, the data demonstrate that FCT was the most effective intervention for two of the three participants, with rates of both low-p and high-p being

highest in the FCT condition for Participants 1 and 2. FCT was concluded to be successful in creating consistent positive behavior change in all of the participants. Figure 6 summarizes the data and shows a higher rate of responses during low-p trials (top panel) when compared to conditions one and three. Additionally, the rate of problem behaviors that occurred during FCT were much lower compared to CT and NCR (Figure 6, bottom panel).

Similar to FCT, NCR is another important intervention that can be implemented regardless of behaviors the individual may be emitting at that time (Holden, 2005). The initial NCR schedule of reinforcement was determined by observing the five baseline trials conducted with each participant at the beginning of the research portion of the study. The NCR schedule was set to approximately 50% of the baseline levels of problem behavior. It is important to note that the NCR schedule was set quite low to ensure consistent reinforcement during the intervention trials. It is important for clinicians to consider the applications of shorter work times in favor of a denser schedule of reinforcement. Future research could investigate NCR rates at different lengths when evaluating rate of responding versus problematic behavior for an NCR schedule. NCR has been used to aid in the reduction of problem behaviors (Lalli et al., 1997), and the present data demonstrate reductions in problem behavior as well. Specifically, the data demonstrate that NCR was the most effective intervention for one of the three participants, with rates of both low-p and high-p being highest in the NCR condition for Participant 3. NCR was concluded to be successful in creating positive behavior change in all of the participants. See Figure 6 for a comparison of rates of responding (top panel) and percentage of problem behavior (bottom panel) across all three participants.

Limitations

Limitations to the present study included, first and foremost, a lack of reliable IOA and

treatment fidelity data (see Tables 1-2 for the limited IOA and Treatment Fidelity data). Although IOA and treatment fidelity data was collected for approximately 12% of all research sessions per participant, there was not an acceptable amount of data collected per participant, per dependent variable to be considered accurate and reliable. According to Cooper et al., (2020), IOA data allows for the reliability of measurement to be assessed. Moreover, IOA allows for the reliability of data to be confirmed therefore increasing the confidence in the accuracy of the data (Cooper et al., 2020). As shown in Table 1, IOA data was not collected for an acceptable percentage of sessions to be considered accurate, valid, or reliable. Likewise, treatment fidelity or integrity is defined as the extent of which procedures are followed and implemented as they have been written and operationally defined (Cooper et al., 2020). In similar fashion, treatment fidelity was not evaluated for an acceptable percentage of sessions to be considered accurate, valid, or reliable (see Table 2). This greatly limits the ability of the present study to confirm that the research assistant did, in fact, implement all procedures correctly. Due to this limitation, data from this study should be interpreted with caution as it cannot be reliably verified through IOA or treatment fidelity data. Another notable limitation was a lack of diversity in the research pool of potential participants. Many individuals at the research site were around similar ages, diagnoses, and emit similar behaviors at times. Due to this, participants with more diverse qualities were difficult to recruit. However, the participants that did take part in the present study fit well within the inclusion criteria set prior to beginning any research and yielded informative results. A second limitation was time constraints placed on this project. If given additional time to run trials with the participants or to expand to a wider pool of participants, results of the present study could have been further established. Additional time spent on this project could have allowed for the instructions for each of the conditions to be examined more intensely as

research data progressed allowing for a more natural evolution of instructional trials with the present participants. The third limitation of this study was the amount of time spent directly with the research assistant to conduct training sessions and answer questions. Although the research assistant was found to be well-versed in ABA terminology and procedures, the intricacies in this project were susceptible to error if not thoroughly reviewed and practiced.

Future Research Opportunities

Although this study was effective in providing evidence towards finding/investigating effective intervention for skill acquisition and behavior reduction, results should be interpreted with caution (given the lack of IOA and treatment fidelity) and there are some opportunities for future research that are apparent. Direct replication of the procedures with stricter adherence to IOA and treatment fidelity guidelines would ensure that the results of the present study are, in fact, accurate and representative of the effectiveness of the procedures used in this study. Additionally, assessing participant assent and consent before beginning research trials was found to be difficult as all participants had limited verbal behavior repertoires and additional methods at discrimination and preference would be beneficial. Although the conditions used during this study were not much different than the participant's typical ABA therapy programming (excluding compliance training), it is still important to ensure that the participants understood the activities that they would be taking part in as well as understanding that they could decline to participate at any time without penalty. In the future, additional inclusion criteria would be beneficial in ensuring that the participants had a basic knowledge of core words and their meanings such as yes, no, all done, and help.

