

Perceptual Control Theory and the Phenomenological Analysis of the Experience of Autism: A Case Study

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Abstract

Autism is defined as a developmental disorder that is often characterized by deficits in a broad range of social functioning. The present qualitative study attempts to begin to understand the subjective and functional nature of these apparent deficits in one boy diagnosed with autism. Using Interpretive Phenomenological Analysis and the framework of Perceptual Control Theory the child's behaviours were considered to be attempts to control his perceptual experience of his environment. Understanding autistic behaviour in this way might allow for a greater understanding of the capabilities of a child with autism rather than focusing on deficits. Stimulation, certainty, and self-interest were identified as possible perceptual themes controlled by the participant. The implications of these findings are discussed in reference to current literature.

Keywords: autism, behavior, perceptual control theory, control, theory of mind, imitation, emotion, IPA

1. Introduction

Autism is considered to be a profound lifelong disability (Smith & Bryson, 1994). Soucy (1997) defines Autism Spectrum Disorder (ASD) as a severe, lifelong pervasive developmental disorder where individuals have noticeable deficits in imitating others, gesturing, learning through observation, joint attention, symbolic play, and in understanding the expression of emotion. Alongside this, an inability to relate to others is highlighted as a prominent feature of ASD (Mastrangelo, 2009). The inability to relate can be identified through social withdrawal, which typically includes 'minimal eye contact and an active avoidance of social contact' (Schleien, 1990, p. 318).

In research looking at the types of social difficulties that are experienced by people with autism, Frith, Siddons, and Happé (1994) found that the social difficulties were linked to being able to understand that other people's minds contain different information from one's own mind. This is the ability to attribute mental states to oneself and to others, and is known as the Theory of Mind (ToM; Baron-Cohen, Leslie, & Frith, 1985). ToM is thought to play a causal role in the development of difficulties in reciprocal social action and communication for ASD (Pellicano, 2007). ToM "provides the ability to predict relationships between external states of affairs and internal states of mind" (Frith, 2003, p. 77).

Interpreting emotional facial expressions is an essential part of social interactions, and is likely to be one of the earliest facilitators of social engagement (Begeer, Rieffe, Terwogt & Stockman, 2006; Bushnell, Sai, & Mullen, 1989). Non-autistic children learn to associate facial expressions with people's inner states. Attending to these cues could be viewed as progress towards a more developed ToM, or "mind reading" (Baron-Cohen, 1995), and the ability to interpret other people's mental states (Begeer et al.). Children with autism, however, appear to have reduced attention to facial emotional cues. Early research showed that children with autism were more likely to categorise photographs by non-emotional features, for example hats, than by emotional facial expressions (Jennings, 1974). Interestingly, when specifically asked, the low functioning children with autism were able to categorise the photographs based on emotional cues. Begeer and others (2006) suggest that children with autism might naturally ignore facial expressions in others, as they may foresee no direct need to deal with this kind of information.

ToM offers insight into the social aspects of pretend play (Charman & Baron-Cohen, 1997) as well as explaining important imaginative deficits (Steele, Joseph & Tager-Flusberg, 2003) of ASD. The metarepresentational hypothesis of play contends that, along with the inability to infer mental states (ToM), children with an autistic disorder do not detach from the fixed characteristics of a representation (Mastrangelo, 2009). However, the meta-representational hypothesis has been under criticism by research which identifies that under instruction, children with autism can engage in pretend play (Lewis & Boucher, 1995). Lewis and Boucher postulate that the deficit is in the ability to generate spontaneous ideas for pretend play, rather than actually in engaging in pretend play. There are some methodological limitations to this concept though, as there is some suggestion that the pretend play in this research may actually be deferred imitation, from watching an adult engage in pretend play.

Deficits in imitation are one of the earliest social functioning impairments noted for children with autism (Rogers, 1999; Stone, Lemanek, Fishel, Fernandez, & Altemeier, 1990; Watson, Baranek, & Delavore, 2003; Williams, Whiten & Singh, 2004). This deficit in imitative behaviour can have many social, communicative and cognitive implications (Smith & Bryson, 1994) and, as it is considered to be a key part of caregiver-infant social interaction, it may also be important in the development of awareness of self and others (Smith & Bryson, 1994; Meltzoff, 1990).

