How Teaching Perspective Taking to Individuals with Autism Spectrum Disorders Affects Social Skills: Findings from Research and Suggestions for Practitioners

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Abstract

Behavior-analytic practitioners working with individuals with autism spectrum disorders (ASDs) may be approached to incorporate perspective taking into a client's programming. Teaching perspective taking to individuals with ASDs has received attention in both the developmental psychology and, more recently, the behavior-analytic literature. The results of our review of the current evidence suggest that although perspective-taking repertoires believed to be related to social skills can be taught (false belief task performance, deictic frames), only directly teaching the social skills of interest (or applied perspective-taking skills) results in improvements in socially important behavior. The aim of this article is to provide practitioners with the current state of research on how teaching perspective taking affects social skills and to provide suggestions on how these findings might be incorporated into their practice.

Keywords Perspective taking · Theory of mind · Relational frame theory · Deictic frames · Social skills

Perspective taking, also referred to as theory of mind,¹ is thought by some to underlie social skills (e.g., Frith, 1989; Happé, 1994), and there is evidence for positive correlations between measures of theory of mind and general social functioning (e.g., Frith, Happé, & Siddons, 1994). This suggested link has led researchers to evaluate strategies for teaching perspective taking with individuals with autism spectrum disorders (ASDs) as a way to improve social skills. This trend is

even more evident in the numerous commercially available curricula with this same goal (e.g., Brennan, 2011; Howlin, Baron-Cohen, & Hadwin, 1999; Ordeltx, 2012; Toomey, 2002; Winner, 2005). The goal of this article is to review the research on the effects of teaching perspective taking on social skills with individuals with ASDs. We also provide recommendations for practitioners on how to proceed when asked to incorporate perspective taking into a client's programming. These suggestions are guided by both research and the *Professional and Ethical Compliance Code for Behavior Analysts* published by the Behavior Analyst Certification Board (BACB, 2014; effective January 1, 2016; hereafter referred to as "the BACB Code").

Perspective taking was defined by Howlin et al. (1999) as "the ability to infer other people's mental states (their thoughts, beliefs, desires, intentions, etc.), and the ability to use this information to interpret what they say, make sense of their behaviour, and predict what they will do next" (p. 2). Howlin et al. (1999, pp. 9–11) give examples of perspective taking, such as reading and responding to intentions, reading the listener's level of interest in one's speech, detecting a speaker's intended meaning, and deceiving or understanding deception.

¹ As behavior analysts, we prefer to use the term *perspective taking* because (a) it does not invoke the same mentalistic assumptions associated with *theory of mind* and (b) the verb *perspective taking* better directs us toward an analysis of *behavior*. However, we also recommend that practitioners choose their battles over semantics when speaking with those outside the field to help build collaborative and more productive working relationships (see arguments by Axelrod, 1992; Bailey, 1991).

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Three Types of Perspective Taking

Research on teaching perspective taking has generally taken one of three routes: teaching performance on false belief tasks, teaching deictic frames, and teaching socially important behavior that requires accounting for the knowledge of others (or *applied perspective taking*; Hutchins, Prelock, Morris, Benner, LaVigne, & Hoza, 2016).

The “litmus tests” of theory of mind are false belief tasks.² False belief tasks were initially developed for the purpose of determining the capacity of chimpanzees (e.g., Premack & Woodruff, 1978) and children (e.g., Dennett, 1978) to infer the private events of others. On average, individuals with ASDs fail false belief tasks more often than typically developing children matched for language ability and mental age (e.g., Baron-Cohen, 1989a; Perner, Frith, Leslie, & Leekam, 1989; Reed & Peterson, 1990; Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998). The dependent variables in false belief tasks are verbal (vocal or point) responses by a participant to an evaluator’s question regarding the false belief of a character in a story. In the most well-known task, the Sally–Anne or unexpected transfer task (Baron-Cohen, Leslie, & Frith, 1985; Dennett, 1978; Wimmer & Perner, 1983), for example, the participant is asked to watch a skit in which Sally places a marble in a basket before walking away. Next, Anne moves Sally’s marble from the basket to a box. When Sally returns to get her marble, the participant is asked where the character thinks the item is, where the character will look for the item, or both. Several other tasks are also frequently used, such as the unexpected contents or “Smarties” task (Baron-Cohen, 1989a; Hogrefe, Wimmer, & Perner, 1986; Perner, Leekam, & Wimmer, 1987) and the second-order false belief task (Baron-Cohen, 1989b; Perner & Wimmer, 1985).

