

AN AUTISTIC SOCIAL RESPONSES DURING NUMERACY PLAY WITH TYPICAL PEERS

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Abstract: Among various characteristics, autistic children demonstrate deficiencies in social interaction and communication that affect their engagement in play activities. This is likely related to the ability in processing social information. Hence, a qualitative approach case study using observation technique was conducted to explore social responses of an autistic child in numeracy play as played in group with typical peers. Eight observation sessions were carried out to explore the social responses of the child during play. The numeracy play was adapted from *Galah Panjang* (Long Pole), a traditional Malay game as medium for autistic child to engage in play. The Long Pole play was adopted by integrating numeracy elements as literature depicted the good tendency of autistic individuals in certain areas, particularly in mathematics. In addition, an analysis was done on the play as a therapeutic tool and a catalyst to observe social responses in the autistic child. Therefore, this research aimed to capitalize on the educational elements that contained in the numeracy play from educational psychology perspectives. Details about the numeracy play including validation are discussed in this paper. Results showed that the autistic child who engaged in the group play involving typical peers triggered elements of social responses consisting of partner awareness, initiating contact, shared participation, and imitation.

Keywords: Play, Numeracy, Autistic, Child, Social Responses.

INTRODUCTION

Play is a complex phenomenon that occurs naturally in most children but according to Mastrangelo (2009), autistic children were recorded in most literature as having deficit in play. Approximately, 75% of autistic children have intellectual disability, communication delay and social impairments (Starr, Foy & Cramer, 2001). Thomas and Smith (2004) mentioned that there is impairment in autistic children's social aspect when playing and interacting with others. This barrier is caused by neurological disruption to communicate, interact and play in social environment (Hess, 2009). Moreover, autistic children were reported as having weaknesses in managing information and signals, developing concepts and reasoning, planning, organizing, and problem solving (Bristol, Cohen, Costello, & Denckia, 1996; Minshew, 1998; Mishev Goldstein, Quill, 1995; Taylor & Siegel, 1994). This happened because autistic children have delayed or abnormal development in areas of language, social skills and behavior (American Psychiatric Association, 1994). The National Autism Society of Malaysia (2013) defined autistic children as having lifelong disability in the aspects of learning, language communication, and emotional and social development.

Besides, there are some models or researches claimed that play is inappropriate for autistic children (Mastrangelo, 2009). This is based on the assumption in theories such as Theory of Mind that

autistic children are not able to predict others' behavior or thinking, which is needed in social aspects of life. However, autistic children are also reported as having strength and positives propensity in learning. They exhibit strength in memory and organizing information (Grandin, 1986, 1995 & William, 1996). While Baron-Cohen, Wheelwright, Skinner, Martin and Clubley (2001); Bergeron (2013) and Tucker (2013) claimed that autistic individuals have inclination on learning Mathematics. Therefore, for these reasons, the researcher adapted numeracy play as a catalyst for the autistic child to play in order to explore the social responses.

LITERATURE REVIEW

Play is not merely to fulfill the needs of children but through play, children can build social, cognitive and emotional skills, and gain self-confidence (Kahn & Wright, 1980). Play also helps to develop motor, social and cognitive skills (Pellegrini & Smith, 1998) and provide related experiences for learning involving memory and language (Leong & Bodrova, 2003).

Piaget (1962) claimed that play is an observable behavior with functional elements, symbols and regulations. While Bateson (1981) suggested that play acts as scaffolding. He added that children could practice concepts, which they gained while playing until they have mastered certain skills. However, the social deficiency in autistic children becomes critical barriers for them to play well.

Play and Autistic Children

According to Baron-Cohen (1987), there is a significant gap between 'play' and 'autistic'. The gap is caused by deficiency in autistic children who have difficulties in reading other people's mind as indicates in the Theory of Mind. They also have difficulties in understanding other people's perceptions. The cognitive deficiency of autistic children causes them to have difficulties in understanding other people's feeling, thought or intention (National Research Council, 2001). Baron-Cohen, Tager-Flusberg and Cohen (2000) stated that deficiency in play might be basic and universal among autistic people.

As a consequence, autistic people may face difficulties in social interaction, in non-verbal language such as eye contact, facial expression and body posture, and fail to initiate contact with others, especially during play. It is also claimed that autistic people are not able to describe others' behaviors, understand others' emotion, predict others' behaviors or emotion, understand others' perception, guess others' intention, and differentiate between fictions and facts (Myles & Southwick, 2005). Due to these weaknesses, autistic children face difficulties socializing with others, especially in play.

