

University of Denver

Digital Commons @ DU

Graduate School of Professional Psychology:
Doctoral Papers and Masters Projects

Graduate School of Professional Psychology

6-21-2016

Relational Frame Theory: Implications for Training Perspective-Taking and Empathy in Children with High Functioning Autism

Lyssa Haase

Follow this and additional works at: https://digitalcommons.du.edu/capstone_masters



Part of the [Developmental Psychology Commons](#), and the [Health Psychology Commons](#)

Recommended Citation

Haase, Lyssa, "Relational Frame Theory: Implications for Training Perspective-Taking and Empathy in Children with High Functioning Autism" (2016). *Graduate School of Professional Psychology: Doctoral Papers and Masters Projects*. 207.

https://digitalcommons.du.edu/capstone_masters/207

This Capstone is brought to you for free and open access by the Graduate School of Professional Psychology at Digital Commons @ DU. It has been accepted for inclusion in Graduate School of Professional Psychology: Doctoral Papers and Masters Projects by an authorized administrator of Digital Commons @ DU. For more information, please contact jennifer.cox@du.edu, dig-commons@du.edu.

Relational Frame Theory: Implications for Training Perspective-Taking and Empathy in Children with High Functioning Autism

Abstract

Perspective-taking involves the ability to shift one's visual-spatial and affective stance relative to contextual cues. Empathy responses leading to socio-emotional reciprocity depend intimately on perspective-taking processes. Deficits in perspective-taking have been widely documented in individuals with Autism Spectrum Disorders (ASD), and are commonly regarded to underlie impaired interpersonal functioning in this population. The most widely used frameworks for understanding ASD derive from a cognitive science program called Theory of Mind (ToM), and from an applied behavior analytic program based on Operant Theory (OT). Recent research interest has centered on a contemporary contextual behavior analytic approach to perspective taking drawing upon Relational Frame Theory (RFT), with explicit focus on deictic relational frame training. This paper suggests that perspective-taking training leading to the development of elaborated deictic framing abilities may offer an advantage over existing modes of intervention for training perspective-taking, empathy, and ultimately improving quality of life among individuals with ASD.

Document Type

Capstone

Degree Name

Psy.D.

Department

Graduate School of Professional Psychology

First Advisor

John McNeill

Second Advisor

Fernand Lubuguin

Third Advisor

James Langley

Keywords

Relational Frame Theory, Perspective-taking, Prosocial responsiveness, Empathy, Autism spectrum disorder

Subject Categories

Developmental Psychology | Health Psychology | Psychology

Publication Statement

Copyright is held by the author. User is responsible for all copyright compliance.


Relational Frame Theory: Implications for Training Perspective-Taking and Empathy in
Children with High Functioning Autism

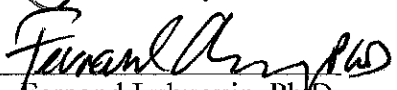
A DOCTORAL PAPER
PRESENTED TO THE FACULTY OF THE
GRADUATE SCHOOL OF PROFESSIONAL PSYCHOLOGY
OFFICE OF GRADUATE STUDIES
UNIVERSITY OF DENVER

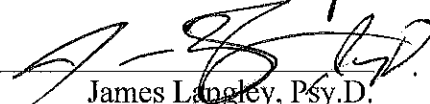
IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE
DOCTOR OF PSYCHOLOGY

BY
LYSSA HAASE, M.A.
JUNE 21, 2016

APPROVED:


John McNeill, Psy.D., Chair


Fernand Lubuguin, Ph.D.


James Langley, Psy.D.

Abstract

Perspective-taking involves the ability to shift one's visual-spatial and affective stance relative to contextual cues. Empathy responses leading to socio-emotional reciprocity depend intimately on perspective-taking processes. Deficits in perspective-taking have been widely documented in individuals with Autism Spectrum Disorders (ASD), and are commonly regarded to underlie impaired interpersonal functioning in this population. The most widely used frameworks for understanding ASD derive from a cognitive science program called Theory of Mind (ToM), and from an applied behavior analytic program based on Operant Theory (OT). Recent research interest has centered on a contemporary contextual behavior analytic approach to perspective-taking drawing upon Relational Frame Theory (RFT), with explicit focus on deictic relational frame training. This paper suggests that perspective-taking training leading to the development of elaborated deictic framing abilities may offer an advantage over existing modes of intervention for training perspective-taking, empathy, and ultimately improving quality of life among individuals with ASD.

Keywords: Relational Frame Theory, perspective-taking, prosocial responsiveness, empathy, autism spectrum disorder

Relational Frame Theory: Implications for Training Perspective-Taking and Empathy in Children with High Functioning Autism

Autism Spectrum Disorders (ASD) represent a range of neurodevelopmental disorders that are often diagnosed in childhood and are characterized by persistent prosocial behavioral and verbal expressive deficits, as well as restricted, repetitive behaviors or interests. These prosocial deficits result in a difficulty in socio-emotional reciprocity or use of nonverbal communication (American Psychiatric Association, 2013). Without the ability to share thoughts and feelings with others and understand another's perspective, it is difficult to develop and sustain constructive and meaningful interpersonal relationships. Historically, the poor prognosis of children with ASD has presented significant challenges for clinicians, educators, families, and the community at large (Koegel, Koegel, Shoshan, & McNeerney, 1999).

Prosocial Deficits in Autism Spectrum Disorders

Children diagnosed with ASD display behavioral impairments in prosocial functioning. Although individual presentations differ across children, all show some degree of stunted interpersonal functioning (APA, 2013). Research has consistently shown that children with ASD display lower levels of direct and imaginative play, fewer prosocial interactions overall, and generally lack reciprocal engagement with others (Scheeren, Koot, & Begeer, 2012). These children are also observed to lack appropriate nonverbal communication and struggle to communicate effectively with others. Children with ASD often lack an awareness of suitable social behavior, and frequently have difficulty attending to or recognizing social cues from others or the environment. They also appear to lack an ability to generate novel responses in

social situations (Mouchiroud & Bernoussi, 2008), and display lower initiation in joint attention and shared enjoyment, as well as less concern for distress in others.

Characteristics and Implications of Prosocial Deficit

Expressed difficulties identifying, understanding, and relating to another's emotional state has significant implications for one's prosocial responsiveness. In fact, the social deficits observed in children with ASD, including their lack of empathy, have been suggested to result from a deficit in perspective-taking abilities. Perspective-taking and empathy are two interrelated processes; the first of which reflects a cognitive skill and the latter an emotional capacity.

Perspective-taking process. The perspective-taking process involves the ability to shift one's visual-spatial and affective stance relative to contextual cues. Socially considered, perspective-taking allows one to understand and effectively respond to another person's psychological perspective, most importantly the socio-emotional patterns of thoughts and feelings experienced by the other. It is therefore essential that one understands and acknowledges that other people have unique characteristics, and accordingly, that they may anticipate and experience situations differently than oneself. Difficulty with perspective-taking leading to impaired prosocial behavior and muted empathetic regard for others are hallmark features of ASD. In a study by Dawson and Fernald (1987), perspective-taking abilities in children with ASD were found to be related to both the quality of prosocial responding, as well as the severity of symptoms of autism. Further, they found that perspective-taking ability was a better predictor of the quality of social skills than receptive vocabulary or nonverbal intelligence (Dawson & Fernald, 1987). In fact, deficits in perspective-taking ability are often thought to be the basis of the social deficits children with ASD exhibit. Children with ASD have difficulty

shifting perspectives to accurately interpret what someone else may be thinking or feeling (Baron-Cohen, 2001). This deficit has a profound impact on a child's peer interactions and social competence.

Two general forms of perspective-taking are distinguished in the literature. *Cognitive perspective-taking* reflects the ability to discern how things are experienced from another person's point of view. Cognitive perspective-taking includes taking into account how another individual perceives and knows about an object or event. It involves incorporating another person's perspective into one's own experience (Hinnant & O'Brien, 2007). Accordingly, cognitive perspective-taking is frequently conceptualized as the ability to accurately attend, recognize, and infer the thoughts of other individuals. There is an emphasis on a cognitive understanding of others in order to interpret, attribute, and predict their behavior (Gould, Tarbox, O'Hora, Noone, & Bergstrom, 2011).