Furthermore, research could evaluate the onset/offset and duration of escape-maintained behaviors emitted by the participants. There was often a longer period of time that elapsed

between the onset and offset of the behavior before being able to continue with the research trials and some problem behavior may have decreased the actual number of minutes provided during instructional trials. Problem behavior occasionally delayed research trials until the participants were able attend to the trials being conducted. As time went on, problem behaviors became less frequent during FCT and NCR while CT resulted in a higher level of problem behaviors. Due to the nature of this study, it was hypothesized that some problem behavior would occur. Because this was an anticipated behavior, behavior plans were in place in regular treatment sessions and the behavior plans were used if higher intensity behaviors did occur. Future research could probe shorter research trials compared to longer research trials. If a participant responded more appropriately (i.e., fewer instances of high intensity problem behaviors) to shorter durations of attending to research trials, this could have been implemented.

Conclusion

The results from this study helped to provide additional evidence supporting the use of FCT and NCR interventions for both skill acquisition and behavior reduction. This information is essential in providing the best possible care and teaching procedures for any individual engaged in EIBI services. Applied behavior analysis is an ever-evolving science, and professionals, such as BCBAs, who utilize this science every day rely on the ongoing research designed to improve the interventions. As ABA continues to grow and branch into treatment areas outside of ABA, it is imperative that the field continues to evolve to provide the best possible care. The present study helps to provide that support by identifying the effectiveness of various interventions.

CHAPTER 5

SUMMARY, CONCLUSION, RECOMMENDATION

Functional communication training was the most effective at creating positive behavior change. During the study, evidence was found to determine that CT is not as effective in creating positive behavior change in both skill acquisition and problem behavior. The recommendation following the completion of this study is for practitioners that FCT and NCR will create positive behavior changes with individuals that share similarities such as age, diagnoses, behaviors, and skills, though results should be interpreted with caution. Future research will provide more information on other demographics that may benefit from this treatment package as well as any other environments. In conclusion, this study provided much needed information on the use of compliance training versus the use of other behavior change interventions.

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APPENDIX A

Treatment Fidelity

Name:	Start time:
Date:	End time:

TREATMENT FIDELITY TASK ANALYSIS	
Set Up	
	+, -, N/A
1. Research assistant prepares all research materials for research session.	
2. Research assistant reviews requirements for the scheduled research session.	
3. Research assistant pairs with client during first 5 minutes of the session.	
4. Research assistant initiates correct condition for the client based on the data.	
5. Checks for participant assent	
Compliance Training	
	+, -, N/A
6. Research assistant identifies reinforcer	
7. Research assistant prepares compliance training specific materials (token board)	
8. Research assistant has an attending response from participant.	
9. Research assistant begins teaching procedures (receptive ID, tacting, etc.)	
10. Research assistant correctly implements compliance training procedures	
11. Research assistant accurately records data	
12. Research assistant correctly implements CT specific error correction procedures	
13. Research assistant correctly implements BIP for problem behaviors	
FCT	
	+, -, N/A
14. Research assistant identifies reinforcer	
15. Research assistant prepares FCT specific materials (token board)	
16. Research assistant has an attending response from participant.	
17. Research assistant correctly implements FCT procedures	
18. Research assistant accurately records data	
19. Research assistant correctly implements FCT specific error correction procedures	
20. Research assistant correctly implements BIP for problem behaviors	
NCR	
	+, -, N/A
21. Identifies reinforcer	
22. Research assistant prepares NCR specific materials (token board)	
23. Research assistant has an attending response from participant.	
24. Research assistant correctly implements NCR procedures	
25. Research assistant accurately records data	
26. Research assistant utilizes high-p and low-p demands as appropriate	
27. Research assistant correctly implements NCR specific error correction procedures	
28. Research assistant correctly implements BIP for problem behaviors	
NET	
	+, -, N/A
29. Research assistant contrives naturalistic teaching opportunities	
Clean Up	
	+, -, N/A
30. Research assistant notifies participant that the research session has ended	
31. Research assistant puts all research materials in their designated area	
32. Research assistant reports all findings directly to lead researcher	
33. Research assistant securely stores all data, participant information, etc.	

APPENDIX B

Data Collection Forms

Compliance Training: During CT, first present 3-5 high-p demands. These are demands you know the participant is able to complete independently. Then, present the research stimuli. During baseline, no instruction will occur. During intervention, utilize most to least prompting in the event of an error. Scoring will consist of a + for a correct response, - for an incorrect response, and *NR* for no response (see scoring page for more detail). Indicate the prompt level used. 5 trials will be run per token board on an FR1 schedule of reinforcement. If low or moderate intensity maladaptive behaviors occur, the behavior will be waited out and the demand will be re-presented contingent on an attending response.

