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Teaching Prerequisite Perspective-Taking Skills to Children with Autism

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Abstract It is well documented that the acquisition of a perspective taking ability leads to the development of important social and communication skills. The present study sought to facilitate a prerequisite skill to perspective taking in three individuals with autism. Participants viewed pictures of a known individual facing left or right looking at an object. We projected arrows from the eyes of the person in the picture as visual prompts (three varying lengths). Two of three participants were able to select the appropriate discriminative stimuli without prompts. During maintenance tests, only one of three participants maintained accurate responding above 50%. The implications of these findings to the development of a perspective-taking repertoire from a behavior-analytic orientation are discussed.

Keywords Perspective taking, Autism, Theory of Mind, Multiple exemplar training

1. Introduction

Perspective taking is widely understood to be a beneficial skill that it allows for greater exposure to reinforcing situations. The skill itself is rather complex and involves multiple, pre-requisite skills. The variety of skills thought to involve perspective taking (e.g., empathy, sympathy, false beliefs, self-reflection) is initially developed through prerequisite skills we most often take for granted. However, individuals with autism spectrum disorder (ASD), per their diagnosis, often show deficits in these prerequisite skills to perspective taking skills.

Perspective taking is most often discussed from a Theory of Mind (ToM) orientation. Ozonoff and Miller (1995) describe ToM as a cognitive approach to perspective taking as a set of complex cognitive processes wherein an individual is able to understand the one's own beliefs and actions and those of others. There are five stages of development of perspective taking according to ToM, and the skills within each range from simple perspective taking to more complex social and communicative skills (Howlin, Baron-Cohen, & Hadwin, 1999).

Schlinger's (2009) ToM review proposed that ToM is acquired as a function of the various ways in which language is used in the environment. The inherently problematic conceptualization of ToM was that "it (ToM research never identifies what children actually do and the circumstances under which they do it (p. 438). Thus, a behavior analytic philosophical orientation to perspective-taking suggests that we should both be able to provide a behavioral account for its occurrence and consider it of high importance in terms of social significance. As with other skills targeted using behavior analytic methodologies, so too should those approaches be applied to the facilitation of perspective taking. Schlinger (2009) stated that this behavior analytic account was, more or less, provided some 60 years ago, in Skinner's (1945) *The Operational Analysis of Psychological Terms.*

However, several behaviorists have stated that Skinner's analysis of verbal behavior was not developed with experimentation in mind, citing that it was both too broad and not functional (Hayes, Barnes-Holmes, and Roche, 2001). A thorough account of these proposed insufficiencies is beyond the scope of the present article (for more, see Barnes-Holmes & Barnes-Holmes, 2000; Gross & Fox, 2009; Hayes, Blackledge, & Barnes-Holmes, 2001 Leigland, 1997; Michael, 1984). In light of these concerns with ToM and Skinner's analysis, McHugh, Barnes-Holmes, O'Hora, & Barnes-Holmes (2004) suggested that a more functional approach to an understanding of perspective taking was warranted. They posited that with such an approach, one would be better able to address behavioral deficiencies with respect to perspective taking, as we could look to an individual's behavioral repertoire to remediate deficits thought to be integral to the skill. Hayes, Barnes-Holmes, and Roche (2001) provided such an explanation of perspective taking via Relational Frame Theory. Specifically, they proposed that a human's ability to derive relations among and between stimuli based on our understanding of self, place, and time sets the stage for most, if not all human language and cognition, including a perspective-taking

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repertoire. Moreover, and most important to a behavior-analytic account of perspective take, the authors suggested that the relevance of derived relation responding to the development of such a repertoire was able to be tested.

Lipkens, Hayes, and Hayes (1993) found that derived relation responding occurs in typically developing infants as early as 18 months. However, research indicates that individuals with autism have been shown to have underdeveloped repertoires in this area. Devany, Hayes, and Nelson (1986) showed that language was positively correlated with derived equivalence relations in an interesting fashion. Specifically, they highlighted that individuals with more severe language delays failed to derive equivalence relations, and thus required greater amounts of training on conditional discriminations than typically developing individuals. This result indicates that conditional discrimination is an integral prerequisite to higher order skills such as, equivalence class formation, joint attention, and language development.

Bakeman and Adamson (1984) found that early joint attention skills (e.g., gaze shifts) developed between 9 and 12 months. However, Charman et al. (1997) found that children with autism had difficulty in switching their gaze as late as 20 months. Additionally, the authors cite long-term detriments in the form of limited language gains and diminished social communication as the children neared the age of 4. Therefore, the facilitation of a perspective-taking repertoire in individuals with autism has profound social implications, and a training dedicated to the remediation of such deficits is warranted.