In contrast, *affective perspective-taking* represents the ability to identify with and understand how someone else is feeling (Oswald, 1996). By taking another person's point of view, one is in a more advantageous position to understand that person's emotional reaction in response to an event. While cognitive perspective-taking involves understanding another person's perceptual perspective or cognitive frame of reference, affective perspective-taking involves understanding another's feelings and desires (Hinnant & O'Brien, 2007). This is tantamount to understanding the complex social world from one's own perspective, while simultaneously showing or experiencing empathetic regard for those others living in it. Adequate affective perspective-taking skills allow a more accurate empathetic response by being able to take into consideration the feelings and wants of another person. Further, it has been

hypothesized that cognitive and affective perspective-taking work in concert to produce empathetic emotional responses, which improves the quality of social interactions.

Empathy. Empathy plays an integral role in social interactions and understanding, and is defined as the ability to understand and share another's emotions (Schwenck et al., 2014). Baron-Cohen and Wheelwright (2004) suggest that empathy encourages the understanding of the intentions of others. This allows for the prediction of another person's behavior, in addition to experiencing an emotion in response to their emotion. Empathy allows us to interact effectively with others in the social world, and is thought to underlie important social behaviors, such as social sensitivity and affectively attuned communication that is responsive to another person's emotional state. Empathetic attunement increases connection and adds depth to social interactions and interpersonal relationships. Unfortunately, children diagnosed with ASD demonstrate difficulty in the ability to empathize (Baron-Cohen & Wheelwright, 2004), leading to functional impairments in social contexts of action.

Complexities. Empathy is a complex experience and has been historically difficult to define. Many researchers suggest both a cognitive and affective component to an empathetic response. Cognitive empathy has been considered as the awareness and understanding of another's emotion, or more simply, perspective-taking. Affective empathy refers to the emotional response that is consistent with the affective state of another, which often results in a shared emotional experience. Cognitive empathy occurs when one is able to identify what another person is thinking or feeling, but does not necessarily connect at an affective level with that feeling. While affective empathy is evident in early childhood, cognitive perspective-taking ability is thought to increase with age (Van der Graff et al., 2014). When an individual is able to recognize and understand another's perspective, including their emotional state, the empathetic

response to that person is enhanced. As a contextually-regulated response, empathy depends highly on situational cues that help guide accurate reflection of another's current feeling states. Thus, awareness and context-sensitivity are crucial to the development of flexible empathetic responding in the moment.

To summarize, perspective-taking and empathy have considerable impact on the quality of social interactions and development of relationships. In fact, a positive relationship between perspective-taking ability, empathy, and interpersonal functioning have been widely documented in the research literature. Affective perspective-taking has also been linked to the quality of peer interactions (Travis et al., 2001). Deficits in perspective-taking are associated with higher levels of social withdrawal, and more difficulty in social interactions (Dawson & Fernald, 1987). Being able to take the perspective of another person and connect with their emotional state contribute importantly to one's prosocial responsiveness in interpersonal contexts of action.

Adding to the account, children diagnosed with ASD specifically show significant deficits in cognitive perspective-taking. Literature suggests that those with ASD have difficulty understanding the perspective of another individual, which influences the way they respond to others, such as when other people are in distress. Interestingly, although children with ASD show deficits in cognitive perspective-taking, they appear to have intact affective perspective-taking abilities (Jones, Happé, Gilbert, Burnett, and Viding, 2010). This finding suggests that, while children with ASD are capable of empathy, its overt expression may be muted due to perspective-taking impairments (Schwenck et al., 2012). This finding leads to an intriguing possibility, that remedying perspective-taking deficits may help foster overt expression of empathy responses in children with ASD. Additionally, the ability to flexibly transfer and generalize these abilities to social contexts of action should logically help foster deeper, more

meaningful interpersonal connection with peers and family relations, and thereby improve overall social functioning. A sole focus on training perspective-taking repertoires rests on the assumption that children with ASD do in fact have intact empathy abilities available to them, but currently remain unexpressed.

Statement of Problem

Difficulty with perspective-taking leading to a deficit in empathy responding is one of several pivotal behavioral features of Autism Spectrum Disorders (ASD). Perspective-taking involves the ability to infer and adopt another person's psychological perspective, most importantly the patterns of thoughts and feelings experienced by the other. Prosocial responding, of which perspective-taking and empathetic responding play an important part, represent an elaborated, multi-layered behavioral process under the control of contextual discriminations. However, while the ability to infer another's psychological perspective is necessary for constructive social interaction and discourse, it is not sufficient. Something more is needed, specifically the explicit behavioral rehearsal of highly flexible response topographies across multiple contexts of social interaction. Core to this training is the development of a deictic relational distinction involving I-YOU.

Currently, however, perspective-taking process is not being adequately addressed by the fields of cognitive science or applied behavior analysis. Given this problem, it is suggested that Relational Frame Theory (RFT), a contextual behavioral approach to language and cognition, might offer a new framework for understanding and treating perspective-taking deficits in ASD populations through deictic relational training. If effective, deictic relational training could supplement early intensive behavioral treatment programs currently in use.

Thus, the current paper proposes the use of a multiple exemplar teaching model for explicitly training flexible and attuned perspective-taking abilities aimed at improving empathy responses and overall prosocial responsiveness among individuals with high functioning ASD. It is believed that the multiple exemplar training approach offers an advantage over other behavior analytic interventions, in that it is explicitly intended to facilitate transfer and generalization of acquired abilities based on refined contextual discriminations of environmental cues.

Review of Current Programs: Description and Aims

Cognitive Science

Cognitive science is an interdisciplinary field of study focused on the mind, mind-consciousness, and mentalistic formulations. In terms of the cognitive framework, behavior is viewed as expression, indication, or manifestation of representational structures in the mind (e.g., schema); its methodological approach makes use of computer analogues, computational modelling, introspective analysis, and metaphorical extension, and how these operate on the representation structures. Historically, cognitive science has emphasized a strong scientific commitment to the importance of inference-driven explanations and use of the hypothetico-deductive approach to theory development. Accordingly, cognitive science represents a mentalistic approach to psychological science.

Theory of Mind (ToM). An important aspect of being responsive and effective in social interactions is the ability to discriminate and experience the world from other perspectives. Traditionally, the cognitive science approach to perspective-taking has dominated the field. Cognitive science researchers (for example, Baron-Cohen, 1991; Chomsky, 1980, 2007; Meltzoff, 1999; Premack & Woodruff, 1978) regard perspective-taking as a kind of theory of mind (ToM) that develops during the course of typical development. In the model, “mental

states” are representational, meaning they are products of mental representations generated by the mind and according to which behavior is an expression. For example, ToM is concerned with how individuals understand and respond to their intentions, beliefs, and emotions that influence action for oneself and by others (Baron-Cohen, 2001). In short, ToM reflects a conceptual framework for knowing about one’s own mental states and inferring those of another.

Perspective-taking deficits have been shown in individuals with ASD and are considered to lie at the core of the social deficits within these individuals (Dawson & Fernald, 1987). From this approach, these deficits are defined by the individual with autism’s difficulty in attributing mental states to themselves and others, or a deficit in ToM, which results in impairments in communication and social functioning (Frith, Happé, & Siddons, 1994). This notion suggests an important possible point of intervention to improve the social interactions of children with autism.

ToM inspired interventions. ToM researchers have developed methods and tasks to assess the ability of individuals to attribute mental states to themselves and others, and have attempted to train this ability in children with ASD. In a central study by Ozonoff and Miller (1995), adolescents with ASD received instruction in perspective-taking strategies in the context of a social skills training program. While those receiving instruction improved their score on ToM measures, ratings of social skills by parents and teachers showed no improvement (Ozonoff & Miller, 1995). Further, in a similar randomized control trial, children received a 16-week long ToM intervention. Compared to controls, the children who received the intervention showed improvements in conceptual ToM skills, but again, self-reported empathic skills and parent-reports of social behavior for their children showed no improvement overall (Beeger, et al., 2011). Even as the performance on ToM measures of children with ASD improve, limited

transfer and generalization to real-life social interactions have been shown (Fisher & Happe, 2005). The use of multimedia interventions has been used to train the recognition of complex emotions with some success; however, generalization of this skill has not been demonstrated (Golan & Baron-Cohen, 2006). Turner-Brown, Perry, Dichter, Bodfish, and Penn (2008) found during an 18-week long training protocol that while self-report of social functioning improved, along with performance on ToM measures, observer report of social effectiveness in children with ASD did not improve. Moreover, training specific aspects of ToM provides limited transfer effects to other social skill dimensions, including the understanding of emotions and overall social effectiveness (Travis, Sigman, & Ruskin, 2001).

