

Analysis of Perspective Management and Reported Interaction in Story Retellings by Children with ASD and Typically Developing Children

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Abstract

This paper describes a novel approach to research in autism spectrum disorder (ASD) which builds on the linguistic analysis of perspectivisation to develop a suite of analyses of perspective marking in narrative. We report analysis of perspectivisation in the written narratives of 20 children with ASD and 148 typically developing children all attending mainstream primary schools in Victoria. Preliminary findings suggest that children with ASD differ in their profile of perspective management and reported interaction, specifically in producing significantly more instances of simple reported speech or thought, as compared with dialogic representations of character interaction.

Keywords: Autism; ASD; Narrative; Perspective; Discourse analysis; Child language; Reported speech

Introduction

Managing shifts of perspective in narrative is a task that can be expected to present particular difficulties to children with autism. It is well established that children with autism perform more poorly than typically developing children on cognitive tasks designed to test "Theory of Mind" (e.g., Baron-Cohen, 1991, 1992; Baron-Cohen, Leslie, & Frith, 1985; Perner, Firth, Leslie, & Leekam, 1989) and have difficulties in the context of conversational settings with the representation of internal states and assessment of communicative competence (Surian, Baron-Cohen, & Van der Lely, 1996). These results have been presented as evidence of a cognitive theory of autism which predicts difficulties in modeling the representation of self and other and limited ability to recognize that other people's actions are motivated by beliefs, intentions and

emotions (Hobson, 1986; Baron-Cohen, 1995; Baron-Cohen, Tager-Flusberg, & Cohen, 2000). Such findings have also been associated with the social and interpersonal difficulties characteristically experienced by children with autism and which form part of the diagnosis of this condition (American Psychiatric Association, 2000). Other cognitive theories of autism such as executive control dysfunction (Ozonoff, Pennington, & Rogers, 1991) or information processing guided by a preference for local over global sense-making (e.g. Chen, Rodgers & McConachie, 2009) similarly could be expected to predict deficits in the complex task of managing perspectivisation in narrative. We can thus conceptualise perspectivisation as capturing a trace of similar social and cognitive processing tasks to those at issue for these theories.

Although there is a significant body of work focused on the narrative capabilities of children with autism (e.g., Capps, Losh, & Thurber, 2000; Carey, 2008; Diehl, Bennetto & Young, 2006; Goldman, 2008; Losh & Capps, 2003; Solomon, 2004), perspective management in narrative construction has received surprisingly little attention. While earlier studies considered the use of character speech and mental state terms, character speech has typically been subsumed under the broader heading of "evaluative" devices, and study results are conflicting. Tager-Flusberg (1995) and Capps et al. (2000) found that children with autism and typically developing children were equally competent in their use of direct quotation in the production of oral narratives. In contrast, Loveland, McEvoy, Tunali, and Kelley (1990) found considerable differences between typically developing children and children with autism in the use of communication verbs to express direct quotations. Similarly, some researchers have argued

that mental state terms are rare in the language of children with autism (Leslie & Frith, 1998; Tager-Flusberg, 1992) while others found no difference in the use of mental state terms by children with autism as compared to typically developing children and children with intellectual disabilities (Capps et al., 2000; Tager-Flusberg, 1995; Tager-Flusberg & Sullivan, 1995).

A new approach is needed to assess and evaluate the use of perspectivisation in narrative production that goes beyond the examination of lexical items. As the management of a range of perspectives is a key requirement of storytelling, a body of work has already developed within linguistic and literary theory to describe and explain “perspective marking”, with a particular focus on narrative (e.g., Duchan, Bruder, & Hewitt, 1995; Graumann & Kallmeyer, 2002; Li & Zubin, 1995; Mushin, 1998, 2001; Reilly, Zamora, & McGivern, 2005; Sanders & Spooren, 1997; Weibe, 1994).

The research reported here describes a novel approach to research in autism by recognizing that naturalistic narrative data married to an existing body of linguistic analysis in relation to perspectivisation has the potential to provide new insights into the cognitive processes of autism.