Date/Time	**Session #**	**Circle One**	**Problem Behavior** **Circle one** ***Yes / No*** ***Indicate bx (e.g., crying, elopement, etc.)***	**Low Probability Trials** **+/-** ***Indicate prompt level used***	**High Probability Trials** **+/-** ***Indicate prompt level used***	**# of reinforcers delivered for 30 seconds + total time in reinforcement**
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching Expressive ID	***Yes / No***			
		Receptive ID Matching	***Yes / No***			

Data collection form for compliance training condition

Functional Communication Training: During FCT, first present 3-5 high-p demands. These are demands you know the participant is able to complete independently. Then, present the research stimuli. During baseline, no instruction will occur. During intervention, utilize most to least prompting in the event of an error. Scoring will consist of a + for a correct response, - for an incorrect response, and ***NR*** for no response (see scoring page for more detail). Indicate the prompt level used. 5 trials will be run per token board on an FR1 schedule of reinforcement. A visual support cue will be placed near the work table in clear view. If the participant selects the visual support, this will be considered a mand and they will be given a 30 second break away from the table. Following this break, re-present the original demand. Repeat this process until all trials have been completed.

Date/Time	Session #	Circle One	Problem Behavior Circle one *Yes / No* *Indicate bx (e.g., crying, elopement, etc.)*	Low Probability Trials +/- *Indicate prompt level used*	High Probability Trials +/- *Indicate prompt level used*	# of mands for escape + total time spent on break
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			

Data collection form for functional communication training condition

Non-Contingent Reinforcement: During NCR, first present 3-5 high-p demands. These are demands you know the participant is able to complete independently. Then, present the research stimuli. An FI30s schedule of reinforcement will be followed by allowing the participant to leave the work table every 30 seconds. After coming back to the table, begin placing demands using the last used prompt level. During baseline, no instruction will occur. During intervention, utilize most to least prompting in the event of an error. Scoring will consist of a + for a correct response, - for an incorrect response, and ***NR*** for no response (see scoring page for more detail). Indicate the prompt level used. 5 trials will be run per token board on an FR1 schedule of reinforcement.

Date/Time	Session #	Circle One	Problem Behavior Circle one *Yes / No* *Indicate bx (e.g., crying, elopement, etc.)*	Low Probability Trials +/- *Indicate prompt level used*	High Probability Trials +/- *Indicate prompt level used*	# of mands for escape + total time spent on break
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			
		Receptive ID Matching Expressive ID	*Yes / No*			

Data collection form for non-contingent reinforcement condition

APPENDIX C

Inter-Observer Agreement Forms

Observer 1:
Observer 2:
Date:
Interval Length:

Interval	Observer 1 Data	Observer 2 data	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

TABLES

Table 1. IOA data for Participants 1-3 including all dependent variables.

	Session #	Rate of Low-P Trials	Percentage of Low-P Problem Behaviors	Rate of High-P Trials	Percentage of High-P Problem Behaviors
Participant 1	22		100		
	36			95.833	
	24			100	
	31				97.06
	21	100			
Participant 2	43		100		
	48		100		
	8			100	
	23				100
	44	100			
	30				100
Participant 3	44		100		
	49		100		
	8			100	
	27				98.11
	9	100			
	21	100			

Table 2. Treatment fidelity data for Participants 1-3.

Treatment Fidelity Scores	
	Score
Participant 1	100
	100
	96
	100
	100
	100
Participant 2	100
	100
	100
	100
	100
	100
Participant 3	96
	100
	100
	100
	100
	100