Pragmatically considered, the generalization of ToM inspired training to ASD has been met with limited success (Begeer et al., 2011; Fisher & Happé, 2005; Golan & Baron-Cohen, 2006; Ozonoff & Miller, 1995; Silver & Oaks, 2001; Travis, Sigman, & Ruskin, 2001; Turner & Brown, 2008, to name a few). Additionally, besides its questionable applied utility, several other areas of concern call into question the utility ToM derived frameworks. For example, in line with cognitive science more generally, ToM formulations are (1) inherently essentialistic, nativist, mechanistic, mentalistic, prone to tautological explanation, and lack theoretical parsimony (Palmer & Donahoe, 1992); (2) perpetuate the age-old metaphysical problem of psychophysical mind-body dualism (Skinner, 1985); (3) invoke the use of invented, reified, and “in-principle unobservable” explanatory constructs (e.g., mind, modules, generator of grammars, intentions, and Type II explanatory constructs) (Wilson, 2001, p. 207); (4) transform figurative constructs into literal entities; and, as a result (5) offer limited explanatory power or treatment utility. As a human centered concern, the most critical question to ask is: “How is a researcher or clinical practitioner supposed to intervene on hypothetical properties of mind?”

The Science of Applied Behavior Analysis

The science of applied behavior analysis (ABA) refers to an empirically-based system of principles, methods, and practices based upon the radical behavioral tradition of B. F. Skinner (1938, 1953, 1981). Skinner's concept of "operant" denotes and orients a particular focus (the organism) and field (the environment), or an organism operating in and with its surroundings. An operant class is organized by its functions relative to particular contexts of action. Operant behavior is not defined by its public observability, but rather as an activity (public or private, verbal or nonverbal) of the organism that enters into functional relations with the world (Donahoe & Palmer, 1994). Historically, ABA has emphasized a strong scientific commitment to the importance of data-driven explanations and use of the inductive approach to theory development. Accordingly, ABA represents an empirical, nonmentalistic approach to psychological science with a focus on observation, description, and integration of the data (Chiesa, 1992, 1994).

Operant theory. ABA frameworks stress the role of three conditions in behavioral regulation, including context, action, and consequences of responding. Four primary behavior-consequence relations are defined by contingency analysis, namely positive reinforcement, negative reinforcement, positive punishment, and negative punishment. The former two contingency relations increase the probability of a response, while the latter two decrease the probability of a response.

Contingency relations are investigated through use of a methodology called functional analysis. Functional analysis involves the search for orderly relations among environment-behavior events; it seeks to establish empirical generalizations derived *from* data and accumulative observations rather on the basis of *a priori* theory (i.e., data-driven, not theory-driven) (Chiesa,

1992, 1994). The method of functional analysis relates uniformities and functional dependencies among verbally abstracted features of the observational event-field. The functional analytic unit is expressed in terms of a three-concept contingency sequence, namely an antecedent (A), behavior (B), and consequence (C) relation. More technically, A and C reflect the independent variables in the operant model, specifically those features of the environmental context that are in-principle observable and directly amenable to influence from the outside by a researcher or practitioner. B reflects the dependent variable in the operant model, specifically those features of behavior that are in-principle observable and indirectly amenable to change from the outside by a researcher or practitioner.

Operant inspired interventions. ABA programs are derived on the basis of operant theory. Operant inspired intervention approaches are derived from functional analysis, from which contingency management strategies are employed to influence target behaviors, functions, and relevant contexts of action. In short, contingency management approaches aim to alter those select contingency relations, thereby controlling the consequences of targeted responses or broader patterns of responding. ABA has been used in treatment with children with ASD for more than 45 years (Matson & Smith, 2008), and is perhaps one of the most recognizable and studied approaches. Three common operant derived approaches to the treatment ASD are described below.

Pivotal Response Therapy. Consistent with ABA principles, pivotal response interventions have been used with children with ASD to address their deficits in social and educational functioning. Pivotal response therapy assumes that when the intervention is focused on core parts of functioning, or pivotal areas, widespread impact can be seen on a number of target behaviors. By specifically aiming treatment and improving areas such as motivation,

attending to multiple cues in one's environment, initiation, and self-management, it is believed that generalized improvements in a variety of areas that are not directly receiving intervention are produced (Koegel, Koegel, Harrower, & Carter, 1999). By targeting these pivotal areas, improving social and play skills, and reducing disruptive behaviors is thought to be possible. The goal of pivotal response interventions is to teach children to be responsive in their natural environments in an efficient and effective way. Essentially, rather than focusing on individual target behaviors, focusing on behaviors that have possible collateral impacts on multiple target behaviors is thought to be less time consuming and costly.

A study by Koegel, Koegel, Shoshan, & McNerney (1999), using pivotal response intervention to teach initiation skills in children with ASD, found an increase in the number of spontaneous self-initiations by the children in a social play interaction, as well as exhibiting "appropriate" pragmatic behavior when rated by observers. Studies have specifically focused on examining the number of child responses, amount of disruptive behavior that is exhibited, amount of spontaneous speech, the quality of friendships and peer relationships, and academic improvement. Despite promising results, these studies have often utilized relatively small samples sizes, thus limiting statistical power and generalizability of findings, and have not included perspective-taking as a possible pivotal area of development and intervention (Koegel, Koegel, & Brookman, 2003).

Discrete Trial Training (DTT). Discrete trial training (DTT) is an ABA procedure that focuses on individualized and simplified units of instruction to enhance a child's learning, specifically when teaching new forms of behavior or developing appropriate discriminations between different cues or requests. DTT is often implemented in an one-on-one environment with a specially trained clinician. A discrete trial includes providing a child with a cue,

prompting the child if necessary, waiting for the child's response, and following the response with a consequence. This short process (usually 5-20 seconds long) is then followed by another discrete trial; this DTT "session" continues for two to five minutes followed by a short break before continuing these discrete trial sessions for several hours (Smith, 2001). Although this recommendation is met with controversy, it is usually recommended that children receive between 15 and 40 hours a week of one-on-one DTT for two or more years, with 40 hours a week showing the largest gains.

DTT has been used with children with ASD and is frequently applied and utilized as a part of a comprehensive ABA treatment program. Imitation, receptive language, expressive language, conversation skills, and grammar and syntax are common areas in which DTT has been applied. When used as a part of an ABA treatment program, DTT has demonstrated increases in IQ and a decrease in a need for professional services with children with ASD (Smith, 1999; McEachin, Smith, & Lovaas, 1993). However, several limitations with DTT have also been identified, including the limited transfer and generalization of skills acquired in DTT to other environments, and the significant amount of intensive time and labor required of the children, their families, and clinicians. Effects of discrete trial training across domains appear to be inconsistent throughout research, and the generalization of the improvements and skills gained through ABA appears to be difficult and limited.

Early Intensive Behavioral Interventions (EIBI). Currently, the most widely used treatment methods to address the many symptoms and deficits of ASD are early intensive behavioral interventions (EIBI). These interventions rely on the early identification of ASD, and appear to be the most promising and effective method currently to treat behavioral deficits in this population. EIBI tend to focus on improving the deficits that exist in language, imitation, social

skills, adaptive skills, and academics. They also address challenging behaviors, rituals and repetitive behaviors, and self-injurious behaviors. These specific targets for intervention are broken down into small, discrete components and are typically enhanced using discrete trial training, reinforcement, shaping, extinction, and prompting (Peters-Scheffer, Didden, Korzilius, & Sturmey, 2011).

One of the most directly addressed deficits in EIBIs concerns the expressive aspects of a child with autism's language use, which contribute importantly to the quality of social interactions shown by these individuals. These skills are most often treated intensively and at an early age. One of the more popular and effective models to improve language and communication uses prompts and reinforcers to increase responding to questions, follow directions, differentiate between sounds, and establish relationships between sounds and objects (Matson et al., 2012). Picture Exchange Communication Systems (PECS) have also become more utilized to expand communication skills, especially with children who are unable to communicate through speech.

Communication and socio-emotional reciprocity are critical aspects contributing to effective interpersonal engagement in social contexts of action. These deficits in children with autism also receive considerable attention in EIBI. Deficits of this type are addressed using social stories, which teach a child what to expect and appropriate ways to respond in different scenarios. Modeling, prompting, and reinforcement are also used to improve social skills in these children. The use of video modeling has increased as a way to teach reciprocal pretend play or appropriate peer engagement (Matson et al., 2012). Training nonverbal communication skills is considered an important treatment area to enhance social interactions in children with ASD, particularly those who communicate primarily through nonverbal modes of action.