Numeracy Play

In this research, a numeracy play has been adapted from a traditional game which is Long Pole (known as *Galah Panjang* in Malay term) by integrating elements of mathematics for autistic children (Aswati Hamzah & Azimah Abdullah, 2017). This is in line with the emergent evidence found in literature that indicates autistic people have inclination towards mathematics (Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001; Bergeron, 2013; Tucker, 2013). Based on this evidence, the researcher attempts to attract autistic children to react and play the game. In addition, the game plays the role as a catalyst. It is also operated as therapy for them to improve their social skills.

The Innovation of *Galah Panjang* Numeracy Play

Galah Panjang is a cultural game that played by Malay community since long time ago. Originally, it has two columns and several rows depending on the number of players. The players are divided into two teams. One team is to guard the territory while the other team is to enter the opponent territory. Players have to use strategies, competency and quickness to enter the opponent territory in order to win the game. The 'enter team' has to pass through the 'guard team' without being touch. If the 'enter team' is touched, they will lose the game. The opponent will take turn to play the game next.

However, for this research the originality of *Galah Panjang* game has been adapted and innovated into numeracy play to suit the aims of this research where numeracy elements were incorporated as claimed by some researches on autistic superiority in mathematic (Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001; Bergeron, 2013; Tucker, 2013). The game acts as therapy and catalyst to observe the social responses in autistic child. While playing, the autistic child is expected to show the social responses of awareness of partners, initiating contact, shared participation and imitation. The steps of playing the innovated game of *Galah Panjang* will be discussed in the procedure part.

Related Learning Theories to the Development of *Galah Panjang* Numeracy Play

The innovation of *Galah Panjang* is based on several theories. Among the theories are Piaget's cognitive theory and Vygotsky's social theory. Besides, Baddeley's working memory model is also included in the development of *Galah Panjang* numeracy play.

According to Piaget, children need to construct knowledge of their own through active learning process. This is because, children's participation is the key component towards their learning and cognitive development. These can be achieved through the constructs of initiating actions, curiosity, and problem solving. Siegel (1977) also supported the need for children to construct knowledge by themselves through playing with objects. Children will use their schema. The children's schema will be built cognitively from the mental representation of the symbols and numbers used in the game. In addition to schema, the concept of assimilation, accommodation and equilibrium are also applied while playing the game. Play allows the autistic children to act, respond and solve problems while playing the game. Thus, the children can construct knowledge and understand about the rules of the game. Through playing the game, the autistic children can add new information to their existing knowledge base. At times, children reinterpreting this new experience to fit in with the previously existing information about symbols and numbers on the dices and play mat.

A model developed by Baddeley about human working memory also advocates the cognitive processes. Working memory underpins abilities in areas such as learning and comprehension (Henry, 2012). This happened when autistic children learn and comprehend the steps of playing the game correctly. The 'central executive' controls several forms of attentional control such as focusing attention, switching attention, and dividing attention as well as the ability to inhibit unwanted thoughts or actions and the ability to stay focused on a particular goal (Baddeley, 2002; Duncan, 1995; Miyake et al., 2001). Since autistic children have difficulty in focusing attention in tasks, providing favorable stimulus like mathematical game could attract them to stay focused on the given task. Autistic children do not show deficit in visuo-spatial

task as they do not have problem in remembering information that are visually presented but they have trouble in shifting from one matter to another and misidentifying relevant information needed to focus (Alloway, Rajendran & Archibald, 2009). Autistic children also have impaired development and the use of organizational strategies. This shows that autistic children have difficulties in connecting components of Phonological Loop and Visuo-spatial Loop simultaneously. Hence, through play, the autistic children will receive stimuli repeatedly to connect all those components, that is vital to the children's cognitive development and learning process.

From Vygotsky's theory of social interaction, the Zone of Proximal Development (ZPD) and children's active participation, children are able to construct partner awareness, initiating contact, and shared participation while playing game. Autistic children seem to lack of automatic social responses and show limited interest in other children. These discrepancies lead to difficulties in forming social relationships. This is because the basic element of social interaction is the shared enjoyment or understanding of events and conversations (Henry, 2012). Therefore, play is proposed for autistic children as a platform to achieve automatic social responses through interaction with peers.

The Aims of *Galah Panjang* Numeracy Play

The *Galah Panjang* numeracy play acts as therapy and catalyst while observing the social responses of autistic children in several constructs listed below.