Because these tasks became the accepted measure of theory of mind and because theory of mind was hypothesized to be a core deficit in ASDs (e.g., Baron-Cohen et al., 1985; see also the discussion by Tager-Flusberg, 2007, on a shift away from this view), researchers have attempted to teach individuals with ASDs to pass these tasks. Several strategies have been successful in teaching individuals with autism to pass false belief tasks, such as direct teaching (e.g., Feng, Lo, Tsai, & Cartledge, 2008; Swettenham, 1996), video modeling (e.g., Charlop-Christy & Daneshvar, 2003; LeBlanc, Coates, Daneshvar, Charlop-Christy, Morris, & Lancaster, 2003), thought bubbles (e.g., Paynter & Peterson, 2013; Wellman, Baron-Cohen, Caswell, Gomez, Swettenham, Toye, & Lagattuta, 2002), and the “mind is like a camera” analogy

(e.g., Fisher & Happé, 2005; McGregor, Whiten, & Blackburn, 1998a, b; Swettenham, Baron-Cohen, Gomez, & Walsh, 1996).

Over the last several years, behavior analysts working under a relational frame theory (RFT) perspective have begun investigating perspective taking as relational responding, particularly as deictic relations (see Montoya-Rodríguez, Molina, & McHugh, 2017, for a recent review). Lovett and Rehfeldt (2014) stated that “deictic relations involve a specification of the stimuli to be related based on the perspective of the speaker as opposed to the formal properties of the stimuli” (p. 22). Deictic relational responding has been successfully taught to individuals with autism using multiple-exemplar instruction of the three deictic relations (I–you, here–there, and now–then) at three levels of complexity (simple, reversed, and double-reversed). Typically, participants are presented with brief descriptions of relations and are asked to respond to questions (McHugh, Barnes-Holmes, & Barnes-Holmes, 2004). For example, a reversed relation would be “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?” (Lovett & Rehfeldt, 2014, p. 23).

Social skills thought to require perspective taking might be called “applied perspective taking.” Applied perspective-taking skills are likely to result in socially mediated reinforcement, excluding “educational” reinforcement (Skinner, 1957), and therefore are socially functional. Examples of applied perspective taking include deceiving, providing listener-appropriate detail in conversation, persuading, and helping (Frith et al., 1994; Howlin et al., 1999; Hughes & Leekam, 2004; Peterson, Garnett, Kelly, & Attwood, 2009).

Method

We sought to review the research on the effects of teaching perspective taking on social skills of individuals with ASDs. To identify relevant research, we conducted online database searches using EBSCOhost (PsycINFO, PsycARTICLES, Academic Search Premier, and Education Research Complete). Specific search terms were designated for each of the three types of perspective taking. To determine the relation between improved false belief performance and socially important behavior, the following subject terms were used in the search in relevant three-word combinations: *perspective taking*, *theory of mind*, and *false belief*; *teaching*, *training*, and *intervention*; and *autism*. To determine the relation between improved responding to deictic relations and socially important behavior, the following subject terms were used in the search in relevant three-word combinations: *perspective taking*, *relational frame theory*, *deictic frames*, and *autism*. To determine the effect of teaching applied perspective taking on the socially important behavior taught,

² Given the extensive body of research on theory of mind and perspective taking, we have limited the scope of our review to research related to belief-based perspective taking (also referred to as *cognitive perspective taking*; e.g., Mori & Cigala, 2016), or behavior that accounts for others’ private events that fall under the heading of belief (know, think, believe, etc.).

teaching, training, intervention, and autism were combined in relevant three-word combinations with the following words or phrases: *deception, lying (lie), white lie, game, game strategy, hide and seek, cheat, sabotage, joke, secret, fairy tales, double bluff, listener appropriate detail, conversation, conversation detail, referential communication, persuasion, correcting false belief, and helping* (examples from Frith et al., 1994; Howlin et al., 1999; Hughes & Leekam, 2004; Peterson et al., 2009). We reviewed abstracts or full texts to determine the relevance of each study. Reference lists and subsequent citation lists (i.e., “cited by” lists) also served as additional resources.