Management of perspective-taking in narrative derives from the fact that the “story world” is removed in space and time from the immediate world of the story telling, and that the role of narrator may be related in complex ways to the identity and roles of the story participants. Theories of perspectivisation typically refer to a plethora of diverse linguistic phenomena implicated in perspective taking and marking. However one of the most central elements of perspective marking revolves around the representation of character speech, thought and interaction.

A range of different manners of representation of character speech and thought are possible, and theories of perspectivisation have been concerned to map these to an assessment of “degree of perspectivisation” of a character. Our concern here, however, is with the most basic and primary considerations, of whether children do represent character speech, thought and interaction, and if so, at what level of complexity this is done. Earlier work on the narratives of typically developing children, in particular Hickman (1993), has suggested that children’s representation of speech and interaction becomes more sophisticated as they get older. Can anything distinctive be identified in the representations by children with autism as compared with those of typically developing children?

We report here an analysis of perspectivisation in written narratives of 20 children with autism spectrum disorder (ASD) and 148 typically developing (TD) children, all attending mainstream primary schools in Victoria.

Method

Participants

Study 1 – TD children. The study involved 179 children from one state primary school in Melbourne, Australia. The school population has a relatively high socio-economic status: in a nine-level range it is classified as a “Like 2 school” based on a range of demographic measures. Academically, the students achieve well above state and like school results according to externally assessed testing. Children from all primary school grade levels took part. In the Victorian state education system this comprises grades Prep (here “0”) to 6. Included in the analyses reported here are 148 children, with nine children excluded on the grounds that English was not the primary language spoken at home, and 22 children excluded on the basis of significant departure from prescribed methodology. Children with known communication disorders were also excluded from this typically developing cohort. Table 1 gives a profile of the participants by year level and gender.

Table 1: Profile of Study 1 TD participants.

| Year level | <i>N</i> | Male | Female |
|------------|----------|------|--------|
| 0 | 19 | 11 | 8 |
| 1 | 31 | 16 | 15 |
| 2 | 25 | 13 | 12 |
| 3 | 12 | 8 | 4 |
| 4 | 16 | 6 | 10 |
| 5 | 37 | 23 | 14 |
| 6 | 8 | 4 | 4 |
| Total | 148 | 81 | 67 |

Study 2 – Children with ASD. The participants were 20 children with ASDs aged between 6 and 13 years sourced primarily through the Catholic Education Office in Melbourne, Victoria. All of the participants had undergone a team assessment from a recognised child mental health service, or an autism specialist. The children all demonstrated evidence of productive language and competence in English. All children were considered high-functioning (IQ above 70) and all were enrolled in mainstream primary schools. The 20 participants considered here represent the first phase of a larger study within which we expect to collect data from 40-50 children with an ASD and at least one TD child matched to each of these by school, year level and gender. Table 2 provides a profile of the participants in Study 2 by year level and gender.

Table 2: Profile of Study 2 ASD participants.

| Year level | N | Male | Female |
|------------|----|------|--------|
| 0 | 2 | 2 | 0 |
| 1 | 4 | 3 | 1 |
| 2 | 4 | 2 | 2 |
| 3 | 4 | 4 | 0 |
| 4 | 4 | 4 | 0 |
| 5 | 0 | 0 | 0 |
| 6 | 2 | 1 | 1 |
| Total | 20 | 16 | 4 |

Materials and Procedure

An internet based story elicitation environment was designed for the purpose of data collection. The “StoryLincs” program (www.autismnarrative.unimelb.edu.au) allows children to write their stories in a book format and the final product is “published” in an online library. Specifically designed innovative features of the program include optional page boundaries – page boundaries completely determined by the children – and the absence of spell check and grammar check facilities. The program records all keystrokes from the story-writing process, and creates a database of stories containing the final edited version published to the library, and a comprehensive editing record.

