

EXPOSITORY AND PERSUASIVE DISCOURSE IN  
SCHOOL-AGED CHILDREN WITH AUTISM SPECTRUM  
DISORDER

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## **Abstract**

Children with Autism Spectrum Disorder (ASD) have difficulty in a range of language domains that can affect their spoken language. An area that has not had extensive research done is that of explorative and persuasive discourse in individuals with ASD in terms of use of syntax in comparison to Typically Developing (TD) peers. The present study examined the language production of children with ASD across the domains of expository and persuasive language. Language was examined through syntactic complexity, language content, and information processing issues. Participants were split into three groups; 1) children diagnosed with ASD; 2) a language matched group of typically developing children (LA); and 3) participants of the same chronological age as the ASD group (CA). The CA and LA groups were also gender matched with the ASD group. The ASD and LA groups differed significantly from the CA group in both discourse tasks. For the persuasive discourse task there were significant differences between groups for; total number of words, total number of T-units, total number of clauses, number of supporting reasons and the attitude. There were significant differences between groups for; total number of words, total number of errors, total number of T-units, total number of clauses and nominal and adverbial clause use in the expository discourse task. Information processing also showed some significant differences between groups in this task. Analysis of group versus genre also highlighted some areas of significant differences between persuasive and expository discourse, this is discussed. Clinical implications for assessment and intervention for the ASD population are discussed.

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## **1.0 Literature Review**

### **1.1 Autism Spectrum Disorder**

Autism Spectrum Disorder (ASD) is defined by three main areas of impairments; social interaction, communication, and restricted or repetitive behaviours (Ricketts, 2011; Webb & Jones, 2009; Paul, 2007; Boucher, 2012 etc.). Social interaction requires the ability to understand different social behaviours and the ability to interact with others. Often children with ASD have difficulty in this area with maintaining social relationships, they appear to have passive social contact, and rarely spontaneously initiate interactions (Autism New Zealand, 2015; Wing, Gould & Gillberg, 2011; Paul). Physical contact is another area of social interaction that children with ASD often have difficulty with, for example; often they do not like to be touched or cuddled (Shirian & Dera, 2015). The second area of impairment is specific to communication and the ability to use and understand language. This is demonstrated in the decreased ability to communicate with others verbally and non-verbally (Wing et al.) for a range of communication functions such as; commenting, requesting, initiating etc. Thirdly, restricted and/or repetitive behaviours relate to the difficulty in changing thoughts and actions; this is often shown through repetitive and obsessive behaviours (Paul). Children with ASD often present with behavioural difficulties when there is a change of routine and may have obsessions over favourite objects (Autism New Zealand; Paul).

Autism is a spectrum disorder which represents the vast range of abilities in each of the areas of impairment between each individual with the diagnosis. Some individuals may have greater impairments in one area than another, whereas others may have significant impairments in all areas (Paul, 2007). Children with ASD may also present with additional diagnoses such as; epilepsy and attention and hyperactivity disorder (Paul). As noted, one of the key areas of diagnosis is communication difficulties. The nature of the language

difficulties also vary. For instance, 30% of children diagnosed with ASD will be non-verbal; however of those that are verbal, many will have language deficits (Tager-Flusberg, Paul & Lord, 2005). In terms of play/social impairments some of the characteristics identified can range from; lack of interest in engaging with others, limited imaginative play and lack of facial expression (smiling and making eye contact) to an inability to develop appropriate peer relationships (Paul).

In the early years, ASD was considered a relatively rare diagnosis, for example; statistics from the American Psychiatric Association in 1980 (as cited in Baron-Cohen, Leslie & Firth, 1985) show that ASD affected approximately four in every 10,000 people. The incidences of ASD have grown significantly over the past decades. The Autism and Developmental Disabilities Monitoring (ADDM) Network (2014) surveyed the prevalence of ASD in the United States for the year 2010. They found that one in 68 children aged eight are diagnosed with ASD. One in 42 of those diagnosed are boys compared with one in 189 girls diagnosed. In New Zealand it is estimated that one in 100 children are diagnosed with ASD with a total estimation of 40,000 people with ASD (Autism New Zealand, 2015). There are a number of possible reasons for the rapid increase of incidence over the years. One may be due to the changes in diagnosis of ASD specifically the substitution of diagnoses. Increases may be due to the reduction of other diagnoses that are substituted to fall under the diagnosis of ASD (Yoo, 2013). Another possible reason for such a dramatic increase in diagnosis of ASD could be due to the sensitivity of the diagnostic tools used and the number that are using the tools (Yoo). Therefore, with such a rapid and large increase in incidence of ASD it is a very important area to research.

Children are often diagnosed with ASD between one and three years of age, as this is a time when delays in the development of language and play are often noticed (New Zealand Guidelines Group, 2010). Some parents have reported that they have noticed differences in



terms of their child's development before one year of age (Webb & Jones, 2009). Autism is very complex with a vast range of degrees of impairments in different areas and developmental milestones (Shirian & Dera, 2015). The Diagnostic and Statistical Manual of Mental Disorders (DSM) has set criteria that should be met for the diagnosis of ASD. In the past ASD characteristics have commonly been grouped into three main areas; social interaction, communication, restrictive and repetitive behaviours (New Zealand Guidelines Group; Wing et al., 2011). In the latest DSM revision social interaction and communication are still key aspects in the diagnosis criteria (Wing et al.,). Due to the nature of ASD it is important that it is a multidisciplinary team involved in the assessment and planning for the individual with ASD (Paul, 2007); although, in New Zealand it is the paediatrician that makes the final diagnosis.

Communication difficulties are one of the hallmark characteristics of ASD, therefore it is not surprising that many children with ASD are non-verbal or have limited verbal language. Those that do use verbal language often start speaking later and develop their speech at a slower pace to Typically Developing (TD) peers (Tager-Flusberg et al., 2005). Eigsti, Marchena, Schuh & Kelley (2011) suggest that the communication difficulties children with ASD present with are not due to their social motivation deficit. However, research shows a fundamental language deficit which attributes to the communication difficulties for children with ASD. Eigsti et al., also suggest that all individuals with ASD have language impairments. Although individuals with ASD have a language deficit, not all domains of language are affected equally. For instance, the language domains of phonology/decoding and semantics appear to be delayed but less impaired than the domains of syntax and discourse production (Ricketts, 2011). Not only are there impairments in the specific language domains individuals with ASD often have other unusual features such as;

echolalia and neologisms that are not seen in TD children. Although the use of echolalia is typically seen in children with ASD not all children with ASD will use it (Paul, 2007).

The impairments that are noted in children with ASD can have a domino effect as they limit academic and general life success. Estes, Rivera, Bryan, Cali & Dawson (2011) found that children with ASD have varied academic achievement. They also found that often the academic achievement was different to that of expected academic achievement based on Intelligence Quotient (IQ) levels. Estes et al., found that similarly to the research in TD children that within the ASD population social abilities and problem behaviours had a significant impact on their level of academic achievement. Not only does the impairment in social interactions in children with ASD affect the academic success it also impacts on their ability to establish and maintain appropriate relationships with peers (Paul, 2007). Paul (2007) suggests that those individuals with ASD that perform closer to TD peers on IQ tests have increased chances of having some degree of independence in adulthood. It is also suggested that those that develop functional speech by age six will have better prognosis (Paul). Although these individuals with ASD with higher IQ and verbal language have increased chances of independence, ASD remains a lifelong disability which impacts on their ability to participate in day to day activities (Paul; Estes et al., etc.)

## **1.2 Language and Autism Spectrum Disorder**

### ***1.2.1 Phonology/Decoding***

Phonology is the way that sounds are organised in language and the function of those sounds (Kuipper & Allan, 2004). We have to know all the important sounds and what rules apply for combining these sounds to form words (Gleason, 2005). This also includes decoding which supports processing written language. In addition, phonology also overlaps with phonetics; the way that we produce and articulate the sounds (Eigsti et al., 2011).

The articulation and production of speech sounds was examined in a sample of 89 participants with high-functioning ASD compared with a control group of participants with Specific Language Impairment (SLI) (Kjelgaard & Tager-Flusberg, 2001). They used an articulation assessment and a language assessment. Their findings indicate that all participants scored within normal range. When articulation scores were compared with the language scores they found a correlation between lower language scores and lower articulation scores, although they were still within a normal range. This suggests that children with ASD that have below average language abilities may have more articulation errors however, within a normal range.

Decoding is an area that some studies have revealed discrepancies in terms of the development in children with ASD. Ricketts (2011) completed a review of current literature and found that in general literature suggests that children with ASD have high word recognition but a much lower level of language comprehension. Huemer & Mann (2010) conducted a study on 384 participants with ASD and compared these with a group of 100 participations with dyslexia. They completed a range of standardized assessments; four decoding measures and five comprehension measures. Their findings suggest that although the participants have relatively intact decoding skills that they often had poor comprehension skills. Huemer & Mann concluded that if children with ASD have a language comprehension impairment it is unlikely to be due to poor decoding skills. There are a number of possible factors why there is such significant discrepancy between word recognition and language comprehension, these include; oral language skills, decoding of words, linguistic and semantics skills (Huemer & Mann, 2010).

In contrast Nation, Clarke, Wright & Williams (2006) examined 41 children with ASD and their reading skills. Reading skills were based on; word recognition, non-word decoding, reading accuracy and text comprehension. Their results found that 32 children were

able to decode real words although 64% were significantly below norms for decoding of non-words. This suggests that some children with ASD do have difficulty decoding non-words which may be linked to poor phonological processing skills. Nation et al., suggest that poor decoding skills are a factor to be considered when assessing language comprehension skills in children with ASD.

In these studies they found that in both cases the children with ASD had language comprehension difficulties with or without difficulties with decoding which suggests that there are other factors to consider regarding the reasoning behind language comprehension difficulties. Overall, studies show that children with ASD have reasonably intact decoding skills of real words (Huemer & Mann, 2010; Nation et al., 2006; Ricketts, 2011).

### *1.2.2 Semantics*

Semantics is the study of the language meaning system; how we acquire new words and what they mean which then develop the complex network of words that have associated meanings (Gleason, 2005). In studies of typically developing language, semantics has been measured as vocabulary understood or produced. This is often assessed in a natural environment through play or looking through a book (Gleason). In the early years psychologists would keep diaries of words used by young children, although often this would lead to only unusual words being recorded rather than all the different words that they would use (Gleason). Gleason discusses a more recent way of measuring development through organised checklists that are developed to mirror typical development and provide a reminder for parents as to what words are normal and/or important for their children to understand and use.

Like most aspects of language development the area of semantics is one that continues to develop throughout childhood and adolescence (Gleason, 2005; Nippold, 1998; Mansfield & Billow, 2007). Not only through increasing word banks but also through

expanding on old words. Nippold et al., (2007) found that across the groups the use of these words increased from the children up to the adult participants. Gleason suggests that young children tend to use more nouns and verbs, possibly because they are often more tangible and often modelled when adults are talking to children. With a greater network of words and their meanings children are able to use more language in their everyday discourse. Adults continue to elaborate on old words this is done through changes to their environment and increased experiences in a range of social and cultural settings.

Most research suggests that children with ASD have good or mixed abilities in the area of semantics. Ramondo & Milech (1984) conducted a study on three groups of participants, ASD, special needs and TD. They used a range of sequences with differences in levels of syntactic and semantic dimensions. For example; high syntactic, low semantic dimensions “Last six we all went by tree to see the big box.” (p.98). An example of low syntactic and high semantic dimension was “Red white green dog cat bird horse train car bus boat” (p.98). They found that children with ASD were better able to recall sentences with semantic related items than sentences without semantic related items therefore suggesting that participants with ASD did not have a deficit in semantic processing. Although, they did suggest that to determine a semantic deficit it may be important to complete research that looks at semantic processing independent of syntactic processing. This way of assessing and measuring semantic abilities may not give the most accurate information for children with ASD. We know that children with ASD have a specific area of impairment in the area of social communication (Ricketts, 2011; Webb & Jones, etc.). Therefore, it may be worthwhile measuring semantic abilities in a task that is not isolated from social and communication demands.

More recent literature has identified that semantic skills such as vocabulary identification and categorisation is less difficult than when understanding mental state verbs

and semantic organisation for children with ASD (Eigsti et al., 2011). Therefore we would need to link the semantic ability with other linguistic domain skills such as pragmatics and syntax to gather accurate measures of ability in everyday life.

Nippold et al., (2007) conducted research on TD children, adolescents and adults using written persuasive discourse to measure and analyse syntactic, semantic and pragmatic development. This task does not isolate semantic abilities from social and communication demands which allowed Nippold et al., to gather information on semantic abilities in a natural day to day activity. They suggested that semantic development was important in discourse in terms of literate words; words that have low frequency but are used to link words and ideas. Therefore the use of discourse to measure semantic development could be useful for children with ASD.

Brown, Oram-Cardy & Johnson (2013) examined reading comprehension skills in children with ASD compared with TD children. One moderator that they used to assess this was semantic knowledge. They found that the level of semantic knowledge was the strongest predictor of reading comprehension ability. Brown et al., also commented that when the text had higher social content children with ASD had significantly reduced comprehension. Overall they found that there were mixed abilities in semantic skills. Children with ASD that had better semantic knowledge and decoding skills had higher success in the reading comprehension. The participants that had deficits in semantic knowledge and decoding skills had lower reading comprehension. Therefore showing that level of semantic knowledge will impact on individuals with ASD and their ability to read text with comprehension.

Groen et al., (2010) used functional magnetic resonance imaging (fMRI) on participants with ASD and a group of TD controls. They measured brain activity when participants were presented with stimuli that had pragmatic content, semantic content or both pragmatic and semantic integrated. They found that there were no differences in brain

activation when there was only one condition; however, when participants were required to integrate the two conditions the ASD participants had differing brain activity. For the participants with ASD they found that they had abnormally reduced activation of the left inferior frontal lobe region. This suggests that they may use their brain differently when social information is required to be integrated. Thus, it is important to integrate social information demands when measuring semantic development for a realistic measure of skills in real life situations.