FIGURES

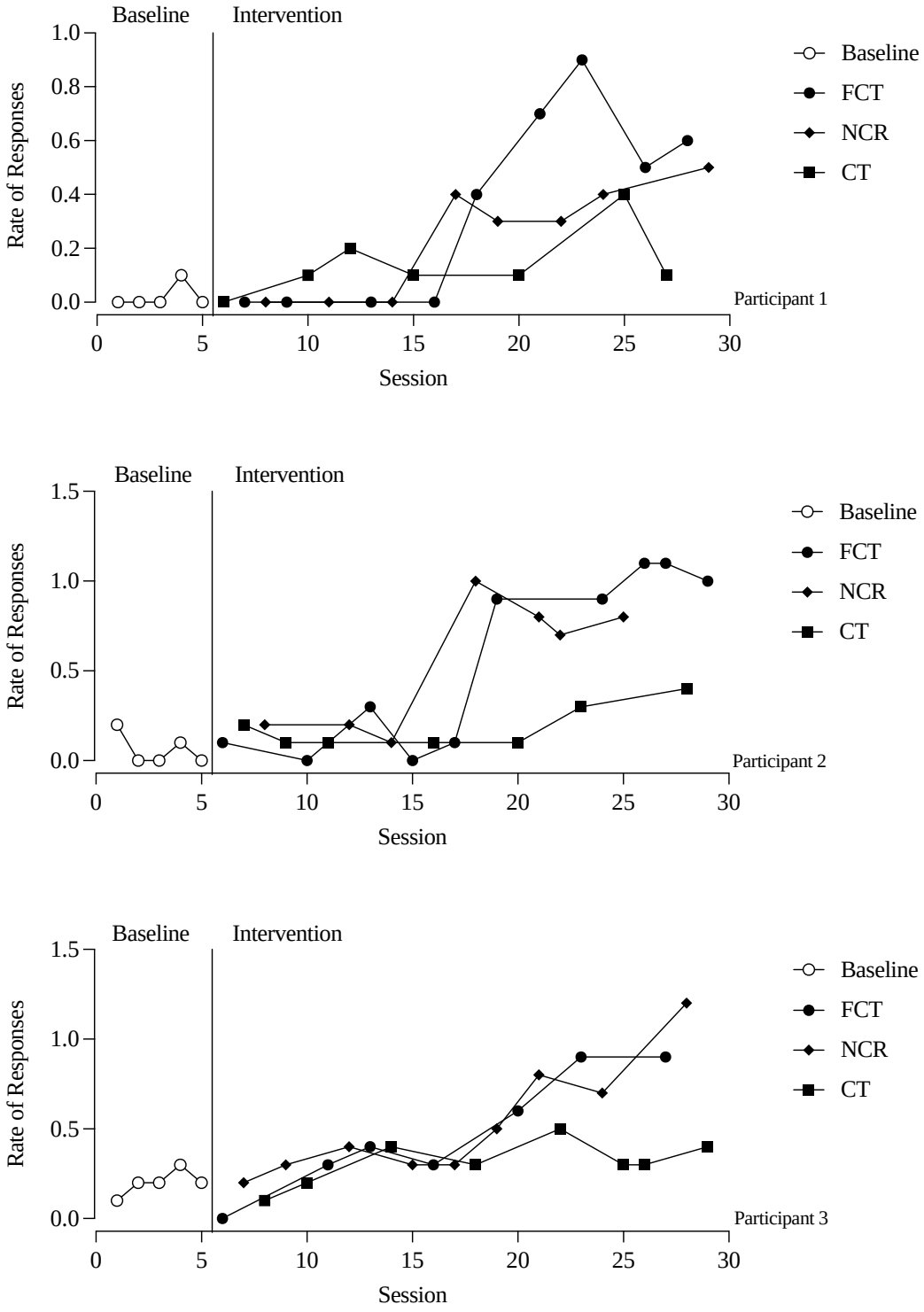

Figure 1. Rate of low-p trials with compliance for Participants 1-3.

