DEFICITS OR DIFFERENCES

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# A NEW METHODOLOGY FOR STUDYING PRAGMATIC LANGUAGE IN AUTISM SPECTRUM DISORDER

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## Lay Abstract

This thesis proposes a new method of studying pragmatic language use in people with autism spectrum disorder (ASD). This methodology involves using observation and the data that can be gathered using it can fill several gaps in the current research on pragmatic language use in ASD. In this study, people with ASD interacted with either non-autistic people or other people with ASD in triadic conversation sessions. These sessions were recorded, transcribed, and analysed for various aspects of pragmatic uses of language. The pragmatic language use of three participants with ASD, representing three different levels of language ability, was analysed. The results showed that some participants used types of pragmatic language differently based on with whom they were communicating and also that some purported pragmatic impairments in ASD may not be as 'impaired' as they seemed based on previous research.

## Abstract

This dissertation proposes a new method of studying pragmatic language use in autism spectrum disorder (ASD). The existing research into pragmatic language use in ASD has predominantly used interviews and experiments in clinical environments to gather data from participants with ASD. These research methods focus heavily on comprehension, on comparing the performance of the participant with ASD to their non-autistic interlocutor. The methodology proposed in this thesis involves using observation and a naturalistic environment to gather conversational data that can be used to fill several gaps in the current research on pragmatic language use in ASD. In this study, people with ASD interacted with either non-autistic people or other people with ASD in triadic conversation sessions. These sessions were recorded, transcribed, and analysed for various pragmatic uses of language that previous research had observed were impaired, such as types of non-literal language and conversational turn taking. The pragmatic language use of three participants with ASD, representing three different levels of language ability, was analysed. The results showed that some participants used types of pragmatic language differently based on with whom they were communicating and also that some purported pragmatic impairments in ASD may not be as ‘impaired’ as they seemed based on previous research. For example, while all participants in this study used more interruptions when interacting with others with ASD compared to when interacting with non- autistic

people, the rates of interruption were far less than what has been observed between non-autistic speakers (Hancock & Rubin, 2014), even though people with ASD have been described in the research literature as interrupting frequently (Ochs, Kremer-Sadlik, Sirota, & Solomon, 2004). The research presented in this dissertation has implications for future clinical research into pragmatic language impairments in any speech community and provides an additional methodology that can be used, expanding on the types of research questions that can be investigated in this area.

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# Table of Contents

## List of Figures

# List of Tables

## List of Conversational Examples

## List of Abbreviations

**ABA:** *Applied Behavioural Analysis*

**AS:** *Asperger's Syndrome*

**ASD:** *Autism Spectrum Disorder*

**CC-A:** *Communication Checklist for Adults*

**CLAN:** *Computerized Language Analysis*

**CA:** *Conversation Analysis*

**DLD:** *Developmental Language Delay*

**DSM-5:** *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*

**FSL:** *French as a Second Language*

**HFA:** *High Functioning Autism*

**MLUm:** *Mean Length of Utterance in Morphemes*

**MLUw:** *Mean Length of Utterance in Words*

**MIP:** *Metaphor Identification Procedure*

**NSE:** *Native Speaker of English*

**NSJ:** *Native Speaker of Japanese*

**NT:** *Neurotypical*

**NLL:** *Non-Literal Language*

**PPVT-4:** *Peabody Picture Vocabulary Test, 4th Edition*

**PDD-NOS:** *Pervasive Developmental Disability - Not Otherwise Specified*

**SLI:** *Specific Language Impairment*

**SIL:** *Summer Institute of Linguistics*

**SALT:** *Systematic Analysis of Language Transcripts*

## Declaration of Academic Achievement

I hereby declare that the following thesis is my own work. This thesis does not violate any proprietary rights.

All the research ideas presented in this thesis are my own. I have also benefited from the guidance and suggestions of my supervisor (Dr. Stroińska) and my thesis committee members (Dr. Anderson, Dr. Connolly, Dr. Hall, and Dr. Szatmari). The transcription and coding manual used to guide the transcription process was written by me and fine-tuned based on feedback from my interrater transcriptionist, Amanda Davidson, and based on our experiences with linguistic transcription and issues we found during the transcription and coding of the footage analysed in this study. I designed the experimental paradigm used in this study with input from my thesis committee and members of the Autism Research Training program and I gathered and analysed all data herein.

I wrote the thesis that follows, including revisions and additions suggested by my thesis supervisory committee and examiners.

# Chapter 1 – Introduction

## 1.1 Motivations

When studying disordered speech[1], there is a tendency amongst researchers and clinicians to compare it to that of an 'ideal speaker', which tends to be a neurotypical (typically-developing, NT) speaker. This practice may be of use in cases whereby patients may have been close to what could be labelled an 'ideal speaker' at one time, following typical language development: this could be, for example, the case of aphasia after a traumatic brain injury in an otherwise healthy, typically-developing person. In other types of disordered speech, this practice remains common; however, it may not be appropriate. In patients with autism spectrum disorder[2] (ASD), or other neurodevelopmental disorders, normal development may have been affected meaning that speakers from these populations may never have had the same language development as a NT speaker.

[1] In this thesis, I frequently use clinical terminology including the term 'disorder' and describe the participants in clinical terms. This is not intended to undermine the notion of differences, to confirm the view of people with pragmatic language difficulties as deficient, or to further stigmatize people with difficulties in pragmatic aspects of language. The use of clinical terminology in this paper is to make it more easily related to by clinicians and researchers who already use these terms, as they are one of the primary audiences for this thesis. The use of clinical terminology also makes it less likely that this work can be dismissed by a clinical audience as purely linguistic.

[2] Throughout this thesis, I use person-first language 'person with autism' and identity-first language 'autistic person' interchangeably. While some style guides may require authors to use person-first language for the purposes of reducing stigma, it has recently been argued that this practice actually serves to increase the stigma faced by people with specific types of disabilities due to the fact that many authors only use person-first language to refer to people with disabilities and not for people without disabilities (Gernsbacher, 2017).

Thus, to compare the linguistic performance of a speaker with ASD to that of a NT speaker can be likened to comparing apples to oranges not apples to apples. Utilizing this practice for studying the language and communication skills of speakers with neurodevelopmental disabilities like ASD is insufficient and creates a skew in the conclusions against speakers with neurodevelopmental disabilities. The language skills of speakers with ASD are seen as impaired because they are different from the standard of language skills of NT speakers. However, this begs the question: if not held up against an NT standard of language and communication, are the language and communication skills of people with ASD effective? We could rephrase this question a bit further: Are the language skills of people with ASD 'impaired', or merely different?

One of the hallmark characteristics of ASD has been difficulties with social interaction (American Psychiatric Association, 2013, p. 31). These difficulties have been mostly focused in an area of language called pragmatics, "the science of language seen in relation to its users" (Mey, 1993, p. 5). However, being a person with ASD, I have observed that these 'difficulties' did not seem to be as severe or frequent as the literature had led me to believe. During my Master's degree, I worked with other people with ASD, in different disciplines, and we frequently finished each other's sentences. This sort of communicative behaviour is one that would not be expected based on the ASD literature. The pragmatic deficits in ASD have been theorized to be caused by a deficit in theory

of mind (Frith, 2003), the ability to attribute mental states onto others (Frith & Happé, 1999), and if one is not able to put oneself into another person's situation or mindset, it is very unlikely that they would be able to finish another person's sentences. When looking deeper into the literature on pragmatic impairments in ASD, I noticed that the studies describing communicative impairments were all based on interactions between people with ASD and people without ASD; there were no studies looking at interactions only between people with ASD. This prompted me to conduct a pilot study during my Master's to investigate whether communication between people with ASD might not exhibit the same 'impairments' as interactions between people with ASD and people without ASD: to put it differently, I wanted to find out whether conversations between people with ASD might not rely on the same mechanisms that might be impaired between people with ASD and people without ASD. In the pilot study (Salt, 2011), I held a series of six conversation sessions, with three to six adolescents and adults with ASD in each. These sessions were video-recorded and transcribed. I focused on two specific pragmatic impairments that have been observed previously in ASD: frequent interruptions, and difficulties with non-literal language. I observed that the number of interruptions that maintained the conversational topic outnumbered the number of interruptions that changed the conversational topic. I also observed, that despite the literature saying the people with ASD have trouble with figurative language (De Villiers, Stainton, &

Szatmari, 2007; Frith, 2003; Happé, 1995), the participants used metaphors, irony and sarcasm in the sessions, and they did it in creative ways. This led me to focus my research for my Master's degree on pragmatic uses of language, especially in the case of 'disordered' speech. I have continued that line of inquiry in my PhD research. I believe that this specialization in my studies combined with my insider's perspective of having ASD myself, makes me uniquely qualified to conduct this research. This study is also significant in that it is the first study that I am aware of examining conversational interactions between adults with ASD, as the existing literature focuses exclusively on interactions between people with ASD and NTs.

## 1.2 A Shift of Focus

The current project began as a follow-up to that pilot study and the original question I wanted to answer was whether people with ASD communicate differently, in terms of pragmatic uses of language, with other people with ASD than they do with non-autistic people. However, existing methods and research results based on those methods were not appropriate for investigating this issue. There were a number of reasons for this.