Studies chosen for inclusion met the following general criteria:

1. The study was published in English in a peer-reviewed journal prior to January 1, 2017.
2. A primary aim of the study was teaching (i.e., included manipulations of the presentation of materials, prompting, and/or consequences for responding).
3. Teaching was conducted with at least one participant diagnosed with ASD (consistent with the current *Diagnostic and Statistical Manual of Mental Disorders* [5th ed.; *DSM-5*], American Psychiatric Association, 2013, definition, including Asperger’s disorder and pervasive developmental disorder not otherwise specified).
4. Baseline and posttreatment measures (direct or indirect) of functional social skills (i.e., the taught response would likely result in socially mediated reinforcement, excluding “educational” reinforcement; Skinner, 1957, p. 84) were taken.
5. The report included enough methodological detail on teaching procedures to be sufficiently technological or included enough detail that a “typically trained reader could replicate that procedure well enough to produce the same results, given only a reading of the description” (Baer, Wolf, & Risley, 1968, p. 95).
6. The response or responses being taught required belief-based perspective taking (i.e., accounting for the beliefs or knowledge of another person).

Interrater Agreement

A second researcher independently conducted online database searches for 33% of keyword combinations. This second researcher then independently determined if each paper identified in those searches met the inclusion criteria described previously. Interrater agreement was calculated by dividing the number of agreements on articles that met the inclusion criteria divided by the total number of agreements plus disagreements multiplied by 100. Interrater agreement was 100%.

Results

A summary of the results of the literature investigating the effects of teaching perspective taking on social skills is presented in Table 1.

False Belief Performance

Our search revealed four papers (Chin & Bernard-Opitz, 2000; Feng et al., 2008; Fisher & Happé, 2005; Hadwin, Baron-Cohen, Howlin, & Hill, 1997) that taught false belief performance, measured the effects of that teaching on social skills, and met our additional inclusion criteria. Generally, research showed that improvements in false belief task performance did not also produce improvements in socially important behavior.

Hadwin, Baron-Cohen, Howlin, and Hill (1996) taught 10 participants with ASDs five levels of belief-based perspective taking (simple visual perspective taking, complex visual perspective taking, seeing leads to knowing, predicting actions based on true belief, and predicting actions based on false belief). Teaching, however, was limited to eight sessions; thus, not all participants learned to pass each task. Results did show that the mean number of levels that participants passed after teaching was statistically greater than that passed before teaching. In a subsequent paper, Hadwin et al. (1997) also compared the conversation skills of these same participants before and after teaching. Conversation skills were measured during adult–child interactions with a book, and vocalizations were categorized as answers (“if a child just comprised a one-word or a one-sentence response to a prompt,” p. 525), developments (“if a child produced an utterance that was two or more sentences,” p. 525), perseverations (“if responses were echolalic or repetitive,” p. 525), or unclear responses (“if responses were unclear from the tape or were unrelated to the book,” p. 525). The number of mental state words (categorized as emotion, volition, cognition, or perception) spontaneously used was also recorded. Results showed that there were no changes in measures of appropriate conversation skills, “developments,” or the number of mental state words used following teaching.

Chin and Bernard-Opitz (2000) evaluated the correlation between false belief performance and social skills by first teaching conversation skills and then measuring the effect on false belief performance. The researchers taught three participants with ASDs five conversation skills: initiating a conversation, taking turns, listening, maintaining a conversation topic, and changing the topic. Teaching was limited to nine sessions, and only one participant experienced training in each of these skills. Outcomes of the teaching were measured in 3-min conversations. In addition, false belief task performance (unexpected transfer and contents tasks for two participants, second-order false belief task for the other) was measured

Table 1 Summary of the results of the literature investigating the effects of teaching perspective taking on social skills

Type of perspective taking	Study	Social skill outcome measure	Improvements in social skill?	Limitation(s)
False belief performance	Chin and Bernard-Opitz (2000)	Taught conversation skills	N/A ^a	Did not teach to mastery
	Feng et al. (2008)	In vivo social skills measurement	Yes	Social skill improvements confounded by other social skills taught in addition to false belief performance
	Fisher and Happé (2005)	Teacher questionnaire of applied perspective-taking skills	No	Indirect measure of social skills (questionnaire)
	Hadwin et al. (1997)	Appropriate conversation skills and number of mental state words used	No	Did not teach to mastery
Deictic framing	None	—	—	Lack of research on the effects of teaching deictic framing on social skills
Applied perspective taking	Bergstrom et al. (2016)	Telling socially appropriate lies	Yes	Lack of social validity data
	Rannick, Persicke, Tarbox, and Kornack (2013)	Responding to deceptive statements	Yes	Lack of social validity data
	Reinecke et al. (1997)	Performance on penny-hiding game	Yes	Lack of social validity data; improvements in performance during baseline, which included reinforcement

^a No improvement on false belief performance outcome measure

intermittently before, throughout, and after teaching. Although participants improved in some aspects of conversation skills relative to baseline, none of the participants ever passed false belief tasks.