Most analyses regarding the development of perspective-taking lie in the conceptual realm and thus, there is a paucity of empirical work targeting such a repertoire. Rehfeldt, Dillen, Ziomek, and Kowalchuk (2007) used multiple exemplar training (MET) to train a perspective-taking repertoire by asking a series of questions. For example, participants were asked, "I have a green brick and you have a red brick. If I was you and you were me, which brick would you have? Which brick would I have?" Results of the study suggested that typically-developing individuals via MET, were able to answer these questions and to generalize these responses to novel stimuli. Participants with an ASD diagnosis made significantly more errors than their typically-developing peers when presented with this task. Furthermore, the authors found that a derived relational responding (DRR) repertoire served to facilitate accuracy in this task, suggesting the importance of a DRR repertoire to the development of perspective taking.

Given the limited research surrounding basic perspective taking skills, Gould, Tarbox, O'Hora, Noone, & Bergstrom (2011) developed a procedure to promote responding to what another sees (a prerequisite to perspective taking). The authors used visual prompts in the form of various lengths of arrows to increase the salience of the conditional stimulus's (picture of person's face looking left or right) with respect to the discriminative stimulus (object in the person's line of sight). Subsequent to training, the authors targeted the generalization of these trained skills to the natural environment using real people looking at actual objects. The results indicated that participants were, for the most part, unable to display the skill (labeling what another sees in the environment) with any consistency.

Therefore, the present study sought to replicate and extend the work of Gould et al. (2011) in a number of ways. First, I aimed to use the methods similar to those described by Gould et al. (2011), but apply them with individuals with limited verbal repertoires in an effort to determine whether a more developed verbal repertoire was necessary to facilitate perspective taking. Second, we modified the discriminative stimuli to include additional variations to which the participants would have to respond (i.e., up and down) during maintenance and generalization probes. This was done in an effort to more closely represent the ways in which individuals take the perspective of another. Lastly, we conducted all sessions in the students' academic setting with all peers and supervisors present so as to approximate the natural environment and highlight that perspective taking training is plausible (i.e., by teachers or paraprofessionals) within a setting with less environmental control.

2. Method

2.1. Participants and Setting

Participants were preschool-age and school-aged individuals diagnosed with autism spectrum disorder (ASD) diagnoses attending school in self-contained, special education classrooms in a Midwestern school district. Each participant had limited verbal repertoires, as determined by their Individualized Education Plan (IEPs) goals oriented to the development of expressive and receptive language skills. David was a 3-year-old boy with an ASD diagnosis who had a verbal repertoire of one to two word approximations. Jake was a 9-year-old boy with a diagnosis of ASD and engaged in spontaneous three-word utterances. Lastly, Hollis was 13-year-old boy with an ASD diagnoses who engaged in echolalia and had one to two-word spontaneous requests.

2.2. Materials

Stimulus cards consisting of four pictures of objects (discriminative stimuli) were printed on regular printer paper. Additionally, each card displayed a picture of a person's head and shoulders (the conditional stimulus) located in the center of the paper. The discriminative stimuli were placed at equal distances from the conditional stimulus on each piece of paper so as to minimize position biases. The person's head and shoulders were oriented to the left or right, and thus the conditional stimulus was looking at the discriminative stimulus to the left or right side of center. Like the Gould et al. (2011) article, the pictures located in the "above" and "below" positions were included as distracters. We included within-stimulus prompts in the form of red arrows from the eye's of the conditional stimulus to the respective discriminative stimuli to facilitate accurate responding.

2.3. Target Responses and Data Collection

The target response was similar that of the Gould et al. (2011) study. Participants were required to point to or touch the correct discriminative stimulus, as indicated by the direction of the person's eye gaze (conditional stimulus), when provided with the verbal instruction, "What does he see?" During the generalization probes, however, additional response requirements were included. Specifically, we modified the orientation of the confederate's gaze to include not only left and right, but up and down as well. We did this in an effort to more closely approximate the various ways in which individuals look at objects (i.e., it's not always the case that a person's body is oriented to the object at which he/she is looking). Participants advanced to the next training when they reached 100% accuracy in two consecutive sessions. If a participant's responding decreased below 100% for two consecutive sessions, he then moved back a training phase and we reintroduced a more salient within-stimulus prompt.