Firstly, existing studies attesting to pragmatic impairments in ASD used either interviews or experimental paradigms. Interview studies presenting in the literature were dyadic, which limits the potential for different types of pragmatic

uses of language, and most interviews were done between an autistic participant and the neurotypical (non-autistic, NT) researcher. Also, previous research has argued that interviews represent a specific style of interaction that may not be reflective of the full array of a person's communicative abilities (Gumperz, 1972; Labov, 1972/1997) and they create an asymmetrical power dynamic that favours the interviewer (Briggs, 1986). Experimental studies too may not be adequate proxy measures for natural conversation, as they tended to focus on language comprehension, rather than language production, which also means that the data only represents the linguistic skills of people with ASD in a receptive role during a conversation, rather than in an active role. Also, for both interviews and experimental studies, there is an issue of elicitation: the type of language observed can be limited by the stimulus or the questions asked (Briggs, 1986) and this can artificially limit the opportunity for some more spontaneous communicative behaviours to present themselves or can elicit rare constructions at a rate far higher than would be expected in natural conversation.

Secondly, many of the studies focused on children. There is nothing wrong with that, in and of itself, but it leaves a gap in the research when looking at adults. There is no reason to assume that the language difficulties observed in children will persist to adulthood or present in the same way in adulthood.

Lastly, these studies have not accounted for the effect of some of the social

determinants of speech, namely cultural background and gender, which could affect pragmatic uses of language. In most studies presented in the literature, participants' demographic information (i.e. cultural background and gender) was not provided. This leaves potential confounding variables that could affect the data gathered.

The above mentioned issues with the existing studies made me realize that not only were there significant lacunae in the research of pragmatic uses of language in ASD, but also that before I could answer the question of whether people with ASD communicate differently with other people with ASD compared to NT people, I would need to develop a different research method that could address the concerns posed by the existing studies. The other goal in creating an alternative research method to investigate pragmatic abilities in ASD was to make sure that it could also address some of the gaps in the research literature on pragmatic uses of language in ASD. This dissertation describes the method that I have developed and argues that this method provides an alternative for researchers investigating pragmatic abilities in ASD. The research method that I have described in this study uses observation and focuses on trying to keep interactions between participants as natural as possible. This way, it provides a window into the everyday communicative life of people with ASD, and allows the data to be kept as close to naturally occurring communication as possible. To test this research method's ability to investigate new research questions and address some

of the knowledge gaps, I used it to do a preliminary investigation of the question that I originally wanted to answer in my PhD research: do adults with ASD communicate differently when interacting with other adults with ASD compared to when interacting with NT adults? While this dissertation provides some of the answers I was seeking, it mostly shows that there are alternative ways to do research on pragmatic uses of language in ASD than those previously described in the literature, which can gather different types of data.

## 1.3 Organization

This dissertation is organized into five parts that correspond to the following chapters. Chapter 2 contains a review of the literature on several topics that were considered relevant to this study. Firstly, I address the concept and definition of 'pragmatics' used in my research as different fields of study define the term differently. I then review and discuss methods for coding certain types of pragmatic uses of language that were analyzed in this thesis. Secondly, I review the research literature on ASD and pragmatic 'difficulties' observed therein. I pay particular attention to pragmatic uses of language that are investigated in this study, namely difficulties with figurative language and turn taking. Lastly, I review the methods that have been employed to research pragmatic uses of language in ASD in the past, i.e. interviews and experimental paradigms. I discuss the issues inherent in using those methods for this type of research, some of which

were listed previously in this chapter. I also review observation as a potential research method for studying disordered speech. In Chapter 3, I describe the research method that I used in this study in detail, explaining why my approach helps to avoid some of the pitfalls associated with methods used in the past. In Chapter 4, I present the results of my observation research with ASD and NT participants engaging in spontaneous conversations. Based on the results of my analysis, I attempt to provide some answers to the research question as to whether people with ASD communicate differently depending on their interlocutors, including both quantitative and qualitative data. In Chapter 5, I discuss the conclusions of this study, the implications of the data analysed and the future directions for research on communication among and with people with ASD.

## Chapter 2 – Literature Review

In this chapter, I review the literature surrounding three main areas of inquiry that underpin this study and the proposed methodology therein. These areas are the research on the use of pragmatics in communication by people with Autism Spectrum Disorder (ASD), methodologies used in researching pragmatic aspects of communication in general, and coding practices for pragmatic uses of language. One of the challenges of structuring this literature review was that many of the reviewed studies address multiple areas that I am addressing below, thus causing a significant amount of overlap across sections. I decided to review each subject area separately, rather than reviewing each study in its entirety, to maintain coherence in terms of how the literature available led me to my choices in designing and conducting this research. Therefore, some studies are reviewed more than once in this chapter, focusing on different aspects each time. Also, due to the focus of this dissertation on methodology in research on linguistic phenomena in communication with people with ASD, this review puts emphasis mostly on experimental papers and papers that involved data collection. I have also reviewed a number of the cornerstone papers in pragmatics and ASD. Papers that do not provide detailed information on the methodology used in the data collection process will not be reviewed in full.

## 2.1 Defining Pragmatics

Pragmatics is an interdisciplinary subject, involving the study of context in communication, or elements thereof, and is present in many disciplines, including linguistics, sociology, speech language pathology and others. While this breadth of knowledge that pragmatics applies to has significantly expanded, it has also created an issue of definitions. Acknowledging this, Givón wrote: “Pragmatics may be likened to a vast terrain whose boundaries are so distant that we perceive them only dimly, given our less-than-exalted vantage point” (1989, p. 1). As a result, in each field of study, the term ‘pragmatics’ has a different definition. While these definitions are typically related or similar, usually based around the notion of context, they can vary quite a bit between fields. This is not surprising as even within linguistics there are multiple definitions depending on the researcher and their focus. The different definitions used to describe and study pragmatics in different fields and subfields can lead to a confusion of terms and this in turn can lead to confusion over what aspects of communication are of interest to pragmatics.

From a formal semantics and logic perspective, pragmatics has been defined as “those aspects of the meaning of the utterances which cannot be accounted for by straightforward reference to the truth conditions of the sentences uttered” (Gazdar, 1979, p. 2). In the functionalist school of linguistics, pragmatics

is defined as “an approach to description, to information processing, thus to the construction, interpretation and communication of experience. At its core lies the notion of *context*, and the axiom that reality and/or experience are not absolute fixed entities, but rather *frame-dependent*, contingent upon the observer’s *perspective*.” (Givón, 1989, p. xvii). These definitions are customized to their specific subareas of linguistics, incorporating other concepts from those subareas into the definitions themselves. In terms of more general definitions of pragmatics within linguistics, there are a couple that are more widely applicable. Huang defines pragmatics as “the systematic study of meaning by virtue of, or dependent on, the use of language” (Huang, 2014, p. 2). The Summer Institute of Linguistics (SIL) provides a slightly more specific definition: “the study of the aspects of meaning and language use that are dependent on the speaker, the addressee and other features of the context of utterance” (SIL International, 2015). The SIL provides an interesting example of what pragmatics covers to further qualify their definition: “The effect that the following have on the speaker’s choice of expression and the addressee’s interpretation of an utterance: context of utterance, generally observed principles of communication, the goals of the speaker” (SIL International, 2015). Even though these definitions differ, there are common threads: context, meaning, and the role of the speaker. Context is critical to these definitions because while the semantic perspective on meaning is based on truth, there are situations in which an objective truth is not apparent. In these cases, the

context of the utterance and the perspective of the speaker in making the utterance are necessary to determine the meaning as intended by the speaker.

In the field of speech-language pathology, pragmatics is typically defined as "appropriate social language use" (Volden, Mulcahy, & Holdgrafer, 1997, p. 181). In clinical linguistics, pragmatics is defined as "concerned with problems of explaining textually and contextually based inferential processes involved in communication" (Asp & De Villiers, 2010, p. 21). These definitions not only vary from the linguistics definitions but also do not necessarily cover the same areas that pragmatics in linguistics does.

One of the most relevant definitions of pragmatics with regard to this project is the one from the clinical sciences community. In the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)—the manual used by physicians in North America for diagnosing mental health conditions, including ASD—a definition of pragmatics is provided in the details of the diagnostic criteria for Social (Pragmatic) Communication Disorder: "the social use of language" (American Psychiatric Association, 2013, p. 48). Examples of deficits under this definition of pragmatics include "deficits in understanding and following social rules of verbal and nonverbal communication in naturalistic contexts, changing language according to the needs of the listener or situation, and following rules for conversations and storytelling"(American Psychiatric

Association, 2013, p. 48). This definition is quite broad when compared to the definitions within linguistics and this significant discrepancy explains some of the confusion in the ASD literature around pragmatics, which will be discussed in more detail in Section 2.2. If we compare the DSM-5 definition to the SIL definition, we can observe an interesting dichotomy. In the clinical literature, the focus of the definition is on a behaviour that does not fit a norm without necessarily going beyond that. In linguistics, the focus of pragmatics is to look at the meaning created and interpreted as an effect of the behaviour, not just the behaviour itself. There is also no reference to norms other than that communication partners have certain expectations and evaluate communication based on how it relates to those expectations. To describe a behaviour as a *deficit* is common in the clinical literature but can imply 'wrongness', that some rule or standard has been violated. However, not everything can be classified that way because, especially in the case of language, standards can vary. Describing behaviours instead as differences, and allowing for the description of behaviour without underlying assumptions of standards, can provide more information and more perspective by not precluding new information due to underlying assumptions. The study presented in this thesis uses the linguistics definition of pragmatics set forth by the SIL so as to preclude judgements on the 'rightness' or 'appropriateness' of social behaviour: "the study of the aspects of meaning and language use that are dependent on the speaker, the addressee and other features

of the context of utterance" (SIL International, 2015). I believe that this leads to a more objective and less biased perspective on language use among persons with ASD.