Using a “mind is like a camera” analogy (Swettenham et al., 1996) to teach the unexpected contents false belief task across a maximum of 10 sessions, Fisher and Happé (2005) found that the number of participants who passed this task was statistically greater following the teaching. When teacher responses on a questionnaire about socially important perspective-taking behavior were compared before and after teaching, however, the difference between the scores was not statistically significant. Following teaching, participants also improved on a penny-hiding game (Gratch, 1964; see also Baron-Cohen, 1992)—a more socially functional measure of perspective taking in which the participant hides an item in one hand and then presents both fists for the other player to choose. Although participants who experienced teaching in false belief task performance improved on this game, another group of participants who experienced executive function teaching also improved. Thus, it is unclear which variables were responsible for the improvements.

Feng et al. (2008) taught an 11-year-old boy with ASD to pass both the unexpected transfer and second-order false belief tasks. The participant was also taught other skills thought to contribute to false belief performance (e.g., two types of visual perspective taking, seeing leads to knowing, true belief) and other social skills (anger control, greetings, and needs expression). Once these skills were mastered, role-plays with feedback with both adults and peers were also conducted.

Before, during, and after teaching, the researchers also periodically measured the participant’s appropriate and inappropriate social interactions with peers. Although increases in appropriate social interactions and decreases in inappropriate social interactions were observed, these results cannot be attributed to learning false belief task performance alone, as other social skills were also taught.

Deictic Frames

Our search revealed that although four studies have successfully taught individuals with ASDs to respond to deictic relations (Belisle, Dixon, Stanley, Munoz, & Daar, 2016; Gilroy, Lorah, Dodge, & Fiorello, 2015; Jackson, Mendoza, & Adams, 2014; Lovett & Rehfeldt, 2014), none evaluated the effects of this teaching on social skills. Two of these studies (Jackson et al., 2014; Lovett & Rehfeldt, 2014) and an additional study with typically developing children (Montoya-Rodríguez & Molina Cobos, 2016) did evaluate the effects of improved deictic responding on false belief performance, but none of these studies showed any changes in the latter measure.

Given the increase in empirical investigations into the relational frame account of perspective taking (Montoya-Rodríguez et al., 2017), this body of research was included despite the lack of studies into the relation between improved deictic framing and social skills. Based on the current lack of evidence of this relation, we do not recommend that practitioners adopt teaching deictic framing as a way to improve social skills.

Applied Perspective Taking

Our search produced three studies that directly taught applied perspective taking (Bergstrom, Najdowski, Alvarado, & Tarbox, 2016; Ranick, Persicke, Tarbox, & Kornack, 2013; Reinecke, Newman, Kurtz, Ryan, & Hemmes, 1997), but this search also revealed several areas of related research that could inform behavior-analytic practice.

Dependent Variables Reinecke et al. (1997) taught participants to hide an object in a guessing game similar to the penny-hiding game. Participants were required to engage in five responses: hiding their hands while hiding the object, ensuring that the object was not visible in the fist, keeping both fists closed (two responses), and not indicating which fist held the object. Bergstrom et al. (2016) taught participants to tell socially appropriate lies—or “white lies”—when presented with two scenarios: receiving an undesired gift and being asked about another’s appearance. The target response had three parts: the lie that he or she liked the gift or the appearance, a sincere tone of voice, and a sincere facial expression that included smiling. Reinforcement, however, was contingent upon only the lie. Ranick et al. (2013) taught participants to identify and respond to deceptive statements made by others with the intention of excluding them from activities or gaining access to their items. A correct response was determined when “the participant identified that the therapist or peer was being deceptive by asserting that he/she could not exclude the participant or take his personal items” (Ranick et al., 2013, p. 505).

Independent Variables All three studies taught applied perspective taking using modeling and contingent feedback. In the study by Reinecke et al. (1997), baseline sessions of the penny-hiding game consisted of two experimenters modeling two trials of the game prior to the participant taking the role of the guesser for five trials (Condition 1) and then taking the role of the hider for 10 trials (Condition 2). Independent guessing resulted in edible and social reinforcement, and incorrect responses resulted in prompting. While the participant acted as the hider, noncontingent social reinforcement was delivered throughout sessions and noncontingent edible reinforcement was delivered at the end of sessions. Thus, baseline conditions consisted of both modeling and contingent feedback, and two of the three participants’ hiding improved. For the third participant, edible reinforcement was made contingent upon “independent approximations” (Reinecke et al., 1997, p. 131) of hiding and produced modest gains. In addition to modeling and contingent feedback, Ranick et al. (2013) and Bergstrom et al. (2016) both also used rules and incorporated multiple exemplars of both discriminative stimuli and social partners. Results from both studies showed that responding generalized when untrained discriminative stimuli and social partners

were presented. Ranick et al. also assessed skill maintenance after 1 month, and responding remained above baseline levels for all three participants.