Study 1 – TD Children. The storytelling task in which the children participated was a retell task. Each class was read the story “The three little wolves and the big bad pig” (Trivizas, 2003) on two consecutive days by their class teacher. On the first day, children completed a narrative composition task to familiarise themselves with the internet-based story elicitation environment, and then heard the story for the first time. On the second day, the children were read the target story a second time, and then asked to retell this story using the StoryLincs program. Children were given up to 40 minutes to complete the task.

Study 2 – Children with ASD. Data collection for the children with autism followed the same protocol outlined above, but with two differences. Firstly, in order to create an environment which promoted maximum comfort for the participants, and an optimum setting for story-writing, sessions were one-on-one between researcher and child. Secondly, the researcher rather than the classroom teacher read the target story to the child on each day.

Analysis

Children’s stories were segmented into “perspective spaces” (PSS), each consisting of a continuous stretch of story representing a particular perspective or “voice”. The default is the narrator’s voice, where the story is

being told by an omniscient third person observer.¹ As soon as a character’s speech or thought is represented, this is treated as an introduction of a new PS, and thus a shift or boundary in perspectivisation. This segmentation allowed us to produce a quantitative measure of the number of PSS or perspective shifts in the story. This is then an alternative measure of story complexity to, for example, standard measures of linguistic complexity such as Total Number of Words.

In addition to the division of the story into PSS, we also identified whether representation of character speech or thought was singular or dialogic.² A characteristic example of a singular instance of represented speech is presented in the first example (1) below, where speech by a character is reported without a verbal response from the interlocutor. In contrast, complex or dialogic representation of character speech occurs when a verbal interaction between characters is represented, as in examples (2) and (3). Representation of thought is inherently singular and non-dialogic, at least in this data.

(1) *One day the mother wolve told the wolves to make their own house and to explor the world but to be careful of the big bad pig. So they did.* [Year 4, TD, F]

(2) *the litle wolves asked “Mr. Kangaroo can we use some of your bricks”, “certainly” said the kangaroo.* [Year 4, TD, F]

(3) *then they met a kangaroo who had bricks they asked can you give me some of your bricks said the wolves sure said the kangaroo and he gave them lots of bricks. so the wolves set of and builded a lovely house of bricks.* [Year 3, TD, M]

If TD children omit overt reporting of a response to a character’s speech, this occurs most frequently with the mother’s exhortation to the three little wolves to build their own house, as in example (1). In this case reported action by the wolves is sufficient to move the story on. In contrast, dialogic exchanges are frequently reported in the wolves’ interactions with the various animal characters they meet along their way and of whom they request different kinds of building materials. This is a story context in which a verbal accession to the request is required before the story action can proceed, as in examples (2) and (3). In unusual cases where such a response is not reported, the lack is notable. This is true of example (4), from a TD child. Example (5), from a child with ASD, is similarly unusual in not representing the response of the wolves to the challenge by the big bad pig.

¹ Of course, many other possibilities exist, but for the story retelling task we are concerned with here, this was the approach children adopted.

² A range of other related measures were undertaken which are not discussed here, for instance, the number of animate characters mentioned and the number of animate entities whose perspective was represented.

(4) *so thay whent oof and thay saw sume briks and thay siad can we have sume of oru brics siad the three littil wolfs siad and thay got plentey of brics* [Year 1, TD, M]

(5) *One day, the big bad pig came prowling down the road. When he saw the house that the three little wolves had built, he said "Little wolves, little wolves, let me come in, or I'll huff and I'll puff and I'll blow your house down!" So he huffed and he puffed and he puffed and he huffed, but the house would not come down.* [Year 4, ASD, M]

Coherent and effective retellings of the story are possible without representing any perspective other than that of the narrator, i.e. with no represented speech, thought or interaction. Example (6) is from a boy in Grade 1. Such stories have only one PS.