### ***1.2.3 Morphology***

Morphemes are the smallest units of language and morphology is the rules that determine how we use these morphemes (Gleason, 2005). Eigsti et al., (2011) suggest that for children with ASD the use of the smallest meaningful units of language appears to be mostly intact, although, this is an area of limited research. However, according to some authors (Churchill, 1972; Ricks & Wing, 1975; Park, Yelland, Taffe & Gray, 2012) children with ASD have some difficulty with prepositions, conjunctions and pronouns. These are all important parts of language that are essential for successful communication.

Park et al. (2012) completed a study with three groups of participants; a group of children with ASD, a group with developmental delays without ASD and a third group of TD children. They used language samples taken during the administration of the Autism Diagnostic Observation Scale (ADOS). Language samples were transcribed and coded for syntax and use of grammatical morphemes. In addition to the language sample they also administered the Wugs Task where participants were required to apply inflections to non-words. They found that children with ASD had varying results in terms of their use of grammatical morphemes. However, they found that in terms of acquisition of Brown's (1973) grammatical morphemes participants with ASD had significantly similar rankings with the

group of TD participants. Park et al. found the main areas of weakness when compared with TD peers were; noun phrases, sentence structure, regular plurals, regular past tense inflections and regular third person pronouns.

One area that is notably affected in children with ASD is the use of pronouns (Churchill, 1972; Ricks & Wing, 1975; Park et al., 2012; Novogrodsky, 2013). In contrast to Park et al., (2012) using the observation scale language sample; Novogrodsky used storytelling and story retelling to obtain language samples in children with ASD. Novogrodsky found that in the story retelling task the children with ASD had no significant difference in use of pronouns compared with the TD children. However, in the storytelling both younger and older children with ASD had more ambiguous use of pronouns than the TD children. Novogrodsky suggested two reasons for these results. Firstly, that in the story telling there is a higher demand in terms of narrative planning and linguistic demand, whereas in the story retelling children can rely on their ability to recall the model and repeat phrases. Secondly, Novogrodsky explored the hypothesis that Theory of Mind (ToM) development has an impact on use of pronouns. When the children were telling their stories and referring to a character they were not monitoring the listener's mental model. This therefore suggests a reason for the ambiguous use of pronouns in young TD children with an immature ToM and in the children with ASD due to their deficit in ToM. The notion of ToM as an influencing factor is discussed in greater detail in the syntax section.

#### ***1.2.4 Syntax***

Syntax has been identified as one of the most complex linguistic domains of language due to the nature of having to combine words to make phrases (Eigsti et al., 2011). TD children develop along a continuum. They begin with using single words, move to combining words, then start to make simple sentences and gradually as they increase in age their sentence



length increases. Syntax can be measured in terms of micro-structure. Microstructure refers to linguistic structures, grammatical complexity and the number of different words used in a sentence (Westerveld & Gillon, 2008). Manolitsi & Botting (2011) similarly described microstructure as a form of assessment of structural language ability at sentence level.

Research into the influence of syntax in ASD is equivocal with varied results. Eigsti et al. (2011) reported that early research suggested that syntax was not impaired in children with ASD and that these skills were at the same level of the participants IQ. However they established that recent studies have found that there is some discrepancy and that there is a delay in this area of language (Riches, Loucas, Baird, Charman & Simonoff, 2010; Conti-Ramsden & Botting, 2001).

Syntax in children with ASD has been measured in a variety of ways. One method studies have used is sentence repetition. Ramondo & Milech (1984) conducted one of the earlier studies that examined semantic and syntactic ability in children with ASD through sentence repetition. They had three groups of 12 participants; ASD, developmentally delayed and TD. Sentences varied in both syntactic and semantic demand. The sentences varied in syntactic demand based on how they were formed; well-formed (for example; “Last week we all went by train to see the big farm” (Ramondo & Milech, p.75) or not well-formed (for example” Week went see big last the all to train we farm by” Ramondo & Milech, p.75). Their results suggest that there is a clear deficit in processing of syntactic information for children with ASD. This was shown through the difference in recall of well-formed in comparison with not well-formed sentences. There was a significant difference between the group with ASD and the TD group.

A more recent study also used sentence repetition to measure syntactic abilities in children (Riches et al., 2010). Riches et al., compared two clinical populations; SLI and ASD with a control group of TD participants. Like Ramondo & Milech (1984) participants were

required to repeat a range of phrases with varied syntactic complexity. Riches et al., also included a range of relative clauses. Repeated sentences were scored based on syntactical errors. Their findings found that in both the clinical populations there was a higher rate of errors when compared with the control group. These errors were predominantly in the phrases that contained object relative clauses (e.g., “The mother that the child carried wore a **short yellow** shirt” p.60) versus subject relative clauses (e.g., “The child that hugged the **fluffy old teddy** wore a cap” p.60). There were less errors in the phrases with an adjective in the relative clause (e.g., “The granny that the **tall thin** thief robbed wore some shoes” p.60) versus an adjective in the main clause (e.g., “The monster that killed the **prince** wore a **bright green** cloak” p.60). Although these findings were similar in both clinical populations the participants with SLI had greater error rates and Riches et al., suggested that this was due to a short term memory deficit as the SLI participants also scored lower on the short term memory section of the assessment battery. Conti-Ramsden & Botting (2001) suggest the importance of completing a short term memory task in order to identify or rule out participants with SLI if they are not your subject group.

While sentence repetition and standardised assessment are useful and valid ways to measure syntax there are some limitations to using this form of assessment. Sentence repetition is limiting due to the decreased linguistic demands required to complete the task. In order to address that, other researchers have looked at syntax in a discourse context. This approach creates a more natural language sample and allows for measuring the use of syntax to convey meaning. Language sampling is also a very important form of assessment as it provides a way to identify how an individual uses language to communicate with others (Oetting et al., 2010).

Novogrodsky (2013) examined language samples of children with ASD and TD children in story retelling and story-telling. Transcribed language samples were analysed

based on narrative length, sentence complexity and third person subject pronoun ambiguity. Results from this found that through the story retelling and story-telling the children with ASD produced complex syntax structures similar to the TD children. Novogrodsky found that for the participants with ASD the language samples from the story-telling task were longer than the story retelling and had a higher error rate. This could have been due to the fact that in the story retelling children with ASD were able to use their repetition skills and repeat what they had heard and that story-telling requires a greater linguistic demand.

Retelling tasks can be limiting as they can mask deficits in reference use in children with ASD (Novogrodsky, 2013). Volden & Lord (1991) used a story telling task with similar results regarding syntactic errors. They took language samples from children with ASD and TD children during story-telling and picture description and through general conversation about topics that came up during the interview. They found that the high functioning ASD group produced more non-developmental syntactic errors suggesting a linguistic disorder rather than just a language delay. They found that their grammatical structure was more rigid which meant that they had shorter Mean Length of Utterance (MLU) than their TD peers and this impacted on their non-developmental syntactic errors.

In contrast to Volden & Lord (1991) and Novogrodsky (2013), Banney, Harper-Hill & Arnott (2014) only used story-telling language samples. The language samples were obtained during a subtest of the ADOS and language samples were compared between children with ASD and children that were TD. In particular they examined the local structure which included syntax, cohesion and global elements; story grammar and internal state language. They found that the narratives elicited from children with ASD showed less complex syntactic structure. Participants with ASD also showed greater use of ambiguous pronouns consistent with the findings of Novogrodsky (2013).

There has been some research into the area of syntax in conversational discourse to suggest that by age five most children are using complex sentences in their conversations (Miller, 1981 as cited in Nippold, Hesketh, Duthie & Mansfield, 2005) which would suggest that complex syntax could be assessed through conversational discourse. Although, in contrast to this Nippold et al., (2007) study found that they were able to elicit greater syntactic complexity in an expository discourse task compared with a conversational discourse task. The expository discourse tasks that were used were appropriate for engaging children in meaningful discourse, allowing for language samples that could be analysed in terms of syntactic measures.

Little research has been completed specifically exploring the use of syntax in expository discourse. Nippold et al. 2007 completed a study using a peer conflict resolution (PCR) task to elicit expository discourse language samples. Nippold et al., also used the results from another expository discourse language sample through the favourite game or sport (FGS) task. They found that the PCR task elicited greater syntactic complexity than that of general conversation discourse.

An alternative view Eigsti et al. (2011) considers is that the discrepancy in syntactic abilities could be contributing to the social and cognitive factors. This is also in line with suggestions from Manolitsi & Botting (2011) who discussed the requirement of some ToM skills for use of accurate syntax in discourse. This would suggest that it would be worthwhile measuring syntax through socially motivating types of discourse such as persuasive and expository.

As suggested by Manolitsi & Botting (2011) a socially motivating discourse is persuasive discourse. Persuasive discourse is the ability to make others do, think, want, feel or say something (Bartsch, Wright & Estes, 2009). Therefore in order to do this we can assume that it is important to be able to use social cognition to alter the conversation

depending on the conversation partner's opinions and beliefs in the topic. Hence persuasive discourse is a socially motivating type of discourse that may support eliciting language samples that can be measured in terms of syntactic ability. In addition, expository discourse is another type of discourse that can be classified as socially motivating; the use of language to convey information (Bliss, 2002).

### **1.3 Discourse and Autism Spectrum Disorder**

Discourse is the social communication domain in which we use language to communicate with others. Discourse is an area of pragmatics that has received some attention in research, primarily in the use of conversation and narrative. Pragmatics is an area of language that has traditionally been described as the most impaired area of language for children with ASD. Eigsti et al. (2010, pg. 683) describe this area of language as “the most “socially motivated” domains of language”. This is because of the skills it requires for successful discourse. For example, being aware of and responding to social cues (Colle et al., 2008), knowledge and interest (Eigsti et al., 2010). This impairment for children with ASD in social communication and executive functioning creates a lack of social knowledge and awareness which may lead to other impaired development and learning (Mundy & Burnette, 2005; Schuler & Wolfberg, 2000). One of the key characteristics in the ASD diagnosis is the impairment in social interaction. This research would suggest that there is going to be significantly less chance for successful discourse in children with ASD.

There are four main types of discourse that have been researched; narrative, conversational, expository and persuasive. There has been a significant amount of research conducted in the area of narrative discourse (Westerveld & Gillon, 2008; Manolitsi & Botting, 2011; Cole et al., 2008) and conversational discourse (for example; Nippold et al., 2005). Not only has there been extensive research in narrative discourse in children who are

TD (for example; Westerveld & Gillon), but narrative has also been examined in clinical populations. For instance a number of researchers have focused on narrative discourse with children with SLI (Manolitsi & Botting) and also in children with ASD (Manolitsi & Botting; Cole et al.,).

Little is known about the language production of children with ASD in two other discourse genres; expository and persuasive. However, there are advantages with understanding these other discourse genres that have not been widely examined. Further research into these genres could provide a greater depth of knowledge regarding children with ASD and their language development and ability to use language for successful discourse.

### *1.3.1 Narrative Discourse*

Narrative discourse language is language that is used throughout the day; sharing news, re-telling a story etc. (Westerveld & Gillon, 2008). It is important for participation and engagement in everyday life. The use of narrative as an assessment tool instead of a standardised assessment may be useful in some clinical populations such as; ASD and SLI due to its sensitivity of small changes over time (Manolitsi & Botting, 2011). Nippold (1998) has extensively examined the development of narratives and has found that there are key elements that mark the development from children to adults. For example; increases in length, inclusion of character's feelings and thoughts; and more awareness of engaging the listener during the story telling (Nippold). Narrative discourse that has been widely researched in TD children, children with language impairments, ASD and other learning difficulties (for example; Westerveld & Gillon, 2008; Manolitsi & Botting, 2011; Cole et al., 2008).

Manolitsi & Botting (2011) compared language information from story-telling narrative discourse language samples and a range of four standardized assessments for children. Their study consisted of 13 participants with ASD and 13 participants with SLI. In this study they measured macro-ability; story structure and story content, and micro-ability; semantic and syntactic skills. These were all scored on a 0-3 scale based on the level of structure, content and linguistic skills. For standardised assessments a language assessment, pragmatic language assessment and two non-verbal cognition assessments were used. Results indicated that the ASD group performed significantly lower in usage of expressive skills in the story-telling and that there were some differences in structural language. This may have been due to impairment in pragmatic language skills that are essential when producing a narrative with good overall structure and content (Manolitsi & Botting). This is consistent with Nippold (1998) who found that the ability to acknowledge characters feelings and thoughts; and ensure that the listener is engaged are signs of development of narrative ability. Manolitsi & Botting found that completing the narrative language sample provided information regarding language use in these clinical populations in comparison to the standardised assessments. They suggest that narrative is a useful clinical tool and may provide more qualitative information for children with different communication impairments that standardised assessments are unable to show.

Colle et al. (2008) investigated the narrative skills of a group with ASD and a group of matched controls. They assessed pragmatic skills and semantic and syntactic skills. They used four main areas of coding to measure these skills; length and episodes (total number of words, total number of episodes), reference analysis (introduce a character, re-introduce a character or to maintain references to actions carried out by the same character), temporal relations (use of temporal adverbs, conjunctions and expressions) and mental state expressions (mention of emotional state of the character). Similar to Manolitsi & Botting

(2011) a story retelling task was used to obtain a language sample. Their analysis of the samples differed from Manolitsi & Botting as Colle et al., as they found that phonology and syntax were relatively similar in both groups. Interestingly, the ASD group had similar results to the control group for story structure and length of story. However, the ASD group used more ambiguous references to the characters in the story. This was not noted when talking about the main character but when talking about the dog and/or other characters.

