

Understanding Perspective-taking, False Belief, and Deception from a Behavioural Perspective

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ABSTRACT

Perspective-taking, understanding false belief and deception are considered by mainstream psychologists to be critical for competent cognitive development. Theory of Mind researchers, in particular, have devoted considerable attention to these cognitive domains. By contrast, these phenomena have traditionally attracted little or no interest from behavioural psychologists. This situation, however, has begun to change in recent years with behavioural researchers working under the rubric of Relational Frame Theory devoting considerable effort to empirical analyses of these cognitive abilities. The current paper reviews some of the first empirical evidence generated by the relational frame approach to perspective-taking, false belief and deception as related relational skills. The results of this work show considerable overlap with more traditional Theory of Mind findings, and thus suggest that these topics may be an important area of integration between these two disparate traditions. Additional evidence from studies in which specific relational repertoires were targeted for remediation when perspective-taking, false belief and deception were found to be absent also suggest the applicability of the relational frame interpretation of these abilities. Although much more work needs to be done, current empirical evidence suggests that from both conceptual and applied perspectives, the relational frame approach to these phenomena may be an important and fruitful avenue for future research.

There exists a substantive body of psychological research on the cognitive skills of perspective-taking, false belief and deception (Baron-Cohen, 1995). This research has been dominated by a cognitive developmental account commonly referred to as Theory of Mind (ToM -- Baron-Cohen & Hammer, 1997; Baron-Cohen, Tager-Flusberg & Cohen, 2000). The basic concepts in ToM concern the ability of a person to understand the relationships between behaviour, beliefs and emotions. From this perspective, therefore, a well-developed ToM enables an individual to know that beliefs can be false as well as true (Woodruff & Premack, 1979) and that behaviour can be guided differently when beliefs are true or false and when particular emotions are present or absent. The current article is concerned with the cognitive rather than emotional aspects of ToM and attempts to lay out an alternative behavioural account of the types of cognitive phenomena commonly studied by ToM researchers, namely perspective-taking, false belief and deception.

Historically, researchers from the behavioural tradition have paid little or no attention to cognitive phenomena and behaviour-analytic research on perspective-taking, false belief or deception is rare or non-existent. One group of researchers, however, working under the rubric of Relational Frame Theory (RFT), a modern behavioural account of human language and cognition (Hayes, Barnes-Holmes, & Roche, 2001) have begun to devote considerable attention to these areas.

The RFT account of language and cognition is based on the core concept of derived and multiple stimulus relations. At its simplest, RFT proposes that verbally able individuals can relate a multitude of stimuli or events in the world in a highly generative, complex and arbitrary fashion, thereby allowing novel events (e.g. novel words) to be understood and have meaning (based upon relations, explicitly trained or derived, with other events). According to RFT, these relations among events vary. Specifically, one arbitrary event may be verbally constructed as more than another, they may be equal or opposite, or they may be different (irrespective of the psychological features of the related events themselves. For example, a one-euro coin is smaller than a fifty-cent coin and yet it is verbally constructed as 'worth more'. In the language of RFT, these patterns of relations among stimuli or events are usefully described as relational frames, within which stimulus relations come to participate in novel and arbitrary ways.

According to this view, the behavioural skills of perspective-taking, false belief and deception constitute specific, complex and derived patterns of relational responding. Specifically, RFT proposes that the relational perspective-taking frames of "I-YOU", "HERE-THERE" and "NOW-THEN" are central to the development of perspective-taking, false belief and deception. The current paper presents a brief review of the ToM and RFT approaches to the study of each of these three crucial developmental skills and finally argues that the RFT approach to these abilities, although still in its infancy, may provide a useful behavioural account of traditionally mainstream cognitive phenomena.

Perspective-Taking

Theory of Mind. According to ToM, one critical aspect of perspective-taking involves an understanding of informational states of the self and others, which develops across three levels of cognitive complexity from understanding that different people can see different things to understanding the principle that 'seeing leads to knowing' (Howlin, Baron-Cohen & Hadwin, 1999). Level 1 of ToM is referred to as *simple visual perspective-taking* and involves the principle that different people can see different things. This skill is typically assessed and/or established by presenting the following scenario. A card with a different picture on each side (e.g., a dog on one side and a cat on the other side) is placed between the child and the experimenter so that each person can see only one side of the card. The task involves asking the child to identify what s/he and the experimenter each see. In this task, a simple form of visual perspective-taking is assessed because the child is required to adopt the perspective of the self and another with regard to the visual environment.