Research has shown EIBI to be an effective method for addressing functional deficits that characterize ASD. Meta-analyses on the efficacy of EIBI and ABA show some improvement on adaptive behaviors, communication, living skills, and socialization when compared to control groups (Peters-Scheffer, et al., 2011). However, the effect of ABA appears to have the most significant impact on dimensions of intellectual functioning, motor, and functional skills, but less so for communication skills (Ospina et al., 2008).

For the most part, the standard applied behavior analytic treatment modalities for ASD are not currently targeting the development of perspective-taking skills in this group, despite the apparent link between perspective-taking and the social skills deficits characteristic of ASD. While peripheral applications, such as video modeling, have been developed to address the role of social deficits in ASD, these treatments do not appear to promote transfer and generalization of intervention effects to naturalistic settings, and thus do not increase the incremental validity of standard ASD treatment protocols.

Although deficits in perspective-taking ability are widely documented in children with ASD and are thought to lie at the core of social interaction difficulties in this population, research has yet to address this ability, nor empathy responses, in any systematic way among children with ASD. Given the close relationship between perspective-taking abilities and empathetic responding, interventions designed to promote the joint development of both would seem an important addition to current behavior analytic approaches to overall social function in children with ASD. Ultimately, empirical investigations would be required to substantiate this proposition.

Contextual Behavior Science

Contextual behavior science expands upon behavior analysis to emphasize the exploration of the function and meaning of behavior within its context, and posits that behavior cannot be studied effectively without co-regard to the conditions and circumstance giving rise to it (Morris, 1988). Contextualism emphasizes an “act in context,” rather than examining individual parts or responses separate from their surroundings, thus providing a more holistic account of events viewed as a total-working psychological whole process under contextual control (Hayes, Hayes, & Reese, 1988). Importantly, the psychological event is taken to be historically-situated (history-as-context), wherein personal history establishes the motivating operations (meaning and function) of reinforcers and punishers in the moment. Context therefore does not merely refer to location, place, or time but rather to the accumulated history of the individual evolved to the present moment. Pragmatically understood, effective and successful working is regarded as the truth criterion, rather than a correspondence between observation and some absolute truth about the world (Barnes-Holmes, 2000). From this perspective, behavior refers to any and all activity of the individual, including both observable and private events. Private events include acts such as sensing, feeling, imagining, thinking, remembering, and so on, as an integrated, contextually regulated whole.

Relational Frame Theory (RFT). Relational Frame Theory (RFT) is grounded in behavior analysis and provides an account of the complex nature of language and cognition. It provides a description of how humans relate events verbally, and are able to derive the relations and functions of one stimulus to another. RFT utilizes a concept of derived stimulus relations, and a process referred to as arbitrarily applicable relational responding, to characterize verbal behavior (i.e., arbitrary means that any thought-symbol can be used to identify a referent, not that

verbal behavior is applied arbitrarily). RFT provides an empirical and theoretical foundation for language and cognition, and is thought to give rise to processes including perspective-taking (Barnes-Holmes, McHugh, & Barnes-Holmes, 2004). Several key components of RFT are outlined in the sections that follow.

Relational responding. According to RFT, relational responding occurs when one shows a generalized repertoire of responding to one stimulus in terms of another (Stewart & Roche, 2013). One type of responding is referred to as non-arbitrary relational responding, which is responding guided by the physical or formal properties of the stimuli being related (e.g., direct properties such as color, shape, or size) that are not solely dependent on the subjective experience of the properties (“red,” “round,” “small”). Arbitrarily applicable relational responding is based on aspects of the socio-verbal context that define the relation between stimuli. Such relational responding can occur regardless of the formal properties of the stimuli being related, as illustrated by the development of a functionally defined equivalence class. Stewart and Roche (2013) describe this form of relational responding by stating, “What is critical is the provision of multiple exemplars of exposure to differential consequences for responding in accordance with the pattern of functional relations at issue” (p. 59). Multiple exemplar training can strengthen the response to arbitrary contextual cues in the presence of differing topographical and non-arbitrary features. Further, RFT recognizes that language competent humans are capable of deriving new verbal relations between stimuli that have not been directly taught, thereby swiftly expanding the number of relations previously unrelated stimuli in a verbal network.

Relational frames. RFT employs the notion of *relational frame* to describe patterns of arbitrarily applicable relational responding (AARRs). For example, AARRs include frames of

coordination, comparison, distinction, opposition, hierarchy, causation, and deictic, to name a few. Research has suggested that relational framing process can be trained to strengthen them when they are absent or underdeveloped (Stewart & Roche, 2013). All relational frames share three defining properties.

The term *mutual entailment* describes the bidirectional stimulus relation; thus if A is related to B in a particular way, then B is related to A in the reverse. If the first relation is specified, the second complementary relation emerges without explicit training. The specific relations involved can vary (Examples: If @ = at, then at = @; or if $A > B$, then $B < A$).

The term *combinatorial entailment* refers to a stimulus relation in which two or more complementary relations become interrelated; thus if A is related to B in a characteristic way, and B is related to C, then A and C are also related in that context, so that two directly trained relations generate four untrained (derived) relations. Additionally, other derived complementary relations emerge in the process, namely B-A, C-A, and C-B. The specific relations involved can vary (Example: If A is valued more than B and B valued more than C, then A is valued more than C; or if A before B and C before A, then C before B will emerge without explicit training, along with derived complementary relations).

The term *transformation of stimulus functions* refers to a process whereby the motivating operations of a given stimulus alter or transform the function of other complementary stimuli composing the equivalence class in accordance with the derived relation between the two, without explicit training. Thus, given the relation $A < B < C$, when B is associated with a particular motivating operation (i.e., sadness), the other stimuli in the relation take on psychological functions in line with the dimension in play (Example: A will evoke less sadness and C will evoke more sadness than B, respectively).

The three defining properties of relational framing described above are regulated by contextual cues that are provided by social and physical environments. What makes relational framing so relevant to human experience is the ability to transform psychological functions on the basis of contextually-regulated verbal processes. Thus, a functional change imparted to one stimulus member in an equivalence class may alter the other members of the class accordingly, leading to generalization of the psychological function altered.

Deictic Relational Framing

The functional importance of perspective-taking in social contexts has occupied the interest of contextual behavior analytic researchers for some time, though its application to ASD is relatively recent. According to the RFT account, prosocial responsiveness and empathy responses involve a complex set of derived relations generated, at least in part, through perspective-taking, and more specifically, the process of deictic relational framing process (Vilardaga, 2009).

Deictic relational framing activity is considered a prerequisite ability for the development of perspective-taking repertoires. Deictic frames specify a relationship between the perspective of the speaker and other events, and underlie the formation of identity, spatial, and temporal frames of reference (Barnes-Holmes, Barnes-Holmes, & Roche, 2001). Perspective-taking is especially important in situations where other-oriented understanding is functionally useful. Thus, perspective-taking processes help facilitate and guide appropriate other-oriented interactions. It also underlies the development of self-reflective awareness, specifically of the kind that allows one to view a situation or experience from a different location or time, such as from another person's vantage point. As with other forms of generalized operant classes, deictic relational frames are organized by their unique functions in particular contexts of action.

Three frames that are particularly important to the development of a perspective-taking repertoire are I-YOU, HERE-THERE, and NOW-THEN. Although the form of questions and physical environment thought to establish these deictic frames could be very different, the perspective of an individual remains a constant locus upon which the frames are based (Barnes-Homes et al., 2004). A study by Barnes-Holmes et al. (2004) found that deictic relational repertoires appear to follow a developmental trajectory, showing an increase in complexity and functional applicability with age.

Deictic relational framing is also thought to set the foundation for developing empathy responses beyond mere perspective-taking alone. Fundamentally, perspective-taking reflects a particular kind of generalized operant behavioral class involving deictic relational framing processes that can be taught through multiple exemplar training (DeBernardis, Hayes, & Fryling, 2014). Deictic relational framing allows an individual to coordinate their behavior relative to the changing environment, and derive meaning out of interactions with others. Further, a well-developed deictic relational framing repertoire, and thus enhanced perspective-taking ability, can have significant implications for a person's capacity to produce "genuine" empathetic responses (i.e., genuine, as *in* the body first-person immediate, not simply the word or idea alone). As a deictic relational framing repertoire becomes more established, the ability to discriminate the thoughts and feelings and experiences of others may also increase (Vilardaga, Estévez, Levin, & Hayes, 2012). That said, although perspective-taking influences the development of prosocial responsiveness and provides a critical relational distinction (I-YOU) for discriminating another's (YOUR) experience, it may alone be insufficient for arousing congruent affective responses unless the pertinent psychological functions are transformed accordingly in (MY) experience in the process (see Limitations section below).