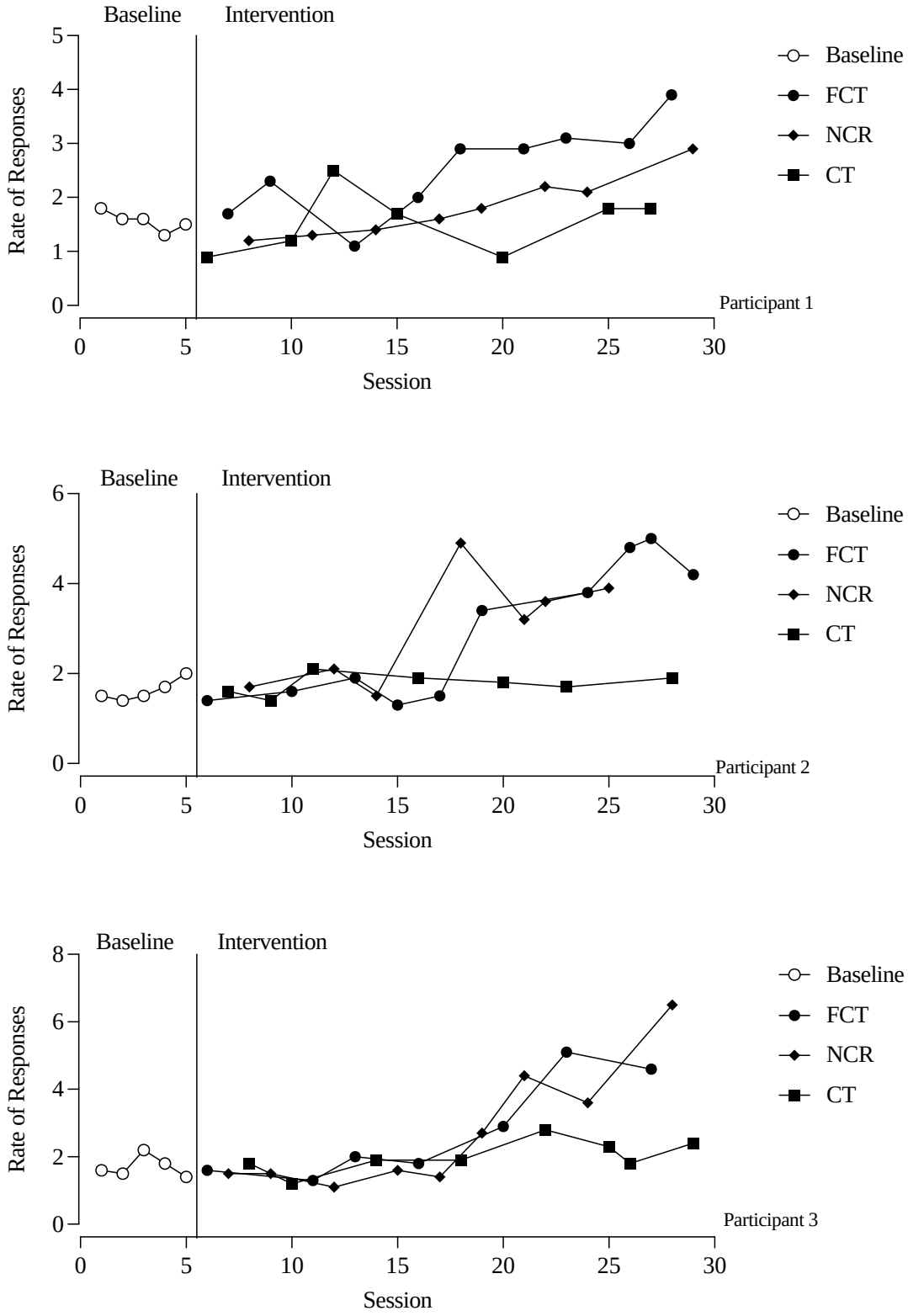

Figure 2. Rate of high-p trials with compliance for Participants 1-3.