2.4. Experimental Design and Interobserver Agreement

An A-B design with systematic stimulus fading replicated across participants was used to assess participant responses to the multiple exemplar training. Similar to the Gould et al. (2011) study, maintenance probes were taken post-intervention. Additionally, generalization probes were taken to assess the spread of the prerequisite perspective taking skill with new stimuli and real people. Interobserver agreement (IOA) data were collected for 41% of all sessions. IOA was calculated by dividing the total number of trials for which there was agreement by the total number of trials for which there was agreement plus disagreements, and the quotient was multiplied by 100%. The IOA for all of the sessions was determined to be 100%.

2.5. Procedure

2.5.1. Preference Assessment

Prior to any baseline probes, we conducted a multiple stimulus without replacement preference assessment (per the DeLeon & Iwata (1997) procedures) with each of the participants so as to indicate preferred items or activities that may then be used during multiple exemplar training. The item selected first by each of the participants was used in all subsequent training trials unless the participant indicated a preference for a new item by going to get the item or pointing to the item or activity.

2.5.2. Baseline Assessment

Each of the stimuli cards was probed without visual prompts across two sessions for each of the participants. The stimulus cards differed across each participant, as we used stimuli within each participant's receptive object labeling repertoire. We made this inclusion to minimize the likelihood that mistakes were due to the participant's not knowing the object at which the person in the picture (conditional stimulus) was looking.

2.5.3. Perspective Taking Training

Each session consisted of eight trials, with an equal number of correct responses to left and right directions. All correct responding during training sessions was reinforced via provision of a preferred item. During training, we superimposed large, medium, and small arrows onto the stimulus cards with lengths of 7.2, 3.3, and 0.5 cm, respectively. The arrows protruded from the conditional stimulus's eye out in the direction of the correct discriminative stimulus for training trials. We randomized the correct response placement (i.e., discriminative stimulus to the left or right) so as to minimize positional biases. For David, we included a gestural prompt in addition to the large arrow for two sessions so as to facilitate accurate responding. We were able to fade to less restrictive within-stimulus prompts during subsequent sessions. During the "No Arrow Phase", we omitted the arrow from the discriminative stimulus so as to approximate the baseline condition.

2.5.4. Maintenance and Generalization Probes

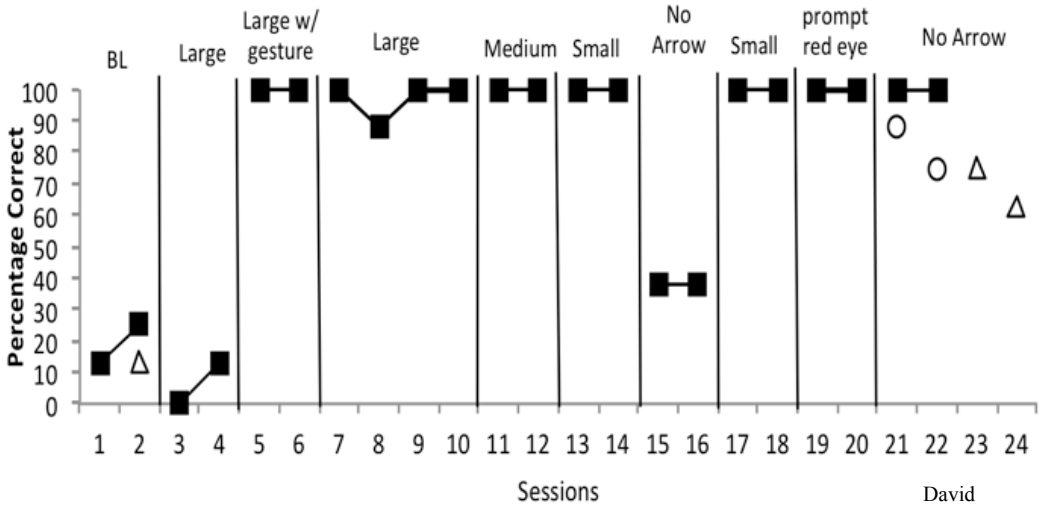
Maintenance probes were taken during latter sessions wherein novel stimuli were imbedded into sessions. We included eight new, actual objects for each of the participant's maintenance probes, and these were assessed every other trial without the within-stimulus prompts. We conducted generalization probes at two occasions within each student's special education classroom. An actual person stood in the center of the room and, based on the trial, looked one of four directions: up, down, left, or right. Each direction was randomly probed two times each session, for a total of eight trials per session. As with baseline and training phases, the verbal prompt was, "What does he see?"