The literature on imitation and autism addresses both child-centred imitation and adult-centred forms of imitation. In child-centred imitation it is the adult, or observer, who imitates the actions and behaviours of the child with autism. In the adult-centred approach to imitation, it is the adult who is performing behaviours with the goal being to have the child with autism replicate the behaviours. Primarily, the literature focuses on trying to get the child to imitate the actions of the adult. The general outcome of such research, in line with modern theoretical arguments, is that children with autism use imitative gestures less than children without autism of a similar age (see Smith & Bryson, 1994 for a review). However, earlier research noted that children with autism are particularly sensitive to being imitated by others (Dawson & Adams, 1984; Tiegerman & Primavera, 1984; Hartshorne & Herr, 1983). Therefore, the child-centred approach may go beyond much of the current literature because it suggests that children with autism have some potential to engage in reciprocal social interactions. While deficits may be present, it is encouraging that restructuring the way we interact with children with autism, through a child-centred approach, may help to reduce the isolation that is so often depicted for autism.

This child-centred approach, to imitate children with autism, was explored by Hartshorne and Herr (1983) in two case studies of children with autism. Of particular interest are the conclusions drawn by Hartshorne and Herr for facilitating change in children with autism. They argue that imitating a child with autism is the essence of encouragement and, rather than denying the behaviour, exemplifies its importance to the child. A final comment made by Hartshorne and Herr was that behaviours commonly associated with autism may serve as a means to exert control over the environment. As much as loud repetitive vocalisations would help to control what one hears, or flapping one's arms would divert attention to that sensation, perhaps creating an artificial interaction where a child with autism actually controls another person is of some significance to a very self-centred autistic view of the world. This concept of control over sensation and perception can be explored through the psychological theory known as Perceptual Control Theory (PCT; Powers, 2005).

1.1 Perceptual Control Theory

Perceptual Control Theory (PCT) proposes that behaviour is one component of a process of control (Powers, 2005). From a PCT perspective, control is defined as "achievement and maintenance of a preselected perceptual state in the controlling system, through actions on the environment that also cancel the effects of disturbances" (Powers, 2005, p. 296). To put it another way, "PCT explains how living things survive by controlling important aspects of how they experience their environments" (Carey & Bourbon, 2006, p. 8). This control requires three simultaneous processes: action, comparison, and perception (Powers, 1998). Powers (2005) suggests that these three processes are key components of all purposeful activity. From this perspective, understanding a person's behaviour entails identifying what perception is being controlled.

The basic control system unit in PCT is a Closed Causal Negative Feedback Loop (Carey, 2008; Powers, 2005). Powers (2005) defines this control system as "an organisation that acts on its environment so as to keep its inner perceptual signal matching an inner reference signal or reference condition" (p. 296). Importantly, in living things, this reference signal can only be set by the person experiencing the perceptual input. That is, one's reference signals cannot be determined by an external operator (Carey, 2008). What separates this basic model from many other psychological theories is that it is functional, rather than conceptual, and it focuses on the input to the system, not the output of the system.

PCT builds upon the basic negative feedback loop by suggesting that these control systems are arranged in

parallel and hierarchically. Higher levels are considered to be more complex than lower levels, and the higher levels operate as functions of the lower levels (Powers, 2005). It is assumed that one can perceive a lower level perception without a higher level perception, but not the other way around. As a higher level control system is moderated by many lower level control systems, it is the higher systems that specify what the lower level systems perceive (Carey, 2008).

1.2 PCT and Autism

Given that the PCT framework focuses on an individual's experience of perception it may offer a new perspective for understanding the isolated existence of people with autism. A focus on the input, rather than the outputs, may help to redefine the experience of ASD. Rather than focussing on the behavioural and emotional deficits evident in people diagnosed with ASD, PCT provides an opportunity to begin to understand how people with these particular capabilities are making sense of their world. PCT allows one to gain some insight into the way in which actions are being used to control the individual's environment in order to make what is perceived match what is desired.

The crucial factors to explore from a PCT perspective are the perceptions being controlled rather than the behaviour being observed. Moreover, it is the control of certain perceptions that may typify much of the stereotypical mannerisms that are displayed by people with an ASD. In line with PCT, and its emphasis on the individual experiencing a perception, Shapiro (2000) states that is highly important to understand what is going on inside the minds of children with Asperger's disorder, an ASD, and we must gather an understanding of their cognitive emotional experiences if we are to help them.