(6) *The 3 littel woves and the big bad pig*

*wan day 3 littel woves set off to bild a house. they bilt a bric houes but the big bad pig got his slej hamer and noced the houes down.
then the 3 littel woves bilt a houes awt of concreet.
then the big bad pig came and got his atomadice drill and noced the houes down.
then thae bilt a casel and the big bad pig bloo it up.
then the 3 littel woves bilt a houes awt of flowers. then the big bad pig came and ternd into a goody he end.* [Year 1, TD, M]

Results

Study 1

Analysis of the cross-sectional study of 148 primary school children across all seven grades in one Victorian primary school has been reported in part by Stirling, Barrington, Douglas, and Delves (2009a, 2009b). This showed that PS analysis, like some other measures of linguistic complexity such as story length in Total Number of Words, is a good candidate for a measure that shows a stepwise incremental progression as children proceed through the years of primary school education.

Figure 1 shows the mean number of PSS per story at each year level. There is a strongly linear relationship between the year level and the total number of PSS in the story. On average children's stories include 2 additional PSS per year level. A linear regression analysis shows a straight line fit with a correlation coefficient of .75 meaning that 56% of the variance of the total PS variable is explained by year level alone. If we control for the effect of the increase in length of stories over higher year levels, it is still the case that as children progress through the year levels they produce roughly .5 of an additional PS per year on average over and above what would be expected from the length of the story. A one-way analysis of variance including post

hoc testing using Least Significance Difference method shows significant differences between grade levels for: grade prep-1 ($p = .01$); grade 1-2 ($p = .03$); grade 2-4 ($p = .00$); and grade 4-5 ($p = .03$). Thus, there is an overall pattern of significant differences across grade levels, but the discriminating power is not sufficient to pick up distinctions between some adjacent grades.

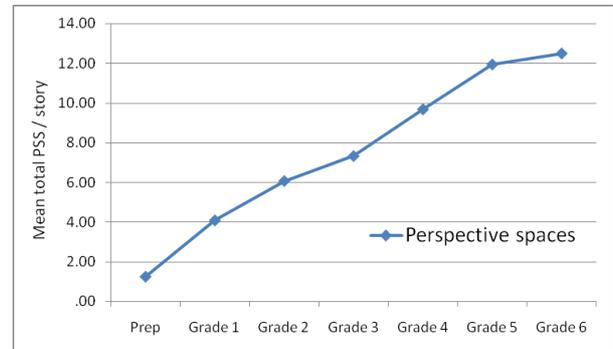


Figure 1: Study 1 - Mean number of PSS per story across grade levels

We find that there is also a highly significant effect for gender. This is the case whether we consider mean number of PSS in total ($F(1,147) = 14.44, p = .00$), mean number of single PSS ($F(1,147) = 5.88, p = .02$), or mean number of complex PSS ($F(1,147) = 8.17, p = .01$). These are shown in Figures 2-4. Note that despite the appearance of the graphs in Figures 2 and 4, they do not demonstrate a statistically significant interaction between year level and gender, due to high variability across children. There was a significant interaction between year level and gender for single PSS ($F(6,147) = 2.89, p = .01$).