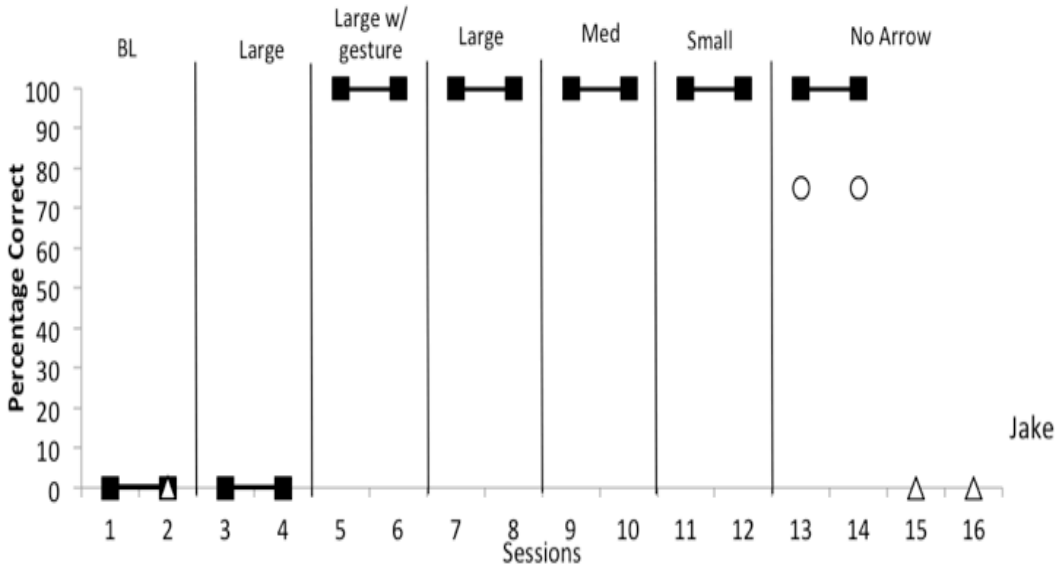
3. Results

The results of the present study are consistent with those of the Gould et al. (2011) study. David's responding during the baseline and initial generalization probe was below 25% accuracy. His low accuracy in responding continued in the "Large Arrow Training Phase". With that, a gestural prompt in the form of the implementer pointing to the discriminative stimulus was included for two sessions. David's responding for each of these sessions was at 100%. We then faded the gestural prompt, returning to the "Large Arrow Training Phase" and David was able to reach criterion within four sessions. David met criterion in the fewest number of sessions (2) for both the medium and small arrow training phases. However, when we omitted the arrow entirely, his accurate responding decreased 38% for two sessions. Thus, we reintroduced the small arrow and accurate responding increased to 100% across two sessions, meeting criterion. Due to the initial unsuccessful attempt to omit the small arrow entirely, we imbedded a less salient within-stimulus prompt in the form of a red dot on the conditional stimulus's

eye. Doing so facilitated David's meeting response criteria. During the final "No Arrow Phase", David's responding was at 100% accuracy across two sessions. However, his responding during two maintenance probe session was at 88% and 75% accuracy, respectively. His accuracy further decreased when responding to generalization probes (i.e., 75% and 63% for two sessions).

Jake's responding during baseline was similar to David's in that he did not answer accurately on any of the trials across two sessions. His responding during the initial generalization probe yielded the same results (0%). Interestingly, when we instituted the large arrow training, Jake's responding remained at 0% accuracy across two sessions and thus, we instituted the large session in accompaniment with a gestural prompt (similar to that which was used in David's training). This inclusion served to increase Jake's responding to 100% accuracy across two sessions. We then removed the gestural prompt and his response accuracy remained at 100% for the large arrow training. Jake continued to respond at the 100% across two-session criterion mark for the remaining training sessions (medium, small, and no arrow training). However, his responding during maintenance probes decreased to 75% across two sessions, even though responding in absence of the arrows with familiar items remained at criteria. Jake's responding during the generalization probes further decreased to 0% across two sessions.