1.3 Aim of the Present Study

This exploratory study sought to investigate the possibility of understanding the phenomenology of autism from the perspective of perceptual control. The research question guiding the study was: *Is it possible to understand the actions of someone diagnosed with autism as attempts to control their experiences?*

2. Method

2.1 Participant

The research project used an exploratory case study design. The participant was an Australian Caucasian male, aged 10 years old, with a diagnosis of autism. An assessment indicated he was relatively high functioning for this population group. He had received previous interventions for developmental delays prior to participation in the present study.

2.2 Procedure

Four 60-minute sessions of interaction and play activities were used as the basis for data collection. The first session with the participant was used to familiarise him with the principal researcher (JCB). The sessions focussed on the interaction between the researcher and the participant during play activities, such as building a worm farm and playing board games, and during conversation with the participant. During the sessions, the researcher maintained an inquisitive, clinical approach when interacting with the participant. Activities were chosen to be varied and engaging so that a range of behaviour could be sampled. All four sessions were video recorded, allowing in-depth analysis of the sessions. Observation of the participant, through the recorded sessions, and data analysis were undertaken independently by the principal researcher (JCB). The four sessions were extensively reviewed, with the participant's behaviour noted and potential perceptions identified that may have been controlled by the behaviour. The identified controlled perceptual variables and behaviours were sorted into thematic clusters. The clustered controlled variables were re-examined and refined into more cohesive clusters, and extraneous information was removed. The sessions were simultaneously reviewed and analysed as a form of triangulation by the secondary researcher (TAC) who had extensive experience with PCT.

2.3 Data Analysis

For this project, Interpretive Phenomenological Analysis (IPA) (Smith, 1996) was used to organise and synthesise the data, and Perceptual Control Theory (PCT) (Powers, 2005) provided the theoretical framework for the study.

IPA is an ideal analytical method to use with PCT because IPA is a method for gaining greater understanding of the lived experience of individuals while PCT is a theoretical explanation of how individuals interact with their environments. Conventionally, IPA aims to analyse the quality and texture of individual experience through interpretive engagement with text (Willig, 2001). Using PCT principles to inform the methodology, however, allows a researcher to analyse behaviour rather than text or transcripts.

Therefore, in this study, PCT principles combined with the IPA methodology allowed for identification of thematic “controlled variables” through behavioural observation, testing, and discussion, rather than text analysis. Additionally, the experimental outcomes for analysing behavioural responses were interpreted through the theoretical approaches of PCT and IPA. This approach may explain how an individual with autism acts upon the environment to control what is perceptually important.

3. Results

Using the principles of PCT and the analytical methods of IPA, three controlled variables (or themes) were identified. These were *amount of stimulation*, *degree of certainty*, and *level of self-interest*. These three controlled variables, which are addressed in the following sections, appeared to predominantly explain the way in which the participant interacted with his environment. From a PCT perspective, *level of self-interest* appeared to be a higher level perception than *amount of stimulation* and *degree of certainty*.

3.1 Amount of Stimulation

Amount of stimulation refers to a tendency to seek a particular level of stimulation from the environment. The participant frequently identified objects visually and then proceeded to interact with the identified object. The delay between switching to attend to a new interest seemed to be considerably rapid quite brief, and may have indicated a desire to maintain a constant high level of stimulation.

The participant appeared to maintain visual stimulation through manipulating the environment, which seemed to facilitate direct visual access to an object of attention. Following this, the participant would often adjust his own proximity to an object. This appeared dependent on whether he chose to attend to it. If an object was introduced that the participant sought to engage with, he would move towards the object. Similarly, he would often move away, or lean back, from an object if he sought a break from attending to it. This was interpreted as the participant seeking to become as involved with an object of interest as possible, in order to maintain his preference for stimulation. Evidence for this point was also indicated by his tendency to hold, touch, and manipulate objects of attention. Holding and manipulating objects increases the amount of stimulation derived from an object.

Amount of stimulation also appeared to be maintained through secondary stimulation. Secondary stimulation can be considered to be the stimulation derived from behaviours occurring alongside an already existing and maintained behaviour. On several occasions, while interacting verbally with the researcher, the participant frequently engaged in activities such as zipping his jacket up and down, tossing and spinning teddy bears or pencils in the air, or seeking out a game or object to attend to while the communication was still occurring.