### 2.1.1 Coding Pragmatic Uses of Language

The term 'pragmatic uses of language' is employed here to refer to words and constructions that are used to perform pragmatic functions. This includes concepts like metaphors, irony, sarcasm, and other types of non-literal language. As discussed in the previous section, different fields define pragmatics differently, leading to a confusion of terms and confusion over what aspects of communication are considered to be of interest to pragmatics. The choice of the definition of pragmatics also affects how pragmatic uses of language are coded. Coding refers to "the classification and labelling of natural events into discrete categories" (Lampert & Ervin-Tripp, 1993, p. 169). When creating a coding scheme for conversational data, there are two main approaches: the researcher "can proceed either in a top-down fashion, based on some theory, or from the bottom up, based on the raw data at hand" (Lampert & Ervin-Tripp, 1993, p. 171). Regardless of which approach is used to create a coding scheme, "every investigator who studies language must recognize that underlying assumptions have an influence on the decisions that are made at every step of the construction process with each decision affecting subsequent ones and the end product as a

whole" (Lampert & Ervin-Tripp, 1993, p. 172). The definition of pragmatics used in a given study would be one of these 'underlying assumptions' and would influence the coding of pragmatic uses of language. Non-literal language use is seen as unequivocally within the domain of pragmatics. Given that, coding non-literal language is hardly homogeneous. Below, I discuss the coding of one prominent type of non-literal language use studied in ASD, metaphors (Happé, 1993; Hermann et al., 2013; Norbury, 2005). I describe some of the difficulties encountered in these practices, how they have changed, and how they influenced the coding decisions I made in this study. Also, the studies listed above are reviewed later in this chapter.

### 2.1.2 Coding Metaphors

One of the most popular methods for clinicians to identify figurative language like metaphors is the method first proposed by Barlow, Kerlin and Pollio (1971) and expanded by Pollio, Barlow, Fine and Pollio (1977) (Pragglejaz Group, 2007, p. 32). This method involves training three raters and having them learn the different types of non-literal language. They then pick out what they each believe are the figurative elements of a text, rating them as frozen or novel and then comparing their selections amongst themselves. Figurative elements were considered 'frozen' if they "had become a part of the ordinary vocabulary even though [they] could still be recognized as non-literal" (Pollio & Barlow,

1975, p. 4). Figurative elements were considered ‘novel’ if “the rater had never experiences this usage in context before” (Pollio & Barlow, 1975, p. 4). These independent ratings are then coded based on a majority vote (Barlow et al., 1971, p. 17). The system created this way can still be quite subjective due to the fact that it is comparing the interraters' value judgements about whether an element is figurative, which would be heavily dependent on the rater's training and experience; this system does not rely on transparent and consistent criteria. Also, as stated by the Pragglejaz Group, Barlow et al. do not provide explicit criteria for determining whether a specific word or phrase is metaphorical; they offer only prototypical examples (Pragglejaz Group, 2007, pp. 32–33). In another study looking at metaphors used during the treatment of depression, metaphors were coded but the criteria for doing so were not very specific (Levitt, Korman, & Angus, 2000, p. 28). In this case, the authors used Lakoff and Johnson’s definition of a metaphor, “the understanding of one thing in terms of another” (1980, p. 5) as their only listed criterion. This is quite vague and leaves the coding of metaphors vulnerable to many subjective judgements. It is only by reading their enclosed list of examples that it becomes clear that they applied this definition to phrases rather than individual words and that the example phrases consisted of solely creative (productive) metaphors (Levitt et al., 2000, pp. 28–29). Cameron (2003) also investigated and coded metaphors, in the medium of educational discourse. While much of her data was creative and phrasal metaphors, in some cases, she coded

individual words as well (Cameron, 2003, pp. 96–97), such as in the case of prepositions. Using two different scales (in this case, phrase and word) makes quantifying and coding metaphors difficult.

In contrast to the previously addressed approaches, the Metaphor Identification Procedure (MIP) developed by the Pragglejaz Group (2007) provides a far more detailed and objective approach. The MIP was intended to allow for the identification of words used metaphorically in natural discourse (Pragglejaz Group, 2007, p. 1). The MIP contains far more detailed instructions than the other approaches discussed and, as a result, is more thorough and less reliant on subjective experience: while judgements do occasionally need to be made, they are made in accordance with set criteria and limitations established in the procedure. The MIP begins with the analyst reading an entire text to establish familiarity with both the text and the context. Then, each word's contextual meaning is identified and compared to its base meaning to determine whether the contextual meaning of the word is different from the basic meaning. If it is, the researcher must determine whether there is some sort of comparison present between the two meanings that is necessary for the full contextual meaning to be understood. Only under those circumstances is a word labelled as metaphorical according to MIP. This procedure has more criteria and more steps that must be completed on lexical items to determine whether they are being used metaphorically to the point that subjective judgements are minimized. With one of

the goals of this study being to have as objective a description of ASD language as possible, the MIP was considered the best method to use for this project. This procedure is explained more thoroughly in the next chapter, with focus on how it was used specifically in this study.

### 2.1.3 Divisions of Non-Literal Language

There are several types of non-literal language (NLL) studied in pragmatics. These include irony, sarcasm, metaphor, idiom, simile, analogy, hyperbole and more. Of particular interest to this study are irony, and by extension sarcasm, as well as metaphor and simile. The use of these types of NLL has been applied as proxy measures for different levels of theory of mind in studies of ASD. The main study that has looked at NLL as a proxy measure for Theory of Mind is *Communicative competence and theory of mind in autism: A test of relevance theory* (Happé, 1993). In this study, Happé argues that difficulties with theory of mind tasks vary across the autism spectrum and that under Sperber and Wilson's Relevance Theory, these difficulties could be extended to apply to comprehension of different types of figurative language. Based on relevance theory, Happé argues that simile, metaphor, and irony would require different degrees of competence on theory of mind tasks and would be analogous to varying levels of theory mind ability. Of simile, Happé explains:

> According to relevance theory, *similes* can be understood at a purely literal level – saying, 'He was like a lion' is no different from saying 'He was like his father'. In both cases the hearer is set the task of deciding in what respect there is a similarity. (Happé, 1993, p. 103)

Happé follows this explanation with a prediction that autistic speakers who lack a theory of mind should be able to use and understand similes since the interpretation is strictly literal (Happé, 1993, p. 103). With regard to metaphors, Happé explains: "In a metaphor, the propositional form of the utterance is a more or less loose interpretation of the speaker's thought. Therefore metaphors cannot be fully understood or properly used without a first-order theory of mind – using a default value of literalness will not work (Happé, 1993, p. 104). Put simply, a metaphor is not a literal reflection of reality and some understanding of the speaker's intention is necessary to a proper interpretation of the metaphorical utterance (Happé, 1993, p. 104). With regard to irony, Happé argues that, under relevance theory, irony is more cognitively demanding than understanding metaphor and that it requires "an understanding of second-order metarepresentation (a thought about an attributed thought)" (Happé, 1993, p. 104). She provides the following example: "When we exclaim, 'Well, that's very clever isn't it!', we are mentioning a possible thought and expressing our attitude towards it – an attitude of mockery" (Happé, 1993, p. 104). The hearer must understand that the exclamation happened in a situation that did not call for

praise. In her study, Happé's predictions were confirmed. Autistic participants who performed poorly on first-order theory of mind tasks, performed poorly on tasks involving identifying metaphors and irony but performed satisfactorily when interpreting similes. Autistic participants who performed poorly on second-order theory of mind tasks but performed no differently from the control group of participants with mild learning difficulties on first-order theory of mind tasks, performed as the control group with identifying metaphors and similes but did not perform as the control group when trying to identify irony. Finally, autistic participants who performed no differently from the control group on second-order theory of mind tasks also performed as the control group when identifying and interpreting similes, metaphors, and irony. Due to this distinction between the above listed types of NLL, in the current study I decided to code each of these types of NLL separately, rather than coding them together as a single category of NLL.

## 2.2 Pragmatics and ASD

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that is usually diagnosed in childhood and is characterized by difficulties with social interaction and repetitive behaviours (American Psychiatric Association, 2013, p. 31). While typically diagnosed in childhood, ASD persists across the lifespan (American Psychiatric Association, 2013, p. 56). Before the most recent version

of the DSM, the DSM-5, five separate autism spectrum disorders: Asperger's Syndrome, Autism, Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS), Childhood Disintegrative Disorder, and Rett Syndrome were recognized (American Psychiatric Association, 2000, p. 40). These diagnostic categories are still used in some of the literature and may be seen further in the studies reviewed below as well as in later sections of this dissertation. In the pragmatic language use and ASD literature, there is little focus on Childhood Disintegrative Disorder and Rett Syndrome. The differences between the other three diagnoses are that people with Asperger's Syndrome do not have a clinically significant language or cognitive delay compared to people with Autism (American Psychiatric Association, 2000, p. 80). Also, people with PDD-NOS have severe impairments in the development of social interaction, impairment in verbal or non-verbal communication skills, or present stereotyped behaviours, but in insufficient quantities to reach threshold for the diagnostic criteria for other autism spectrum disorders and other related disorders (American Psychiatric Association, 2000, p. 84).

In many of the studies of pragmatics and ASD, people with ASD are further specified as either 'high-functioning' or 'low-functioning'. 'High-functioning' ASD has been defined as "autism absent of cognitive delay" (Sanders, 2009, p. 1562) and by inference 'low-functioning' can be defined as 'autism with a cognitive delay'. The classification of 'high-functioning' is

discussed in more detail in methodology chapter, especially how it applies to the current study. However, I have introduced it here because it is referenced in some of the studies being reviewed.