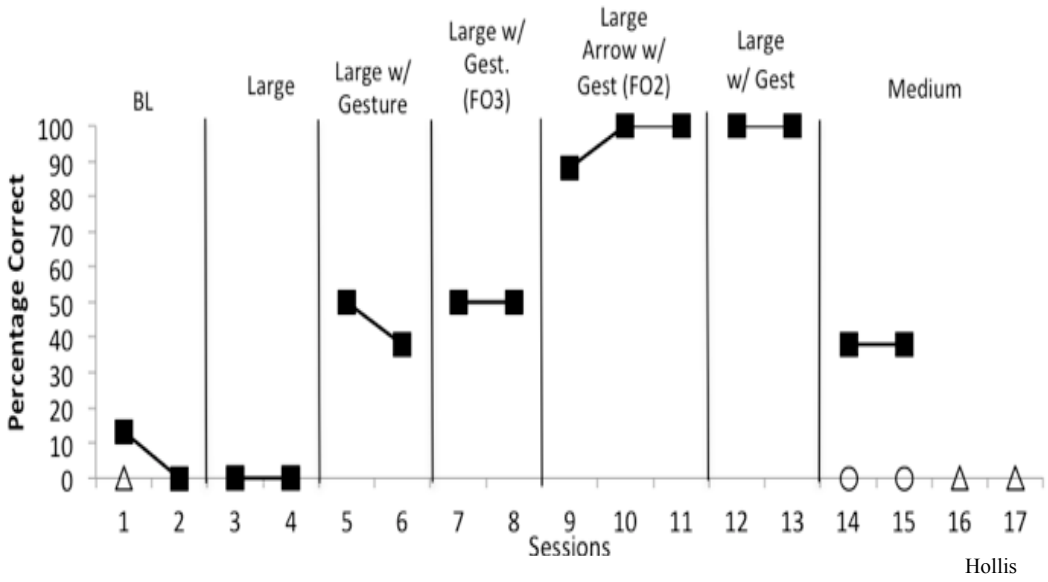


Figure 1. Percentage correct for each participant for baseline, training, generalization (open circles) and maintenance (open triangles)

Lastly, Hollis's responding during baseline was well below the criterion of 100% across two consecutive sessions. We then implemented the large arrow training procedure, and similar to that of Jake, Hollis's responding remained at 0% across two consecutive sessions. As with the other two participants, we then included a gestural prompt to promote Hollis's accurate responding. Responding increased to 50% and 38% across two sessions, respectively. Therefore, we decreased the field size by removing one of the distracters and responding only slightly increased to 50% across two sessions. We further decreased the field size, such that only the left and right stimuli were present during session trials in this phase. This modification increased accurate responding, and Hollis met response criterion within three sessions. We then reintroduced a full field size (FO4) in addition to the gestural prompt, and accurate responding remained at criterion. Due to the Hollis's moving schools, we ran into time constraints that necessitated our moving to a less salient prompt (i.e., medium arrow) than the original procedure outline. Accurate responding decreased to 38% yielded responding at 0% accuracy. Hollis's responding during generalization probes was at 0% for two consecutive sessions.

4. Discussion and Conclusions

The results of the present study indicate the utility of multiple-exemplar training to facilitate a prerequisite skill to perspective taking in persons with an autism diagnosis. Similar to that of previous research (Gould et al., 2011; Mundy, Sigman, & Kasari, 1995; Ozonoff & McEvoy, 1994) all three participants failed to respond accurately when asked, "What does he see?" in the presence of conditional and discriminative stimuli. These data support previous research in that individuals with autism show a deficiency in a gaze-following repertoire, or more accurately, the absence of one.

As in the Gould et al. (2011) findings, participants of the current study required additional prompts beyond that which were originally planned to facilitate accurate responding using the aforementioned training paradigm. Interestingly, increased accuracy in responding occurred for all three participants when and only when gestural prompts were introduced, and this occasioned correct responding with less salient prompts in subsequent sessions. This finding may be attributable to the novelty of the entire training paradigm in general. Most often is the case that, matching-to-sample, table-top tasks are structure such that the sample stimulus is located at/near the top of the table, with the comparison stimuli located below the sample stimulus in a horizontal line. The current structure was set up with the conditional stimulus (or sample stimulus) at the center of the table, with the discriminative stimuli (comparison stimuli) located at four cardinal directions from the conditional stimulus. If this does account for the low accuracy initially, then subsequent research would do well to vary the way(s) in which the stimuli were placed with respect to one another so as to increase flexibility in responding.