During the complex visual perspective-taking described in ToM Level 2, children are typically assessed for the understanding that different people may see the same things differently. In a common scenario, the experimenter and the child are seated opposite one another, with a picture positioned face up on the table between them. In this way, one participant will see the picture the right way up, whereas the other participant will see the picture upside down. Once again, the task involves asking the child to describe what s/he and the experimenter can each see. According to ToM, responding correctly to these questions involves complex visual perspective-taking because both observers are actually viewing the same item, yet each has a different perspective on it.

At ToM Level 3, children are typically assessed for an understanding of the principle that 'seeing leads to knowing'. In a typical scenario, a child is presented with an empty box, and is asked to close

his/her eyes while the experimenter places an unknown object inside the box. The child is then asked to try to guess what is inside the box, and in order to respond correctly, the child should indicate that s/he cannot know what is inside the box because s/he did not see what was put in there. The child is thereafter shown inside the box, and is asked "How do you know what is inside the box?" In order to respond correctly, the child is required to state that s/he can now know what is inside the box because s/he has seen inside. In order to determine the child's ability to adopt the perspective of another in this task, a similar scenario is reenacted with a doll, and the child is asked to adopt the perspective of the doll with regard to the same events. The ToM approach to perspective-taking, therefore, involves a developing sequence of cognitive skills from a simple to complex understanding of the informational states of the self and others.

Relational Frame Theory. According to RFT, the relational frames that are most critical for the development of perspective-taking are the deictic frames that specify a relation in terms of the perspective of the speaker (sometimes referred to as the perspective-taking frames). The three deictic frames that appear to be primarily involved in perspective-taking are the frames of I and YOU, HERE and THERE, and NOW and THEN (Barnes-Holmes, Barnes-Holmes, & Cullinan, 2001; McHugh, Barnes-Holmes & Barnes-Holmes, in press). Deictic relations are believed to emerge in part through a history of responding to questions such as "What was I doing there?" and "What are you doing now?" Although the form of these questions may vary little across contexts, the physical environment referred to in the questions can vary greatly from instance to instance. Thus the relationship between the individual and other events (i.e. one's perspective) serves as the constant variable upon which the frames are based (i.e. I is the same perspective now as it was yesterday). For example, I is always from this perspective here, but not from the perspective of another person there. Consider again the scenario from ToM Level 2, in which two children are sitting opposite one another and observing a picture placed on the table in front of them. In this arrangement, the child on one side of the table will see the picture the right way up, whereas the child on the other side will see the picture upside down. Although both children in this example are observing the same picture, the perspective of the child on one side is different from the perspective of the child on the other side. In other words, when the child on one side speaks of seeing the picture from "here", it is not the same place as when the child on the other side speaks of "here".

Although many instances of perspective-taking involve the spoken words "I", "you", "here", "there", "now", and "then" (e.g. "you were there then and I am here now"), RFT argues that the perspective-taking properties may be present even when these actual words are absent. Specifically, relevant phrases often include, or substitute, words that participate in frames of coordination with particular individuals, places, and times (e.g. "It is one o' clock and I am at home [HERE and NOW], but Molly [YOU] is still at playschool" [THERE and NOW]). These substituted words serve the same functions of contextually controlling the specific patterns of relational responding that would otherwise be provided by the actual words themselves (e.g. "I" and "you"). For example, "Molly" or "her" may be functionally equivalent to "YOU" and "at playschool" may be functionally equivalent to "there". What is important, from an RFT point of view, is the generalised relational activity and not the actual words themselves. According to RFT, therefore, perspective-taking is a relational activity that involves a complex interplay of responding in accordance with the perspective-taking relational frames.