- i. **Partner awareness:** As the play involves at least two players, each of the players should aware of each other. The awareness of partnership during play between players could be seen through their eyes contact, understanding of others facial expression, interaction within the suitable distance, understanding non-verbal language of others and the ability to cooperate during play.
- ii. **Initiating contact:** The play will bond social relationship between players as the children may have physical contact, initiating relation by calling name or showing something to his play friend.
- iii. **Shared participation:** The *Galah Panjang* numeracy play needs reciprocal relationship between players in order to play. While playing, children share their participation when they communicate verbally during play such as talking and requesting something, helping friend, taking turn, lending hand for requesting and giving something, and playing together until the end.
- iv. **Imitation:** Children may exhibit imitation of his play friend through observed behaviors during playing such as collecting dices, rolling dices, moving to the answer mat, clapping hands, raising both hands as guarding territory, and tapping hand for passing turn.

METHODOLOGY

A qualitative approach case study was conducted using observation technique. The observation lasted for eight sessions to explore the social responses of an autistic child throughout the numeracy game play. 'Long Pole' or traditionally known as *Galah Panjang* was used as medium to observe the participant's social responses. The numeracy game underwent the validity procedure before being applied to autistic children.

Participant

A participant was involved in this case study, which was a male autistic child who was 10 years old (refer Table 1) which studies at *Program Pendidikan Khas Integrasi (PPKI)* in *Kementerian Pendidikan Malaysia (KPM)* school in Pulau Pinang. The participant was selected through purposive sampling technique. There were several justifications in selecting the participant which were a) the age limit of participant within 10-12 years, b) study in Special Education Integration Program in national schools, c) nearby location to the researcher, d) the suitability of participant to this study based on the response of teachers, e) and the willingness of Special Education teacher in the school to participate in this study.

Besides the participant, five typical children were paired with the autistic child in a play setting which six of them including the autistic child were later divided into two groups so that they can play in groups of A and B. For this research, the participant was labeled as AG1.

Participant's Background

AG1 joined Special Education Program in the government school since he was 7 years old. AG1 was addicted to cellphone, liked to imitate Mickey Mouse cartoon voice and loved to talk alone. He did not response to questions that asked by the researcher. This shown that AG1 had difficulty to build relationship with the researcher. Besides, AG1 shown limited focus during learning.

Table 1 Autistic Participant Information

Name	Hasan (AG1)
Chronological Age	10 years old
Gender	Male
Race	Malay
Interest	Watching tv cartoon programmes and imitating Mickey Mouse voice
Autistic Level	High (based on rating from Head of Special Children Education Program)

Note: Participant name is pseudo name

Instrument

The researcher used the Social Skills Checklist for Autistic Children which was adopted (Vijayan, 2003; Bellini, 2007; Diana, 2007; Jennifer, 2007; Kristi & Theresa, 2009; Wendy at al., 2010). Kappa reliability test for Social Skills Checklist was 0.744. Therefore, the checklist was suitable to be used in this study because of high reliability and very satisfying (Chua, 2012).

The checklists were intended to provide a structure and framework to observers during eight observation sessions. It also acted as a memorandum of understanding between the researchers and observer in getting specific information about the social skills of autistic children during the study. In this study, the observers comprised of two special education teachers who teach in the school because the teachers understand the behavior of their students better than other teachers or other observers. In addition, the willingness and time constraints also important as observers. In fact, not all teachers like to engage in a long term research. Thus, only voluntarily special need teachers purposively selected as observers in this study.

The researcher also used the observation form to record information that had occurred while the games play. This form has two columns that separate the descriptive notes and reflective notes. Descriptive notes contain a description of autistic child, dialogue, physical background, statements about certain events and activities. While in the reflective note provides an opportunity for researchers to record personal thoughts like speculation, feelings, problems, ideas, impressions or preconceptions (Bogdan & Biklen, 1998). Demographic information related to time, place and date to be explained about the place and the study will also be included in this form. The researcher used the form to record the situation (Hancock, 1998). Information gathered from observation will boost cross-checking data (cross reference), especially when used with different data collection methods (Denzin & Lincoln, 1998). Eight observation sessions were video-recorded. Video recording is carried out to prevent the biased recall, while it can be analyzed repeatedly and in detail (Noraini Idris, 2010).

Validation of Long Pole (*Galah Panjang*)

The professional experts have validated the numeracy play in terms of face, language and content validity. Those professionals are experts in the field of mathematics and special education. This is to ensure the suitability of the game for autistic children.

Pilot Study

A pilot study has been carried out to test the usability of the game. Besides, the behaviors during playing the numeracy play were video-recorded and observed using the checklist.