### 2.2.1 Overview of Pragmatic Deficits

In the clinical literature, the terms *social* and *pragmatic* are frequently used synonymously and interchangeably especially with regard to ASD and the associated deficits observed therein, and other related disorders. For example, in the DSM-IV-TR, the diagnostic features listed for 'Autistic Disorder' include: "A disturbance in the pragmatic (social use) of language is often evidenced by an inability to integrate words with gestures or understand humor or nonliteral aspects of speech such as irony or implied meaning" (American Psychiatric Association, 2000, p. 71). The word *pragmatic* did not appear anywhere else in the sections of any of the five autism spectrum disorders and for the remainder of the sections, the language impairments in ASD are described as *social* in the DSM-IV-TR. An interesting note however, appears in Appendix D about 'Autistic Disorder', which describes the changes made in the DSM-IV-TR from the DSM-IV: "The text … has been modified to highlight difficulties in the pragmatic aspects of language" (American Psychiatric Association, 2000, p. 830). Also, in the DSM-5, there is a disorder related to ASD that is called both "social (pragmatic) disorder" (American Psychiatric Association, 2013, p. 47) and

"pragmatic (social) disorder" (American Psychiatric Association, 2013, p. 197). However, in my opinion, using the terms *pragmatic* and *social* synonymously or interchangeably is incorrect. *Social* refers to many factors involving interactions with others besides language and as discussed previously, *pragmatic* refers to meaning created by contextual use of language. It is very possible to have difficulty with social interaction with it not being a problem of pragmatics. For example, one of the described deficits in ASD is "difficulty relating to people" (De Villiers et al., 2007, p. 293). This would definitely fit the definition of social issue but not a pragmatic one. As discussed in Section 2.1, the definition of pragmatics in the clinical literature varies from the definitions in linguistics and so it is worth keeping that in mind as we discuss the pragmatic deficits in ASD: some of the deficits that have been labelled as pragmatic in the clinical literature but do not fit a linguistic definition of pragmatics, will not be discussed here. De Villiers, Stainton and Szatmari (2007), based on the works of several other researchers, compiled a list of characterizing behaviours of ASD. From this list, I have selected the deficits that meet the linguistic definition or are otherwise related to pragmatics, as defined in linguistics. More attention is paid to specific deficits that are coded for in this study.

People with ASD have long been argued to have difficulties with theory of mind, or mindreading (De Villiers et al., 2007, p. 293). Theory of Mind is "the ability to attribute mental states and predict behaviour accordingly" (Frith &

Happé, 1999, p. 1). In and of itself, difficulty with theory of mind is not a pragmatic deficit under the linguistics definition discussed previously, however, it has been argued to underlie many of the social and pragmatic deficits described in the literature (Frith, 2003, p. 80).

Some children with ASD may use language in different or unexpected ways, assigning non-standard meanings to words and expressions or using words in different contexts that may not be understood by another interlocutor. This has been referred to as "idiosyncratic word use" (Frith, 2003, p. 121) or "idiosyncratic lexical meanings" (De Villiers et al., 2007, p. 294). It has been argued that this behaviour is based on different associations made during learning of words than would be seen in a neurotypical child (Frith, 2003, p. 121). In his landmark paper describing autism, Kanner describes this phenomenon as observed in one of his patients. Whenever Paul saw a saucepan, he would say 'Peten-eater'. According to Paul's mother, this behaviour started when she was reciting the nursery rhyme "Peter, Peter, pumpkin eater" and she dropped a saucepan during the recitation (Kanner, 1943, p. 227). Paul associated saucepans with the nursery rhyme and assigned the meaning of 'saucepan' to 'Peten-eater'. What makes this type of word use different in autism than what might be seen in neurotypical people is that the associations are unique to the person with autism and that the associations "do not refer to wider experiences that are accessible to *both* speaker and listener" (Frith, 2003, p. 121).

Another pattern of pragmatic language use seen in ASD that is different than what is observed in neurotypicals is “impairment in foregrounding and backgrounding of information” (Baltaxe, 1977, p. 179; De Villiers et al., 2007, p. 294). In discourse, new information is ‘foregrounded’ upon old information and old and new information are distinguished specific use of different syntactic devices (Baltaxe, 1977, p. 179). People with ASD have been observed having difficulty differentiating between old and new information. Baltaxe presents an example from an interview with an autistic young adult as an example of this:

> Q: How do you account for the fact that the team has dropped down almost to the bottom?
>
> A: They’re a lousy team this year. They’ll fall from world champions. They have won the world championship. They have won thirteen world championships (Baltaxe, 1977, p. 179).

Baltaxe notes the lack of anaphoric pronoun used to replace old information, i.e. ‘world championship’ as evidence of issues of backgrounding as it makes the response somewhat repetitive (Baltaxe, 1977, p. 179). While the repetition of the word championship in the response to the researcher’s question seems redundant, using anaphoric pronouns is obviously only one way to represent foregrounding and backgrounding.

People with ASD have also been observed saying things that lack relevance to the hearer (Asperger, 1991), in contrast to Sperber and Wilson’s

(1986) account of relevance within neurotypical conversation. Sperber and Wilson proposed that relevance is primarily a function of cognitive processes. They proposed that there is a universal cognitive predisposition in humans to maximize relevance (Wilson & Sperber, 2006, p. 610). Because this predisposition is universal, speakers are argued to have some awareness of it; in speaking an utterance, there is a presumption that the spoken utterance has optimal relevance. Optimal relevance is determined by the hearer based on whether the utterance "is relevant enough to be worth the audience's processing effort" (Wilson & Sperber, 2006, p. 612). Many utterances may have more than one possible meaning and in this situation, the maximally relevant interpretation or meaning is the one that takes the path of least cognitive effort.

Frith argues that the behaviour of people with ASD saying things that lack relevance to the hearer may be linked to difficulty with foregrounding and backgrounding information. It is important to note that relevance is contextual and fluid. When new information is introduced, it changes the context and can alter the relevance of an utterance in a number of ways (Stainton, 1994, p. 272). Frith tested her hypothesis using an example scenario that was tested with several children. Two researchers and a child are in a room and the first researcher pulls out a wooden toy bee. The first researcher shows the second researcher and the child that the toy flaps its wings. The second researcher feigns surprise and then leaves the room. The first researcher then shows the child that the bee toy's head

nods as well. When the second researcher returns, she asks the child what the bee can do. Autistic children were just as likely to mention that the bee could flap its wings, as they were to mention that the bee could nod its head. Neurotypical children mentioned the nodding of the head. The response by the neurotypical children is what would normally be expected as the maximally relevant response as the researcher was absent for that part of the demonstration while they were present for the flapping of its wings (Frith, 2003, pp. 129–131). To the researcher asking the question, the ability of the bee to nod its head would be new information and this new information is maximally relevant in this circumstance. When the researcher asks the children what the bee can do, it would not be relevant to ask about something that the researcher already knew that it could do, as it would be redundant to spend the cognitive effort interpreting information that the researcher already has.

In terms of other broad pragmatic discourse features, cohesion and coherence in discourse have also been studied as a deficit in the speech of people with ASD. Baltaxe and D'Angiola (1992) analysed transcribed language samples from sessions of semi-structured play between a child and a researcher. The children in this study were either neurotypical, autistic, or had been diagnosed with specific language impairment (SLI). Baltaxe and D'Angiola coded the transcripts for markers of cohesion in discourse, cohesive ties. An example of a cohesive tie that was coded for in this study is the use of a pronoun that serves a

referential function within the text: "*John* is out. *He*'ll be back at five" (Baltaxe & D'Angiola, 1992, p. 16). Cohesive ties were categorized based on their function into five categories: reference, ellipsis, conjunction, substitution, and lexis (Baltaxe & D'Angiola, 1992, p. 7). The researchers found that autistic children on average used cohesive ties at a rate of one-third the frequency of neurotypical children (Baltaxe & D'Angiola, 1992, p. 8). The researchers also looked at the rate of cohesive tie error among autistic and neurotypical children. They defined cohesive tie error as ties that were incomplete, such as by referring to items that were not specified in the text, or erroneous, whereby a tie led the listener to incorrect information (Baltaxe & D'Angiola, 1992, p. 19). They also found autistic children had a rate of cohesive tie errors of over six times higher than neurotypical children (Baltaxe & D'Angiola, 1992, pp. 10–11). In a later study, Fine et al. (1994) analysed interviews with neurotypicals, people with high functioning autism (HFA), and people with Asperger's syndrome (AS) for cohesive links. The researchers examined noun phrases (NPs) to determine if they were phoric (not interpretable without contextual information, uses referencing) or nonphoric (interpretable without the need for contextual information). Phoric NPs were further broken down into subtypes based on the type of referencing they used. Endophoric NPs referred to antecedents found within the discourse. Exophoric NPs referred to antecedents found in the world of the participants. Cultural NPs referred to antecedents that were salient to members of the same

cultural group. Bridging NPs required the listener to draw inferences to understand the reference. The final category, unclear NPs, was further subdivided into ambiguous NPs—which refer to multiple possible antecedents—and additioning NPs, whereby no antecedent was given. (Fine et al., 1994, pp. 320–322). The researchers found that there was no difference in the usage rates of endophoric and exophoric references between the control and AS groups. The HFA group however, used less endophoric links and more exophoric links than the AS and control groups. The AS group made more errors with additioning referencing than the control and HFA groups. Lastly, the HFA group used more cultural references than the AS and control groups (Fine et al., 1994, pp. 323–324). This is a notable result, however, it is important to note that the participants in the HFA group were older than the participants in the AS and control groups. The issue of age of participants in this study is discussed in more detail in section 2.3.4.2. These results show that even within the autism spectrum, there can be a significant variance in pragmatic abilities even when it comes to a single type of pragmatic language, namely referencing.