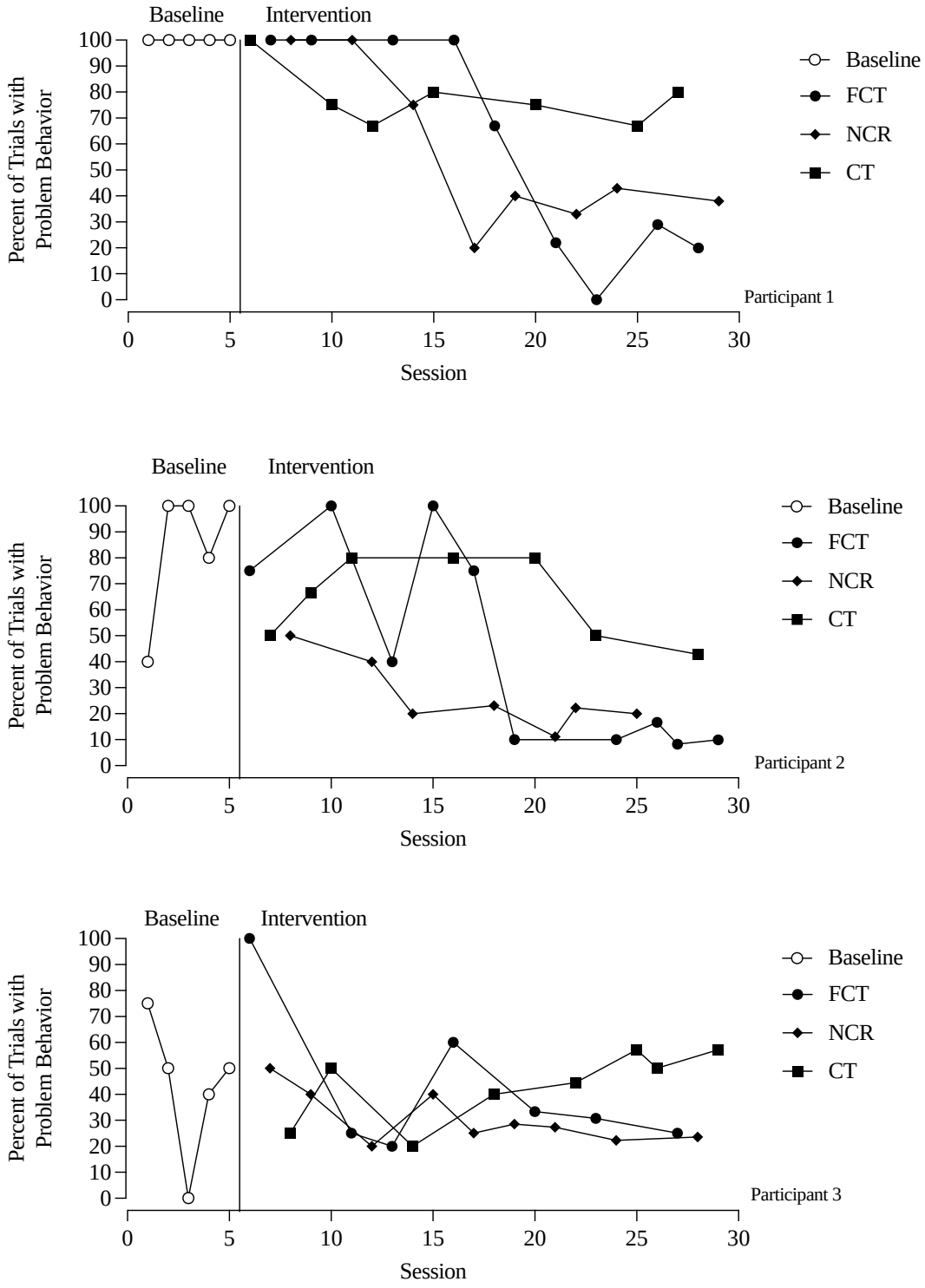

Figure 3. Percentage of low-p trials with problem behavior for Participants 1-3.