Perhaps the greatest clinical limitation of these studies is that none assessed the social validity of the response, treatment, or outcome. Ranick et al. (2013) stated that “participants’ parents and clinical teams prioritized the ability to identify and respond appropriately to deception as an important target for clinical intervention” (p. 505), and Bergstrom et al. (2016) “selected participants for inclusion based on parental indication that their children made blatantly honest utterances often interpreted as rude” (p. 2). It is not clear, however, if the changes they made in participants’ behavior, albeit graphically convincing, were sufficient to be rated as favorable to stakeholders.

Conclusions of the Review

To date, only teaching applied perspective taking has resulted in improved social skills. In other words, although theory of mind and deictic framing are thought to be necessary for social behavior that accounts for the knowledge or beliefs of others, the evidence thus far indicates that learning either of these repertoires is not sufficient to improve social skills.

Practitioners should note the paucity of research into the effects that teaching any of these types of perspective taking has on social skills (see Table 1). In particular, there has not been any research into the effects of teaching deictic framing on social skills with individuals with ASDs. In addition, limitations to the studies teaching false belief performance may have contributed to the lack of support for teaching these skills. Neither Chin and Bernard-Opitz (2000) nor Hadwin et al. (1997) taught to mastery, and improvements in outcome measures may have been seen if the participants had experienced additional teaching. Fisher and Happé (2005) used an indirect measure of social skills—a questionnaire completed by teachers—that may not have accurately shown improvements after learning false belief performance. Feng et al. (2008) taught other social skills in addition to false belief performance, making the effects of teaching on improvements in measured social skills unclear.

Despite the evidence supporting teaching applied perspective taking to improve social skills, practitioners should again be cautioned that there are currently only three studies describing effective procedures, and these demonstrations lack social validity data, particularly with respect to stakeholders’ satisfaction with the outcomes. In addition, the previously noted experimental design limitation of Reinecke et al. (1997) should be taken into consideration.

Suggestions for a Behavior–Analytic Approach to Teaching Applied Perspective Taking

Based on the results of our literature review and because clients have the right to effective treatment (Element 2.09 of the BACB Code, 2014), we recommend that practitioners teach applied perspective-taking skills directly when stakeholders report a lack of perspective taking to be a problem. Practitioners should convey the lack of supporting evidence for teaching false belief performance or deictic framing to stakeholders when appropriate. Because there is limited research targeting applied perspective taking, we have also examined related research and the BACB Code (2014) to develop suggestions for practitioners. In the following section, we offer guidance for determining the most appropriate dependent and independent variables and provide suggestions for assessing social validity.

Determining the Dependent Variable

Stakeholder Interviews When approached by a client's stakeholder to incorporate perspective taking into the client's curriculum, we advise practitioners to begin by interviewing the stakeholder requesting the programming and any other relevant stakeholders (see Fig. 1). These interviews will help the clinician to operationally define the behavior(s) the stakeholder would like to see improved.

During interviews, the clinician may find that the stakeholder's concerns have been prompted by a poor score on an assessment of perspective taking, such as a developmental neuropsychological assessment (NEPSY–II) theory of mind subtest (Korkman, Kirk, & Kemp, 2007) or a Theory of Mind Inventory (TOMI; Hutchins, Prelock, & Chace, 2008). Such assessments, however, typically focus on false belief performance or stakeholder report of perspective-taking skills. If this is the case, we encourage practitioners to discuss with the stakeholder the lack of evidence for teaching false belief performance as a way of improving social skills and our ethical obligation to ensure clients' right to effective treatment (Element 2.09 of the BACB Code, 2014). In conjunction with this discussion, the clinician might provide examples of *applied* perspective-taking repertoires that might be relevant and could be taught to address this deficit.