Another common issue observed in conversations with people with ASD is perseveration on a single topic (De Villiers et al., 2007, p. 294). Related to one of the other diagnostic criteria for ASD, repetitive behaviours, people with ASD tend to perseverate about specific subjects. This can manifest in repeatedly talking about the same topic or repeatedly coming back to a specific topic even when

other interlocutors have attempted to change the topic, as was observed by Bernard-Opitz (1982).

One of the other pragmatic deficits observed in ASD in the pragmatics literature is violations of Gricean Maxims (De Villiers et al., 2007, p. 294; Surian, Baron-Cohen, & Van der Lely, 1996). Grice (1975) proposed that there are implicit rules, or maxims, that govern conversation, in the furtherance of the Cooperative Principle: the idea that speakers cooperate toward an accepted purpose (Surian et al., 1996, p. 58). To study this, Surian et al. (1996), created several staged conversational exchanges that were audio recorded. Each exchange contained a violation of a Gricean maxim. Neurotypical children as well as children with ASD and children with SLI were given dolls equating to the characters on the audio tapes and were asked to identify the "doll that said something silly" (Surian et al., 1996, p. 62). The researchers found that while the children with SLI and neurotypical children were able to complete the task at a rate significantly above chance (which suggested that they were able to understand Gricean Maxims), only three of eight children with ASD were able to complete the task at a rate above chance (Surian et al., 1996, p. 63).

It is important to note the significant overlap between these different proposed impairments. Gricean maxims address relevance via the maxim of relation as does relevance theory, though from the perspective of cognitive processes involved in interpreting relevance (Surian et al., 1996, pp. 58–59).

Gricean maxims and relevance theory could also be related to issues of theory of mind as, if one is unable to determine another's communicative intention, it would be difficult to determine relevance or the communicative purpose of an exchange, unless it is explicitly stated. As stated previously in the current section, difficulties with theory of mind could also be related to issues with foregrounding and backgrounding information. The following two subsections discuss two more impairments that also overlap with theory of mind and other previously mentioned difficulties: difficulty with turn taking rules, and difficulties with figurative language.

#### 2.2.1.1 Turn Taking

Difficulty with conversational turn taking has become one of the hallmark linguistic deficits that has been observed in ASD. This phrase however, 'difficulty with conversational turn taking', is vague and different authors have defined different impairments as being under this umbrella term. De Villiers and Szatmari used this term to cover impairments in the rhythm of conversation. They focus on the length of the conversational turns, specifically that people with ASD "are often considered terse, providing polar responses with no supplementary information" (De Villiers & Szatmari, 2004, p. 212). The authors also observe that "interactionally, the expected rhythmic patterns of exchange are not linked to their contexts" (De Villiers & Szatmari, 2004, p. 212). When people are conversing,

there is an expected rhythm between in conversational responses and this can vary by context. The authors propose that people with ASD may not be able to recognize the contextual need for rhythm in responses given in certain contexts and this could appear as an inflexibility in their response patterns in certain situations (De Villiers & Szatmari, 2004, p. 212). Ochs et al. (2004) and Dobbinson et al. (1998) among other features discuss pause lengths, which contribute to the rhythm of conversations. For the purposes of this study, I have focused this section of the literature review on two specific elements of conversational turn taking that can be measured quantitatively and were analysed in this study: interruptions and overlapping speech.

Volden et al. (1997) conducted a study investigating perspective-taking and referential communication in relation to theory of mind. Participants were given a card with two images on it with distinctive features. A ‘listener’ would sit opposite the participant with the same card and then the researcher would raise a divider so the participant could no longer see the card in front of the listener. The researcher would then indicate that one of the images on the participant’s card was ‘the secret one’. The participants would then go through two tasks from the setup described above. The first task, hereafter referred to as the referential task, would involve describing the ‘secret’ image to the listener so that the listener could select the correct image from their card. The second task, hereafter referred to as the perspective-taking task, involved the researcher reciting messages with

an increasing number of attributes and the participant was asked between each message whether the listener knew which image was the secret one to assess whether the speaker had accurately interpreted the listener's perspective (Volden et al., 1997, pp. 185–186). The control group performed at ceiling on the perspective-taking task while the autistic group had a mean score of 87.5% on this same task. Like the perspective-taking task, the control group also achieved a higher mean score on the referential task, than the autistic group achieved (Volden et al., 1997, pp. 189–190). During the course of the study, Volden et al. noted a general observation, separate from the analysed results, that "the autistic group [of participants] displayed several linguistic peculiarities that marked their communicative interactions as being qualitatively different from their age matched and equivalent language level peers" (1997, p. 193). One of the noted differences was that participants with ASD interrupted the flow of their interactions with inappropriate statements more often than NT participants and this behaviour was consistent among the participants with ASD (Volden et al., 1997, p. 193). The study did not report any counts of the numbers of interruptions or otherwise quantify the frequency of the interruptions. No examples of interruptions or any kind of taxonomy of various types of interruptions were presented thus making the researchers' observation difficult to verify.

Dobbinson et al. (1998) sought to qualify and document some of the conversational impairments of autism using conversation analysis (CA). A

researcher met with a 28 year old woman with ASD, named Mary, who had an IQ of 66 and recorded conversations between the two of them. In analysing the conversations, Dobbinson et al. noted about overlapping speech in one of the examined samples: “overlaps do occur, both with [the researcher] and Mary acting as overlapping turn-taker” (1998, p. 123). While this was the case in one sample, in the other three samples, only two uses of this type of conversational behaviour were observed at all, both by Mary. It is important to note here that much of the overlapping behaviour exhibited by Mary was interpreted by the researchers as “either delayed turn completions, or as a type of delayed self-initiated repair” (Dobbinson et al., 1998, p. 123). In these cases, the researcher thought that Mary had finished her turn and then started their own turn, only for Mary to overlap the researcher with more information. This is an interesting conclusion and suggests that people with ASD may have different rules or expectations governing conversational turns than NT interlocutors do.

Ochs et al. (2004) described social deficits observed in autism from an anthropological perspective by studying ethnographic recordings. One of their main areas of study was conversational turn taking in autism. While Ochs et al. contended that previous research into turn taking and autism has shown that

people with autism interrupt others frequently[3] (Ochs et al., 2004, p. 159), this conclusion is not supported by previous work by Tager-Flusberg: "conversational turn taking abilities are not specifically impaired [in autism]" (Tager-Flusberg, 1996, p. 170). Ochs et al. also argued that while some overlapping speech behaviour such as that described by Dobbinson et al. was observed, the majority of overlaps in their data "occurred at projected possible completions for turn-constructional units" (Ochs et al., 2004, p. 161) and thus should not necessarily be considered an impairment or problematic behaviour. In addition, in this study, counts of overlaps were not provided.

Overall, the research into conversational turn taking abilities of people with autism is not extensive and the results seem to be contradictory. This is indicative of the need for more research in this area.

#### 2.2.1.2 Figurative Language

Probably one of the most commonly described pragmatic impairments in ASD is difficulty with figurative language. In studying figurative language, most researchers focus on metaphor and irony (and a subtype of irony, sarcasm). People with ASD are described as being overly literal when faced with figurative

[3] It should be noted that the reference used to justify the statement by Ochs et al. that previous research in ASD has shown that people with ASD demonstrate "failure to use eye gaze to signal turn taking; and frequent interruption of others" (Ochs, Kremer-Sadlik, Sirota, & Solomon, 2004, p. 159) is incorrect. The article that was referenced, *Gaze Behavior: A New Look at an Old Problem* (Mirenda, Donnellan, & Yoder, 1983), does not discuss turn taking or interruptions at all. That article discussed the use of eye gaze in monologues and dialogue situations by both children with ASD and NT children. This was confirmed by the study's first author, Pat Mirenda (personal communication, May 24, 2018).

language (De Villiers et al., 2007, p. 294; Frith, 2003, p. 18; Happé, 1995, p. 275). This impairment has been attributed to difficulties with Theory of Mind and was discussed earlier in detail in Section 2.1.2. Being able to read another's intentions and metarepresentations has been argued to be critical to understanding figurative language (Happé, 1993, 1995). This particular aspect of figurative language has been studied using a combination of theory of mind tasks and metaphor and irony identification tasks, as is the case in Happé (1993, 1995). The results of those studies have supported the general conclusions that first-order theory of mind is required to understand metaphor and second-order theory of mind is required to understand irony. Norbury (2005) argued that theory of mind alone does not explain the results that Happé observed in terms of metaphor comprehension. In her study, she argued that, rather than theory of mind ability, the most important factor in understanding metaphor is actually semantic knowledge (Norbury, 2005, pp. 385–386). Norbury reproduced Happé's study with younger participants and she added a test of semantic word knowledge to the testing battery (Norbury, 2005, p. 389). She then compared the group performances on the theory of mind, semantic knowledge, and metaphor tasks. She found that "children passing first-order theory of mind tasks were no more successful at metaphor [comprehension] than the no [theory of mind] group" (Norbury, 2005, p. 394) contrary to Happé's prediction. Norbury's data showed that semantic knowledge, along with age, were key factors in determining metaphor comprehension and they were correlated,

with participants with higher semantic knowledge, as well as those who were older, achieving higher scores on the metaphor task (Norbury, 2005, pp. 394–395). She concludes by saying that there are several processes that work in synergy to create metaphor understanding such as, contextual processes, world knowledge and experience, and semantic analysis. Usually, all of these factors are correlated with participant age. She argues that it is possible that a deficit in any one process involved in metaphor comprehension, such as theory of mind, could be compensated for by increased ability in the other processes involved (Norbury, 2005, p. 396).