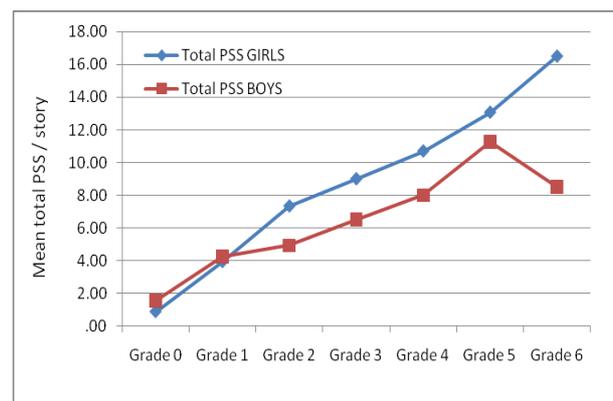


Figure 2: Study 1 - Total PSS by gender across grade levels

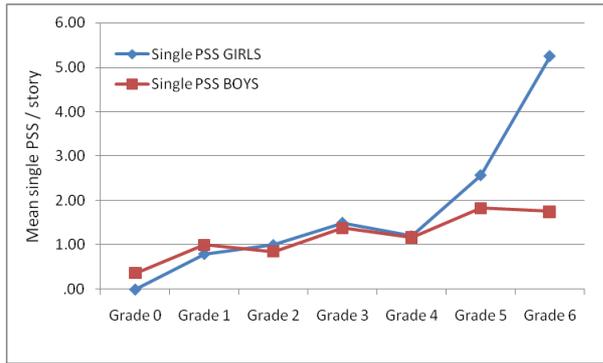


Figure 3: Study 1 - Single PSS by gender across grade levels

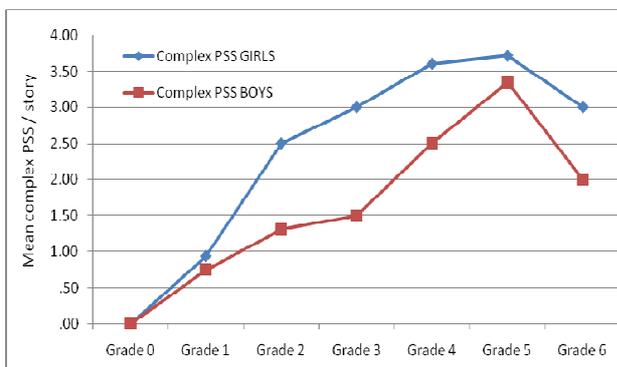


Figure 4: Study 1 - Complex PSS by gender across grade levels

Study 2

As there were only four female participants in Study 2, and the results of Study 1 suggest that gender is likely to be a confounder, most of the analyses reported for Study 2 compare the 16 male participants to TD boys only.

Table 3 gives the results for the three PS analyses for the male participants with ASD in Study 2. Recall that there are no participants from year 5 as yet.

Because of the relatively small numbers, post hoc testing is not able to establish statistical significance in the step from each grade level to the next, but the overall results retain evidence of a linear relationship between total number of PSS and year level (linear regression analysis $R = .70$), with more difference evident for total PSS than for either single or complex PSS. Additionally there was a significant difference between children in the younger year levels and children from grade 4 on ($p = .05$). Figure 5 plots the mean total PSS across year level for the male participants with ASD.

Figure 6 shows the mean total PSS across year levels for male ASD participants in Study 2 compared with male TD participants in Study 1. There is a significant

difference between these two groups for mean total PSS per story ($F(1,96) = 8.03, p = .01$), and there is a significant interaction of year level by diagnostic group for this measure ($F(5,96) = 4.22, p = .00$).

Table 3: PS analyses for male ASD group.

| Year | N | Total PSS | Single PSS | Complex PSS |
|------------|--------|-----------|------------|-------------|
| 0 | Mean 2 | 1.00 | .50 | .00 |
| | (SD) | (.00) | (.71) | (.00) |
| 1 | Mean 3 | 3.00 | .33 | .67 |
| | (SD) | (2.00) | (.58) | (1.16) |
| 2 | Mean 2 | 4.50 | 1.00 | .50 |
| | (SD) | (3.54) | (1.41) | (.71) |
| 3 | Mean 4 | 7.00 | 2.25 | 1.00 |
| | (SD) | (4.90) | (1.71) | (1.16) |
| 4 | Mean 4 | 17.25 | 4.50 | 4.00 |
| | (SD) | (3.50) | (1.29) | (1.16) |
| 6 | Mean 1 | 19.00 | 6.00 | 3.00 |
| | (SD) | (-) | (-) | (-) |
| Total Mean | 16 | 8.50 | 2.31 | 1.62 |
| | (SD) | 7.26 | 2.18 | 1.78 |