RFT proposes that deictic relational framing, like other forms of relational responding, is developed, expanded, and maintained through multiple exemplar training environments, such as those occasioned by socio-verbal contexts. Multiple exemplar training is defined in RFT as, “a history of reinforcement for responding in accordance with a range of contextually controlled, arbitrarily applicable relations ... where derived relational responding is established by a history of reinforcement across exemplars” (Hayes, Barnes-Holmes, & Roche, 2001, p. 25–26). Less technically specified, multiple exemplar instruction provides practice with a variety of response topographies (e.g., visual, auditory, tactile, etc.) that are designed to promote the transfer and generalized patterns of responding with sensitivity to momentary contextual cues; for example, contextually-regulated patterns of deictic relational responding involved in flexible perspective-taking.

Without question, perspective-taking is fundamental to the development of constructive and meaningful social relationships. Perspective-taking is not merely a verbal abstraction, nor is it an isolated activity separate from its surroundings, but rather a unique form of relational framing response that is contextually-regulated and functionally necessary for navigating and negotiating socio-interpersonal contexts of action effectively and sensitively.

Deictic relational framing in ASD. In addition to other measures of perspective-taking ability, children with ASD have also been found to show deficits on measures of deictic relational framing ability, implying a relationship between them. Rehfeldt, Dillen, Ziomek, and Kowalchuk (2007) found that individuals with high-functioning ASD scored lower than same-aged peers on relational learning tasks involving perspective-taking. Given the significance of deictic relational framing to perspective-taking, and perhaps empathetic responding, it follows

that the development of a deictic relational framing repertoire in children with ASD should positively impact their social functioning.

Proposed Enhanced Approach

As noted, deficits in perspective-taking are generally regarded to be at the core of the social difficulties seen in children with ASD. Impairments in perspective-taking have been associated with lower displays of prosocial behavior (Janssen et al., 2014), as well as increased social withdrawal (Dawson & Fernald, 1987). In order to respond sensitively and flexibly to the interpersonal context, one needs to be able to recognize and understand the thoughts and feelings of others; perspective-taking and empathy are pivotal to effective prosocial responding in social contexts of action (Janssen et al, 2014; Villatte, Monestès, McHugh, Baqué, & Loas, 2010). Deictic relational framing is central to the development of perspective-taking abilities, and functions as an important precursor to empathetic responding and social reciprocity.

From a RFT approach, perspective-taking is conceptualized as both a process and outcome of the ability to relate events in terms of deictic frames involving I-YOU, HERE-THERE, and NOW-THEN. The ability to relate events relationally develops over time on the basis of multiple exemplar training keyed to contextual discriminations, and a history of reinforcement for recognizing and responding differentially to these deictic distinctions. Considerable behavioral rehearsal across social interactions is required to establish this ability as a context-sensitive process (Lovett & Rehfeldt, 2014).

Because relational frames allow for the transformation of psychological functions within equivalence classes, deictic relational framing is also considered a foundational process for empathetic responding (Vilardaga, 2009). With a well-developed deictic framing repertoire, an individual may be more skilled at discriminating the thoughts, feelings, and experiences of

others. Thus, their ability to respond flexibly and effectively in social interactions with heightened capacity for empathetic responding is enhanced, provided that the “relevant” psychological functions are transformed in the moment (Vilardaga et al., 2012). “Relevant” in this case means transformed in affective alignment with another (congruence, attunement), relative to the specific contextual cues at hand, thus leading to a sense of kinship, not indifference to the other.

It follows logically that the relational learning deficits in perspective-taking seen in children with ASD may promote the social deficits shown by these children (Rehfeldt et al., 2007). These deficits seem to implicate the role of impaired contextual discrimination processes and the under-rehearsal of generalized behavioral repertoires necessary for attuned, flexible, and generalized social responding (Janssen et al., 2014). While ToM interventions have focused on improving the ability to infer the perspective of others, including relatively complex emotions, this skill alone is insufficient as shown by limited transfer of prosocial behavior to naturalistic settings (Lovett & Rehfeldt, 2014). From a RFT approach, the most effective way to promote attuned and flexible perspective-taking is to train the deictic relational framing abilities directly with added emphasis on transfer and generalization effects (McHugh et al., 2004). Therefore, training deictic relational responding directly through multiple exemplar training should support flexible attending in the moment relative to self-other affectional connections, thereby promoting increased sensitivity and capacity for accurate empathetic responding in social contexts of action.

Research has shown that deficits in deictic relational responding can be remedied through reinforced multiple exemplar training (Lovett & Rehfeldt, 2014; Rehfeldt et al., 2007; O’Neill, 2012). For example, McHugh, Barnes-Holmes, & Barnes-Holmes (2004) developed a deictic training protocol that targeted the three types of perspective-taking frames and three levels of

relational complexity, including simple, reversed, and double reversed relations. A simple relation requires an individual to change perspective according to a single frame. For example, a trial of a simple I-YOU relation: “I have a red brick and you have a green brick; which brick do I have, and which brick do you have?” A reversed relation requires the reversal of a simple relation. An example of a reversed I-YOU trial is: “I have a red brick, and you have a green brick. If you were me and if I was you, which brick would I have, and which brick would you have?” A double-reversed relation requires an individual to reverse two simple relations. A double-reversed I-YOU/HERE-THERE trial: “I am sitting here on the blue chair, and you are sitting there on the black chair. If I was you and you were me, and if here was there and there were here, where would I be sitting, and where would you be sitting?” (McHugh et al., 2004).

This training protocol was used successfully to remedy deficits in perspective-taking in several otherwise normally developing young children with errors decreasing as a function of age (McHugh et al., 2004). Rehfeldt et al. (2007) used a modified deictic training protocol that consisted of 57 questions, from the protocol proposed by McHugh, et al. (2004), to improve the scores of children with high functioning ASD on the deictic relational framing measure. Further, an abbreviated modification to the protocol initially developed by McHugh et al. (2004) was made to include 34 items by Gore, Barnes-Holmes, & Murphy (2010) to create the RFT Perspective-Taking Protocol (RFT-PT) (see Appendix A).

When using the RFT-PT, Gore et al. (2010) found a positive correlation between a participant’s percentage of correct trials and verbal skill level, suggesting the importance of language for the perspective-taking ability, as measured by the protocol. Thus, this particular protocol may be best suited for use with children classified as high functioning ASD, characterized by the ability to communicate using language or have an IQ higher than 70.

Research has shown that deictic relations are sensitive to reinforcement contingencies, and can be readily established using differential reinforcement based on multiple exemplar training, thereby improving transfer training effects beyond therapy (Rehfeldt et al., 2007). Notably, studies have also shown promising results on generalization tasks following training in deictic relational framing with adolescents diagnosed with Asperger's Syndrome (Lovett & Rehfeldt, 2014).

As noted, the RFT-PT may be best suited for higher functioning children with ASD who have some verbal ability and could be included with the current operant inspired treatments these children are receiving. Specifically, the proposed addition of the RFT-PT would initially target the mastery of simple relations through multiple exemplar training prior to moving to reversed and double reversed relations. After each trial, the child would receive feedback and continue the curriculum until mastery is reached, following the instructional sequence outlined by McHugh et al. (2009). To minimize the time and cost of having a clinician present to provide the perspective-taking curriculum, the RFT-PT has been successfully administered electronically through a computer program (Lovett & Rehfeldt, 2014).

These findings as a whole suggest that RFT-PT training may be of direct benefit to children with ASD to help facilitate the development of novel and more flexible cognitive attending responses in interpersonal settings. Further, RFT-PTs could be adapted (see Appendix B) using multiple exemplar training with empathy tasks focused on simple feeling-states with the hope of improving generalized socio-emotional reciprocity. Given that positive outcomes actually obtained from this approach to empathy training, modified RFT-PTs could be incorporated into traditional operant inspired therapies (e.g., EIBI, pivotal response therapy) for children with ASD, thereby offering a more comprehensive approach to treatment.

Limitations

Despite the encouraging findings discussed above, several limitations are apparent. Given the complexities of the social environment, deictic relational framing responses participate in verbal relational networks entailing interactions among other kinds of relational framing responses. Thus, in order to optimize treatment, transfer and generalization of acquired skills may require pre-training with tasks designed to generate multiple exemplar experiences with other forms of relational responding (e.g., coordination, opposition, comparison) (Barnes-Holmes, Foody, Barnes-Holmes, & McHugh, 2013).