Hermann et al. (2013) conducted a study investigating automatic metaphor processing in AS adults and NT adults. They modified a sentence-verification task, previously used by Glucksberg, Gildea and Booking (1982), and created a metaphor interference task consisting of stimuli sentences varying in literalness and truth being presented to participants word by word. Participants, 20 adults with AS and 20 NT adults, were asked to assess the literal truthfulness of the sentence and their response time was measured. (Hermann et al., 2013, pp. S178–S181). The study found that there was no difference in metaphor interference between AS and control participants, indicating that the early automatic stage of metaphor processing is not impaired in AS (Hermann et al., 2013, p. S182). They also noted that both the AS and control groups took longer to judge sentences that were literally false but metaphorically true than scrambled metaphors (sentences

that are literally false and do not present an understandable meaning) (Hermann et al., 2013, p. S182). This evidence supports their conclusion that automatic metaphor processing is not impaired in AS and may support the argument "that metaphor processing in AS may be less impaired than expected" (Hermann et al., 2013, p. S183).

Zalla et al. (2014) sought to study the effect of occupational stereotypes of the comprehension of irony in adults with HFA, and AS, as well as NT adults. The researchers presented the participants with various stories and the participants were told the occupation of the person telling the story. The occupations presented were ones that had stereotypical reputations as either frequently using sarcasm (e.g. a comedian) or not using sarcasm at all (e.g. a scientist). Participants were then asked a number of questions including a question about the speaker's intent and then they were asked to judge on a rating scale, the level of irony of the story from ironic to polite (Zalla et al., 2014, pp. 3–4). The researchers found that participants with HFA/AS "exhibited no difficulties understanding irony… confirming relatively preserved abilities to perform pragmatic reasoning tasks" (Zalla et al., 2014, p. 6). In addition, participants with HFA/AS were able to identify occupational stereotypes related to sarcasm just as well as NT participants. Interestingly, in contrast to the NT participants, the ASD participants, while able to identify occupational stereotypes, did not integrate this information into the irony comprehension process (Zalla et al., 2014, p. 8). While social

stereotyping is theorized to help and enhance irony comprehension, it is interesting that individuals with ASD in this study did not need to use social stereotyping but they still had no issues with identifying ironic statements.

The studies reviewed above show that the evidence on potential impairments with non-literal language in ASD is contradictory and, for the most part, do not support the notion that non-literal language is impaired in people with ASD. Also of note based on the studies by Norbury (2005) and Zalla et al. (2014), are that the conclusions reached by these studies support the idea that pragmatic skills, specifically regarding non-literal language, are not impaired in ASD but could be different. Norbury argues that more highly developed cognitive abilities in subprocesses involved in metaphor comprehension could compensate for a possible deficit in theory of mind. Zalla notes that people with ASD, unlike NTs, do not use the social stereotyping in the irony comprehension process, yet the results of the ASD participants on the irony comprehension task in that study were comparable to the results of the NT participants. This shows that despite the cognitive differences in how people with ASD and people without ASD process irony, both groups are able to comprehend irony at the similar rates. These contradictions and inconsistencies in the results demonstrate the need for more research into this area and I believe that the methodology presented in this dissertation will assist in addressing this gap in the literature.

## 2.3 Methodologies in Researching Pragmatic Aspects of Communication

Studies investigating pragmatic aspects of communication in ASD tend to follow similar methodologies. The methodologies that have been used have provided a body of research from which to work, however, there are some issues that are not always dealt with in every study. In the subsections below, some of these methodological issues are identified and addressed in studies involving pragmatic aspects of communication in ASD. Studies that are reviewed here are reviewed strictly in terms of their methodology. Their outcomes are already reviewed in sections 2.1 and 2.2.

### 2.3.1 Focus on Interviews Rather than Naturalistic Discourse

Interviews have been a common method of gathering conversational data in clinical populations. Of the 12 studies reviewed earlier in this chapter, whereby conversational data was gathered from participants with ASD, three utilized an interview methodology (Baltaxe, 1977; Dobbinson et al., 1998; Fine et al., 1994), and one used an informal, semistructured, play conversational setting between the researcher and the participant (Baltaxe & D'Angiola, 1992). Some of the remaining studies of pragmatic language and ASD reviewed in this chapter used

an experimental methodology[4] (Happé, 1993; Hermann et al., 2013; Norbury, 2005; Surian et al., 1996; Volden et al., 1997; Zalla et al., 2014), with the potential problems with that type of methodology being discussed in section 2.3.2 below. Others used observation as their methodology (Bernard-Opitz, 1982; Loveland, Landry, Hughes, Hall, & McEvoy, 1988; Ochs et al., 2004). In this section, both interviews and observations as language research methodologies, especially in the context of pragmatics and of disordered speech, are reviewed.

#### 2.3.1.1 Interviews and Observation as Methodologies in Language Research

Interviews have long been a standard methodology in the social sciences and have been frequently used therein (Briggs, 1986, p. 1). Within linguistics, the main sub-discipline to use interviews has been sociolinguistics, "the description and analysis of language use and the way it relates to cultural and social patterns" (Briggs, 1986, p. 15), for determining differences between language varieties as well as to elicit language samples from informants. Briggs (1986) discusses the use of interviews in sociolinguistics based on his own experiences and mistakes while doing sociolinguistic fieldwork in a Spanish-speaking speech community in New Mexico. He argues that while the interview is a useful tool, it is frequently

[4] I use the term experimental in this dissertation to refer to study designs that involve participants actively engaging in tasks designed by the researcher and in which the researcher does not participate and in which there is usually a control group for comparison. This type of methodology is explained in more detail in section 2.3.2.

used without consideration or acknowledgement of its flaws (Briggs, 1986, p. 2). Briggs argues that the shortcomings in using interviewing as a methodology are based on one underlying assumption: “because the interview is an accepted speech event in our own native speech communities, we take for granted that we know what it is and what it produces” (Briggs, 1986, p. 2). Much like with experimental paradigms, which will be discussed in section 2.3.2, interviews gather information based on the questions asked therein. This makes interviews a good way of gathering objective information like facts and reports of experiences, but it can eliminate a lot of the contextual information around these facts and experiences. Briggs argues that this is done for ease of analysis and a native speaker bias on the side of the researcher. These are perhaps not done deliberately, but are inherent to the design of the interview: “Interview data are indeed decontextualized with respect to the social behavior they describe. But interview responses are equally decontextualized; their form and content are shaped to fit the exigencies of the interview situation” (1986, p. 118).

Another issue with using interviews as a methodology for gathering language data is that the interview itself creates a specific power dynamic between interviewer and interviewee. This in turn can affect what language data are presented during the interview or how it is interpreted. In the interview situation, the researcher has a great deal of power. The interviewer decides on the topic of conversation; decides when a response is adequate, by moving on to the

next question if so or rephrasing or repeating the question if not; and creates the textual representations of the interaction. The interviewee is left with little power at all unless they break the frame of the interview and subvert the interview process (Briggs, 1986, p. 56). This power differential alters the fundamental interaction within the interview, distancing it from normal conversation. Gumperz describes the interview setting as "often formal and contrived and almost always quite different from the settings within which people usually interact" (1972, p. 7). He goes on to describe the linguistic data that is gathered via interviews with informants as, in the best case scenario, "samples of a single speech style, generally relatively formal speech. The setting in such interviews tends to reduce to a minimum the very type of linguistic devices by which social meaning is conveyed in normal interaction" (Gumperz, 1972, pp. 23–24). Labov expanded on this thinking in discussing the role of the interview in sociolinguistic research and the data it can produce:

> Interview speech is formal speech – not by any absolute measure, but by comparison with the vernacular of everyday life. On the whole, the interview is public speech – monitored and controlled in response to the presence of an outside observer. But even within that definition, the investigator may wonder if the responses in a tape-recorded interview are not a special product of the interaction between the interviewer and the subject. (Labov, 1972/1997, p. 168)

In his analysis of the nature of research interviews as a methodology, Kvale (2006) combines the above perspectives. Kvale argues that “the interview is neither an open conversation, in the sense on an informal exchange of ideas, nor a dialogue in the philosophical sense of a reciprocal search for true knowledge by egalitarian partners” (Kvale, 2006, p. 486).

Given that interviews are not representative of natural communication, lose much of the contextual information needed to determine pragmatic meanings, and are biased in favour of the interviewer, interviews are less than ideal for investigating pragmatic aspects of language. However, there is another option.

Labov presents naturalistic observation as a methodology alternative to the interview: “One way of controlling for this [the effect of an interaction between the interviewer and the interviewee] is to study the subject in his own natural social context – interacting with his family or peer group” (Labov, 1972/1997, p. 168). In his study, Labov (1972/1997) used covert observation to study the social differences of the distribution of /r/ in New York department stores. He went into department stores that catered to people of different socioeconomic statuses and asked the salespeople for items that would elicit a response including the words ‘fourth floor’ (Labov, 1972/1997). This research design allowed Labov to collect as much natural data as possible as the participants thought that the researcher was an ordinary customer and the participants were not taken out of their natural

environment. Observation has also been used to study pragmatic aspects of language.