Research suggests that narrative is an important form of discourse to evaluate in ASD for a number of reasons. Firstly, it has been studied extensively in a number of populations so allows comparisons with ASD across populations (Manolitsi & Botting, 2011; Cole et al., 2008). Secondly, it has been shown to distinguish between TD children and those with ASD and is sensitive to some of the difficulties in children with ASD (For instance, Colle et al., 2008; and Manolitsi & Botting, 2011). Another advantage of using narrative discourse for individuals with ASD is that it is a form of discourse used relatively frequently and for relaying social information (as in personal narratives for instance). The potential disadvantage of narrative is that it may not be as sensitive to more advanced syntactic structures. Also although narrative is social, it does not require social interaction like other forms of discourse such as conversation, neither does it necessarily require consideration of other's knowledge. This is however dependent on the type of narrative task. For example, a retelling task as used by Colle et al., relies more on memory than taking another's perspective. Another form of discourse to consider then is conversation, in that more than one speaker is involved.

### ***1.3.2 Conversational Discourse***

Conversational discourse is an interactive and less formal genre of discourse (Crystal, 2002). This is often assessed through discussion of common topics, such as; interests, school, family and pets (Nippold et al., 2005). This form of discourse is essential in social contexts for



example; when engaging in conversation with friends discussing fashion, movies and exchanging opinions and sharing information (Nippold et al.). Conversational discourse is an area that has had a significant amount of research completed in a range of clinical populations (LeBlanc et al., 2014; Roberts et al., 2007; Capps, Kehres & Sigman, 1998) and with TD individuals (for example; Nippold et al.).

One clinical population that has been found to have difficulties in the area of conversational discourse is individuals with Traumatic Brain Injury (TBI). LeBlanc et al., (2014) examined a large group of individuals with TBI (195 participants) on acute evaluation of conversational discourse using the Protocole Montreal d'évaluation de la communication (D-MEC) tool. They then compared the performance on the checklist with other findings on tests of memory, mental flexibility, semantic and letter category naming, verbal reasoning etc. They found that performance was related to the Disability Rating Score, indicating that those with lower disability rating had better outcomes in conversational discourse. They found that for participants with TBI that the D-MEC allows for early identification of conversational discourse impairment in acute post-TBI patients. This is a tool used to evaluate language in individuals with brain injuries, other tools have also been used to measure conversational discourse in other clinical populations.

Roberts et al., (2007) examined conversational discourse in boys with Fragile X and ASD, boys with Fragile X without ASD, boys with Down Syndrome (DS) and TD boys. Conversational discourse was measured through the conversation section of the ADOS. From the language samples obtained the authors measured topic continuity, topic quality, elaborate topic maintenance, turn type, and perseveration. Results indicated that all groups of boys were able to take turns. However, the boys that had both Fragile X and ASD produced significantly more non-contingent discourse than the boys in the three other groups. They also found that the boys with Fragile X with or without ASD perseverated more, although,

between groups the group with Fragile X alone perseverated less than those that also had ASD. Therefore some of the discourse impairments may have been due to the comorbidity between Fragile X and ASD. This would suggest that it would be interesting to examine conversational discourse in children with ASD to see if difficulties in this area are characteristic to the ASD diagnosis.

It is widely known that children with ASD have impairments in conversational skills (Capps et al., 1998). Capps et al., compared the conversational skills of 15 children with ASD and 15 with developmental delays; both groups were matched on language age. Language samples were gathered through semi-structured conversation focused on three topics: vacation, friends and school. They found that children with ASD more often failed to respond to comments and made less relevant contributions to the conversation and produced fewer personal narratives. While this study found differences between the groups based on specific conversational behaviours (e.g., responding to questions, repetitions, and verbal and non-verbal communication) they did not examine the syntactic complexity of the language used.

One study that did examine syntactic complexity during conversational discourse is that of Nippold et al., (2005). They completed a cross sectional investigation comparing syntactic development between conversational and expository discourse in TD participants across all ages. For conversational discourse an interview was conducted where the participant was asked questions to discuss familiar topics. The FGS task was used to elicit an expository discourse language sample. They found that in both genres syntactic complexity increases with age, with the two best indicators being mean length of T-unit and relative clause use, both of which continued to develop into early adulthood. Although they found increased development across the ages in both genres, they found that expository discourse elicited greater syntactic complexity than conversational discourse.

Although there has been extensive research into the area of conversational discourse and TD children (Nippold et al., 2005) and clinical populations (LeBlanc et al., 2014; Roberts et al., 2007; Capps et al., 1998) it is limiting in terms of using the language samples to examine syntactic complexity. An alternative to conversational discourse as suggested by Nippold et al., is that of expository discourse. Nippold et al found that expository discourse was able to elicit greater syntactic complexity due to the complex thought that is required for this genre. Unlike narrative discourse expository discourse continues to have a demand on social interaction which is beneficial when examining the language used by individuals with ASD.

### ***1.3.3 Expository Discourse***

Expository discourse is the use of language to convey information (Bliss, 2002). Expository language is essential for participating in daily life and changes as children get older, increasing in demand (Westerveld & Moran, 2013). For example, primary school age children might use expository discourse skills to share their news about a favourite topic or event that happened, or provide a brief description of how to make something. As children get older the demands typically increase to having to use language to explain complex ideas and opinions.

As noted previously, one of the disadvantages of conversational discourse is that it does not necessarily elicit more advanced syntax (Nippold et al., 2005; Nippold et al., 2008). In contrast, expository discourse has been found to require more linguistically complex syntax. In an examination of language growth across childhood and adolescence, Nippold et al., (2005) found that significant changes were noted in the level of syntactic complexity used by older children and adolescents using an expository task. The expository discourse task used was the FGS task. For this task participants were asked to think about their favourite

game or sport. Participants were then prompted with a series of questions, what is it?; why is that your favourite game?; how do you play it (rules, how many people etc.); and what should you do to win the game?. These questions are used to ensure that all participants covered the same issues. There were more noticeable differences between genres for utterance length and syntactic complexity compared with the differences across ages. In the FGS task across the ages they noted an increase in knowledge of the topic; thus suggesting that complex thought increased the use of complex syntax (Nippold et al., 2005). While it was evident that language change across ages could be measured using the FGS, additional studies were needed to determine whether expository tasks, and in particular FGS, would differentiate syntactic difficulties between children with SLI compared to those that were TD.

Nippold et al., (2008) conducted a study comparing the syntactic development of TD children and those with SLI and as measured by expository and conversational discourse language samples. They had a large group of participants 106 who were identified as having SLI; 84 who were identified as having nonspecific language impairment (NLI) and 254 who were TD. A conversational discourse language sample was gathered by the examiner asking questions about general topics of interest. For the expository discourse language sample the FGS task (Nippold et al., 2005) was used. In the expository discourse task the TD group had longer mean length of T-units than both the SLI and NLI groups. However, in the conversational discourse task there were no significant differences between groups. All groups of participants performed at a higher level during the expository task as opposed to the conversational discourse task. Without the expository task the authors would not have been able to see the complex syntax that the participants were capable of using.

While expository discourse clearly elicits greater level of syntactic complexity than conversation, when compared with narrative, the same findings are not necessarily indicated. Scott & Windsor (2000) compared the language use in narrative and expository discourse

through written and spoken language. Three groups of participants were used; 20 with Language Learning Difficulties (LLD), 20 Chronological Age (CA) matched and 20 Language Age (LA) matched. Scott & Windsor also used a different method for eliciting language samples than other studies (for example; Nippold et al., 2008; Nippold et al., 2005). They used educational videos that participants viewed and then produced summaries in the form of spoken discourse in both narrative and expository and secondly, in written form for both types of discourse. Transcripts were coded for productivity measures. Their findings show that all groups produced written language samples that were shorter than the spoken samples and contained a higher level of errors. They found that all groups produced the same number of clauses per T-unit; however, the LLD group produced fewer total numbers of T-units with more grammatical errors. In all of the groups they elicited longer language samples for the narrative discourse task compared with the expository discourse task; this may have been due to the familiarity of the narrative discourse task.

It is difficult to compare the findings of Scott & Windsor (2000) and the Nippold et al., (2008) study because of the different type of expository discourse task used as task type has been shown to influence results. For instance Westerveld & Moran (2013) conducted research using two different methods for eliciting expository discourse in order to find out if one would elicit a more detailed and complex language sample. They used three groups of participants who were all TD; young primary school aged, intermediate school aged and high school age. The two methods that they used were the FGS task and a retelling of an expository passage about a game. They found that the FGS elicited a higher MLU than the retell which allows for greater opportunities to examine strengths and weaknesses in language used. Westerveld & Moran found that although the MLU was shorter for the recall, it also elicited some syntactically complex sentences suggesting that using recall may be good for obtaining a quick language sample.

Another study that compared task types in expository discourse was Nippold et al. (2007). There are a number of different task types that can be used to elicit expository language samples. In this study they used data from a previous study using the FGS task (Nippold et al., 2005) and in addition used a PCR task. The PCR task is of interest to young people as they move through the different ages (childhood to adolescence and onto adulthood) (Nippold et al., 2007). As this is an important time when rapid growth is seen in knowledge of social issues (Selman et al., 1986) and learning of establishing and maintaining friendships (Santrock, 1996). Due to this interest and development it is expected that this topic may stimulate the use of complex syntax (Nippold et al., 2007). Nippold et al., used these two tasks to examine the syntactic complexity in expository discourse across three age groups; 11, 17 and 25 years. Their findings suggest that with the PCR task the different questions prompted different types of clauses to be used. Therefore they were able to elicit greater syntax than the FGS task. They found that there was a significant difference in complexity of syntax used between the children and the adults as the adults produced more information in their answers.

The PCR task has been shown to be useful in eliciting complex syntax (Nippold et al., 2007). Brinton, Fujiki & McKee (1998) used an expository discourse language sample similar to the PCR to examine the negotiation skills of children with SLI. They had three groups, six participants with SLI, six CA matched and six LA matched. Each participant was grouped with two other partners that were matched for gender and CA. The groups of three participants were read a passage and given a task, the participants then had to work together to come up with one solution. From this they were able to examine the syntactic complexity of the language used in addition to Selman's (1981) Interpersonal Negotiation Strategies (INS) to analyse the data and rate participants negotiation skills. Brinton et al., used this additional measure to examine the way children communicate in negotiation contexts and the

development level of the negotiation strategies. Brinton et al., found that participants with SLI produced similar length utterances however used less negotiation strategies. Qualitatively the authors noted that this meant that the participants with SLI were less influential in their group in making the overall and final decision. Using the INS enabled the authors to evaluate the developmental levels of negotiation strategies.

Expository discourse tasks would be beneficial for research in the ASD population. Previous research has suggested that expository discourse tasks provide detailed information about a child's use of syntax and language (for example; Nippold et al., 2008; Westerveld & Moran, 2013; etc.). We know that children with ASD present with impaired language in syntax and discourse production (Ricketts, 2011). By completing an expository discourse task we can measure syntax and discourse production to be able to have more specific data on the severity and specifics of the impairment.

#### ***1.3.4 Persuasive Discourse***

The definition of 'persuasion' is "The action or process of persuading someone or of being persuaded to do or believe something" (Oxford Dictionary of English, 2010). Persuasive discourse is the ability to use language to make others do, think, want, feel or say something (Bartsch, Wright & Estes, 2009). Therefore in order to do this we can expect that it is important to be able to use social cognition to alter the conversation depending on the conversation partner's opinions and beliefs in the topic. Persuasive discourse can therefore be linked to ToM; the ability to see alternative viewpoints. This is an area that has been shown to be a weakness for children with ASD (Baron-Cohen, 1995). There is still little known about how ToM development impacts on individuals with ASD and their ability to produce and understand persuasive discourse.

Persuasive discourse can be seen in all ages including very young children (Bartsch et al., 2009). Some research has suggested that four to five year old children are more likely to

use verbal assertion (72 %) as dominance behaviour rather than physical assertion (12%) (Williams & Schaller, 1993). Bartsch et al., completed a study to examine the persuasive transcripts of four TD children aged between three and five years of age. They used archived longitudinal language samples from conversations at home. Utterances were coded for a range of persuasion chunks. They found that the main persuasion tactics used by the children were; questioning, commanding, protesting and explaining. They noted that all children slightly altered their argument as a result of the explicitly outlined mental state of the conversational partner.

In addition to using persuasive discourse to measure the types of persuasive language and tactics that children use Nippold et al., (2005) suggests that persuasive discourse provides an excellent opportunity to assess the link between literacy skills and later developing complex syntax skills. They completed a study with three groups with 60 TD participants, the three groups were split as; children, adolescents and adults. Participants were asked to write about the topic of animals being trained to perform in the circus. Nippold et al., used the language samples to measure syntactic, semantic and pragmatic development. Their findings suggested that from the children up to the adults there was improvement in all language domains. The adults were able to produce more complex language samples with increased number of reasons and ability to demonstrate flexibility in their thought processing.

A clinical population that has been used to examine the use of persuasive discourse has been people that have brain injuries (for example; Moran, Kirk & Powell, 2012; Ghayoumi et al., 2015). Moran et al., administered a persuasive discourse task to two groups of participants; one of eight adolescents with acquired brain injury (ABI) and a TD control group of eight adolescents that were matched for gender, age and education. The persuasive discourse task required participants to listen to a passage about whether team sports or individual sports were better. The passage was designed to ensure that the speaker considered



all possible views on the topic. This topic was chosen as a topic of interest to the age group examined to increase the chances of a successful language sample (Nippold, 1998). Language was measured in terms of, productivity (looking at T-units, mazes, repetitions, and length of utterances), syntactic complexity (use and variety of clauses in the language sample) and language content (number of reasons to support argument). Results indicated that language content and syntactic complexity showed no significant difference between the groups. However, Moran et al. found significant differences in the language content with the control group of TD participants producing more than twice as many supporting reasons. This indicates that the ABI population have difficulties with persuasive discourse; research has also suggested that participants with brain injuries have impairments in social cognition and ToM (Turkstra et al., 2004) which can impact on the ability to use persuasive discourse. ToM is an area that has been highlighted as an area of impairment for children with ASD (Korkmaz, 2011; Durrleman & Franck 2015; Colle et al., 2008 etc.), therefore it would be interesting to use a persuasive discourse task and also examine ToM with this population.