Additionally, the RFT-PT approach requires some verbal competency on the part of the trainee; therefore, it may only be applicable to high functioning ASD children who demonstrate some language ability. Children showing lower verbal competency are normally taught through nonverbal methods, so it's unlikely the RFT-PT will be applicable to this population in its current form.

Further, research is needed to examine the efficacy of the proposed addition of the RFT-PT and it's impact on perspective-taking repertoires and empathy responses. While it has been noted that children with ASD show an increased percentage of correct responses using the protocol through pre- and posttest scores after instruction (Rehfeldt et al., 2007), the RFT-PT curriculum will prove to be especially beneficial if children with ASD generalize these skills to social and interpersonal contexts and improvements in their social functioning are seen. Therefore, it will be important to examine the transfer of these skills and perspective-taking abilities and empathy responses in "real-life" social contexts, which may be completed through means such as self and parent report, observation, and social responsiveness, empathy, or interpersonal effectiveness measures after completing instruction of the RFT-PT protocol.

Finally, being able to state what one is feeling should not be confused with what one is actually feeling. Doing so represents a type of category error; for example, the difference between cognitive versus affective perspective-taking. That one is able to shift perspectives at levels of relational complexity (simple, reversed, double reversed) entails a cognitive move; doing so does not ensure that the psychological functions of the speaker will be automatically transformed along with the perspectival shift. Take for example the reversed relation: “I am sad because I lost my favorite toy and you are happy because you are playing with friends. If I was you and you were me, what would I be feeling? What would YOU be feeling?” If authentic empathy occurs beyond the cognitive level of understanding, then some independent measure of empathy responding (affective level) will need to be incorporated into the training protocol to know whether congruent feeling is evoked at the time the report is made. This may be less an issue if children with ASD have intact affective perspective-taking abilities in place as suggested by Jones et al. (2010).

Alternatively, it seems important that one is able to reflect a feeling verbally (though not actually feel it in the moment) since that act would reflect at least some degree of intersubjective attunement with another. That is to say, accurate tracking and attending represents important aspects of social process that demonstrates a capacity to identify with and have a psychological interest in another, whether or not vicarious congruent-experience accompanies the process in the moment for the speaker. Being able to verbally reflect an empathetic statement in a spontaneous and generalized way would be a significant advancement toward improved social functioning for individuals with ASD.

Summary

Children diagnosed with ASD show significant difficulty tracking and attending to socio-emotional stimuli that in turn adversely impact their quality of interpersonal relations. Deficient perspective-taking along with reduced empathetic expression have been identified as key contributors to impaired social functioning. Research suggests that a contemporary contextual behavior framework drawing upon RFT principles and RFT-PT multiple exemplar training may offer a new approach to building perspective-taking abilities in some children with ASD, particularly those who show some language competency. Further research is needed to examine if a modified RFT-PT incorporating empathy training exemplars will help promote the development of empathy responses, with a focus on the transfer and generalization of this ability to the naturalistic social environment. If successful, the modified RFT-PT approach may be added to standard behavior analytic approaches for the treatment of ASD, in order to offer a more comprehensive intervention strategy for these individuals.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.) Arlington, VA: American Psychiatric Publishing.
- Barnes, C., & Rehfeldt, R.A. (2013). Advances in language interventions based on relational frame theory for individuals with developmental disorders. In Dymond, S., & Roche, B. (Ed.) *Advances in relational frame theory* (51-71). Oakland, CA: New Harbinger.
- Barnes-Holmes, D. (2000). Behavioral pragmatism: No place for reality and truth. *The Behavior Analyst*, 23, 191-202.
- Barnes-Holmes, Y., Barnes-Holmes, D., & McHugh, L. (2004). Teaching derived relational responding to young children. *Journal of Early and Intensive Behavioral Intervention*, 1, 3-12.
- Barnes, Holmes, Y., Barnes-Holmes, D., McHugh, L., & Hayes, S. (2004). Relational frame theory: Some implications for understanding and treating human psychopathology. *International Journal of Psychology and Psychological Theory*, 4(2), 161-181.
- Barnes-Holmes, Y., Barnes-Holmes, D., Roche, B. (2001). The development of self and perspective-taking: A relational frame analysis. *Behavioral Development Bulletin*, 1, 42-45.
- Barnes-Holmes, Y., Foody, M., Barnes-Holmes, D., & McHugh, L. (2013). Advances in research on deictic relations and perspective-taking. In Dymond, S., & Roche, B. (Ed.) *Advances in relational frame theory* (51-71). Oakland, CA: New Harbinger.
- Barnes-Holmes, Y., McHugh, L., & Barnes-Holmes, D. (2004). Perspective taking and theory of mind. *The Behavior Analyst Today*, 5(1), 15-25.

- Baron-Cohen, S. (1991). Precursors to a theory of mind: Understanding attention in others. In A. Whiten (Ed.), *Natural theories of mind: Evolution, development and simulation of everyday mindreading* (pp. 233-251). Oxford: Basil Blackwell.
- Baron-Cohen, S. (2001). Theory of mind in normal development and autism. *Prisme*, *34*, 174-183.
-
- Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with aspergers syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, *34*, 163-175.
- Beeger, S., Gevers, C., Clifford, P., Verhoeve, M., Kat, K., Hoddenbach, E., & Boer, F. (2011). Theory of mind training in children with autism: A randomized controlled trial. *Journal of Autism and Developmental Disabilities*, *41*, 997-1006.
- Chiesa, M. (1992). Radical behaviorism and scientific frameworks: From mechanistic to relational accounts. *American Psychologist*, *47*, 1287-1299.
- Chiesa, M. (1994). *Radical behaviorism: The philosophy and the science*. Boston, MA: Authors Cooperative, Inc. Publishers.
- Chomsky, N. A. (1980). Rules and representations. *Behavioral and Brain Sciences*, *3*(127), 1-61.
- Chomsky, N. A. (2007). Of minds and language. *Biolinguistics*, *1*, 9-27.
- Dawson, G., & Fernald, M. (1987). Perspective-taking ability and its relationship to the social behavior of autistic children. *Journal of Autism and Developmental Disorders*, *17*, 487-498.
- DeBernardis, G., Hayes, L., & Fryling, M. (2014). Perspective taking as a continuum. *The Psychological Record*, *64*, 123-131.

Donahoe, J. W. & Palmer, D. C. (1994). *Learning and complex behavior*. Boston, MA: Allyn & Bacon.

Fisher, N & Happé, F. (2005). A training study of Theory of Mind and executive function in children with autistic spectrum disorders. *Journal of Autism and Developmental Disorders*. 35, 757-771.

Frith, U., Happé, F., & Siddons, F. (1994). *Autism and theory of mind in everyday life*. Cambridge, MA: Blackwell Publishers.

Golan, O., & Baron-Cohen, S. (2006). Systemizing empathy: Teaching adults with asperger syndrome or high-functioning autism to recognize complex emotions using interactive multimedia. *Development and Psychopathology*, 18, 591-617.

Gore, N., Barnes-Holmes, Y., & Murphy, G. (2010). The relationship between intellectual functioning and relational perspective-taking. *International Journal of Psychology and Psychological Theory*, 10(1), 1-17.

Gould, E., Tarbox, J., O'Hora, D., Noone, S., & Bergstrom, R. (2011). Teaching children with autism a basic component skill of perspective taking. *Behavioral Interventions*, 26, 50-66.

Hayes, S. C. (2004). Falsification and the protective belt surrounding entity-postulating theories. *Applied and Preventive Psychology*, 11, 35-37.

Hayes, S.C., Hayes, L.J., & Reese, H.W. (1988). Finding the philosophical core: A review of Stephen C. Popper's world hypotheses. *Journal of Experimental Analysis of Behavior*, 50, 97-111.

