



Contents lists available at ScienceDirect

Research in Autism Spectrum Disorders

Journal homepage: <http://ees.elsevier.com/RASD/default.asp>

Establishing deictic repertoires in autism

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ARTICLE INFO

Article history:

Available online 19 May 2015

Keywords:

Relational responding
 Perspective-taking
 Autism
 Relational Frame Theory

ABSTRACT

Derived relational responding is an increasingly researched topic in the behavioral sciences. Deictic frames, among other forms of relational responding, have been found to underlie complex behavior, including perspective-taking. Researchers have developed procedures for training children, with and without disabilities, to demonstrate relational responding. Recent extensions of these teaching procedures incorporated more naturalistic contexts as an avenue for establishing these repertoires, but the efficacy of these new procedures for children with disabilities and the degree to which these improvements generalize have not yet been explored. The purpose of this study was to determine if relational repertoires could be established using newer, more naturalistic teaching procedures in children diagnosed with an autism spectrum disorder and to what degree improvements would generalize to another adult. Results indicated that all participants met criteria for mastery on all levels of relational complexity. Additionally, all three children demonstrated generalization of these repertoires to a novel adult following training to mastery. The results suggest that an intervention approach utilizing a Barnes-Holmes protocol in a story reading context was effective for establishing deictic repertoires in children diagnosed with an autism spectrum disorder.

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1. Introduction

Among areas of intervention for children with developmental disabilities, there are relatively few interventions designed to remediate perspective-taking deficits (Baron-Cohen, 1995; Howlin, Baron-Cohen, & Hadwin, 1999; Heagle & Rehfeldt, 2006; LeBlanc et al., 2003). This limited range of intervention impacts a wide range of individuals, including children with a development delay (Heagle & Rehfeldt, 2006; LeBlanc et al., 2003; Rehfeldt, Dillen, Ziomek, & Kowalchuck, 2007) and even those still acquiring perspective-taking abilities beyond early childhood (McHugh, Barnes-Holmes, & Barnes-Holmes, 2004). Deficits in these repertoires limits one's ability to respond to emotional and affective stimuli (Baron-Cohen, 2005; Perner, 1988), infer the beliefs of others (McHugh, Barnes-Holmes, Barnes-Holmes, & Stewart, 2006), form and sustain friendships (Klin, Schultz, & Cohen, 2000) and respond appropriately in complex social environments (Perner, 1991).

While deficits in perspective-taking and social behavior are frequently researched in autism (Lord & McGee, 2001; Matson, 2008; Volkmar, Lord, Bailey, Schultz, & Klin, 2004), similar challenges are observed to a lesser degree in many other populations. Efforts to remediate perspective-taking deficits would benefit those with a developmental disability (Rehfeldt et al., 2007), various neuro-behavioral disorders (Villatte, Monestès, McHugh, Freixa i Baqué, & Loas, 2010), depression and anhedonia (Villatte, Monestès, McHugh, Freixa i Baqué, & Loas, 2008), and even typically-developing individuals (Heagle & Rehfeldt, 2006;

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McHugh et al., 2004; McHugh, Barnes-Holmes, Barnes-Holmes, Stewart, & Dymond, 2007; Weil, Hayes, & Capurro, 2011), an increasingly prevalent consumer of behavior analytic interventions and supports. Prior to the emergence of Relational Frame Theory (RFT: Hayes, Barnes-Holmes, & Roche, 2001a), research into perspective-taking was predominantly cast into the theory of mind framework (Baron-Cohen, 1995, 2005; Baron-Cohen, Tager-Flusberg, & Cohen, 2000; Howlin et al., 1999; Volkmar et al., 2004). Within a theory of mind framework, individuals incorrectly identifying the informational states (e.g., beliefs, motivations, etc.) of others were thought to be at less advanced stage of development. Within this framework, individuals were thought to progress through several stages before they could correctly assume the true or false beliefs of others (Baron-Cohen, 1995, 2005; Baron-Cohen et al., 2000; Howlin et al., 1999). The development of perspective-taking was thought to progress from basic visual perspective-taking, to inferring an informational state (e.g., beliefs, motivation, etc.) and to the development of predictions of other's behavior based on those states—be they accurate or not (Baron-Cohen, 1995, 2005; Baron-Cohen et al., 2000; Howlin et al., 1999). A typically developing child would be expected to demonstrate these capabilities no later than the age of six-years, as biological maturation has been cited as the driving factor in the development of these repertoires historically (Baron-Cohen, 1995, 2005; Baron-Cohen et al., 2000).