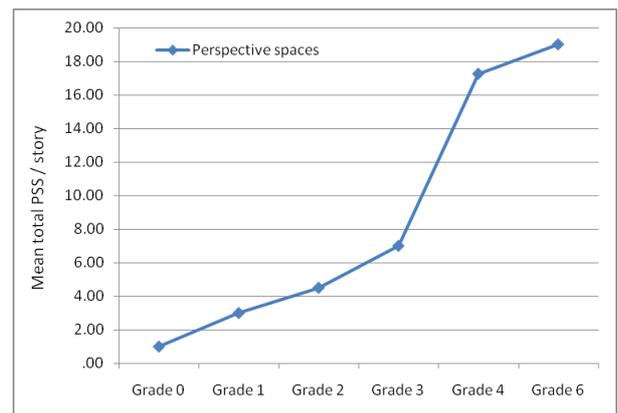


Figure 5 Mean total PSS for male ASD group

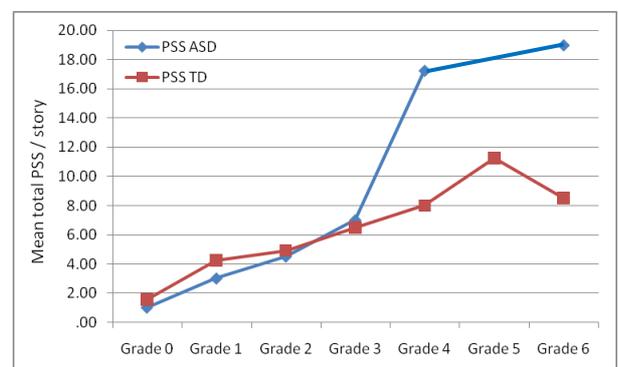


Figure 6 Mean total PSS for ASD and TD males

The results also patterned differently for the two diagnostic groups for single as compared with complex PSS. Again considering only the male students in each diagnostic group, there was a significant difference between the two groups for mean number of single PSS per story ($F(1,96) = 13.13, p = .00$) but not for mean number of complex PSS per story. Figure 7 shows the pattern of distribution of single PSS across the two groups and Figure 8 the complex PSS.

Discussion

It is notable that the group of 20 children with ASD participating in Study 2 and the group of 148 TD children in Study 1 did not differ dramatically with respect to their production and management of PSS, at least as indicated by the gross quantitative analyses reported here. Both groups manifested more complex profiles of perspective space management as they progressed through the year levels of primary schooling. The children with ASD, like the TD children, were able to report both singular and dialogic instances of character speech and interaction. Some of the children with ASD were among the most productive of PSS, although qualitative examination of their stories is needed to show whether this reflects a greater or lesser facility with this aspect of the narrative task.

An apparent trend for children with an ASD to produce fewer PSS at younger year levels and then catch up to or overtake TD children from around grade 4 requires further examination with a larger group of ASD participants. If this trend is borne out by the larger study, various cognitive explanations are available for consideration in explaining it. For example, we know that it is at around the age of eight and above that high-functioning children with autism begin to be able to pass Theory of Mind tests (Baron-Cohen, 1992; Prior, Dahlstrom & Squires, 1990; cf. Sullivan, Zaichik, & Tager-Flusberg, 1994). On the other hand, we also know that age nine is something of a ‘watershed’ in the development of narrative ability (Berman, in press). However as we have seen, watershed effects are not evident in TD children’s production of PSS, though some other aspects of narrative structure do manifest such effects (Stirling et al., 2009a).

The main observable difference between the ASD and TD males was in the mean number of single PSS produced per story. Children with ASD produced more single PSS than TD children. Recall that single PSS are single instances of reported speech or thought without a reported response by another character.

Although the children with an ASD in this study did not differ from the TD group in the number of complex PSS they produced, the results are consistent with a picture of children with an ASD as having more difficulty with, or less interest in, the representation of responses to character speech. This is borne out by more detailed qualitative examination of the children’s stories. As indicated in the analysis of examples (1) through to (5) earlier, in some cases, children’s omission of a verbal response to a character’s speech is notably unusual to the reader. For instance this seems to be the case when the reported action by a character seems insufficient by itself to move the story on. Preliminary examination of the data suggests that when TD children omit representations of a verbal response, this is often where a reported action will do instead. In contrast, in at least some cases, children with ASD omit