Dammeyer (2012) conducted a longitudinal study investigating the pragmatic language development, specifically turn taking and conversational management skills, in young children with cochlear implants. The participants in this study were three young children who had significant hearing loss and had used hearing aids before getting cochlear implants. The study lasted four years and the three children were observed six times each year for the first three years and only twice in the fourth year of the study. These observation sessions lasted 90 minutes and involved two speech language therapists and the children. One of the therapists would video record the session and the other therapist would join the children in their activities. The sessions were not structured and the children were given a number of activities that they could do. The therapists in the sessions did not respond to the children's activities or conversations unless the children asked for help (Dammeyer, 2012, pp. 221–222). Over the course of the sessions, the children's use of gaze behaviour increased and the length of their dialogues increased, however, the participants' pragmatic abilities overall remained minimal (Dammeyer, 2012, pp. 225–226). This study used observation to quantify and analyse the participants' production of pragmatic aspects of language to determine whether cochlear implants aided in the development of pragmatic abilities. This

study involved a nonstandard speech community and so it would be interesting to investigate the implications of using this method for studying ASD.

There is conflicting information on which methodology, if any, is recommended with regard to studying language in people with ASD. Helen Tager-Flusberg, one of the important researchers in the field of language use development in children with ASD, wrote a paper discussing the trials and tribulations of conducting research with this population (2000). She wrote that "in the field of child language, it is generally acknowledged that the richest source of data, especially on productive use of language, comes from spontaneous speech samples" (Tager-Flusberg, 2000, p. 317). She follows this up by saying that the best methods for gathering this type of data are the least structured and the most open-ended, such as observing children interacting with others (Tager-Flusberg, 2000, p. 317). These statements support using observation as a method to study language skills in children with ASD. However, there is a caveat:

> The lack of structure in which natural language samples are typically collected is an especially difficult context for children with autism. Given no constraint or external demand, the autistic child enjoys his or her own isolation and does not spontaneously socially engage with others or communicate much with them. This means that very little language might be gathered using this methodological approach, thereby making the collection of meaningful data very difficult. (Tager-Flusberg, 2000, p. 317)

This statement seems to indicate that observation, while potentially ideal, may not work well with children with ASD and that researchers may need to use another type of methodology. Also, given that she says that children with ASD may not spontaneously engage in speech, her statement seems to imply that a methodology using some sort of language elicitation, such as an interview or structured experiment, might be more effective. Tager-Flusberg goes on to state that other studies, such as Bernard-Opitz (1982), which is reviewed in more detail in section 2.3.4.3 later in this chapter, have demonstrated that conversational context has an effect on the social interactions of children with ASD, namely that children with ASD tend to be more social in a familiar setting and when interacting with familiar people (Tager-Flusberg, 2000, p. 318). She finishes her explanation of social context by stating that "laboratory-based studies using an experimenter as the primary conversational partner will not provide the most accurate portrait of the autistic child's linguistic capabilities" (Tager-Flusberg, 2000, p. 318). This statement contradicts the idea of interviews or experimental studies as being an alternative approach to observation and leaves the overall message inconsistent. She concludes her article by saying that a combination of approaches would be less vulnerable to some of the discussed pitfalls of using individual methods in isolation. However, she concedes that, for future research, new and novel methods for studying language in ASD will have to be developed (Tager-Flusberg, 2000,

pp. 227–228), giving the impression that none of the methods available are truly adequate to the task of studying language in children with ASD.

As discussed in this section, the interview is a common research method in linguistics, and while it has its uses, gathering pragmatic language data is not one of the types of data for which the interview is well suited.

### 2.3.2 Experimental Studies

Many language studies use experimental paradigms and focus on how participants react to a variety of stimuli. These experimental studies are usually done by bringing participants to a location, usually a clinic, or a lab at a university or hospital. Participants are then instructed on what they need to do on the task that they will be performing by a member of the research team. The participants then engage in the experimental task. The information gathered in these types of studies is limited by the experimental paradigm used, stimulus design, and experimental questions being asked. This approach can lead to a focus on comprehension of language, rather than production of language. When describing performative language abilities, such as in pragmatics, it is essential to look at both sides; just because someone can understand and properly interpret something, does not mean they would ever say it in the normal course of conversation. The studies discussed below all used experimental paradigms and focused on comprehension of language rather than production.

In her study, Happé (1993) ran two experiments. In the first experiment, Happé presented participants with a series of sentences and a list of words and the participants were asked to finish each sentence with one word from the list. This was done 3 times, each with a different set of sentences and list of words to test comprehension of three types of language use: synonyms (used to test the participants overall understanding of the task), similes, and metaphors. In the second experiment, participants were provided with stories and were asked follow-up questions to determine whether they understood ironic and metaphorical statements used in the story (Happé, 1993, pp. 106–107). These tasks were designed with comprehension in mind and tested the ability of people with ASD to understand figurative language and by extension, their theory of mind ability.

Surian et al. (1996) investigated whether people with ASD could detect violations of conversational maxims. The researchers scripted and recorded 27 conversational exchanges. In each exchange, one speaker would ask a question and the two remaining speakers would answer. One of those answers would always contain a maxim violation. Participants were shown three dolls who were portrayed as the speakers on the tape. Participants were played each exchange and were asked to point to the doll who said something ‘funny’ as a way of indicating the speaker who violated the maxim with their answer (Surian et al., 1996, pp. 61–63). Participants were also administered a false belief task to assess their

theory of mind ability. This was the Sally-Ann task, whereby a puppet named Sally hides a marble in a box and leaves. A puppet named Ann moves the marble to the basket while Sally is gone. When Sally comes back, the participant is asked where Sally will look for the marble, with the correct answer being the box (Surian et al., 1996, p. 63). These tasks are completely based on comprehension as the children are asked to respond to the conversational exchanges attributed to the puppets placed before them based on their understanding of the verbal exchanges presented.

Norbury (2005) as discussed previously, wanted to replicate Happé's earlier study (1993) about theory of mind and figurative language use but wanted to investigate whether other factors were involved in metaphor comprehension than just theory of mind. All participants were administered a standardized test that measured word knowledge, along with a theory of mind task, and a metaphor comprehension task. The test of word knowledge contained two receptive subtests, one for synonyms whereby participants had to identify the word closest in meaning to another word from a list of four, and another for figurative language whereby the participants had to select the most appropriate interpretation of an idiomatic phrase from a list of four possible interpretations. The test also contained two expressive subtests, asking participants to provide definitions for words, and asking participants to state two possible meanings of ambiguous words in context. The theory of mind task used in this study involved presenting

the participants with two stories. Each story had two questions that were asked to evaluate first-order theory of mind and two questions evaluating second-order theory of mind (Norbury, 2005, p. 389). The metaphor task that the researchers administered to the participants was adapted from Happé (1993) described earlier in this section. Norbury's adapted metaphor task contained several important differences from Happé's. Norbury mixed the conditions rather than presenting them in distinct sets and items were randomly ordered and presented in a single sitting to avoid response bias. The materials were also written with a simpler vocabulary. Lastly each sentence had four words that could be used to complete it (Norbury, 2005, p. 390). This was done to prevent participants from using the process of elimination to complete the task correctly as in Happé six words were provided to complete five sentences (Happé, 1993, pp. 106–107; Norbury, 2005, p. 390). All of these tasks predominantly test the participants' comprehension of language use and pragmatic aspects of communication.

Zalla et al. (2014) gave participants stories and told them who the speaker was and what their occupation was. The occupations used were ones that had been previously determined through a pilot study to be either prone to using sarcasm and irony or not prone at all to use sarcasm or irony. Participants were asked questions on each of the stories including one relating to the speaker's intent. Participants were also asked to rate the stories in terms of multiple factors such as mockery and politeness.

All of the above studies in this subsection focused almost exclusively on the ability of people with ASD to comprehend pragmatic uses of language. None of the above studies looked at pragmatic aspects of language production; however one of the studies has made conclusions about language production based on the authors' findings related to comprehension. Surian et al. stated:

> Children with autism failed to distinguish a rude response from a polite one. This suggests that when rude or awkward utterances are produced by children with autism, these are due to a competence deficit in the domain of politeness rather than motivational factors, as suggested by Baltaxe (1977). (1996, p. 66)

Surian et al. (1996) were studying whether children with ASD could identify violations of Gricean maxims. They did not collect any conversational data from their participants. Thus, their suggested conclusion about children with ASD producing rude utterances just because they were not able to identify violations of the maxim of politeness beyond a level of chance is speculative at best. It is possible that Surian et al. based this conclusion on two examples presented in the paper by Baltaxe, however, there are too many unknowns to properly examine those examples. The examples in question are presented with no context and Baltaxe also acknowledges that the responses could have multiple interpretations, including echolalia, as well as rudeness (Baltaxe, 1977, p. 179). While language comprehension and language production are deeply related processes, if a data-

driven study is only focused on one of these processes, it is not necessarily appropriate to expand the conclusions to the other process.