A final example for *amount of stimulation* was provided through observation of a game of memory. After several games, the researcher discontinued playing and sat away from the game to assess what effect this would have on the amount of stimulation the participant experienced. The participant proceeded to set up and play on his own. Following the completion of this game, and a few seconds sitting quietly, the participant looked down to the cards in his hands and proceeded to view each one in turn and call out what type of card it was. At this time, the researcher attempted to interrupt in order to divert his attention. However, these interruptions did not appear to create disturbances for him and he continued this activity until he had called out each of the cards. As the cards were of apparent interest to him, he may have been deriving as much stimulation as possible from them. At the completion of examining all the cards, he immediately set up to play another game by himself. He commenced this game and 13 seconds later increased the pace of turning cards. A further 16 seconds later he stated “I’m trying to beat the time.” He maintained this pace until the completion of the game, and immediately upon completion asked “Is it time to go home?” This example may indicate that, following the removal of competition and interaction with the researcher, the participant sought to maintain a similar level of stimulation from the game by creating a new set of rules to operate within.

3.2 Degree of Certainty

Degree of certainty reflects a tendency to maintain a perception of understanding and knowing what is occurring in the environment. In this study the participant appeared to have a strong desire to understand objects, events, and concepts.

During the sessions the participant had a tendency to seek out objects and appeared to want to understand more about them, such as how they functioned or were used. This mostly occurred with new objects with which he interacted and, once he had identified a function for the object, he would seemingly use it in this manner. For example, rather than just passing coins over to the opponent on completion of a game of “Connect Four”, he would reload all the opponent’s coins into the game and empty them into the opponent’s tray. While this took

considerably longer, he stated this was a quicker way to do it.

Further evidence from the observation that *certainty* was an important factor in the way the participant perceived his world, came from how he responded when confronted with uncertainty. Uncertain events appeared to be related to an increase in levels of distress. His tone of voice, and behaviour shifted significantly on several occasions when he appeared unsure or unclear about understanding an event or situation.

An example of uncertainty, and the participant relying on his own experiences, was an interaction with the researcher relating to a squeaky fan. Upon hearing the faint squeak of the fan in the roof, the participant soon became quite distressed and stated, "Where is it coming from?" He then indicated "When I find it, I am going to go 'bang' to it", motioning his fist downwards. The researcher continually stated that the noise was a fan in the roof and directed the participant to the source. Despite this, the participant would not accept that this was the source and stated that it sounded like a siren that he had heard before, and again relied on his own experience. The researcher's assurances had minimal influence over the participant, and he firmly held to his own interpretation of the event. The participant stated, "It is all around me, so I don't know where it is coming from." As he could not locate the source, or determine what was creating the noise, his distress appeared to increase.

In addition, the participant frequently verbalised his thoughts. He appeared to control the conversation by remaining on topics that he was familiar with; namely himself, his experiences, and his thoughts. While this behaviour may have maintained his levels of interest in the interaction, the constant verbalisation may also have assisted in controlling the degree of certainty. The rationale behind this behavioural interpretation is that if the participant constantly chooses and controls the terms for his interactions, then he can be more certain that the interaction will not deviate to a topic he is unsure about; as it limits another's ability to generate uncertainty though introducing new topics.

3.3 Level of Self-interest

Level of self-interest refers to a tendency to maintain interactions and engagement with others and objects on the provision condition that there is personal interest to the participant. Control of this variable appeared to be mediated by both *amount of stimulation* and *degree of certainty*. That is, at times the participant appeared to alter the amount of stimulation and certainty he was experiencing in order to keep self-interest at a high level.

In this study, the participant maintained an interaction if it was of interest to him, or it was about him. Otherwise he tended to generate a new topic of interest. In this sense, he controlled how he interacted with the world by engaging when it was of personal interest. Interestingly, the participant seemed to verbalise his thoughts in an almost constant manner that seemed random from an external observer's perspective. The topics were generally related to his 'self', as he verbalised thoughts about his present experience and what he was attending to in the moment.

4. Discussion

The present study identified three variables that seemed to be important perceptions being controlled by a 10 year old boy diagnosed with autism. Maintenance of these controlled variables of stimulation, certainty, and self-interest, explain much of the participant's social interactions and behaviour generally.