Another study that has used a topic of interest to elicit persuasive discourse is that of Ghayoumi et al., (2015). They completed a study using two participant groups; 13 participants with TBI between 19 and 40 years of age and a second group of 59 healthy adults matched for age. All participants were asked to give their opinion on public transport versus private vehicle; this topic was chosen as something that would appeal to all participants in order to get a good quality language sample. In this study they also offered participants feedback with encouragement to extend the sample (E.g., “anything else?). Their results indicated that the participants with TBI demonstrated impairment across language domains. These results differed from those of Moran et al.’s (2012) as they found participants with TBI had less syntactic complexity shown through decreased use of dependent clauses. They also noted that in the language samples measures of both micro-linguistic and microstructural

showed impairments as the TBI group produced discourse with significantly less productivity, syntactical complexity and cohesion.

Persuasive discourse would be an interesting task to administer to the ASD population. Children with ASD have an impaired ToM; being able to understand and identify mental states (Baron-Cohen et al., 1985). Persuasive discourse requires a high level of social cognition in order to be able to use language to persuade another person. In previous research into persuasive discourse they found that the TD population appear to have no problems with persuasive discourse, especially as they get older (Nippold et al., 2005). However, research into clinical populations such as participants with TBI has suggested that there is impairment in language domains and the ability to produce persuasive discourse (Ghayoumi et al., 2015). This particular clinical population (TBI) also exhibits impairment in social cognition and ToM (Turkstra et al., 2004).

#### **1.4 Summary and research questions**

Children with ASD have impairments in social interaction, communication and restricted or repetitive behaviours (Ricketts, 2011; Webb & Jones, 2009; Paul 2007; Boucher, 2012 etc.). A key area of diagnosis is communication; they have difficulty in a range of language domains that can affect their spoken language. Overall, studies found that the areas of phonology/decoding are reasonably intact (Huemer & Mann, 2010; Nation et al., 2006; Ricketts, 2011). Semantics has varying levels of abilities in children with ASD, often depending on the social information demands on the task (Groen et al., 2010). Morphology is also varied with one of the most notable areas of impairment the use of pronouns (Churchill, 1972; Ricks & Wing, 1975; Park et al., 2012; Novogrodsky, 2013). One area that has had a significant amount of research in children with ASD is that of syntax (Riches et al., 2010; Novogrodsky, 2013; Volden & Lord, 1991 etc.). One way that has been effective in measuring syntax is through discourse (Novogrodsky, 2013; Volden & Lord, 1991 etc.) as it

provides a natural language sample for measuring language skills (Oetting et al., 2010). This is a social communication domain which is often difficult for children with ASD (Mundy & Burnette, 2005; Schuler & Wolfburg, 2000). There has been significant research into the area of narrative discourse (Westerveld & Gillon, 2008; Manolitsi & Botting, 2011; Cole et al., 2008) and conversational discourse (for example; Nippold et al., 2005). An area that has not had extensive research done is that of expository and persuasive discourse in individuals with ASD in terms of use of syntax in comparison to TD peers. Nippold et al., (2005) found that expository discourse is especially good at eliciting complex syntax when they compared expository and conversational discourse.

This study is an explorative study to examine the language production of children with ASD across the domains of expository and persuasive language.

Specifically the study will address two questions:

1. Is the syntax of children with ASD less complex than TD peers with matched CA and LA?
2. Do children with ASD differ in how they structure expository and persuasive discourse compared to CA and LA matched TD peers?

## **2.0 Method**

### **2.1 Participants**

Twenty seven school aged students from schools across New Zealand participated in the current study. The participant group included nine children with ASD (age range 12;8 – 17;1, mean age 15;7), nine children matched for chronological age (age range 13;5 – 17;6, mean age 15;9) and nine children matching for language age (age range 6;3 – 16;8, mean age 12;1). All participants spoke English as the primary home language, although they were from mixed cultural backgrounds. None of the participants had any known vision and/or hearing impairment. The children were primarily recruited from the greater Auckland, Bay of Plenty and greater Christchurch regions. As part of the recruitment, participants and their caregivers received an information sheet, a parental consent form and a student assent form. Consent and assent forms were signed and discussed before beginning any of the procedures. This study was reviewed and approved by the Human Ethics Committee at the University of Canterbury. See Appendix A for a copy of the approval letter.

#### ***2.1.1 Children with Autism Spectrum Disorder Group (ASD)***

As noted previously, the participants were split into three groups for the current study: 1) children diagnosed with ASD (ASD Group); 2) children matched with the same chronological age as the ASD participants (CA Group); and 3) a language matched group of typically developing children (LA Group). Each group had nine participants and were matched for gender. The ASD participants were recruited from a specialist school. All participants had a formal diagnosis of ASD from a paediatrician following the New Zealand diagnosis guidelines and were all receiving specialist special education support. For this group the Speech Language Therapist and/or parent reported that the child had enough verbal

language to participate and would be able to cope with a change to routine and participate in the study. Eight of the students in the ASD group attended special school satellite classes where they received some specialist teaching and then joined the mainstream for particular subjects of strengths. These participants were assessed in their school environment in a quiet room that they were familiar with. One of the participants with ASD attended a mainstream school with specialised support and was assessed in a quiet room in his home.

Table 2.1. Participant demographics for ASD Group (Participants with ASD) (n=9).

<b>Participant</b>	<b>A2</b>	<b>A3</b>	<b>A4</b>	<b>A5</b>	<b>A6</b>	<b>A7</b>	<b>A8</b>	<b>A9</b>	<b>A10</b>
<b>Gender</b>	M	M	F	M	F	F	M	M	F
<b>Chronological Age</b>	16;6	15;7	14;0	15;10	16;1	16;9	12;8	15;11	17;1
<b>ROWPVT</b>	86	87	86	138	122	73	94	133	73
<b>CELF-4</b>	55	39	41	75	61	35	44	62	35
<b>Receptive Language Age</b>	8;0	8;2	8;0	16;8	13;1	6;7	9;0	15;4	6;7

Note: ROWPVT = Receptive One Word Picture Vocabulary Test (Bronwell, 2010) (results shown are raw scores); CELF-4 = Clinical Evaluation of Language Fundamentals 4 (Semel, Wiig & Secord, 2004) Recalling Sentences subtest (results shown are raw scores for the Recalling Sentences subtest); Receptive Language Age = based on language age equivalent results from the ROWPVT and are reported for the purpose of language-age matching.

### ***2.1.2 Chronologically-aged Matched Group (CA)***

Once the participants with ASD were identified, typically developing peers were recruited to match the ASD group for sex and age. As most of the students from the ASD group were at a school for children with special needs, the CA group were recruited primarily from primary and high schools. As previously mentioned all participants spoke English as

their predominant language and were from a mixed cultural background. The CA Group (age range 13;5 – 17;6, mean age 15;9) were all gender matched and chronologically aged matched with the participants in the ASD Group (mean age; 15;9, range= 13;5 – 17;6). Over ages of participants are outlined in Table 2.4. These participants were all assessed in either a quiet break out room at their mainstream school or in a quiet room in their home.

Table 2.2. Participant demographics for CA Group (Participants matched for chronological age) (n=9).

<b>Participant</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>C6</b>	<b>C7</b>	<b>C8</b>	<b>C9</b>	<b>C10</b>
<b>Gender</b>	M	M	F	M	F	F	M	M	F
<b>Chronological Age</b>	16;8	14;8	14;10	15;4	16;11	16;7	13;5	16;0	17;6
<b>ROWPVT</b>	144	128	128	151	153	128	137	138	142
<b>CELF-4</b>	93	67	66	95	87	63	89	57	72
<b>Receptive Language Age</b>	19;0	14;3	14;3	>19;0	>19;0	14;3	16;5	16;8	18;0

Note: ROWPVT = Receptive One Word Picture Vocabulary Test (Bronwell, 2010) (results shown are raw scores); CELF-4 = Clinical Evaluation of Language Fundamentals 4 (Semel, Wiig & Secord, 2004) Recalling Sentences subtest (results shown are raw scores for the Recalling Sentences subtest); Receptive Language Age = based on language age equivalent results from the ROWPVT and are reported for the purpose of language-age matching.

### **2.1.3 Language-aged Matched Group (LA)**

Once the ASD group had completed the language testing, nine typically developing children were recruited to match the ASD group for sex, and language age ability. Using the age-equivalent score of the ROWPVT from the children with ASD, children whose chronological-age matched the age-equivalent score of the ASD children were recruited. In

order to qualify for participation, the LA children had to have no known hearing, vision, or developmental or acquired conditions. Like the CA group the LA Group were recruited primarily from primary and high schools. They had English as the primary language at home, although from mixed cultural groups.

Once identified as having a chronological age that matched the ASD group’s language-age, the LA group underwent the ROWPVT and CELF-4 subtest. Given the difficulties of exact matching of individuals according to age-equivalence scores, group raw scores were compared to ensure there was no significant difference in language ability across the ASD and age-matched groups. The mean and SD for the ASD and LA groups were M=99.11, SD=25.16 and M=106.44, SD=19.69 respectively for the ROWPVT and M=49.67, SD=14.15 and M=53.11, SD=12.83 respectively for the CELF-4 subtest. As reported in the results, there were no significant differences between the ASD and the LA group for both the ROWPVT (p=.427) and the CELF-4 subtest (p=.602).

Table 2.3. Participant demographics for LA Group (Participants matched for language equivalent) (n=9).

<b>Participant</b>	<b>L2</b>	<b>L3</b>	<b>L4</b>	<b>L5</b>	<b>L6</b>	<b>L7</b>	<b>L8</b>	<b>L9</b>	<b>L10</b>
<b>Gender</b>	M	M	F	M	F	F	M	M	F
<b>Chronological Age</b>	6;11	8;2	7;1	16;8	13;7	6;3	9;6	15;4	7;5
<b>ROWPVT</b>	85	104	95	121	127	84	125	131	86
<b>CELF-4</b>	36	53	54	45	62	54	56	79	39
<b>Receptive Language Age</b>	7;11	10;3	9;1	12;11	14;0	7;9	13;8	14;11	8;0

Note: ROWPVT = Receptive One Word Picture Vocabulary Test (Bronwell, 2010) (results shown are raw scores); CELF-4 = Clinical Evaluation of Language Fundamentals 4 (Semel, Wiig & Secord, 2004) Recalling Sentences subtest (results shown are raw scores for the

Recalling Sentences subtest); Receptive Language Age = based on language age equivalent results from the ROWPVT and are reported for the purpose of language-age matching.

Table 2.4. Overall participant information for all groups

	<b>ASD Group</b>	<b>CA Group</b>	<b>LA Group</b>
<b>M</b>	15;7	15;9	12;1
<b>SD</b>	1.33	1.23	3.77
<b>Range</b>	12;8 - 17;1	13;5 - 17;6	6;3 - 16;8

Note: M=mean age; SD=standard deviation; Range=range of ages.

## **2.2 Procedures**

All of the assessment sessions were carried out the same way. All experimental tasks were completed during one session in a quiet room in either their satellite unit, mainstream school or at home. The room was familiar to the students and there were no distractions. Participants received a brief explanation of what to expect during the session. The two language assessments were administered first, followed by the persuasive discourse task and finally the expository discourse task. All tasks were audio recorded using an Olympus Dictaphone on the table between the examiner and the participant. All of the procedures were administered to all of the participants.

### **2.2.1 Language Testing**

Language assessments were conducted to obtain general language skills of the participants and secondly, to have a language level for recruiting language aged matched typically developing peers. Two assessments were administered to all participants; the Receptive One



Word Picture Vocabulary Test (ROWPVT) and the Clinical Evaluation of Language Fundamentals 4<sup>th</sup> edition (CELF-4) Recalling Sentences subtest.

### ***2.2.1.1 ROWPVT***

The ROWPVT (Brownell, 2010) was used to assess receptive vocabulary and give participants a language ability age equivalent score. Participants were shown four pictures and asked to point to one that showed what the examiner had said. This test has high reliability and validity. This assessment was completed as per the ROWPVT manual and was scored using their standardised data. The raw score was calculated and was then used to obtain an age equivalent score. The purpose of obtaining the age equivalent score was for recruiting participants for the LA Group.

### ***2.2.1.2 CELF-4 Recalling Sentences***

The CELF-4 (Semel, Wiig, & Secord, 2006) is a comprehensive language assessment with a range of subtests to measure receptive and expressive language, memory, pragmatics and phonological awareness. This test has high reliability and validity. Conti-Ramsden, Botting & Faragher (2001) found that the Recalling Sentences subtest of the CELF-4 was able to identify those with mild and resolved language difficulties. Therefore; for the current study, the Recalling Sentences subtest of the CELF-4 was used as a broad measure of expressive language. Participants were required to listen to a set list of sentences and repeat them. The sentences gradually increase in length and complexity. This task was administered and scored as per the CELF-4 manual.

### ***2.2.2 Discourse***

Two types of discourse were chosen to elicit language samples for analysis and comparison between the three groups. Following the language testing the participants firstly completed a persuasive discourse task which was immediately followed by the expository discourse task. Spoken discourse tasks were chosen to obtain language samples as literature indicates that they are a useful tool for eliciting language in a more natural context for analysis of syntactic complexity (Manolitsi & Botting, 2011).

#### ***2.2.2.1 Persuasive Discourse***

Participants were informed that they were about to hear a short but controversial passage about the circus. Once they listen to the passage they would be asked to express their opinion about the topic. Participants were also told that there was no right or wrong answer so to just say what they thought about the topic.