Of the three participants, only David (3-years-old) maintained a level of responding indicating that the prerequisite skill had maintained and generalized across objects (88% and 75% for two sessions) and generalized in later probes (75% and 63% for two sessions). This finding was interesting in that David had a verbal repertoire comparable (if not less developed) than those of the older participants, Jake and Hollis. While Jake maintained relatively high accuracy during two maintenance probes

(75% for both), responding during generalization probes fell to 0% for two consecutive sessions. The implications of these findings suggest that, at least for Jake, the contextual factors involved in occasioning accurate responding were too different from the table-top procedure to that of the actual room and with the actual person. Hollis required the most modifications to facilitate accurate responding given the current paradigm. Anecdotally, we noticed that Hollis fixated on the items on the desk vs. attending to instruction being provided. His responding was often incorrect in the form of picking up the stimulus cards and flapping them in a stereotypic fashion. Therefore, we decided to decrease the field size in an effort to minimize stereotypic responding, and increase the salience of the relevant stimuli.

REFERENCES

[1] Bakeman, R. & Adamson, L. (1984). Coordinating attention to people and objects in mother-infant and peer-infant interaction. *Child Development, 55,* 1278-1289.

[2] Barnes-Holmes, D., & Barnes-Holmes, Y. (2000). Relational frame Theory and Skinner's *Verbal Behavior:* A possible synthesis. *The Behavior Analyst, 23,* 69-84.

[3] Charman, T., Swettenham, J., Baron-Cohen, S., Cox, A., Baird, G., & Drew, A. (1997). Infants with autism: An investigation of empathy, pretend play, joint attention, and imitation. *Developmental Psychology, 33,* 781-789.

[4] Devany, J. M., Hayes, S. C., & Nelson, R. O. (1986). Equivalence class formation in language-able and language-disabled children. *Journal of the Experimental Analysis of Behavior, 46,* 243-257.

[5] 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.

[6] Gross, A. C., & Fox, E. J. (2009). Relational frame theory: An overview of the controversy. *The Analysis of Verbal Behavior, 25,* 87-98.

[7] Hayes. S. C., Barnes-Holmes, D., Roche, B. (2001). Relational frame theory: A post-Skinnerian account of human language and cognition. New York: Plenum Kluwer Academic.

[8] Hayes S. C., Blackledge, J. T., & Barnes-Holmes, D. (2001). Language and cognition: Constructing an alternative approach within the behavioral tradition. In Hayes S.C., Barnes-Holmes D., Roche B. (Eds.) Relational frame theory: A post-Skinnerian account of human language and cognition (pp. 3-20). New York: Kluwer Academic/Plenum.

[9] Howlin, P., Baron-Cohen, S., & Hadwin, J. (1999). Teaching children with autism to mind-read: A practical guide. Chichester, England: Wiley.

[10] Leigland, S. (1997). Is a new definition of verbal behavior necessary in light of derived relation responding? *The Behavior Analyst, 20,* 3-9.

[11] Lipkins, G. Hayes, S. C., & Hayes, L. J. (1993). Longitudinal study of derived stimulus relations in an infant. *Journal of Experimental Child Psychology, 56,* 201-239.

[12] McHugh, L. (2004). Integrating relational frame theory and theory of mind: An empirical investigation. Unpublished doctoral thesis, National University of Ireland, Maynooth.

[13] McHugh, L., Barnes-Holmes, Y., & Barnes-Holmes, D. (2004). Perspective-taking as relational responding: A developmental profile. *Psychological Record, 54,* 115-145.

[14] McHugh, L., Barnes-Holmes, Y., O'Hora, D., & Barnes-Holmes, D. (2004). Perspective taking: A relational frame analysis. *Experimental Analysis of Human Behavior Bulletin, 22,* 4-10.

[15] Michael, J. (1984). Verbal behavior. *Journal of the Experimental Analysis of Behavior, 42,* 363-376.

[16] Mundy, P., Sigman, M., & Kasari, C. (1990). A longitudinal study of joint attention deficits in autism. *Journal of Autism and Related Disorders, 20*(1), 115-128.

[17] Ozonoff, S., & McEvoy, R. R. (1994) A longitudinal study of executive function and Theory of Mind development in autism. *Development and Psychopathology, 6,* 415-431.

[18] Ozonoff, S., & Miller, J. N. (1995). Teaching Theory of Mind. A new approach to social skills training for individuals with autism. *Journal of Autism and Developmental Disorders, 25*(4), 415.

[19] Rehfeldt, R., Dillen, J. E., Ziomek, M. M., & Kowalchuck, R. (2007). Assessing relational learning deficits in perspective-taking children with high functioning Autism spectrum disorder. *Psychological Record, 57,* 23-47.

[20] Schlinger, H. D. (2009). Theory of Mind: An overview and behavioral perspective. *The Psychological Record, 59,* 435-448.

[21] Skinner, B. F. (1945). The operational analysis of psychological terms. *Psychological Review, 52,* 270-277.