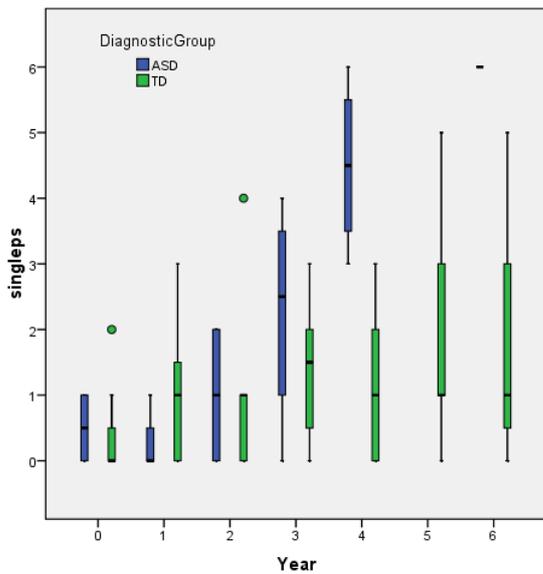


Figure 7 Mean single PSS for ASD and TD males

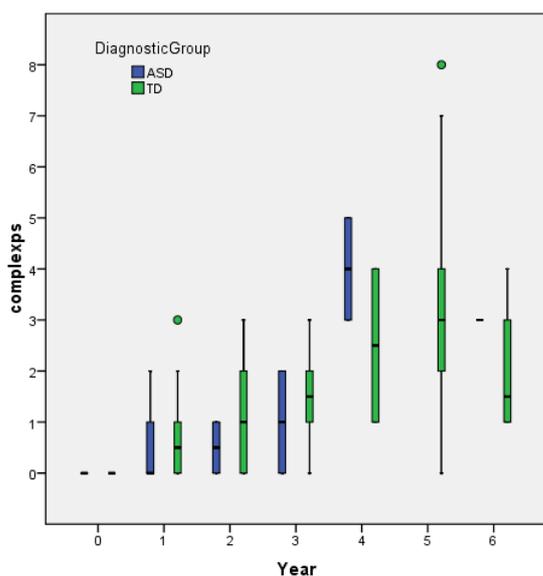


Figure 8 Mean complex PSS for ASD and TD males

responses which are more central to the storyline and in a way which impairs the coherence of the retelling.

Qualitative examination of the stories also identifies instances where children appear to struggle with the representation of speech by groups of characters, or where it is difficult for the reader to identify who is producing particular stretches of represented speech – making the story appear relatively less coherent or comprehensible. These matters are currently under investigation.

Conclusion

The story retelling task involves a complex set of cognitive processes including comprehension, memory, reconstruction of a remembered pattern, and encoding and production of the retold story. Because a stimulus story is involved, it is reasonable to think that children's representations of character speech, thought and interaction are scaffolded by this and may present a pattern somewhat different from what they would do in spontaneous or free storytelling. In fact, the stimulus story in question here, like the original three little pigs story, is highly formulaic and repetitive. It might be expected that children would simply repeat the formulae more or less accurately, with differences between children of differing year levels consisting more in the amount of the story they manage to recall and retell within the time available.

However, it appears that a measurement of perspectivisation centered around patterns of narration and representation of character speech, thought and interaction, provides a potentially informative way of investigating children's development with respect to narrative ability.

A more sophisticated understanding of the similarities and differences between TD children and children with ASDs awaits the opportunity to examine a larger group of children with autism. This research is under way.

Acknowledgments

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Research Profile

This research was conducted as part of the Australian Research Council funded project "Autism and Written Narrative: discourse analysis and the characterisation of higher level language disorder phenotypes" at the University of Melbourne. Stirling is a linguist and cognitive scientist with a particular interest in discourse analysis, narrative and cognitive modeling. Barrington is a medical practitioner with a background in cognitive science, in particular the modeling of belief states, and a special interest in autism and public health. They have been collaborating on research on autism and language for 5 years. Douglas is a postdoctoral researcher whose PhD investigated the semantic and syntactic development of verbs in children with autism. Delves is currently completing a PhD on repair in the conversation of children with autism and typically developing children.