Stakeholder interviews can also help determine the priority of teaching perspective taking (Element 4.02 of the BACB Code, 2014). For some clients, particularly those who exhibit dangerous challenging behavior or whose access to treatment is limited, improving perspective-taking skills may not be a high priority (Element 4.05 of the BACB Code, 2014). Although intuitively compelling arguments can be made for improved understanding of the knowledge and beliefs of others having a positive impact, teaching perspective taking is not an evidence-based treatment for

Fig. 1 Suggestions for a behavior–analytic approach to teaching applied perspective taking

challenging behavior (Element 1.01 of the BACB Code, 2014). Care should also be taken if there is concern that the introduction of an additional teaching target would hinder the progress of ongoing treatment (Element 4.05 of the BACB Code, 2014). This should also include consideration of the client's current repertoire and prerequisite skills needed for the identified target response (Element 4.05 of the BACB Code, 2014).

Should the stakeholder and clinician determine that teaching perspective taking is a priority, additional interview questions can also help the clinician gain insight into the social context of concern and what more appropriate response(s) might be taught. For example, questions may be about specific environments, the most relevant social partners (e.g., specific peers, siblings), and the particulars of the social context (e.g., during games, conversations). In addition, questions about how the client typically responds, how others in the environment have reacted to the client's response and the client's subsequent reaction to their behavior, and how the stakeholder would like to see the client behave instead may inform the response to be taught.

Client Observation(s) Following interviews, we also advise the clinician to directly observe the client under the conditions identified as areas of concern. These observations should be conducted across environments in which the relevant antecedent conditions might occur, with the clinician noting all aspects of the current contingency. These observations also provide an opportunity for the clinician to observe the behavior of others in the client's verbal community. Specifically, the clinician may take note of how often the social situation of interest occurs, specific aspects of that situation for use as discriminative stimuli, and the consequences that follow both appropriate and inappropriate responses in that context. These variables should then be incorporated into programming.

Formal Assessment Although some contexts may lead to a relatively obvious target response, for others, coming to the most socially valid target response may be more challenging. For example, a client may frequently report the inappropriate behavior of his peers to authority figures (i.e., “tattling”). Determining the situations under which this response is and is not desired may prove to be difficult, and teaching must then incorporate these finer discriminations. When identifying the most relevant target response proves to be challenging, the work of Minkin, Braukmann, Minkin, Timbers, Timbers, Fixsen, et al. (1976) provides a useful model for practitioners. These researchers acknowledged the difficulties that can arise when designing social skills programming and

presented a four-step process to ensure that the targeted response is socially valid:

- (1) specification of the potential relevant behavioral components,
- (2) social validation of the importance of each of the behavioral components,
- (3) training of the components, and
- (4) social validation that the increases in the specified behavioral components resulted in increased level of judged skill. (p. 128)

A clinician could also apply this strategy to identify perspective-taking responses. To specify the relevant behavioral components (Step 1), the clinician might observe both the client and the peers who are likely to be more skilled socially, focusing on responses that distinguish the behavior of the more skilled person. Observing more socially skilled peers may also indicate which social responses will be reinforced in their specific shared environment(s). The clinician might gain social validation of the behavioral components identified from these observations (Step 2) by asking the stakeholders to point out peers they consider skilled in the social context of concern. The acceptability of those peers' responses should also be confirmed with stakeholders. To provide social validation of the behavior changes (Steps 3 and 4), practitioners should assess stakeholder opinions of the client's performance after teaching and when opportunities to engage in the target response occurred within the client's typical verbal community.

Possible Dependent Variables Here, we provide some suggestions for dependent variables that behavior-analytic practitioners might consider when teaching applied perspective taking. First, we encourage practitioners to consider responses outside the realm of deception given potential ethical implications. Next, we suggest that false belief performance could be extended such that responding is more socially valuable. Finally, we review dependent variables from related research that may also be relevant to individuals with ASDs.

Because the dependent variables used in the aforementioned applied perspective-taking studies all related to deception, we should note here that the BACB Code (2014) states that “behavior analysts do not implement contingencies that would cause others to engage in fraudulent, illegal, or unethical conduct.” It can be argued that the types of deception that have been taught in research thus far would not garner significant concern. In fact, Jaarsma, Gelhaus, and Welin (2012) argued in favor of teaching individuals with autism deception, citing care ethics. They stated: “We think that persons with autism need to be trained in lying and deception in order to live healthier lives in relationship with others” (p. 277). They emphasized that teaching should incorporate rules about the circumstances under which deception is appropriate and gave

the examples of lying to prevent insulting or offending others and when the safety or well-being of others would be threatened by telling the truth (e.g., an armed person asks the location of the intended victim). When a deceptive response is chosen as a target, the clinician is advised to do so responsibly. The ethical implications should be considered and openly discussed with stakeholders throughout programming. In particular, practitioners should discuss and prepare for the possible generalization of deceptive responses to situations where truthfulness is the desired response. Despite the current focus on deceptive responses in the research, we encourage practitioners to consider other applied perspective-taking responses, which we will discuss in greater detail later in this article.