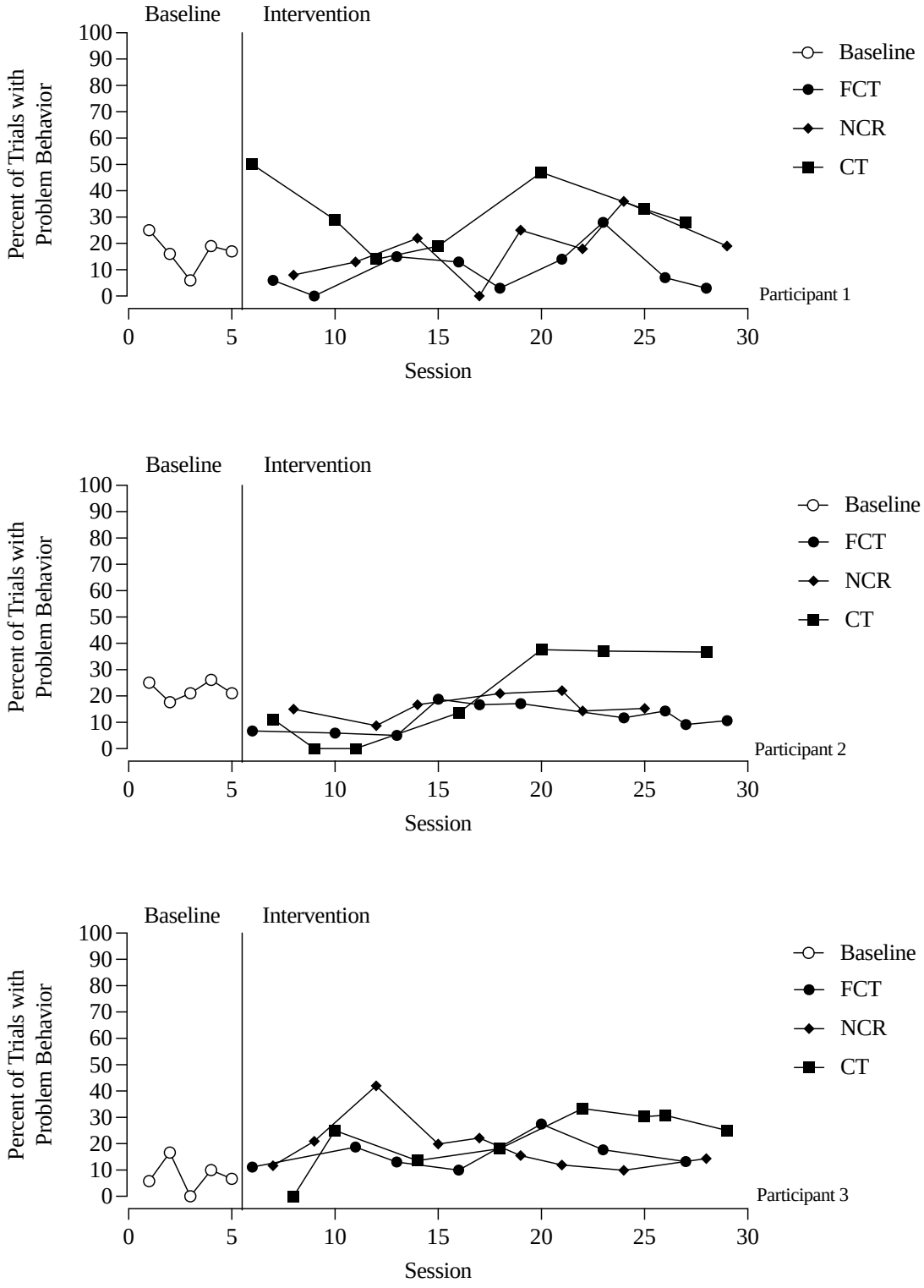

Figure 4. Percentage of high-p trials with problem behavior for Participants 1-3.

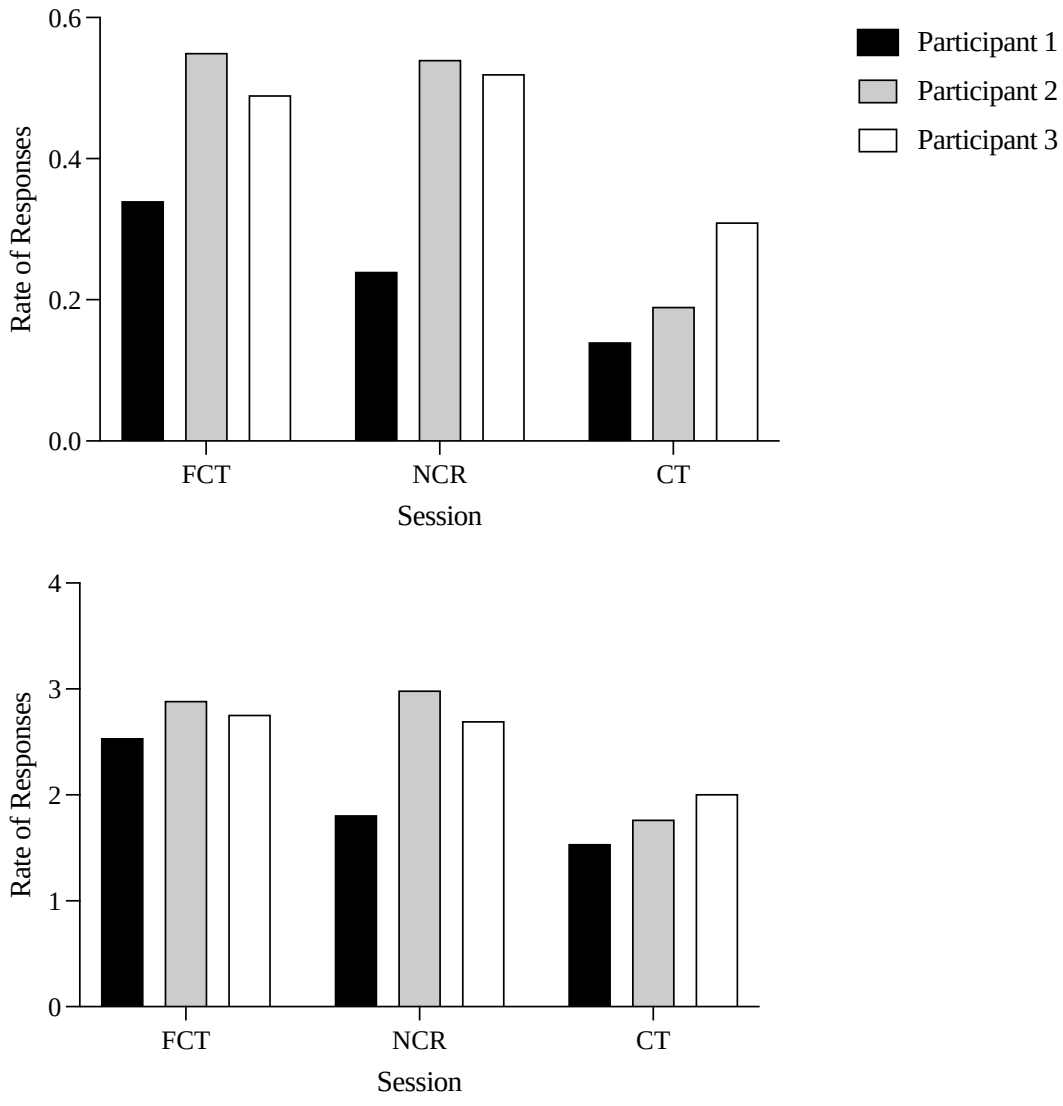

Figure 5. Rate summaries for low-p and high-p trials for Participants 1-3.