More recent research, into how perspective-taking emerges, has utilized a Relational Frame Theory (RFT) approach (Hayes et al., 2001a,b; McHugh et al., 2004; Rehfeldt & Barnes-Holmes, 2009). Rather than assuming that biological maturation drives the development of these abilities, a RFT approach highlights how the arrangement of stimuli in the environment continually shapes how individuals come to derive and respond to stimulus relations in new contexts and situations (e.g., demonstrate relational responding) (Hayes et al., 2001a,b; McHugh et al., 2004). Using this new approach, researchers have since re-explored a range of complex social behavior (e.g., perspective-taking) by analyzing these repertoires in terms of the relational responding that supports them (Barnes-Holmes, Barnes-Holmes, & Cullinan, 2001; Barnes-Holmes, McHugh, & Barnes-Holmes, 2004; Hayes et al., 2001a,b). These researchers have conducted research on relational frames (e.g., deictic frames) as a way to both analyze and teach said repertoires. Among the range of relational frames identified, deictic frames have been identified as a class of relational responding relevant to perspective-taking (Hayes et al., 2001a,b). This family of relational frames (e.g., class of relational responding), includes identity (I vs. You), spatial (Here vs. There) and temporal relations (Now vs. Then) (Barnes-Holmes et al., 2001; Dymond & Barnes, 1995; McHugh et al., 2004).

Within a Relational Frame Theory approach to perspective-taking, the relational responding that supports taking the perspective of others can be both assessed (McHugh et al., 2004, 2007) and taught through the arrangement of stimuli in the environment (Davlin, Rehfeldt, & Lovett, 2011; McHugh et al., 2007; Weil et al., 2011). In the studies referenced, relational repertoires (e.g., deictic frames) were assessed in terms of identity relations (I vs. You), spatial relations (Here vs. There) and temporal relations (Now vs. Then). As participants were taught to demonstrate these relations, higher degrees of relational complexity were introduced by “switching” one or more of those relations (e.g., “If I were you and you were me. . .”). By switching one or more of these relations (e.g., switching I with You) participants had to subsequently derive the novel relations between stimuli in those contexts. For example, if a participant was asked to respond as if they were another person (e.g., switch identity) they should subsequently derive new spatial relations and temporal locations in order to accurately respond as if they were that individual, in that place and time. In cases of deictic frames with a single switch (e.g., Reversed Relations), if the participant was told “You are in the kitchen and I am in the living room” and was then asked “If I were you and you were I, where would you be” the participant would then have to derive new stimulus relations not originally specified in the initial frame. Through systematically increasing the number of switches and varying the frames switched, participants acquired relational responding through differential reinforcement and error correction. Several studies have successfully demonstrated that deictic repertoires can be established using PC-based tools (Heagle & Rehfeldt, 2006; Rehfeldt et al., 2007), instructional table-top (e.g., adult reading from cue cards) activities (Weil et al., 2011) and even story reading activities (Davlin et al., 2011).

While earlier studies provide support that relational responding can be assessed and taught using this framework, only one study has utilized this approach with children diagnosed with an autism spectrum disorder (Rehfeldt et al., 2007). The methods used in this study utilized a computer-based approach to delivering instructional trials and feedback to children with autism, the results of which suggested that children diagnosed with an autism spectrum disorder could be taught to derive deictic relations. While encouraging, the methods utilized in this study required specially-developed computer software. More recent expansions upon protocols have since eliminated the need for computer software and have used storybook materials, resources commonly available to young children (Davlin et al., 2011). However, these newer methods have not been evaluated with children diagnosed with an autism spectrum disorder. Thus, the focus of the current study was to evaluate the effectiveness of a teaching protocol to establish relational responding in children diagnosed with an autism spectrum disorder using the more naturalistic story reading approach from Davlin et al. (2011). The goal of this study was to determine (a) if children with autism would acquire a deictic relational repertoire following the completion of these newer teaching procedures and (b) if those improvements in relational responding would generalize to a novel adult.

2. Method

2.1. Participants

Four children were screened for participation and three were included in the study. The ages for Andrew, Brian and Charles were 8, 9 and 11, respectively, as shown in Table 1. Enrollment was advertised through local academic consultants in

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