Amount of stimulation, degree of certainty, and level of self-interest seemed to be perceptions that a child with autism wanted to experience in particular states. These findings deviate conceptually from prior research that has predominantly noted important deficits in ASD. The present findings can be interpreted alongside previous research in a way that may assist in further understanding the psychological phenomena associated with autism. A control theoretic understanding could provide additional insights and avenues for intervention by considering behaviour as the individuals' attempts to control particular features of their environments.

The results for the present study could offer insights into Theory of Mind (ToM) and the social difficulties for people with autism. ToM states that people with autism have difficulty with understanding that other people's minds contain different information than one's own mind (Frith et al., 1994; Baron-Cohen et al., 1985). Evidence from the current study offers a different perspective on this issue. A preference for high levels of stimulation, certainty, and self-interest are counter to the idea of reading another person's mind. Aiming to read another's mind may in fact be quite stimulating on one level, however, little certainty and self-interest would likely be gained from this endeavour. Given perceptual control operates as a system, it is unlikely with the present findings that a child with autism for whom these controlled variables were important would contemplate this behaviour as it would lead to considerable reduction in certainty, self-interest, and potentially, as a part of the interrelated system, stimulation.

Previous research indicates that children with autism are more likely to attend to non-emotional features than

emotional, though they have the ability to attend to either (Begeer et al., 2006). Results from the present study may help explain this finding. It is suggested here that non-emotional features would be more concrete and interpretable than emotional features, and would be more likely to be maintained for a longer period of time. Non-emotional features would yield more consistent perceptual information, and hence more certainty, than emotional features. In this sense, the hierarchy of control converges well with these previous findings.

Controlling the degree of certainty one experiences is congruent with the meta-representational hypothesis of pretend play, which suggests children with ASD do not detach from the fixed characteristics of a representation (Mastrangelo, 2009). It would make intuitive sense that the more representational uses an object has, the less certainty can be derived from that object. In this sense, the preference for being sure of a representation may outweigh flexibility of thought and abstract thinking. There is some conflict here in relation to the fact that more uses for an object would lead to greater stimulation within the environment. Although, if consideration is given to the control system, this may suggest a higher preference to control for certainty over control for stimulation.

In relation to pretend play, Lewis and Boucher (1995) suggest the ability to generate spontaneous ideas for play is the primary problem. Controlling certainty converges well with this point as generating spontaneous ideas may be counter to controlling certainty. The evidence that suggests children can engage in pretend play when informed and shown how, also fits alongside the idea of an increase in certainty for play, as exposure to the activity may assist with certainty. Although this rationale would still fall under similar criticism that suggests pretend play may actually be deferred imitation. Additionally, engaging in pretend play following instruction does not correspond well with controlling self-interest, as the new activity may not have been generated within the field of the child's interest. This may provide further evidence for the perceptual hierarchy where self-interest is of a higher perceptual level than certainty, as certainty can be controlled without affecting the maintenance of self-interest perceptions. This hypothesis could be explored in future research.

This study had several limitations. While IPA and PCT approaches are useful on a case study basis, the results of the study need to be interpreted in the context that the information may be more relevant to the participant than to children with autism in general. There is considerable need for replication of this research across more of the ASD population. The present study traded generalisability for greater in-depth analysis of an individual, and this may be a key strength. However, the participant in this study was assessed as being relatively high functioning, in terms of autism. While the study yielded exploratory findings for how perceptual control may operate for a child with autism, there is a need for replication with people who are more severely affected by autism the more severe end of the autism spectrum, and for other age groups. This will allow for assessment of the feasibility of the approach and to offer convergent evidence for the present findings.

An additional limitation of the study was the global nature of the IPA approach to analysis. One approach that may be useful could be to take a more fine-grained approach to data analysis by introducing disturbances into the environment and observing the behaviour that immediately follows. Introducing disturbances may allow for more certainty with confirmation of controlled variables, and may assist to reduce the any unintentional biases by the researchers in the collection and analysis of data.

Future research could explore the nature of controlled variables and refine how the hierarchy of perceptual control operates to explain the way children with autism interact with their environment. By developing an understanding of the experience of ASD through PCT, future research may advance treatment approaches for this population. This may be achieved through developing interventions that incorporate perceptually relevant information into treatment for the person with autism. PCT, therefore, could provide an integrative framework within which apparent anomalies in previous research can be better understood and new opportunities are afforded people with difficulties currently labelled as autistic through a different perspective on the way we observe them behaving.

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