Janssen, G., De Mey, H., Hendriks, A., Koppers, A., Kaarsemaker, M., Witteman, C., & Egger, J. (2014). Assessing deictic relational responding in individuals with social anxiety

- disorder: Evidence of perspective-taking difficulties. *The Psychological Record*, 64, 21-29.
- Jones, A., Happé, F., Gilbert, F., Burnett, S., & Viding, E. (2010). Feeling, caring, knowing: Different types of empathy deficits in boys with psychopathic tendencies and autism spectrum disorder. *Journal of Child Psychology and Psychiatry*, 51(11), 1188-1197.
- Koegel, R. L., Koegel, L. K. & Brookman, L. I. (2003). Empirically-supported pivotal response interventions for children with autism. In A. E. Kasdin (Ed). Yale University School of Medicine, & Child Study Center (Eds.), *Evidence-based Psychotherapies for Children and Adolescents* (pp. 341-357). New York, NY: Guilford Press.
- Koegel, L. K., Koegel, R. L., Harrower, J. K., & Carter, C. M. (1999). Pivot response intervention I: Overview of approach. *Journal of the Association for Persons with Severe Handicaps*, 24(3), 174-185.
- Koegel, L. K., Koegel, R. L., Shoshan, Y., & McNerney, E. (1999). Pivot response intervention II: Preliminary long-term outcome data. *Journal of the Association for Persons with Severe Handicaps*, 24(3), 186-198.
- Lovett, S., & Rehfeldt, R.A. (2014). An evaluation of multiple exemplar instruction to teach perspective taking skills to adolescents with asperger syndrome. *Behavioral Development Bulletin*, 19(2), 22-36.
- Matson, J., & Smith, K. (2008). Current statues of intensive behavioral interventions for young children with autism and PDD-NOS. *Research in Autism Spectrum Disorders*, 2, 60-74.
- Matson, J., Turygin, N., Beighley, J., Rieske, R., Tureck, K., & Matson, M. (2012). Applied behavior analysis in autism spectrum disorders: Recent developments, strengths, and pitfalls. *Research in Autism Spectrum Disorders*, 6, 144-150.

- McEachin, J., Smith, T., & Lovaas, O. (1993). Long term outcome for children with autism who received early intensive behavioral treatment. *American Journal on Mental Retardation*, *97*, 359-372.
- McHugh, L., Barnes-Holmes, Y., & Barnes-Holmes, D. (2004). Perspective-taking as relational responding: A developmental profile. *The Psychological Record*, *54*, 115-144.
- McHugh, L., Barnes-Holmes, Y., & Barnes-Holmes, D. (2009). Understanding and training perspective taking as relational responding. In R.A. Rehfeldt & Y. Barnes-Holmes (eds). *Derived relational responding applications for learners with autism and other developmental disabilities* (281-300). Oakland, CA: New Harbinger Publications.
- Meltzoff, A. N. (1999). Origins of theory of mind, cognition, and communication. *Journal of Communication Disorders*, *32*, 251-269.
- Mouchiroud, C., & Bernoussi, A. (2008). An empirical study of the construct of social creativity. *Learning and Individual Differences*, *18*(4), 372-380.
- Morris, E.K. (1998). Contextualism: The world view of behavior analysis. *The Journal of Experimental Child Psychology*, *46*, 289-323.
- O'Neill, J. (2012). Training deictic relational responding in people with schizophrenia. Retrieved from <http://scholarcommons.usf.edu/etd/4188>
- Ospina, M., Seida, J., Clark, B., Karkhaneh, M., Hartling, L., Tjosvold, L., Vandermeer, B., & Smith, V. (2008). Behavioural and developmental interventions for autism spectrum disorder: A clinical systematic review. *PLoS ONE*, *3*(11), 1-32.
- Oswald, P. (1996). The effects of cognitive and affective perspective taking on empathetic concern and altruistic helping. *The Journal of Social Psychology*, *136*, 613-623.

- Ozonoff, S., & Miller, J. (1995). Teaching theory of mind: A new approach to social skills training for individuals with autism. *Journal of Autism and Developmental Disorders, 25*, 415-433.
- Palmer, D. C., & Donahoe, J. W. (1992). Essentialism and selectionism in cognitive science and behavior analysis. *American Psychologist, 47*, 1344-1358.
- Peters-Scheffer, P., Didden, R., Korzilius, H., & Sturmey, P. (2011). A meta-analytic study on the effectiveness of comprehensive ABA-based early intervention programs for children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*, 60-69.
- Premack, D. G., & Woodruff, G. (1978). "Does the chimpanzee have a theory of mind?". *Behavioral and Brain Sciences, 1*(4): 515-526.
- Rehfeldt, R.A., Dillen, J., Ziomek, M., & Kowalchuk, R. (2007). Assessing relational learning deficits in perspective taking in children with high-functioning autism spectrum disorder. *The Psychological Record, 57*, 23-47.
- Scheeren, A., Koot, H. M., & Begeer, S. (2012). Social interaction style of children and adolescents with high-functioning autism spectrum disorder. *Journal of Autism and Developmental Disorders, 42*, 2046-2055.
- Schwenck, C, Gohle, B., Hauf, J., Warnke, A., Freitag, C., & Schneider, W. (2014). Cognitive and emotional empathy in typically developing children: The influence of age, gender, and intelligence. *European Journal of Developmental Psychology, 11*, 63-76.
- Schwenck, C., Mergenthaler, J., Keller, K., Zech, J., Salehi, S., Taurines, R., Romanos, M., Schecklmann, M., Schneider, W., Warnke, A., & Freitag, C. (2014). Empathy in children with autism and conduct disorder: Group-specific profiles and developmental aspects. *Journal of Child Psychology and Psychiatry, 53*(6), 651-659.

Skinner, B. F. (1938). *The Behavior of organisms: An experimental analysis*. New York: Appleton-Century.

Skinner, B. F. (1953). *Science and human behavior*. New York, NY: The Macmillan Company.

Skinner, B. F. (1981). Selection by consequences. *Science*, 213, 501-504.

Skinner, B. F. (1985). Cognitive science and behaviourism. *British Journal of Psychology*, 76, 291-301.

Smith, T. (1999). Outcome of early intervention for children of autism. *Clinical Psychology: Research and Practice*, 6, 33-49.

Smith, T. (2001). Discrete trial training in the treatment of autism. *Focus on Autism and Other Developmental Disabilities*, 16(2), 86-92.

Stewart, I., & Roche, B. (2013). Relational frame theory: An overview. In Dymond, S., & Roche, B. (Ed.) *Advances in relational frame theory* (51-71). Oakland, CA: New Harbinger.

Travis, L., Sigman, M., & Ruskin, E. (2001). Links between social understanding and social behavior in verbally able children with autism. *Journal of Autism and Developmental Disorders*, 31(2), 119-130.

Van der Graff, J., Branje, S., De Wied, M., Hawk, S., Van Lier, P., & Meeus, W. (2014). Perspective taking and empathetic concern in adolescence: Gender differences in developmental changes. *Developmental Psychology*, 50, 881-888.

Vilardaga, R. (2009). A relational frame theory account of empathy. *The International Journal of Behavioral Consultation and Therapy*, 5, 178-184.

Vilardaga, R., Estévez, A., Levin, M., & Hayes, S. (2012). Deictic relational responding, empathy, and experiential avoidance as predictors of social anhedonia: Further contributions from relational frame therapy. *The Psychological Record*, 62, 409-432.

- Villatte, M., Monestès, J., McHugh, L., Baqué, & Loas, G. (2010). Assessing perspective taking in schizophrenia using relational frame theory. *The Psychological Record, 60*, 413-436.
- Warren, Z., McPheeters, M., Sathe, N., Foss-Feig, J., Glasser, A., & Veenstra-VanderWeele, J. (2011). A systematic review of early intensive intervention for autism spectrum disorders. *Pediatrics, 127*(5), 1303-1311.
-

Appendix A

RFT-PT (Adapted from Gore et al., 2010).

Simple Relations

I-YOU

1. I have a red brick and you have a green brick. Which brick do I have? Which brick do YOU have?
2. I have a green brick and you have a red brick. Which brick do YOU have? Which brick do I have?

HERE-THERE

3. I am sitting here on the black chair and you are sitting there on the blue chair. Where are YOU sitting? Where am I sitting?
4. I am sitting here on the blue chair and you are sitting there on the black chair. Where am I sitting? Where are YOU sitting?

NOW-THEN

5. Yesterday I was reading, today I am watching television. What was I doing then? What am I doing now?
6. Yesterday I was watching television, today I am reading. What am I doing now? What was I doing then?
7. Yesterday you were reading, today you are watching television. What are YOU doing now? What were YOU doing then?
8. Yesterday you were watching television, today you are reading. What were YOU doing then? What are YOU doing now?

Reversed Relations

I-YOU

9. I have a green brick and you have a red brick. If I was you and you were me, which brick would I have? Which brick would YOU have?
10. I have a red brick and you have a green brick. If I was you and you were me, which brick would I have? Which brick would YOU have?
11. I am sitting here on the blue chair and you are sitting there on the black chair. If I was you and you were me, where would I be sitting? Where would YOU be sitting?
12. I am sitting here on the black chair and you are sitting there on the blue chair. If I was you and you were me, where would YOU be sitting? Where would I be sitting?