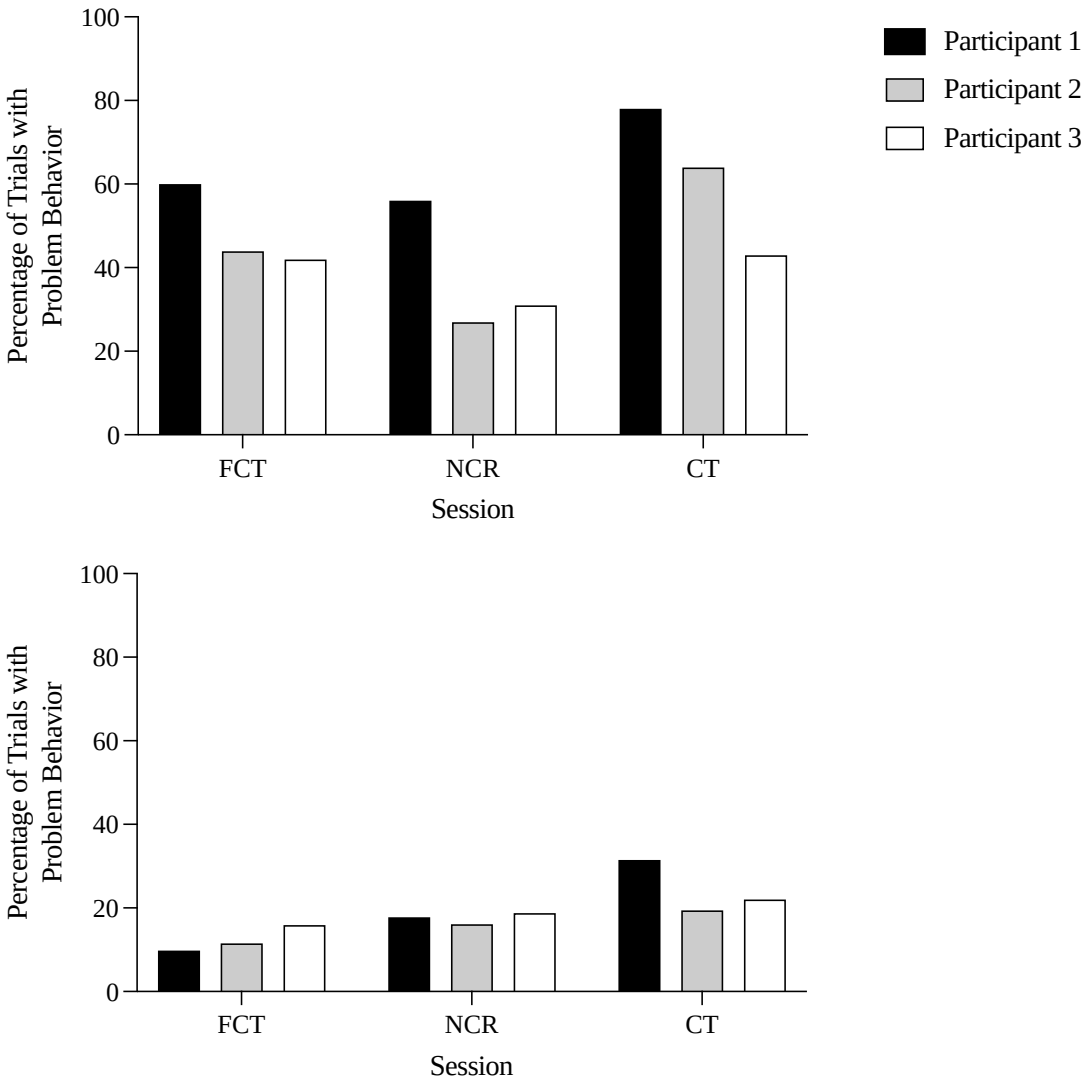

Figure 6. Percentage of problem behavior summaries for low-p and high-p trials for Participants 1-3.

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Research Paper Title:
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Major Professor: Dr. Paige S. Boydston