The topic that was chosen was thought to have interest to the wide range of students that participated in the study. Nippold (1998) suggested that having a topic of interest is more successful in eliciting persuasive discourse. An adaption of Nippold's persuasive task was used to elicit a language sample to analyse. The topic chosen was about whether or not animals should be allowed to perform for public in the circus. The passage that was read to the participants can be found in Appendix B. The spoken persuasive discourse task included an introductory statement, some information for and against the topic followed by some time for the participant to think about their thoughts towards the topic before giving an answer with "lots of good reasons why".

### **2.2.2.2 Expository Discourse**

An adaption of Selman et al.'s (1986) Interpersonal Negotiation Strategies (INS) Interview task was used to elicit a spoken expository discourse language sample. The task was adapted by Nippold et al. (2007) and was presented as a peer-conflict resolution task. As part of a peer-conflict resolution task, participants in Nippold et al.'s study were presented with a conflict between two peers. For example, "Jessica's mother always has her go to a picnic with her friend and her friend's son. Jessica doesn't really like this boy at all, and she doesn't want to go". The PCR was chosen as it was found to elicit greater syntactic complexity than Nippold's favourite game or sport task. The introduction to the task and the four passages can be found in Appendix C (Male) and D (Female) (adapted from Selman et al., 1986, p. 459). There are two copies as the passages had the names of the protagonist changed to be gender matched with the participants. Participants were informed that there were four short stories to listen to and then a few questions to answer. Participants were also told that there were no right or wrong answers and to just say what they thought. Below are the five questions that were asked following each passage.

Questions:

1. What is the main problem?
2. Why is that a problem?
3. How can (*the protagonist*) do something to deal with/change (*the significant other*)?
4. What do you think will happen if (*the protagonist*) does that?
5. How do you think that will make (*the significant other*) feel?

## **2.3 Data transcription and analysis**

Discourse was analysed for structure and content. With regard to structure, both of the discourse language samples obtained were analysed for productivity and syntactic complexity

using the same variables. Content analysis differed across the discourse passages due to the differences in the discourse genre and elicitation methods. Given the slight difference in analysis in the different types of discourse the analyses have been examined and described separately.

### ***2.3.1 Persuasive Discourse Samples***

Each spoken persuasive discourse language sample was transcribed into a Microsoft Word Document and then copied into the Systematic Analysis of Language Transcripts (SALT) computer program (Miller & Chapman, 2010). Each language sample was coded for productivity and syntactic complexity variables.

*Productivity.* All of the language samples were divided up into T-units. For the study, T-units were defined as an independent clause with any associated dependent clauses. From this information, general measures of productivity were calculated; number of T-units, total words and MLU.

*Syntactic complexity.* All of the language samples were coded for the different syntactic variables. Included in this coding was identification of independent variables and then for each independent variable three types of subordinate clauses (nominal, adjectival and relative). Definitions of clauses are outlined in Table 2.5.

*Language content.* Secondly, all of the samples were examined for the necessary features of a persuasive argument. This included initiation of a claim, number of supporting reasons that included a persuasive function, and thirdly was there a counter argument/mixed attitude. Initiation of a claim was coded with a 1 (claim initiated) or 0 (no claim initiated). Initiation of a claim was classified as having used language such as; ‘I want...’ ‘yes, because...’ or a simple yes/no response. The supporting claims that were counted had to be clear and each different claim for and against were only counted once. Some examples of

supporting reasons that were used in the language samples during this study can be seen in Table 2.6. Mixed attitudes were collated in a table with a 1 (mixed attitude) or 0 (one attitude) for inclusion in each language sample.

Table 2.5. Definitions (Moran et al., 2012, p.269) and examples of independent and dependent clauses.

<i>Clause type</i>	<i>Definition</i>	<i>Example</i>
Independent clause	Contains a subject and a main verb and can stand on its own to express a complete thought.	Her mum will probably be disappointed.
Subordinate clause	Contains a subject and a main verb but must be linked to an independent clause to express a complete thought. There are three main types of subordinate clauses: nominal, adverbial, and relative.	
Nominal clause	Acts as the subject or more commonly as the object of an independent clause. Nonfinite clauses were included in the analysis if they contained a subject that was different to the subject in the matrix clause.	She probably could tell her mum (that she doesn't wanna go)...
Adverbial clause	Expresses condition, time, or reason.	Might offend the boy (if he finds out).
Relative clause	Describe preceding noun.	She's getting forced to do

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Describes preceding sentence.	something (she doesn't want to).
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Note: Definitions of clauses used with permission from Moran et al., (2012, p.269); examples taken from participants language samples.

Table 2.6. Examples of reasons included in the persuasive language sample.

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<i>Reason</i>	<i>Example</i>
Human safety	Because they can hurt.
Forced to do tricks	They get trained to do stuff that they might not wanna do.
Physical harm	The trainers can often be too hard on the animals.
Mental harm	It's just inhuman and unnecessary really.
Poor diet	They don't get fed properly.
Captivity	They get cramped up and they'll be in these little cages.
Equality / Fairness	It's not really the right thing to do.
Naturalness (Environment / Animal)	Animals should be free to do whatever they want in the wild.
Livelihood	There's people making money just off the animals.
Entertainment value	It's a good amusement sorta thing.

---

Note: Examples taken from participants language samples.

### ***2.3.2 Expository Discourse Language Samples***

Each expository discourse language sample was transcribed into a Microsoft Word document and then scored based on the Interpersonal Negotiation Strategy (INS) scoring categories from Selman et al. (1986). These categories were based on a model identifying four information-processing issues; definition of problem, action taken, justification of strategy

and complexity of feelings. An outline of the different levels in each scoring category can be seen in Table 2.7.

Table 2.7. INS Issues and Associated Scoring Categories (Selman, 1986, p.453)

Numeric Value	Scoring Category
<b>Definition of problem</b>	
0	No reference to the problem except to restate the protagonist's actions
1	Reference to the problem between self and other in terms of wants or desires of the person viewed as having the most power
2	Reference to the reciprocal context of the relationship between self and other with a focus on one of the two persons having a priority of needs but the other's needs also having validity
3	Reference to a shared problem with consideration of both persons' needs or wants
<b>Action taken</b>	
0	Physical, non-communicative methods
1	One-way directives or requests
2	Reciprocal communication with a balance of perspectives
3	Verbal collaboration with other
<b>Justification of strategy</b>	
0	No justification or anticipation of consequences expressed
1	Self-protective justification
2	Relationship or empathic concerns without attention to long-term consequences
3	Concern for long-term effects on the relationship

---

### Complexity of feelings

0	Consequences of strategy do not include reference to feelings
1	Simple, unidimensional feelings expressed in a self-protective, undifferentiated way
2	Simple, unidimensional feelings expressed in an empathic way
3	Complex, multiple, or changing feelings of self or other expressed

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Note: Table from Selman (1986, p.453).

In addition to scoring the expository discourse language samples using the INS (Selman et al., 1986) all language samples were copied from the Microsoft Office Word document and put into the SALT computer program. In addition, these language samples were also coded for syntactic complexity the same way as the persuasive discourse language samples were.

#### ***2.3.3 Statistical analysis***

Statistical analysis was completed using a one way ANOVA (between groups). The one-way ANOVA was chosen over a two-way ANOVA (group x discourse type) as the intent of the study was not to compare discourse-type explicitly but rather compare group differences across two different discourse measures. Where there was a significant difference of  $\geq .05$  an LSD post hoc analysis was run. The LSD post-hoc test assumes differences between groups when a significant F-value is calculated from the ANOVA. While there is a danger that the LSD does not account for type-1 errors (false positives), it is useful post-hoc test to deal with small sample sizes.



## **2.4 Reliability**

All of the persuasive and expository discourse language samples were cross checked in SALT by the authors Master's Thesis Supervisor to verify that all coding was correctly identified. A random selection of 30% of the language samples were used for reliability measures. The following levels of agreement were reached in the persuasive discourse samples; total number of independent clauses (87%) and subordinate clauses (94%). For the expository discourse samples the following levels of agreement were reached; total number of independent clauses (99%) and subordinate clauses (83%). All disagreements were discussed and resolved so there was 100% agreement on coding.

Similarly, all of the expository discourse responses were scored by the authors Master's Thesis Supervisor to ensure agreement on scoring on Selman et al.'s (1986) categories. For these categories 90% agreement was reached. Any disagreements were discussed and resolved so there was 100% agreement on scores.

### **3.0 Results**

This study compared the language used by students with ASD with CA matched peers and LA matched peers in both expository discourse and persuasive discourse. Language samples were examined for measures of syntactic complexity, productivity and language content.

The results are presented in three main sections. The first section displays the language assessments results. The second and third section display results based on the persuasive discourse task and the expository discourse task.

A one-way ANOVA was used to compare the means of three groups that were random samples. Where there was a significant difference of  $\geq .05$  an Least Significant Difference (LSD) post hoc analysis was run. The LSD post-hoc test assumes differences between groups when a significant F-value is calculated from the ANOVA.

#### **3.1 Language Assessments**

To gather participants for the LA group the CELF-4 Recalling Sentences Subtest was administered. The comparison of results on both the ROWPVT and the CELF-4 Recalling Sentences Subtest are reported in Table 3.1. There was a significant difference between groups in both the ROWPVT ( $F=10.80$ ,  $p<.001$ ) and the CELF-4 subtest ( $F=10.09$ ,  $p=.001$ ). Post hoc analysis revealed that the ASD group scored significantly lower than the CA group in the ROWPVT ( $p=.000$ ) and in the CELF-4 subtest ( $p=.000$ ). The LA group also scored significantly lower than the CA group in both the ROWPVT ( $p=.002$ ) and the CELF-4 subtest ( $p=.001$ ). There were no significant differences between the ASD and LA group for both the ROWPVT ( $p=.427$ ) and the CELF-4 subtest ( $p=.602$ ).

Table 3.1. Raw score results for the ROWPVT and CELF-4 Recalling Sentences Subtest (n=9 per group).

<i>Measure</i>	<i>ASD Group</i>	<i>CA Group</i>	<i>LA Group</i>	<i>F</i>	<i>p</i>	<i>d</i>
<b>ROWPVT</b>						
<i>M</i>	99.11	25.16	106.44	10.80	<.001	.47
<i>SD</i>	25.16	9.62	19.69			
<i>Range</i>	73-138	128-153	84-131			
<b>CELF4 (Recalling Sentences Subtest)</b>						
<i>M</i>	49.67	76.56	53.11	10.09	.001	.46
<i>SD</i>	14.15	14.42	12.83			
<i>Range</i>	35-75	63-95	36-79			

Note: ROWPVT = Receptive One Word Expressive Picture Vocabulary Test (Bronwell, 2010); results shown are based on raw scores; CELF-4 (Recalling Sentences Subtest) = Clinical Evaluation of Language Fundamentals 4 (Semel, Wiig & Secord, 2006); results shown are based on raw scores; ASD Group = participants with ASD; CA Group = participants chronological-aged matched typically developing peers; LA Group = participants language –aged matched typically developing peers.

### **3.2 Syntactic Complexity**

The first question in the current study asked whether children with ASD differ in their use of syntax when compared with their TD, CA and LA peers. Both of the discourse samples were analysed. Results from each type of discourse are described below.

### *3.2.1 Persuasive Discourse*

The first task described for productivity and syntactic complexity is the persuasive discourse task. The results for comparison on measures of language productivity and syntactic complexity for all groups in the persuasive discourse task are reported in Table 3.2.

Measures of language productivity were calculated by counting the number of words and number of T-units produced in the sample. Both of these measures differed significantly across groups. Statistical analysis showed that there were significant differences between groups ( $F=3.98$ ,  $p=.032$ ) for total number of words. Post hoc analysis showed that the ASD group produced significantly fewer words than the CA group ( $p=.044$ ), the LA group also produced significantly fewer words compared to the CA group ( $p=.014$ ). Interestingly the LA groups produced the fewest words on average; however the difference was not significant compared to the ASD group ( $p=.596$ ). For total number of T-units there was a significant difference between groups ( $F=5.64$ ,  $p=.01$ ). Post hoc analysis revealed that the CA group had a significantly higher number of T-units than the ASD group ( $p=.009$ ) and the LA group ( $p=.007$ ). There were no significant differences between the ASD and LA groups ( $p=.886$ ). In addition, all had a large effect size with at least 20% of the variance being accounted for by group.

In contrast, the syntactic measures were mostly non-significant with only total number of clauses reaching significance ( $F=3.66$ ,  $p=.04$ ). Post hoc analysis showed that the CA group had a significantly higher total number of clauses used than the ASD group ( $p=.055$ ) and the LA group ( $p=.017$ ). There were no significant differences between the ASD and LA groups ( $p=.583$ ). Despite the significant result, the effect size was small ( $d=0.02$ ). Total number of mazed words, a measure of efficiency, was not significant. The results indicate that while syntactic complexity did not differ across groups within persuasive discourse, the CA group

produced significantly more words and more T-units as when compared to either the ASD group or the LA group.

### ***3.2.2 Expository Discourse***

The second assessment that was used to answer the question regarding syntax use in children with ASD compared with their TD, CA and LA matched peers was an expository discourse task. The results for comparison on measures of language productivity and syntactic complexity for all groups in the expository discourse task are reported in Table 3.3.

As with the persuasive samples, there was a significant difference in the amount of language produced across groups in the expository sample. This was reflected by a significant difference in total number of words and total number of T-units.