Protocol of Data Collection

The researcher sought consent from Malaysia Ministry of Education (KPM), Jabatan Pendidikan Negeri Pulau Pinang, Jawatankuasa Etika Penyelidikan Manusia USM and respective parents in doing this research. A talk session was carried out to typical peers on how to play before the study was conducted. The play sessions were carried out in eight sessions and the behaviours of playing were video-recorded.

Data Analysis

The recording behaviours were transcribe before being analyzed. Through this, the observation data was analyzed through transcription (Miles & Huberman, 1994). Then the data was analyzed using thematic analysis. The process of analyzing the observation data was documented into transcription, reviewing the transcription in getting the clear understanding, removing irrelevant data, categorizing data, classifying into the main category and redefining to the main category (Bogdan & Biklen, 1998). The data was analyzed by using ATLAS.ti version 7 software.

FINDING AND DISCUSSION

Based on the observation for social responses, the data showed that the participant did portray the sense of partner awareness, initiating contact, sharing participation with peers, and imitating peers. The evidences of the social responses shown as below.

Partner awareness

The participant showed construct of partner awareness. Through this, the researcher found the evident when AG1 was guarding his territory from his enemy (Team B) to enter his area by raising both of his hands. AG1 said “Eee.. tak boleh masuk” (*Eee...you cannot go in*) while facing his enemy. This evidence shown that AG1 was aware of the action of other peers that was trying to enter his area. The voice level that AG1 spoke to the peers was adequate and not shouting. It was because AG1 aware the position of the peers that were near him and to speak at normal volume. Besides, AG1 can stand in front of his group member while AG1 was counting the answer.

Initiating Contact

While playing with peers, AG1 was seen calling his group member and touching his friend. AG1 used his hand to wave at his friend and after the friend looked at him, AG1 shown clown face by saying “Heee..” as if AG1 was disturbing his friend. This shown that AG1 was trying to build relationship through playing with his new friend although the action did was not appropriate. AG1 also seen to touch his enemy by holding his hand when his enemy wanted to enter AG1’s territory. These evidences manifested that AG1 was trying to build relationship with peers through play.

Shared Participation

Through participation, AG1 has shown responses by playing in turn and communicate with his peer. AG1 was seen to play in his turn after his peer by counting the score based on the dice thrown. Besides, AG1 was seen mentioning the score of the dice that he counted with his peer. These evidences have shown that AG1 was able to participate in play after being assisted by the peers.

Imitation

AG1 was seen to imitate the action of his group member when AG1 was assisted to count the score. The peer used his fingers to count the score and AG1 also was following the action. This has shown that AG1 gave attention to people’s action and he was able to imitate the action of counting using fingers.

The responses in partner awareness, initiating contact, shared participation and imitation manifested that social responses were observed during play with peers. This depicted that play developed an active learning through the involvement of the children as the main component for the development of learning and cognitive (Piaget, 1963). Nonetheless, the participant was seen trying to build relationship with peers by making clown face although the action was inappropriate. That was due to the lack in Theory of Mind in autistic child which unable to understand the feelings of others. The counting part during play was seen due to scaffolding given by peers in order to assist AG1 to participate in play. Other than that, the participant also showed responses of imitation toward some actions like the way of guarding his territory, that were consistent with Bandura (1977). As a conclusion, it is to say that the recent finding from the research done is accordance with the recommendation by Vygotsky (1978), where he claimed that social interaction has playing the major role in children development.

CONCLUSIONS AND IMPLICATIONS

The participant has manifested social responses while given a situation of playing the numeracy play. Besides, the researcher found that the autistic child was eager to play with the numeracy play compare to the passive response shown outside the play setting. This is because, the play acts as active learning process where children participated for learning and cognitive development (Piaget, 1963). Besides, children need to play with certain objects in order to develop their knowledge as claimed by Siegel (1977).

In helping the autistic children to improve their skills, play could be used as therapy and catalyst as it provides implications on their social development. As for this research, the innovated *Galah Panjang* numeracy play has made the traditional game to be lifted as an academic tool that contains elements of social and mathematic to be used at school as option in teaching and learning session. As a conclusion, the innovated cultural game of *Galah Panjang*, which is adapted by considering the theoretical aspects of social of children, can act as a therapy and a catalyst for the autistic children to play in order to observe responses during play with peer. Vygotsky's (1978) claim about the socio-cultural effect on the learning and knowledge development is believed to be true when it is applied in this study, which involved play.

Limitations and Future Research

The study done has its limitation in term of generalizability. This is because the study was done as a case study to an autistic child in a rural school in Pulau Pinang. Hence the result could not be generalized to other autistic children. However, the study may be replicated to other type of disabilities or typical children in the future.

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