HERE-THERE

13. I am sitting here on the black chair and you are sitting there on the blue chair. If here was there and there was here, where would YOU be sitting? Where would I be sitting?
14. Yesterday I was sitting there on the blue chair, today I am sitting here on the black chair. If here was there and there was here, where would I be sitting now? Where would I be sitting then?
15. Yesterday you were sitting there on the black chair, today you are sitting here on the blue chair. If here was there and there was here, where would you be sitting then? Where would you be sitting now?
16. I am sitting here on the blue chair and you are sitting there on the black chair. If here was there and there was here, where would I be sitting? Where would YOU be sitting?

17. Yesterday I was sitting there on the blue chair, today I am sitting here on the black chair. If here was there and there was here, where would I be sitting then? Where would I be sitting now?
18. Yesterday you were sitting there on the blue chair, today you are sitting here on the black chair. If here was there and there was here, where would you be sitting now? Where would you be sitting then?

NOW-THEN

19. Yesterday I was reading, today I am watching television. If now was then and then was now, what would I be doing now? What would I be doing then?
20. Yesterday I was sitting there on the blue chair, today I am sitting here on the black chair. If now was then and then was now, where would I be sitting then? Where would I be sitting now?
21. Yesterday I was watching television, today I am reading. If now was then and then was now, what would I be doing then? What would I be doing now?
22. Yesterday you were sitting there on the blue chair, today you are sitting here on the black chair. If now was then and then was now, where would you be sitting now? Where would you be sitting then?
23. Yesterday you were sitting there on the black chair, today you are sitting here on the blue chair. If now was then and then was now, where would you be sitting then? Where would you be sitting now?
24. Yesterday you were watching television, today you are reading. If now was then and then was now, what would you be doing then? What would you be doing now?
25. Yesterday I was sitting there on the black chair, today I am sitting here on the blue chair. If now was then and then was now, where would I be sitting now? Where would I be sitting then?
26. Yesterday you were reading, today you are watching television. If now was then and then was now, what would you be doing now? What would you be doing then?

Double-Reversed Relations

I-YOU/HERE-THERE

27. I am sitting here on the black chair and you are sitting there on the blue chair. If I was you and you were me and if here was there and there was here, where would YOU be sitting? Where would I be sitting?
28. I am sitting here on the black chair and you are sitting there on the blue chair. If I was you and you were me and if here was there and there was here, where would I be sitting? Where would YOU be sitting?
29. I am sitting here on the blue chair and you are sitting there on the black chair. If I was you and you were me and if here was there and there was here, where would I be sitting? Where would YOU be sitting?

HERE-THERE/NOW-THEN

30. Yesterday you were sitting there on the black chair, today you are sitting here on the blue chair. If here was there and there was here and if now was there and then was now, where would you be sitting now? Where would you be sitting then?
31. Yesterday I was sitting there on the black chair, today I am sitting here on the blue chair. If here was there and there was here and if now was then and then was now, where would I be sitting then? Where would I be sitting now?

32. Yesterday I was sitting there on the blue chair, today I am sitting here on the black chair. If here was there and there was here and if now was then and then was now, where would I be sitting now? Where would I be sitting then?
 33. Yesterday you were sitting there on the blue chair, today you are sitting here on the black chair. If here was there and there was here and if now was then and then was now, where would you be sitting now? Where would you be sitting then?
 34. Yesterday you were sitting there on the black chair, today you are sitting here on the blue chair. If here was there and there was here and if now was then and then was now, where would you be sitting then? Where would you be sitting now?
-

Appendix B

Revised RFT-PT to include focus on emotions

Simple Relations

I-YOU

1. I am happy because I am playing with friends and you are sad because you lost your favorite toy. What am I feeling? What are YOU feeling?
2. I am sad because I lost my favorite toy and you are happy because you are playing with friends. What are YOU feeling? What am I feeling?

HERE-THERE

3. I am mad here while doing chores and you are glad there while eating ice cream. What are YOU feeling there? What am I feeling here?
4. I am glad here while eating ice cream and you are mad there while doing chores. What am I feeling here? What are YOU feeling there?

NOW-THEN

5. Yesterday I was scared to meet new people, today I am happy to play on the playground. What was I feeling then? What am I feeling now?
6. Yesterday I was happy to play on the playground, today I am scared to meet new people. What am I feeling now? What was I feeling then?
7. Yesterday you were scared to meet new people, today you are happy to play on the playground. What are YOU feeling now? What were YOU feeling then?
8. Yesterday you were happy to play on the playground, today you are scared to meet new people. What were YOU feeling then? What are YOU feeling now?

Reversed Relations

I-YOU

9. I am sad because I lost my favorite toy and you are happy because you are playing with friends. If I was you and you were me, what would I be feeling? What would YOU be feeling?
10. I am happy because I am playing with friends and you are sad because you lost your favorite toy. If I was you and you were me, what would I be feeling? What would YOU be feeling?
11. I am glad here while eating ice cream and you are mad there while doing chores. If I was you and you were me, what would I be feeling? What would YOU be feeling?
12. I am mad here while doing chores and you are glad there while eating ice cream. If I was you and you were me, what would YOU be feeling? What would I be feeling?

HERE-THERE

13. I am mad here while doing chores and you are glad there while eating ice cream. If here was there and there was here, what would YOU be feeling? What would I be feeling?
14. Yesterday I was glad there while eating ice cream, today I am mad here while doing chores. If here was there and there was here, what would I be feeling now? What would I be feeling then?
15. Yesterday you were mad there while doing chores, today you are glad here while eating ice cream. If here was there and there was here, what would you be feeling then? What would you be feeling now?

16. I am glad here while eating ice cream and you are mad there while doing chores. If here was there and there was here, what would I be feeling? What would YOU be feeling?
17. Yesterday I was glad there while eating ice cream, today I am mad here while doing chores. If here was there and there was here, what would I be feeling then? What would I be feeling now?
18. Yesterday you were glad there while eating ice cream, today you are mad here while doing chores. If here was there and there was here, what would you be feeling now? What would you be feeling then?

NOW-THEN

19. Yesterday I was scared to meet new people, today I am happy to play on the playground. If now was then and then was now, what would I be feeling now? What would I be feeling then?
20. Yesterday I was glad there while eating ice cream, today I am mad here while doing chores. If now was then and then was now, what would I be feeling then? What would I be feeling now?
21. Yesterday I was happy to play on the playground, today I am scared to meet new people. If now was then and then was now, what would I be feeling then? What would I be feeling now?
22. Yesterday you were glad there while eating ice cream, today you are mad here while doing chores. If now was then and then was now, what would you be feeling now? What would you be feeling then?
23. Yesterday you were mad there while doing chores, today you are glad here while eating ice cream. If now was then and then was now, what would you be feeling then? What would you be feeling now?
24. Yesterday you were happy to play on the playground, today you are scared to meet new people. If now was then and then was now, what would you be feeling then? What would you be feeling now?
25. Yesterday I was mad there while doing chores, today I am glad here while eating ice cream. If now was then and then was now, what would I be feeling now? What would I be feeling then?
26. Yesterday you were scared to meet new people, today you are happy to play on the playground. If now was then and then was now, what would you be feeling now? What would you be feeling then?

Double-Reversed Relations

I-YOU/HERE-THERE

27. I am mad here while doing chores and you are glad there while eating ice cream. If I was you and you were me and if here was there and there was here, what would YOU be feeling? What would I be feeling?
28. I am mad here while doing chores and you are glad there while eating ice cream. If I was you and you were me and if here was there and there was here, what would I be feeling? What would YOU be feeling?
29. I am glad here while eating ice cream and you are mad there while doing chores. If I was you and you were me and if here was there and there was here, what would I be feeling? What would YOU be feeling?

HERE-THERE/NOW-THEN

30. Yesterday you were mad there while doing chores, today you are glad here while eating ice cream. If here was there and there was here and if now was then and then was now, what would you be feeling now? What would you be feeling then?
31. Yesterday I was mad there while doing chores, today I am glad here while eating ice cream. If here was there and there was here and if now was then and then was now, what would I be feeling then? What would I be feeling now?
32. Yesterday I was glad there while eating ice cream, today I am mad here while doing chores. If here was there and there was here and if now was then and then was now, what would I be feeling now? What would I be feeling then?
33. Yesterday you were glad there while eating ice cream, today you are mad here while doing chores. If here was there and there was here and if now was then and then was now, what would you be feeling now? What would you be feeling then?
34. Yesterday you were mad there while doing chores, today you are glad here on the blue chair. If here was there and there was here and if now was then and then was now, what would you be feeling then? What would you be feeling now?