Bell and Kirby (2002) stated that predictions like those required in false belief tasks “are then thought to provide guidelines for reciprocal social interactions (where social interaction is fueled by social understanding)” (pp. 18–19). This speaks to what may be missing from teaching the false belief task alone: teaching individuals how to *apply* what they have learned in a way that will be socially maintained. Should a client have difficulties with social situations similar to false belief scenarios, practitioners might consider extending false belief performance to include socially appropriate responses to the situation. For example, related to unexpected transfer task performance, the client might also be taught to point out to “Sally” that her item is now in a different location (i.e., to correct a false belief). This response would likely result in some form of social reinforcement from “Sally,” whereas merely predicting that she would look in the location she had last put the ball would be unlikely to be met with social reinforcement. Should “Anne” include the client in on the trick, the client might be taught to withhold the information from “Sally” so as to not give away the joke. This could be further extended to revealing the true location of the ball should “Anne’s” intentions appear to be malicious or if “Sally” becomes upset by the trick. Responding in the context of the other false belief tasks could be similarly extended when these are socially relevant for the client.

Descriptive research from developmental psychology can also inform applied perspective-taking targets. O’Neill (1996) described how when a caregiver did not see where a toy was placed, typically developing 2-year-old children supplemented their requests for the toy by tacting the toy, tacting its location, or gesturing. Another example of social responding discriminated on the basis of the social partner’s knowledge is giving listener-appropriate detail in conversations. For example, in a questionnaire developed to assess applications of perspective taking, Peterson et al. (2009) asked parents, “Does the child expect you to know things you could not know (e.g., events at home when you were not there)?” (p. 109). Studies teaching referential communication (e.g., Grossman, Peskin, & San Juan, 2013; Olivar-Parra, De-La-Iglesia-Gutiérrez, & Forns, 2011), which use tasks that require that enough detail be given to re-create something (e.g.,

picture, magic trick) from the instruction alone, may prove to be useful when developing programming to teach listener-appropriate detail. The task used by Begeer, Malle, Nieuwland, and Keysar (2010) is particularly relevant, as it requires the participant’s behavior to be discriminated based on the knowledge of his or her social partner. Two participants were seated on opposite sides of a vertical grid that held objects, some of which were very similar (e.g., a large spoon and a small spoon). Some of the sections of the grid were blocked such that only one participant could see the object it contained. The task was for one participant to instruct the other in moving the objects between the sections of the grid. This task may serve as a starting point, but as with false belief tasks, we encourage practitioners to also extend this performance to more socially valuable behavior.

DeBernardis, Hayes, and Fryling (2014) suggested that, in perspective taking, responding is also discriminated on the basis of the history with the other person. They described a continuum of perspective taking that ranges from predicting the behavior of someone based on only the current situation to having a lengthy enough history with the other person that predictions can be made in novel situations. One strategy for teaching such a discrimination has been suggested in a commercially available curriculum that involves clients learning pertinent information about peers for later use in conversation (“friend files”; Winner, 2005), but the efficacy of this strategy has not yet been demonstrated.

Designing the Independent Variable

The results of our review show that very few empirical studies on teaching applied perspective taking have been published. However, the available literature does provide at least initial evidence supporting the use of repeated exposure to the social scenario with models of the appropriate response paired with contingent feedback. Practitioners might also consider presenting participants with rules and incorporating multiple exemplars of the discriminative stimuli and social partners to promote generalization based on the successes of Ranick et al. (2013) and Bergstrom et al. (2016).

We also encourage practitioners to ensure that responding is under the control of the desired stimuli by incorporating nonexamples (S-delta) into teaching. For example, Bergstrom et al. (2016) could have also included scenarios in which a white lie might not be appropriate, such as when a friend asks if he has food in his teeth. Practitioners teaching deception in games might incorporate team games that would require the client to deceive his opponents but not those on his own team. Ensuring that responding is under the appropriate stimulus control may also prevent unwanted generalization, particularly of deceptive responses, to situations in which the taught response is not socially valid.