To date, several studies have investigated the RFT approach to perspective-taking (Barnes-Holmes, 2001; McHugh, et al., in press). In their analyses of relational perspective-taking, these researchers have developed experimental protocols that target the three perspective-taking frames directly (i.e. I-YOU, HERE-THERE and NOW-THEN) and that distinguish between different levels of relational complexity in which the perspective-taking frames may be reversed (simple, reversed and double reversed relational complexity). For example, in a trial referred to as an I-YOU reversed trial (because the trial explicitly targets the relational frame of I-YOU as well as the reversed level of relational complexity), a child may be instructed as follows: "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?" This trial-type is described as an I-YOU reversal because the I-YOU relations are explicitly reversed (in the statement "If I was you and you were me"). According to RFT, responding correctly to this task involves a complex and flexible repertoire of responses in accordance with the deictic relations of I and YOU because I in the trial refers to the Experimenter and YOU refers to the child and the child must be able to appreciate both perspectives. Specifically, if I was YOU and YOU were me, the relational functions (i.e. the perspectives) of I and YOU are reversed, such that my perspective is now yours and your perspective is mine. In the current example, therefore, I (Experimenter) would have the red brick and YOU (child) would have the

green brick. In the RFT perspective-taking protocols, all of the trials involved combinations of one or more of the perspective-taking frames combined with one level of relational complexity (e.g. there were also trials referred to as NOW-THEN simple trials and HERE-THERE reversal trials). Detailed descriptions of these trials, however, are well beyond the scope of the current paper and, thus, for a detailed account of the full range of trial-types the reader is referred to McHugh et al. (in press).

In the study by McHugh et al. (in press), the researchers employed the relational perspective-taking protocol in an attempt to generate a developmental profile of perspective-taking abilities in the normal population. Forty participants from five age bands spanning from early childhood to adulthood were each exposed twice to the relational protocol as test trials only. The participants' age bands were as follows: 3-5 years (early childhood); 6-8 years (middle childhood); 9-11 years (late childhood); 12-14 years (adolescence); and 18-30 years (adulthood). The results of the study indicated a clear developmental trend in the abilities of participants from the different age groups to perform the perspective-taking tasks using the relational protocol. Specifically, accuracy on the perspective-taking tasks increased as a function of age with the youngest children (aged 3-5 years) producing significantly lower levels of accuracy overall than all of the older participants, and the middle and late childhood groups produced significantly lower levels of accuracy than both the adolescents and adults. The study also revealed significant differences between responses to the different perspective-taking frames. Specifically, participants in the four oldest age groups produced their highest levels of accuracy on I-YOU relations and their lowest levels of accuracy on NOW-THEN relations. Furthermore, levels of accuracy decreased as a function of relational complexity (i.e. significant differences were recorded between simple and reversed levels of relational complexity). As well as being in line with the predictions made by RFT, the authors also noted the consistency of these results with the mainstream cognitive literature, which has reported that performances on simple ToM tasks generally develop across the ages of four and five years old, and are usually well established by age six (Taylor, 1988).

In order to investigate the potential application of the RFT protocol when perspective-taking skills are found to be absent, several studies have investigated means of establishing the target relational performances explicitly (Barnes-Holmes, 2001; McHugh, Barnes-Holmes, & Barnes-Holmes, 2003 a). In the first study in this area, Barnes-Holmes (2001) reported that a seven-year-old female required explicit training on the reversed and double reversed levels of relational complexity within all three relational frames in order to complete the protocol. A similar pattern was observed with a three-and-a-half year old male who was exposed only to I-YOU and HERE-THERE trials, and again required extensive training on the reversed and double reversed relations. Barnes-Holmes argued that the findings were also consistent with the ToM literature, and suggested that perspective-taking abilities are rarely present in children under four years of age and even when demonstrated by older children, the relational repertoires may be neither fully established nor flexible. Similar results were also reported by McHugh, et al. (2003 a) with a four-year old male. Although the findings from this study indicated that on initial assessment the child displayed a basic repertoire of simple I-YOU and HERE-THERE responses, no relational skills with regard to NOW-THEN relations appeared to be present. Explicit training on reversed and double reversed I-YOU and HERE-THERE relations was provided and the child proceeded through this training with relative ease. Much greater difficulty, however, was encountered during attempts to establish NOW-THEN responding, even with tasks at a simple level of relational complexity. Extensive training on all levels of relational complexity within the NOW-THEN frame was necessary in order for this child to complete the perspective-taking protocol.