Statistical analysis showed that there were significant differences between groups ( $F=8.89$ ,  $p=.001$ ) for total number of words. Post hoc analysis showed that the CA group produced significantly greater number of words compared with the ASD group ( $p=.001$ ) and the LA group ( $p=.001$ ). There were no significant differences between the ASD and LA groups ( $p=.944$ ). For total number of T-units there were significant differences between groups ( $F=10.50$ ,  $p=.001$ ). Post hoc analysis revealed that the CA group had a significantly higher number of T-units when compared with the ASD group ( $p=.000$ ) and the LA group ( $p=.001$ ). There were no significant differences between the ASD and LA groups ( $p=.758$ ). For both measures a very large effect size was evident (total number of words,  $d=.43$ ; total number of T-units,  $d=.47$ ).

In contrast to the persuasive samples, there was evidence of differences in syntactic complexity as noted by length of T-unit (longer T-units often reflect more dependent clauses), total number of clauses, as well as number of nominal and adverbial clauses. There were significant differences between groups for total number of clauses ( $F=12.03$ ,  $p<.001$ ).

Post hoc analysis revealed that the CA group had a significantly great total number of clauses compared with the ASD group ( $p=.000$ ) and the LA group ( $p=.000$ ). There were no significant differences between the ASD and LA groups ( $p=.973$ ). For nominal clause use there were significant differences between groups ( $F=5.91$ ,  $p=.008$ ). Post hoc analysis revealed that the CA group used a significantly higher number of nominal clauses than the ASD group ( $p=.014$ ) and the LA group ( $p=.004$ ). There were no significant differences between the ASD and LA groups ( $p=.575$ ). For adverbial clause use there were significant differences between groups ( $F=5.16$ ,  $p=.008$ ). Post hoc analysis revealed that the CA group used a significantly higher number of adverbial clauses than the ASD group ( $p=.007$ ) and the LA group ( $p=.016$ ). There were no significant differences between the ASD and LA groups ( $p=.726$ ). Large effect sizes were noted for all. The difference in syntactic complexity may be due to the nature of the type of discourse, in that the expository discourse elicited greater syntactic complexity in the CA group, aligned with findings of Nippold et al., (2005).

Interestingly the number of errors differed significantly ( $F=6.61$ ,  $p=.005$ ) across groups with the CA group producing significantly fewer errors than the ASD group ( $p=.002$ ). The LA group also produced significantly fewer errors than the ASD group ( $p=.014$ ). There were no significant differences between the CA and LA groups ( $p=.425$ ).

Table 3.2. Measures of language productivity and syntactic complexity in the spoken persuasive discourse.

<i>Measure</i>	<i>ASD Group</i>	<i>CA Group</i>	<i>LA Group</i>	<i>F</i>	<i>p</i>	<i>d</i>
Total number of words						
<i>M</i>	40.56	94.33	27.00	3.98	.032	.25
<i>SD</i>	28.67	80.87	17.02			

Total number of T-units

<i>M</i>	2.89	7.22	2.67	5.64	0.01	.32
<i>SD</i>	1.43	5.29	1.22			

Total length of T-unit in words

<i>M</i>	9.15	11.80	6.42	2.98	.070	.20
<i>SD</i>	4.79	5.11	3.02			

Total number of mazed words

<i>M</i>	4.67	10.11	4.11	2.14	.140	.15
<i>SD</i>	5.42	7.37	6.31			

Maze words as proportion of total words

<i>M</i>	10.22	13.22	11.11	.185	.832	.02
<i>SD</i>	9.34	7.41	12.87			

Total number of clauses

<i>M</i>	6.56	13	4.78	3.66	.04	.02
<i>SD</i>	4.48	10.45	2.95			

Nominal clause use

<i>M</i>	2.22	3.33	1.00	2.69	0.89	.18
<i>SD</i>	1.75	2.91	0.82			

Adverbial clause use

<i>M</i>	1.22	2.22	1.11	.83	.45	.06
<i>SD</i>	1.23	2.82	1.20			
Relative clause use						
<i>M</i>	1.22	0.22	0.00	.70	.51	.05
<i>SD</i>	1.23	0.63	0.00			
Clause density						
<i>M</i>	1.91	1.91	1.68	.352	.707	.02
<i>SD</i>	0.90	0.68	0.37			
Number of errors						
<i>M</i>	0.11	0.00	0.00	1.00	.383	.08
<i>SD</i>	0.31	0.00	0.00			

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Note: ASD Group = participants with ASD; CA Group = participants chronological-aged matched typically developing peers; LA Group = participants language –aged matched typically developing peers.

Table 3.3. Measures of language productivity and syntactic complexity in spoken expository discourse.

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<i>Measure</i>	<i>ASD Group</i>	<i>CA Group</i>	<i>LA Group</i>	<i>F</i>	<i>p</i>	<i>d</i>
Total number of words						
M	172.00	356.44	175.56	8.89	.001	.43
SD	76.31	126.28	90.45			

---



Total number of T-units

<i>M</i>	17.44	32.11	18.56	10.50	.001	.47
<i>SD</i>	5.64	8.10	8.11			

Total length of T-unit in words

<i>M</i>	7.22	9.46	6.87	3.44	.049	.22
<i>SD</i>	1.39	3.30	1.00			

Total number of mazed words

<i>M</i>	19.33	20.33	17.11	.127	.881	.01
<i>SD</i>	11.11	6.06	18.78			

Maze words as proportion of total words

<i>M</i>	11.00	6.56	8.44	1.76	.193	.13
<i>SD</i>	6.24	3.95	3.65			

Total number of clauses

<i>M</i>	24.22	52.00	24.45	12.03	<.001	.50
<i>SD</i>	10.24	17.90	11.44			

Nominal clause use

<i>M</i>	5.11	11.33	3.78	5.91	.008	.33
<i>SD</i>	4.18	6.53	2.44			

Adverbial clause use

<i>M</i>	1.11	7.56	1.89	5.16	.014	.30
<i>SD</i>	1.20	7.04	2.56			
Relative clause use						
<i>M</i>	.56	1.00	.22	1.04	.371	.08
<i>SD</i>	.83	1.56	.63			
Clause density						
<i>M</i>	1.38	1.63	1.30	2.50	.104	.17
<i>SD</i>	.24	0.50	.12			
Total number of errors						
<i>M</i>	3.78	0.44	1.22	6.61	.005	.36
<i>SD</i>	2.44	0.68	2.15			

---

Note: ASD Group = participants with ASD; CA Group = participants chronological-aged matched typically developing peers; LA Group = participants language –aged matched typically developing peers.

### 3.3 Language Content

The second research question asked whether children with ASD differ in how they structure persuasive and expository discourse when compared with their TD, CA and LA matched peers. Due to the nature of the differences between the two discourse genres that were chosen language content was measured and reported on separately.

### 3.3.1 Persuasive Discourse

In order to evaluate the language content of the persuasive discourse, three measures were used: initiation of claim, number of supporting reasons, and attitude. These measures were chosen as Moran et al., (2012) found that these measures were able to identify differences between their clinical and typically developing populations.

There was no difference across groups for claims but significant differences were noted for number of supporting reasons and attitude. Specifically for number of supporting reasons ( $F=7.69$ ,  $p=.003$ ). The post hoc analysis showed that the CA group produced significantly more supporting reasons than either the ASD group ( $d=.002$ ) or the LA group ( $.002$ ). There were no significant differences between the ASD and LA groups ( $p=1.00$ ). A breakdown of the different reasons that were used in each group is displayed in Figure 3.1.

Attitude was also markedly different ( $F=10.00$ ,  $p=.001$ ) with the CA group being the only group that demonstrated the ability to acknowledge two sides of the argument.

Table 3.4. Measures of language content in the spoken persuasive discourse task.

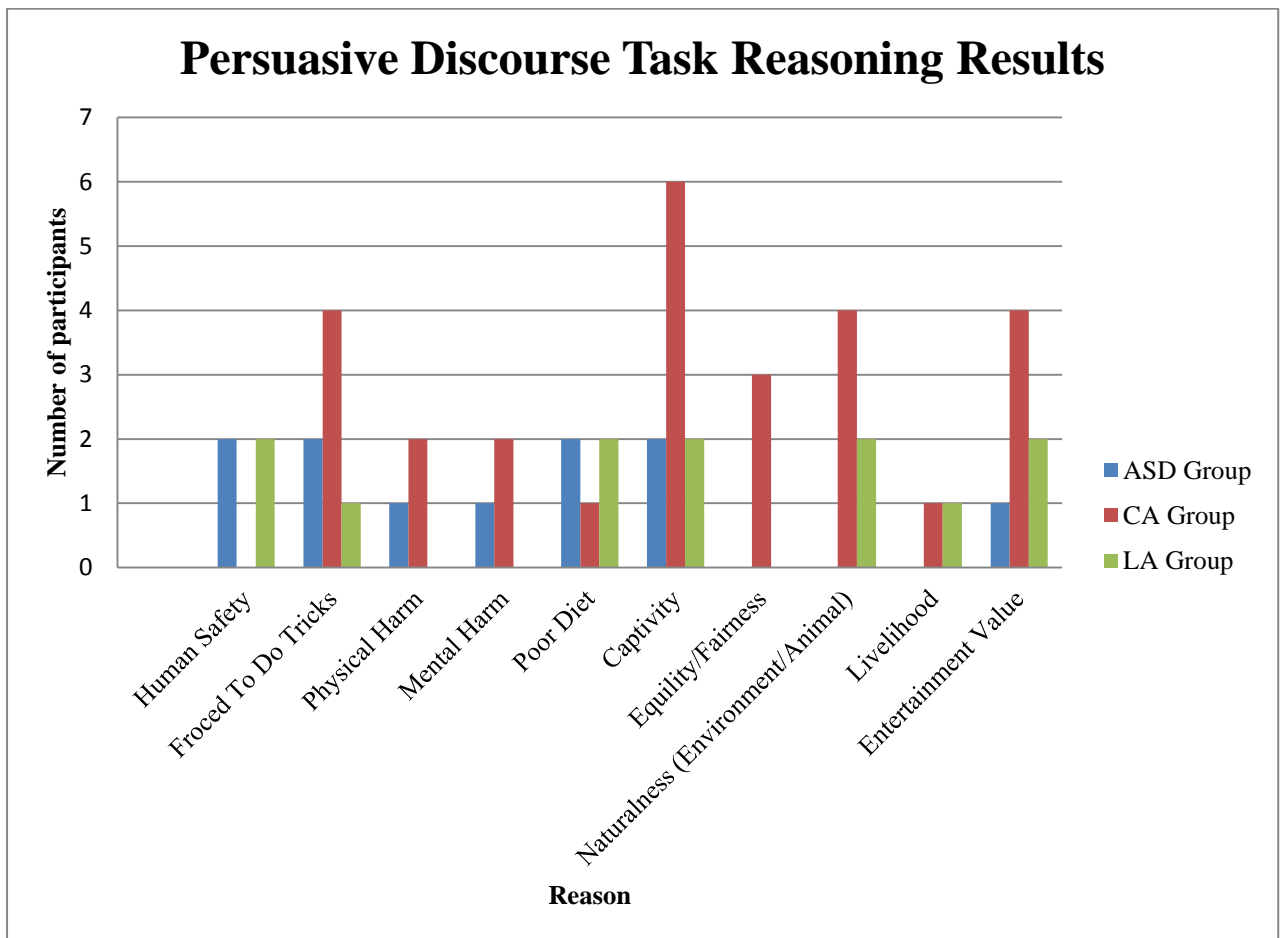
<i>Measure</i>	<i>ASD Group</i>	<i>CA Group</i>	<i>LA Group</i>	<i>F</i>	<i>p</i>	<i>d</i>
Number of supporting reasons						
<i>M</i>	1.22	2.78	1.22	7.69	.003	.39
<i>SD</i>	1.39	0.83	0.44			
Initiation of claim						
<i>M</i>	0.78	1.00	1.00	2.29	.123	.16
<i>SD</i>	0.42	0.00	0.00			

Attitude

<i>M</i>	0.00	0.56	0.00	10.00	.001	.35
<i>SD</i>	0.00	0.50	0.00			

Note: ASD Group = participants with ASD; CA Group = participants chronological-aged matched typically developing peers; LA Group = participants language –aged matched typically developing peers.

Figure 3.1. Number of uses of the different types of reasons used in the persuasive discourse task.



Note: ASD Group = participants with ASD; CA Group = participants chronological-aged matched typically developing peers; LA Group = participants language –aged matched typically developing peers.

### ***3.3.2 Expository Discourse***

INS is a measure of the content of the expository discourse as elicited in the peer conflict resolution task. INS is based on four information-processing issues; definition of problem, action taken, justification of strategy and complexity of feelings. Definitions of these information-processing issues are outlined in Table 2.7. There were no significant differences between groups for the definition of problem. Despite that, it should be noted that the group with ASD had a much wider ranging score, ranging from 1 to 7 compared to 4 to 7 and 3 to 7 for the CA group and the LA group. Significant differences were noted across groups for the three other measures. For action taken there were significant differences between group scores ( $F=7.78$ ,  $p=.002$ ). Post hoc analysis revealed that there were significant differences as the CA group scored significantly higher than the ASD group ( $p=.003$ ) and the LA group ( $p=.002$ ). There were no significant differences between the ASD and LA groups ( $p=.902$ ). For justification and consequences of strategy there were significant differences between groups ( $F=9.53$ ,  $p=.001$ ). Post hoc analysis revealed that there were significant differences as the CA group scored significantly higher than the ASD group ( $p=.000$ ) and the LA group ( $p=.005$ ). There were no significant differences between the ASD and LA groups ( $p=.272$ ). There were also significant differences between groups for complexity of feelings expressed ( $F=23.77$ ,  $p<.001$ ). Post hoc analysis revealed that there were significant differences as the CA group scored significantly higher than the ASD group ( $p=.000$ ) and the LA group ( $p=.001$ ). There were also significant differences between the ASD and LA groups ( $p=.006$ ).

Table 3.5. Measures of INS.