Practitioners should also take care to incorporate the necessary discriminative stimuli into teaching. As exemplified in Ranick et al. (2013), responding to another's deceptive statement may not necessarily require the participant to infer the knowledge of the other person. For example, one lie included in this study was "This is mine. I brought it from home" (p. 505). It is not clear if the participant had sufficient information to infer the other's beliefs. Perhaps the person had brought that same item from home that day and was simply mistaking the participant's identical item for his own. A more convincing demonstration that the participant was accounting for the knowledge of the other person might include exposure to the other person gaining specific knowledge coupled with opportunities to respond to both accurate and deceptive statements. For example, a show-and-tell activity could provide the context for others to gain knowledge of the items and to whom they belong. Then, when another person stated the participant's item was his, the participant could not mistake the deceptive statement for an unintentional error. Assessing participant responses to interspersed true statements, such as the same statement but in reference to an item that actually was owned by that person, would then provide evidence that the participant's behavior was discriminated on the basis of an inference about the other person's knowledge. Rarely, however, are the lies we encounter in our everyday lives so evident, and more skilled deceivers likely take measures to ensure that this is the case. We hope that this brief discussion encourages the reader to recognize and carefully consider the complexity of the stimuli to which the client must respond when designing programming.

Practitioners might also consider teaching applied perspective taking as a form of problem solving. Recently, Taylor-Santa, Kisamore, Reeve, and Sidener (2015) suggested that this might be done by teaching rules (e.g., seeing leads to knowing) and problem-solving strategies, such as self-prompts (Sautter, LeBlanc, Jay, Goldsmith, & Carr, 2011) and visual imagining (Kisamore, Carr, & LeBlanc, 2011). To use a previous example, a clinician may be interested in teaching participants to vary the degree of detail given in a conversation according to the conversation partner's previous knowledge of the topic. To do this, the clinician might teach the participant to apply a "seeing leads to knowing" rule before bringing up a topic. For example, before telling a story about another person, the participant should ask himself privately, "Did John [current conversation partner] see Sam hit that home run?" If the participant is able to respond that John did not, then it would be appropriate to tell John about the home run. If the participant knows that John did see Sam's home run, then the appropriate response might be to include comments about the event (e.g., "Wasn't Sam's home run awesome?") or to choose a different topic of conversation. Should the participant be unable to give a definitive answer about whether or not John saw Sam's home run, then asking John

directly (e.g., "Did you see Sam's home run?") would be appropriate. Visual imagining could also be incorporated as a remembering strategy by imagining watching Sam hit the home run. The supplemental stimuli provided by this imagining may aid the participant in responding to the question of whether John was also there. Teaching similar to behavioral skills training (e.g., Himle, Miltenberger, Flessner, & Gatheridge, 2004) has been shown to be effective in teaching both self-prompts (Sautter et al., 2011) and visual imagining (Kisamore et al., 2011) as problem-solving strategies to typically developing children, but this finding has not been replicated with children with ASDs.

Practitioners may also consider teaching more than one appropriate response to a social situation. Particularly with social skills, it may be difficult to predict the reliability with which a response will be reinforced by a client's verbal community. One way a client could be taught to respond to extinction is to try another appropriate response if the first one is ineffective. For example, Peters and Thompson (2015) taught participants two responses to regain listener interest during conversations and then also taught participants to engage in the other response if their first was ineffective. Because the schedules of reinforcement for social responses will likely vary somewhat unsystematically, it may be helpful to expose new skills to indiscriminable contingencies under teaching conditions (e.g., Stokes & Baer, 1977).

Assessing Social Validity

Finally, we encourage practitioners teaching applied perspective taking to assess the social validity of the target response, the teaching methods, and the outcome. Ensuring the social validity of the response and outcome is essential to the maintenance of social skills by the client's verbal community. Evaluating social validity, in general, will increase the likelihood that clients are satisfied with the services being provided. Social validity assessments (e.g., Hanley, Jin, Vanselow, & Hanratty, 2014; Haring, Roger, Lee, Breen, & Gaylord-Ross, 1986; see also Schwartz & Baer, 1991, for further discussion of conducting social validity assessments) are typically brief and easily incorporated into conversations about client progress.

Conclusion

The primary aim of this article was to provide guidance for behavior-analytic practitioners who have been asked to incorporate perspective taking into a client's programming. We reviewed three lines of research on teaching perspective taking and subsequent effects on social skills. We found that only directly teaching applied perspective-taking skills has resulted

in improved social behavior. Based on these findings, the BACB Code (2014), and related research, we provided suggestions for how a behavior-analytic clinician might go about teaching perspective taking. We would like to encourage behavior-analytic practitioners to consider designing their programming in such a way that the findings will meet publication standards. Our understanding of teaching applied perspective taking will greatly benefit from more research guided by clinical experience and need.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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