Thus far, several studies have investigated the development and establishment of perspective-taking skills using concepts and methodologies generated by RFT. This work has identified specific relational components that constitute perspective-taking as a set of overarching relational skills, and has suggested ways in which these components influence one other. Furthermore, the results of the work conducted to date has suggested significant overlap between this approach to perspective-taking and that more commonly known as ToM. As well as the development of a reliable protocol for assessing perspective-taking in both young children and adults, several studies have highlighted the possible use of the protocol as an effective tool for facilitating or establishing the perspective-skills if they are found to be deficient or absent.

Understanding False Belief

Theory of Mind. According to ToM, the three levels of understanding informational states in the self and others are pre-requisite skills for the development of two later stages in which the ability to respond in

accordance with true and false belief develop, respectively at Levels 4 and 5. According to ToM, Level 4 in the development of informational states involves the ability to predict actions on the basis of *true* belief. A typical scenario used to assess true belief understanding is as follows. The child is presented with two play scenes. In one scene, a doll is placed beside a toy car, and the child is told that the doll was placed there earlier that morning. In the second scene, an identical doll is similarly placed beside a toy plane, and the child is told that this arrangement took place later in the day. The child is then instructed as follows: "This morning, you saw the doll near the car but you did not see the doll near the plane. Where do you think the doll is?" In order to respond correctly, the child should indicate that the doll is near the car. If the child is then asked "Why do you think the doll is near the car?" s/he should indicate that this is where the doll had been seen before. If the child is then asked: "Where would you go to find the doll?" a correct response would indicate that s/he would look near the car. If the child is then finally asked "Why will you go to the car?" a correct response would involve indicating that this is where the doll had been seen previously. From a ToM perspective, responding correctly to these questions indicates the knowledge that a person can only know what has been seen, and will act on this basis (i.e. true belief).

Level 5 of ToM consists of predicting actions on the basis of a *false* (rather than true) belief. Specifically, understanding false belief involves knowing that a person's mental perspective has a causal impact on his/her actions, even when that perspective runs counter to reality, and cannot be derived from it (Harman, 1978; Woodruff & Premack, 1979). False belief scenarios commonly employ a task called the Deceptive Container Task in which the following scenario is presented. A child is presented with a sweet box and asked, "What do you think is inside the sweet box?" Having not seen inside the box, the child will likely suggest that it contains sweets. However, unbeknownst to the child, the box contains pencils and not sweets. At this point in the trial, the box is opened and the child is allowed to see the pencils inside. The child is then asked, "Before we opened the sweet box, what did you think was inside?" A correct response involves the child stating that s/he previously thought there were sweets inside. If then asked "What was really inside?", a correct response should now involve stating that there are pencils inside. According to ToM, responding correctly to these questions indicates the understanding that a person can act on the basis of previous beliefs that are false, as well as on current beliefs that are true. A similar scenario is then presented from the perspective of another (e.g. a doll), and the same questions are posed in order to determine the child's ability to respond in accordance with an alternative perspective.

In a similar false belief task, referred to as the Unexpected Transfer Test (Wimmer & Perner, 1983), the contents of a box, for example, are explicitly removed without the knowledge of a participant. In this task a protagonist places an object in a particular location (e.g. A) and then leaves. In the absence of the protagonist, the object is unexpectedly transferred from location A to location B, and thus, upon return, the protagonist mistakenly believes that the object is still in location A. In order to assess false belief abilities, a child may be asked to identify where the protagonist thinks the object is. In a study involving the Unexpected Transfer Test, Perner, Leekam and Wimmer (1987) reported that three-year-old children almost universally failed the task by suggesting that the protagonist will look for the object in its actual location (i.e. location B). In contrast, children aged four years and older correctly determined that the protagonist believed the object to be in the location in which it was first placed (i.e. location A). According to Perner et al. (1987), younger children fail the false belief test, and thus fail to demonstrate an understanding of false belief, because they do not yet understand the representational capacity of the human mind.