<i>Measure</i>	<i>ASD Group</i>	<i>CA Group</i>	<i>LA Group</i>	<i>F</i>	<i>p</i>	<i>d</i>
Definition of Problem						
<i>M</i>	4.44	5.56	4.33	2.22	.130	.16
<i>SD</i>	1.67	0.88	1.41			
<i>Range</i>	1 to 7	4 to 7	3 to 7			
Action Taken						
<i>M</i>	2.44	5.44	2.33	7.78	.002	.39
<i>SD</i>	2.24	2	1.32			
<i>Range</i>	0-7	2 to 8	0-4			
Justification and Consequences of the Strategy						
<i>M</i>	2.33	5.67	3.22	9.53	.001	.44
<i>SD</i>	2.12	1	1.71			
<i>Range</i>	0-5	4 to 7	0-5			
Complexity of Feelings Expressed						
<i>M</i>	2.67	5	3.11	23.77	.000	.66
<i>SD</i>	1.66	1.5	1.69			
<i>Range</i>	0-4	3 to 7	0-6			

Note: ASD Group = participants with ASD; CA Group = participants chronological-aged matched typically developing peers; LA Group = participants language –aged matched typically developing peers.

### 3.4 Group versus Genres

Due to the differences in language samples obtained from both the persuasive discourse task and the expository discourse task statistical analysis of group versus genre was completed.

Table 2.6 shows the differences between groups and genres of the language productivity and syntactic complexity measures.

There were four measures that showed there were significant differences between genres. For total number of T-units there were significant differences between genres ( $F=4.20$ ,  $p=.021$ ), with the expository discourse task eliciting a greater total number to T-units. Total number of clauses also showed significant differences between genres ( $F=5.27$ ,  $p=.009$ ), with the expository discourse task eliciting a higher number of clauses across all groups. Total number of errors showed significant differences between genres ( $F=6.09$ ,  $p=.004$ ), as there were significantly higher number of errors for the expository discourse task. The final measure that showed significant differences between genres was total number of words ( $F=3.21$ ,  $p=.049$ ), with the expository discourse task eliciting higher number of words.

Table 3.6. Language productivity and syntactic complexity measures comparison between genres.

<i>Measure</i>	<i>F</i>	<i>p</i>
Total number of T-units	4.20	.021
Total number of clauses	5.27	.009
Nominal clause use	2.73	.075
Adverbial clause use	2.99	.060
Relative clause use	.51	.606
Clausal density	.24	.786

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Total length of T-unit in words	.76	.475
Total number of mazed words	.19	.827
Mazed words as a proportion of total words	.89	.419
Total number of errors	6.09	.004
Total number of words	3.21	.049

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## **4.0 Discussion**

Children with ASD have deficits in a range of language domains that can affect their use and understanding of language (Tager-Flusberg et al., 2005; Ricketts, 2011). When assessing language in children with ASD, language samples are potentially useful. They have been shown to produce results that are different from standardised tests across a variety of clinical populations (for example; Manolitsi & Botting, 2011). An area that has not had extensive research completed is that of expository and persuasive discourse in individuals with ASD in terms of productivity, syntactic complexity and language content in comparison to TD peers. This is an important area to study as expository discourse and persuasive discourse are used in our everyday lives in social and academic environments. This study was an exploration of the usefulness of language samples for evaluating the language of school-aged children with ASD. In particular, the study addressed two main questions; is the syntax of children with ASD less complex than TD peers with matched CA and LA? And secondly, do children with ASD differ in how they structure expository and persuasive discourse compared to CA and LA matched TD peers?

### **4.1 Language ability**

In order to select the group matched for language ability a language assessment was completed. The participants in the ASD group scored significantly lower than their CA peers when raw scores from the ROWPVT (Bronwell, 2010) and CELF-4 (Semel, Wiig & Secord, 2006) Recalling Sentences subtest were compared. This is what was expected as a language deficit is a key element in the ASD diagnosis (Wing et al., 2011; Paul, 2007; Ricketts, 2011 etc.) and a number of studies have indicated that language abilities in children with ASD are often delayed (Tager-Flusberg et al., 2005; Ricketts, 2011).

While several researchers have demonstrated differences between ASD and CA in general language (for example; Tager-Flusberg et al., 2005), this study included a third group for comparison; language-age matched peers. Another study that used an alternative to chronological-age matched TD controls was a study conducted by Durrleman & Franck (2015). They matched children and adolescents with ASD with a group of participants matched for non-verbal IQ. They found that IQ-matched participants (mean chronological age 7;6) were slightly younger in age compared with the ASD group (mean chronological age 9;2). This is similar to the current study where the language-age matched peers were chronologically slightly younger than the ASD group.

Some other studies have used language age matched peers and have had similar results in terms of the TD language age matched peers being younger than the clinical population (E.g., Scott & Windsor, 2000; Brinton et al., 1998 etc.). While not specific to ASD, Scott & Windsor included LA matched children when examining discourse in children with LLD (chronological mean age 11;5), they had controls that were LA (chronological mean age 8;11) and CA matched (chronological mean age 11;6). Consistent with this study, the LA children were chronologically younger than the CA and clinical group. Likewise, Brinton et al., found a difference between an SLI group who had a mean chronological age of 10;3 with their LA matched groups who had a mean chronological age of 7;0.

We know that children with ASD or TBI or SLI have language deficits. By comparing these groups with language-age matched peers in addition to chronological-age matched peers we can gain further insight into the language that they use; do they have a language delay or is the language that they use disordered. This is interesting as researchers look at whether children with ASD have a language disorder specific to ASD or if it is just a language delay. By comparing children with ASD to TD peers that are CA and LA matched we are better able to examine the language used and how it differs from the CA and LA

peers. While it is interesting to compare the groups in terms of age, that was not the primary focus of this study. Rather the main aim of the study was to explore whether the groups differed across productivity, syntactic complexity, and language content in two different types of discourse.

## **4.2 Productivity and Syntactic Complexity across Groups**

Both the persuasive and expository discourse tasks were analysed for the same variables for productivity and syntactic complexity. However, due to the nature of the differences between the two genres, as well as the aim of exploring group differences across the two different types of discourse, the language samples were examined and reported on separately.

### ***4.2.1 Persuasive Discourse***

There were significant differences between the CA group compared with the ASD and LA groups for; total number of words, total number of T-units, and total number of clauses. This suggests that the ASD group have less language proficiency than their CA matched peers. Interestingly, they performed similarly to the LA matched group which suggests that the ASD group could just have a language delay rather than language disorder specific to children with ASD.

Whilst there were no known studies that compared ASD with TD or LA children in persuasive or expository discourse, there have been other studies that have used discourse to examine SLI versus TD, TBI versus TD etc. It is interesting to compare these clinical populations as similar to ASD as they also have language deficits as a key characteristic of their diagnosis. Ghayoumi et al., (2015) compared participants with TBI to TD peers. Their results indicated that the TBI participants had less language proficiency than the TD group as they produced fewer clauses. Nippold et al., (2005) found that the total number of clauses

was dependent on age which would also include the language level of the TD child. This suggests that if the participants with ASD had age appropriate language levels then they would potentially have had a similar total number of clauses to the CA group.

Interestingly, areas where there were no significant differences included; MLU, mazed words and the different types of clauses used (nominal, adverbial or relative), clausal density, and total number of errors. This may indicate that although there were differences between the length of the language sample and the total number of clauses it did not impact on the syntactic complexity of the sentences produced by the ASD group relative to the other groups. In the persuasive discourse task both the ASD and LA group were able to produce a range of clauses and have similar clausal density in their shorter language samples.

One study that examined the number of errors in language used by children with ASD was Novogrodsky (2013). She found that in a story retelling task the children with ASD made less errors. In the current study the participants were read a passage outlining some key points for and against arguments on the topic of animals performing in the circus. As participants had just heard phrases for and against it is a possibility that this task had a greater demand on repetition of sentences rather than linguistic demands. Consistent with Novogrodsky's findings the repetition demands of this specific task could have decreased the number of errors; as repetition is an area of strength for children with ASD. Therefore, it may be beneficial to consider other ways to elicit persuasive discourse language samples where there are greater linguistic demands rather than repetition.

#### ***4.2.2 Expository Discourse***

As with the persuasive task, results from the expository language sample showed that there was a significant difference between the total number of words and T-units between the ASD group and the CA group. In contrast to the persuasive discourse sample, differences in

syntactic complexity were evident in the expository sample with children in the ASD group producing fewer clauses.

Expository discourse is a useful method for assessing language productivity and syntactic complexity as it is more likely to elicit complex syntax structures (Nippold et al., 2005). In the current study, the expository discourse task revealed areas of weakness for the children with ASD as they produced significantly fewer total clauses and fewer nominal and adverbial clauses. This was expected as the ASD diagnosis outlines a deficit in a range of language domains (Eigsti et al., 2011). The results indicating fewer total clauses were interesting considering the higher number of words elicited from the expository discourse task. The task used required the participant to answer five questions about a short passage. Participants possibly used fewer total clauses without the demands on story structure to give background information and explain the situation in depth. Manolitsi & Botting (2011) found that participants with ASD used less verbal language and had overall differences on story structure. They suggested that this may have been due to a deficit in pragmatics. For the current study pragmatics was not examined, although literature states that this is a key area of deficit for children with ASD (Paul, 2007).

In addition to the weaknesses discussed above, the current study also highlighted significant differences between groups for number of errors. The ASD group had a significantly higher number of errors in the expository discourse task than the CA group. Interestingly, there were also significant differences between the ASD and LA group. This suggests that these errors are a result of more than just a language deficit. Although for the current study, the errors were not examined to specify the different types of errors used, a number of the errors that were produced by the ASD group were due to incorrect use of pronouns. This is consistent with the findings of Novogrodsky (2013) who also found that the participants with ASD produced more pronoun errors than the TD group. She suggested that

this was due to impairment in ToM development. Further research into pronoun use in discourse and the impacts of ToM development with the ASD population would be beneficial to provide further insight into this data on errors produced during expository discourse.

Interestingly, there were no significant differences between groups for relative clause use and clausal density. The use of relative clauses was low for all groups in this task. Possibly due to the nature of the task it is not the most useful way to elicit relative clause use. An alternative view could be to consider the findings of Nippold et al., (2005) and Nippold et al., (2007) that highlighted how adults had higher use of relative clauses compared with their adolescent and children groups. This indicates that the use and understanding of relative clauses are later developing; this is consistent with other literature suggesting that use and understanding of clauses continues developing into the early school years (Gleason, 2005).

For the purposes of syntax and examining errors, expository discourse may be a more useful measure than some other types of discourse. For instance, expository discourse was shown to elicit more syntax in TD children, adolescents, and adults than conversation (Nippold et al., 2005). Expository discourse did identify syntactic differences between the group with ASD and the CA group. It did not highlight as many differences between the ASD group and the LA group suggesting that it is more likely that just more simple syntax is used.

### **4.3 Language Content**

Language content was measured separately for the two language samples due to the differences in the nature of the genres. For persuasive discourse language content measures were; initiation of claim, supporting reasons used and attitude. It was expected that the ASD group would have a more rigid view with fewer supporting reasons. For the expository discourse task language content was measured in terms of information-processing issues; definition of problem, action taken, justification and consequences of strategy and complexity

of feelings. It was expected that the ASD group would have difficulties with complexity of feelings and justification and consequences of strategy and action taken due to the nature of their ASD diagnosis and their language level.

#### ***4.3.1 Persuasive Discourse***

For persuasive discourse the following language content measures were obtained; initiation of claim, total number of supporting reasons and attitude. All groups were similar in terms of initiation of claim. A possible reason for this could be due to the nature of the question being a forced choice question. Following the passage, participants were asked to answer "...whether or not you think animals should be able to perform in circus'...". The ASD and LA groups produced significantly fewer reasons to support their opinion of the topic. This may have been due to the ASD group relying on their repetition skills to answer the question by repeating some of the examples provided in the passage that was read to them. There were significant differences for total number of supporting reasons and attitude. The ASD and LA participants all used only one single attitude compared with the CA group who had significantly more use of a mixed attitude. This was expected for the ASD group due to the information we know regarding the ASD diagnosis. Individuals with ASD tend to have difficulty seeing others viewpoints and changing their thoughts due to their restricted behaviours (Paul, 2007). Colle et al., (2008) found that participants had difficulty when it came to identifying the listeners need to make appropriate character and temporal references. This suggests that the participants with ASD are unable to look at the topic from more than one viewpoint and change viewpoint dependent on the conversation partner. Attitude is a reflection of the ability to see both sides of an argument. This suggests the possibility that it reflects difficulty with ToM. ToM relates to the ability to identify and understand mental states (Baron-Cohen, Leslie & Firth, 1985). This is an important aspect of being able to hold

a conversation as having a conversation requires appropriate turn taking skills and responding accurately by being aware of your conversation partner's feelings and thoughts towards the subject. Stone, Baron-Cohen & Knight (1998) discuss the development in which ToM is acquired in a sequence beginning in early childhood. ToM development is impacted on the functioning of the different memory systems (Korkmaz, 2011). In addition ToM development also requires some language skills for its development; pragmatics is the main language domain that requires ToM to support language use in social contexts (Korkmaz). The inability to have a mixed attitude toward a topic creates a disadvantage for the ASD group in being able to participate successfully in social and academic life.

#### ***4.3.2 Expository Discourse***

All expository discourse language samples were scored based on four information processing issues from Selman et al., (1986) Interpersonal Negotiation Strategies as outlined in Table 2.6. This was important to analyse due to the nature of the ASD diagnosis. We know that children with ASD have difficulty expressing feelings and thinking about others needs and feelings. The four information-processing issues that were examined are essential skills required for dealing with everyday life that individuals face in school, at home and at work. There were no differences between groups for the definition of problem. This may have been due to the fact that this question required less processing than the other questions as the answer was often achieved by retelling a short section of the story. For example, the story read was "*Tessa was asked to the movies by a boy, and she told him she would go. Tessa's mother doesn't like this boy and probably won't want her to go*" (adapted from Selman et al., 1986, p.459). Some of the participants answered the "What is the main problem?" question by stating "Tessa's mother doesn't like the boy and won't want her to go". Novogrodsky (2013) found that retelling elicited higher quality language than story-telling due to the



different levels in processing required and the repetition skills that children with ASD present with. It would be interesting to assess the ability to define the problem from a picture where the participants have not heard a story; therefore there would be a greater linguistic demand when answering the definition of the problem question.