Relational Frame Theory. As a result of the work on perspective-taking, McHugh, Barnes-Holmes, and Barnes-Holmes (2003, b) began to investigate the relational skills that might be involved in understanding true and false belief as a more complex form of relational perspective-taking. The rationale for this work was as follows. Given that the results of the perspective-taking studies described above were consistent with ToM Levels 1-3 of understanding informational states in the self and others, it seemed feasible that the RFT analysis could be extended to an understanding of true and false belief at Levels 4 and 5 of ToM, respectively. Furthermore, perhaps the existing protocol for assessing perspective-taking could be modified to investigate true and false belief. In an attempt to investigate the understanding of true and false belief, McHugh, et al. (2003, b) developed a protocol of relational tasks modelled on their perspective-taking protocol that emphasised the deictic relational frames and that was adapted from the Deceptive Container Task, commonly used by ToM researchers in the study of false belief.

In their true/false belief protocol, McHugh et al. employed a range of different trial-types in which specific features of the perspective-taking frames were emphasised. For illustrative purposes, consider the following example of a true belief trial, during which the child was exposed to two pictures, one of sweets and the other of pencils presented on a computer screen. During the first part of the trial, a sound file presented the child with the following instructions: "If you (referring to the child) put the pencils in the sweet box and I (referring to the experimenter) am here: what would you think is in the sweet box?" In order to respond correctly to the question, the child was simply required to click on the appropriate picture. In this case, the child clicked on the picture of the sweets. This constituted a correct response on this trial because from the perspective of the child, s/he could see exactly what had been placed inside the sweet box because s/he had placed the item there, hence the child was acting on the basis of a true belief. In the second part of the trial, the child was presented with the same instruction, but this time s/he was asked "What would I (referring to the experimenter) think is in the sweet box?" In order to respond correctly to this question, the child was required to click again on the picture of the sweets because from the perspective of the experimenter (I) the experimenter could see exactly what the child had placed inside the sweet box because the experimenter was HERE, hence the experimenter was also acting on the basis of a true belief.

From an RFT perspective, responding in accordance with logical not may be important in understanding false belief, and thus in line with this thinking, the true belief trial-types were modified in order to permit them to function as false belief trials by emphasising logical not relations. Consider the following example in which the child was presented with pictures of biscuits and a doll depicted on screen. During this trial, the child was instructed as follows: "If I (Experimenter) put the doll in the biscuit tin and you (child) were not here: what would I think is in the biscuit tin?" A correct response on this trial involves indicating that I (Experimenter) will know what is inside the biscuit tin, because I placed the item was placed the item inside (i.e. I was HERE). In this case, the child is required to determine that the Experimenter is acting on the basis of what has been seen, and as such it is a true belief. The child was then asked "What would you think is in the biscuit tin?" A correct response to this question involves indicating that YOU (the child) will think that there will be biscuits inside the biscuit tin because YOU were NOT HERE (i.e. responding on the basis of logical not) when the unexpected doll was placed inside. Hence, YOU (child) would be acting on the basis of a false belief because one would not normally expect to find a doll in a biscuit tin.

In the study by McHugh, et al. (2003, b), the researchers employed the relational true and false belief protocol in an attempt to generate a developmental profile of these abilities, similar to that which was conducted with perspective-taking. Once again, five groups of participants aged within five age bands from early childhood to adulthood were compared. The results of this study indicated a clear developmental trend in the true and false belief abilities of participants aged from early childhood to adulthood. Specifically, participants in the youngest age group (3-5 years) produced the lowest levels of accuracy, while those in the oldest age group (18-30 years) produced the highest levels and accuracy levels overall increased as a function of age. Unlike the results of the RFT profile of perspective-taking skills, significant differences were not recorded between true and false belief performances, suggesting a possible functional overlap between these relational abilities. The results of the work on true/false belief and its consistency with the previous studies of perspective-taking encouraged the same group of RFT researchers to expand these ideas in an attempt to understand and investigate the development of deception as an even more complex repertoire of relational framing.