As expected, the other three issues; action taken, justification and consequences of strategy and complexity of feelings expressed all showed significant differences between groups. The CA group scored significantly higher than both the ASD group and the LA group in terms of the complexity of their responses to the questions. This would indicate that although the participants with ASD were able to identify the problem they were unable to make further predictions about what to do and what the consequences of this would be. It was not surprising that the participants with ASD scored significantly lower than the CA group in the last issue; complexity of feelings expressed. This was predicted as the ability to identify feelings is a key area of deficit in children diagnosed with ASD (Paul, 2007). It is interesting to note that the ASD group also scored lower than the LA group. This contradicts Selman et al., (1986) who suggested that the scoring on the INS is impacted by intellectual ability. The group differences between the ASD and LA group indicate that there is more than a language delay impacting and possibly a deficit specific to children with ASD. This is a deficit that would be interesting to compare to other clinical populations such as those with SLI and TBI to determine if it is ASD specific or due to another impairment that is also seen in other clinical populations. This may be attributed to impairment in ToM similarly to in the persuasive discourse task where the ASD group were unable have a mixed attitude to the topic. It is important to note these areas of impairment when working with individuals with ASD to support their social communication and interactions with others.

#### **4.4 Genre Effects: Persuasive versus Expository**

The aim of the study was not to compare how different groups respond to different types of discourse. Previous research has suggested that genre can elicit varying syntactic complexity (Nippold et al., 2008). This was avoided intentionally due to the differences in content and structure across expository and persuasive; however the results support the use of expository discourse in eliciting more advanced syntax.

The expository discourse task elicited significantly longer language samples than the persuasive discourse task. This interestingly is similar to the results that Nippold et al., (2008) found when comparing expository with another type of discourse; conversational. They found that in all of their results the expository discourse task provided more information and was at a higher level. Nippold et al., (2007) discusses the development of persuasive discourse as an area that is ongoing and often not fully developed by the age of 17 years. In terms of development persuasive discourse is often a later developing form of discourse. That would suggest that children with ASD and a language delay will have difficulty using this type of discourse. The current study showed significant differences between the persuasive and expository discourse task that are aligned with this literature on development of discourse. All participants produced longer language samples with increased use of clauses in the expository discourse task. This would suggest that to elicit a longer language sample from children with ASD, using an expository discourse task would be more successful than a persuasive discourse task.

The significant difference for total T-units used between the groups for both the expository and persuasive discourse is interesting. Nippold et al., (2008) found that total T-units gradually increased as the group mean ages increased. However, Nippold et al., did not find any difference in number of T-units between the conversational and expository discourse. These findings differed from the current study where two different genres were

examined; persuasive and expository. These genres elicited significantly different total T-units. These results suggest genre does impact on total number of T-units and that expository discourse elicits a larger language sample across all groups.

Although the expository discourse task elicited longer language samples it also elicited a significantly higher number of errors than the total number of errors for the shorter language samples in the persuasive discourse task. It is important to note that errors were analysed as a total number of errors in each sample rather than a percentage of errors. It would possibly have provided further insight into error use if errors had been analysed as a percentage of errors due to the vast differences in total number of words used between groups. In terms of the errors that were used, a high number of these errors were due to incorrect use of pronouns. There are two main reasons this may have increased the error rates. Firstly, that with increased number of utterances there is more opportunity for errors. Secondly, that in this task the participants are not aware of the listeners needs; due to deficit in language development and a possible ToM deficit (Novogrodsky, 2013). The use of an expository discourse language sample would therefore be valuable in gaining further insight into the types of errors children with ASD produce.

## **5.0 Limitations, Clinical Implications, and Future Directions**

This study compared students with ASD with their LA and CA matched peers in terms of their use of language when producing spoken expository and persuasive discourse. The study has highlighted a number of areas that must be considered for future research and clinical practice.

For this study, language age equivalent was measured using the ROWPVT. This is a receptive language assessment which could be viewed as limiting as participants are only required to look at four pictures and point to the word they hear. Perhaps, for future research a battery of language assessments could be used to gather a more comprehensive and accurate language age for both receptive and expressive language age equivalents.

To obtain language samples for analysis two discourse genres were chosen; persuasive and expository. The persuasive discourse task did not elicit a great amount of language in comparison with the expository discourse task. In the persuasive discourse task, participants listened to a passage outlining examples of good and bad points about animals in the circus. Participants were then asked one question to think about and then answer. The expository discourse task differed and had a short story and then participants were asked five separate questions to answer. Possibly, for future research in order to elicit a greater language sample in the persuasive discourse task presenting the questions as two separate questions could be beneficial. Alternatively, as in the Ghayoumi et al., (2015) study the use of feedback to the responses to give encouragement and extend the language samples by prompting “anything else?” could be used to elicit more language.

Another way to elicit a greater language sample for the persuasive discourse could be through the use of pictures. Children with ASD are often classed as visual learners (Miles, Chapman & Sindberg, 2006), research indicates that the use of photos can support a significant increase in MLU, with fewer mazes and more complex language when obtaining

discourse language samples. Therefore, by using a picture scene in addition to the auditory explanation future research could elicit greater language samples for this specific genre.

Persuasive discourse is an important part of participating in everyday life as it is a common form of discourse and is the ability to use language to make others do, think, want, feel or say something (Bartsch et al., 2009). Persuasive discourse is not only used for social communication but is seen as an important academic skill according to the New Zealand Qualification Authority (NZQA) (2015). The NZQA set criteria for academic achievement in New Zealand. For level 1 oral language they state that adolescents should be able to produce spoken language that structures convincing ideas to an audience with purpose and control. Therefore these skills that can be examined through persuasive discourse are essential for academic success. It is important that children with ASD are supported with persuasive discourse as we know it is a complex form of discourse and often later developing (Nippold et al., 2005; Nippold, 1998).

Results from previous literature and the current study support the importance of assessment and intervention across discourse genres for children with ASD. Due to the findings from the current study regarding the differences in productivity, syntactic complexity and language content across the two genres; it is important to avoid only assessing one genre and generalising the results, as both TD children and those with ASD perform differently on different discourse genres.

Intervention may be targeted toward different genres and/or language development to increase language skills. One way that Nippold (1998) suggests children develop discourse skills can be through exposure to them. Adults and peers modelling different forms of discourse could be used as intervention for developing discourse skills. Further research should be conducted to continue exploring the impact of the language delays in children with ASD and their impact on persuasive and expository discourse. The specific findings from the

current study that separated the ASD group from the LA and CA groups should also be considered closely and further examined for future research and practice.

## **6.0 Summary**

Children with ASD present with varying language deficits in a range of language domains. This study specifically examined productivity, syntactic complexity and language content during expository and persuasive discourse. The current study found that there were significant differences between the participants with ASD and their typically developing chronologically-aged matched peers; in syntactic complexity, content and ability to use language to support peer conflict resolution.

The use of discourse to examine the language used by children with ASD is important to further understand their functional use of language on a daily basis. Understanding of discourse abilities allows planning of intervention to target specific areas of impairment and support the development of social communication; a key deficit for children with ASD. In the persuasive discourse task the ASD group differed to other groups in their lack of ability to have a mixed attitude toward the topic. In the expository discourse task they also scored significantly lower in their ability to express complexity of feelings. Both of these findings could be attributed to impaired ToM. The persuasive discourse task provided further insight into productivity, syntactic complexity and language content used by children with ASD, LA, and CA children. In addition, the expository discourse task also highlighted areas of weakness in productivity, syntactic complexity and language content; this task, however, did elicit a greater language sample providing greater information for examination in children with ASD. This is an area for future research to consider when examining the language used in children with ASD.

## **7.0 Appendices**

### **Appendix A**

Human Ethics Committee Approval Letter



HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen

Email: [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)



Ref: HEC 2014/104

13 November 2014

Samantha McGillivray  
Department of Communication  
Disorders UNIVERSITY OF  
CANTERBURY

Dear Samantha

The Human Ethics Committee advises that your research proposal “Expository and persuasive discourse in school students with autism spectrum disorder” has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your emails of 12 September and 7 October 2014.

Best wishes for  
your project.

Yours sincerely  
Lindsey MacDonald

A handwritten signature in black ink, appearing to read 'L. MacDonald'.

*Chair*  
*University of Canterbury Human Ethics Committee*

University of Canterbury Private Bag 4800, Christchurch 8140, New Zealand.  
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F E S

## **Appendix B**

### Spoken Persuasive Discourse Experimental Task

*People have different views on animals performing in circuses. For example, some people think it is a **great idea** because it provides lots of entertainment for the public. Also, it gives parents and children something to do together, and people who train the animals can make some money. However, other people think having animals in circuses is a **bad idea** because animals are often locked in small cages and are not fed well. They also believe it is cruel to force a dog, tiger or elephant to perform certain tricks that might be dangerous. I am interested in learning what **you** think about this controversy, and whether or not **you** think circuses with trained animals should be allowed to perform for public. Take a minute to think about your answer. I want you to give me lots of good reasons why you think that.*

adaption of Nippold (1998)

## **Appendix C**

Spoken Expository Discourse Interpersonal Negotiation Strategies Interview Task (Male)

People are always running into problems with others at school, home and work. Everyone has to work out ways to solve these problems. I am going to read to you four short stories, there is no right answer I just want to know what you think about it. Then I will ask you some questions about the story.

**Story 1: *Movies/Mother***

*Tom* was asked to the movies by a girl, and he told her he would go. *Tom's* mother doesn't like this girl and probably won't want him to go.

Questions:

6. What is the main problem?
7. Why is that a problem?
8. How can *Tom* do something to deal with the girl?
9. What do you think will happen if *Tom* does that?
10. How do you think that will make *the girl* feel?

**Story 2: *Not Go on Picnic/Mother***

*Joe's* mother always has him go to a picnic with her friend and her friend's daughter. *Joe* doesn't really like this girl at all, and he doesn't want to go.

Questions:

1. What is the main problem?
2. Why is that a problem?
3. How can *Joe* do something to deal with/change *the girl*?
4. What do you think will happen if *Joe* does that?
5. How do you think that will make *the girl* feel?

**Story 3: *Grill/Peer***

*Mike* and *Peter* work at a fast food restaurant together. It is *Mike's* turn to work on the grill, which he really likes to do, and it is *Peter's* turn to do the garbage. *Peter* says his arm is sore and asks *Mike* to switch jobs with him, but *Mike* doesn't want to lose his chance on the grill.

Questions:

1. What is the main problem?
2. Why is that a problem?
3. How can *Mike* do something to deal with/change *Peter*?
4. What do you think will happen if *Mike* does that?
5. How do you think that will make *Peter* feel?

**Story 4: *Work Extra/Boss***

*John* works at the supermarket after school. He is only supposed to work for 10 hours a week, but his boss keeps asking him at the last minute to work really late on Friday nights. Even though his boss pays him for his extra time, *John* doesn't like to be asked to work at the last minute.

Questions:

6. What is the main problem?
7. Why is that a problem?
8. How can *John* do something to deal with/change *his boss*?
9. What do you think will happen if *John* does that?
10. How do you think that will make *the boss* feel?

(adapted from Selman et al., 1986, p. 459).

## **Appendix D**

Spoken Expository Discourse Interpersonal Negotiation Strategies Interview Task (Female)

People are always running into problems with others at school, home and work. Everyone has to work out ways to solve these problems. I am going to read to you four short stories, there is no right answer I just want to know what you think about it. Then I will ask you some questions about the story.

**Story 1: *Movies/Mother***

*Tessa* was asked to the movies by a boy, and she told him she would go. *Tessa's* mother doesn't like this boy and probably won't want her to go.

Questions:

11. What is the main problem?
12. Why is that a problem?
13. How can *Tessa* do something to deal with/change *the boy*?
14. What do you think will happen if *Tessa* does that?
15. How do you think that will make *the boy* feel?

**Story 2: *Not Go on Picnic/Mother***

*Jessica's* mother always has her go to a picnic with her friend and her friend's son. *Jessica* doesn't really like this boy at all, and she doesn't want to go.

Questions:

11. What is the main problem?
12. Why is that a problem?
13. How can *Jessica* do something to deal with/change *the boy*?
14. What do you think will happen if *Jessica* does that?
15. How do you think that will make *the boy* feel?

**Story 3: *Grill/Peer***

*Millie* and *Emma* work at a fast food restaurant together. It is *Millie's* turn to work on the grill, which she really likes to do, and it is *Emma's* turn to do the rubbish. *Emma* says her arm is sore and asks *Millie* to switch jobs with her, but *Millie* doesn't want to lose her chance on the grill.

Questions:

6. What is the main problem?
7. Why is that a problem?
8. How can *Millie* do something to deal with/change *Emma*?
9. What do you think will happen if *Millie* does that?



10. How do you think that will make *Emma* feel?

**Story 4: *Work Extra/Boss***

*Amy* works at the supermarket after school. She is only supposed to work for 10 hours a week, but her boss keeps asking her at the last minute to work really late on Friday nights. Even though her boss pays her for her extra time, *Amy* doesn't like to be asked to work at the last minute.

Questions:

16. What is the main problem?
17. Why is that a problem?
18. How can *Amy* do something to deal with/change *her boss*?
19. What do you think will happen if *Amy* does that?
20. How do you think that will make *the boss* feel?

(adapted from Selman et al., 1986, p. 459).

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