Understanding Deception

Theory of Mind. According to ToM, understanding false belief develops in its most complex form into the skills of deception because it involves knowing that beliefs can be false and that they can be manipulated (Baron-Cohen et al., 2000). One of the most widely used tools employed by ToM researchers for assessing deception skills in children is the Maxi Task, which consists of a modification of the Unexpected Transfer Test (Premack, 1990). The first part of the task is similar to the scenario described above and involves a story about a character (Maxi) who puts chocolate into a cupboard (e.g. a red cupboard). In his absence, Maxi's mother relocates the chocolate from the red cupboard to a blue cupboard. As in the previous task, the child's understanding of false belief is determined by asking the question "Where will Maxi look for the chocolate when he returns"? In the second part of the task, Maxi's brother is introduced. In the unfolding scenario, his brother wants to find the chocolate and asks Maxi to tell him where it is. In an attempt to deceive his brother and to avoid him getting the chocolate, Maxi (who

still believes the chocolate is in the red cupboard) tells his brother that the chocolate is in the blue cupboard (where in fact it is). In order to determine the child's ability to understand this combination of false belief and deception, s/he is asked "Where will Maxi tell his brother the chocolate is?" According to ToM, a correct answer to this question depends on the child's interpretation of Maxi's intention to deceive his brother by giving him information that he knows to be false. There is considerable controversy in the ToM literature, however, with regard to the typical age at which deception skills are readily demonstrated (Premack, 1990).

Relational Frame Theory. As an extension of the RFT research program on perspective-taking and responding to true/false belief, researchers in this area have also begun an empirical analysis of deception. In line with ToM researchers, RFT research in this area has approached deception as a more complex type of false belief responding. Based on this reasoning, McHugh, Barnes-Holmes, and Barnes-Holmes, (2003, c), modified their relational true/false belief protocol to include tasks that appear to target the relational skills that may underpin deception, in an attempt to generate, as before, a developmental profile of the relevant relational performances. Once again, forty participants aged within five age bands between 3 and 30 years old, were individually exposed to a computerised procedure.

All of the trial-types contained within the deception protocol involved the presentation of a scenario similar to the Maxi Test. Specifically, each trial-type involved a picture of an object to be hidden (e.g. a teddy), and two pictures of places in which to hide the object (e.g. a toy box and a fridge). As is evident from the current example, one of the potential locations for the target item is more obvious than the other (e.g. you would expect to find a toy in toy box but not in a fridge) in order to incorporate true and false belief and to facilitate deception. During each trial in the automated procedure, a hypothetical situation was created with regard to the three pictures. Consider again the example of the teddy, the toy box and the fridge in which the participant was instructed as follows: "If I have a teddy and I don't want you to find it, where should I hide the teddy?" Participants were required to drag the picture of the object, (i.e. the teddy) into one of the target locations (i.e. into either the fridge or the toy box). A correct response on this trial involves the participant indicating that I (experimenter) should hide the teddy in the location in which you (participant) are not likely to find it (i.e. the experimenter should hide the teddy in the fridge rather than the toy box). The results of this study showed a clear developmental trend in terms of levels of accuracy on deception tasks produced by participants across the five age groups. Specifically, participants in the oldest age group (18-30 years) produced the highest levels of accuracy, while participants in the youngest age group (3-5 years) produced the lowest levels and levels of accuracy overall increased as a function of age.

In a related study currently underway by the same researchers, the deception protocol has also been used in an attempt to train these deception skills in young children when the relational repertoires are found to be absent (McHugh et al. 2003, c). In the training conducted to date, a six-year old boy has been trained to respond to all of the tasks contained within the protocol and the child has subsequently performed accurately on generalisation tests involving the same trial-types but different sets of stimuli. This preliminary work once again highlighted the possible utility of the RFT-based deception protocol as both a testing and training tool for identifying and, where necessary, remediating deception skills.

Summary and Conclusions

The skills involved in perspective-taking, understanding false belief and deception are considered by most mainstream psychologists to be critical for competent cognitive development. Theory of Mind researchers, in particular, have devoted considerable attention to these areas. By contrast, these phenomena have traditionally attracted little or no interest from behavioural psychologists. This situation, however, has begun to change in recent years with behavioural researchers working under the rubric of RFT devoting considerable effort to empirical analyses of these cognitive phenomena. The current paper reviewed some of the first empirical evidence generated by the RFT approach to perspective-taking, false belief and deception as a series of related relational repertoires. The results of these studies indicated considerable overlap with more traditional ToM findings, and thereby suggest that these topics may be an important area for future study and integration between these two disparate traditions. Further evidence from RFT training studies also suggest that considerable practical benefits may be gained from a relational frame analyses of perspective-taking, false belief and deception. Although much more work needs to be done from both conceptual and applied perspectives, the evidence reported in the current paper suggests that such endeavours may well be worthwhile.

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