### 2.3.3 Use of Dyads vs. Triads

Conversational studies, both interviews and studies in other formats, are frequently done as dyads, with only two active participants. While this approach can be easier to perform and could be very useful when studying certain features of communication, it is not the only approach that can be used and, in fact, in some cases, may not be the best choice for studying other conversational features. Dyadic interactions, especially in the context of an interview, have a predictable format (Interlocutor A, Interlocutor B, Interlocutor A, Interlocutor B, etc.) and this format may limit some conversational constructions and emphasize others. Susan Ervin-Tripp (1979) sought to describe the turn taking behaviour of children based on analysis of a corpus of transcribed conversations between children and conversations between children and adults. She made a number of predictions on what types of communicative behaviours would be observed based on the number of participants in each conversation. In terms of dyadic communication, she predicted: “We would expect to find more turn-relevant interruptions (since processing should improve), some overlaps due to anticipation rather than to processing delays, remedial repetitions by interrupted children, and more acknowledgement overlaps” (Ervin-Tripp, 1979, p. 396). In terms of triads, she

predicted: “When there are peer competitors vying for a third addressee, there is no utilitarian reason to avoid interruption. In the case of a third child attempting to interrupt an older dyad, there may be a serious difficulty in monitoring the speech in the dyad well enough to identify turn-relevant points” (Ervin-Tripp, 1979, p. 396). In terms of the results from her study, she noticed a number of interesting differences in the conversational behaviour of children in dyadic and triadic conversations. Firstly, the data of this study showed that there was a greater likelihood of observing overlaps in triads (Ervin-Tripp, 1979, p. 398). Secondly, the data also showed that interruptions made by young children were appropriately timed only 25% of the time in dyads and 12% of the time in triads (Ervin-Tripp, 1979, p. 398). Lastly, the data showed that, in general, children were better at completing other interlocutors’ sentences through use of an interruption in dyads rather than triads and as they got older. This practice of completing other interlocutors’ sentence through use of an interruption will be referred to as ‘latching’ in the remainder of this section and will be defined and discussed more thoroughly in the next chapter of this thesis. Among the children in the study who were younger than four and a half years, the success rate of latching was 16% in dyadic interactions and 7% in triadic interactions. Among children older than four and a half years and younger than six years, the success rate of latching was 30% in dyadic interactions and 12% in triadic interactions (Ervin-Tripp, 1979, p. 398).

Another difference that has been noted in the literature on conversational turn taking is that dyadic conversations tend to be shorter than triadic ones beyond the obvious fact that three people take longer to complete a conversation than two people. In a study by Barton and Tomasello (1991), parents were observed interacting with one of their children, with the other child, and then with the two of their children together. The average length of the conversations, measured in turns, was much higher during the triadic conversations, rather than the dyadic ones and the difference was statistically significant (Barton & Tomasello, 1991, p. 522). Also, while Barton and Tomasello acknowledge that in dyadic conversations the number of turns taken by each participant will be close to, if not equal to, 50%, due to the alternating nature of the conversation, this was not the case in the triadic conversations (Barton & Tomasello, 1991, p. 522). The researchers found that all participants took significantly more turns when in a triadic conversation, compared to a dyadic one, making for longer and more structurally complex conversations (Barton & Tomasello, 1991, p. 523). While the researchers could not say definitively what caused this result, one hypothesis they presented was that in a triadic conversation, there is less pressure on each participant and thus, if a participant is not comfortable they may opt out, and let the other participants talk amongst themselves, until they have something they want to contribute, at which point they can opt back in. This is in contrast to dyads whereby half of the conversational weight is borne by each participant and if one participant is unable

or unwilling to contribute, the conversation can break down (Barton & Tomasello, 1991, p. 526). If the researchers' hypothesis is correct, this would indicate that there is more pressure and possibly stress in dyadic conversations and this may affect how the participants behave in the conversation.

In terms of the studies reviewed previously in this chapter that have gathered conversational data to investigate pragmatic uses of language and ASD, all seven studies were formatted in terms of dyads. Four of these studies (Baltaxe & D'Angiola, 1992; Bernard-Opitz, 1982; Loveland et al., 1988; Ochs et al., 2004) did not use interviews as their research method. In the case of the Ochs et al. study, the researchers did analyze data that was gathered by Dobbinson et al. (1998) via interviews. For the remainder of this section, I will be addressing the Ochs et al. study without considering the data analyzed from Dobbinson et al. as it was gathered using a different method than that of Ochs et al. The other three studies (Baltaxe, 1977; Dobbinson et al., 1998; Fine et al., 1994) all gathered their conversational data via interviews. The studies previously reviewed in this chapter that were not mentioned in this section did not gather conversational data. They were primarily experimental studies using specific stimuli to test various aspects of pragmatic use of language in ASD.

As can be seen based on the results found in the studies reviewed above, there are substantial differences in the types of communicative behaviours and pragmatic uses of language that can be observed in dyads compared to triads.

Given that none of the studies reviewed in the section gathered conversational data from participants with ASD in triadic settings, this leaves a significant gap in the research of conversational turn taking abilities in ASD.

### 2.3.4 Focus on Children versus Adults

Children tend to be the focus of many of the studies around pragmatic uses of language and ASD. Part of the reason for this is likely ease of recruitment given that treatment programs and other services for adults[5] with ASD are still rare (Howlin & Moss, 2012). Another contributing factor for the focus of studies on children could be the general awareness of the existence of diverse ASD populations. Kanner's original study identifying autism in North America focused exclusively on children, while Asperger's paper identified adult patients as well as children (Howlin & Moss, 2012, p. 275). Asperger's paper, which was originally published in German, did not receive much attention in North America until the paper was described in English by Lorna Wing (1981). It was subsequently translated into English and republished by Uta Frith (Asperger, 1991), and Asperger syndrome was added to the DSM-IV (American Psychiatric Association, 1994, p. 75). That having been said, until the DSM-5 when ASD was categorized as a neurodevelopmental disorder, ASD was categorized instead as a disorder "usually first diagnosed in infancy, childhood, or adolescence" (American

[5] I define adult in this section in chronological terms, with an adult being 18 years of age or older.

Psychiatric Association, 2000, p. 39). It should be noted that the APA stipulates that this classification "is for convenience only and is not meant to suggest that there is any clear distinction between 'childhood' and 'adult' disorders" (American Psychiatric Association, 2000, p. 39). The fact that Kanner's paper was more widely available earlier and that it only contained descriptions of children with ASD, it is possible that the idea of adults with ASD may have lagged behind, which may have contributed to the focus on children, especially in earlier studies. The remaining part of this subsection will be divided into three main categories: pragmatic language studies with only child participants, pragmatic language studies with both child and adult participants, and pragmatic language studies with only adult participants. Relevant issues with each category of study will be addressed in their respective subsections. Table X below also summarizes the information about the participants in the studies reviewed in the following sections.

*Table 2.1 - Summary of Participant Ages by Study*

| **Study**[6] | **Total Number of Participants** | **Participant Age Range (in years)** |
|---|---|---|
| Bernard-Opitz (1982) | 1 | 8 |
| Loveland et al. (1988) | 36 | 2-13 |
| Baltaxe and D'Angiola (1992) | 26 | 3-8[7] |
| Surian et al. (1996) | 24 | 6-13[7] |
| Norbury (2005) | 94 | 8-15 |
| Baltaxe (1977) | 5 | 14-21 |
| Happé (1993) | 32 | 9-38 |
| Volden et al. (1997) | 20 | 13-24 |
| Ochs et al. (2004) | 16,1[8] | 8-12,28[8] |
| Dobbinson et al. (1998) | 1 | 28 |
| Hermann et al. (2013) | 40 | 22-68 |
| Zalla et al. (2014) | 34 | 18-47 |
| Fine et al. (1994) | 75 | 7-32 |

#### 2.3.4.1 Child Participants Only

Bernard-Opitz (1982) studied the pragmatic language use of one eight-year-old boy with ASD. The participant in this study had an IQ ranging from 61 to 65 depending on the test used. The participant "was selected because of obvious discrepancies between sufficient skills in semantics and syntax, and poor language use; though there were only minor phonological, syntactic or semantic problems, his linguistic performance was poor" (Bernard-Opitz, 1982, p. 101). The child

[6] The studies are listed in the order they are reviewed in this section.
[7] The range of ages was not reported in this study. The range shown here is of the mean ages of the three participant groups in the study.
[8] This study included qualitative data in their analysis from Dobbinson et al. (1998). The numbers after the commas for both number of participants and age range represent the participant data from Dobbinson et al. (1998).

was recorded interacting with his mother, as well as a stranger, and the clinician in different conditions to observe his communicative behaviours. In this study, Bernard-Opitz sought to describe the participant's use of communicative acts (responses, statements, and requests) as well as how the usage might change according to the communicative partner. Bernard-Opitz found that the participant was far more verbally interactive with his mother or other familiar adults, than with strangers (Bernard-Opitz, 1982, p. 103). The participant also varied his speech acts in the various experimental conditions (Bernard-Opitz, 1982, p. 107).

Loveland et al. (1988) sought to observe and describe pragmatic deficits in autistic children, with particular focus on speech acts . The authors recruited a total of 36 children, ranging in age from 2 to 13 years old, for the study and separated them into three groups: children with ASD, children with a developmental language delay (DLD), and NT children. In their study, children were video-recorded interacting with one of their parents in a free-play scenario with toys available. The researchers coded for different types of speech acts used by the parents and the children as well as for gestures used. The researchers found that compared to the children from the NT and DLD groups, children with ASD were less likely to respond to adults initiating communication and using gestures. The children with ASD in the study also produced fewer communicative acts overall and initiated less frequently than children from the NT and DLD groups (Loveland et al., 1988, p. 600).

Baltaxe and D'Angiola studied "10 autistic, 8 normal, and 8 specifically language-impaired children" (1992, p. 5). The NT children were recruited from a nursery school, the SLI children were recruited from a specialized program in the local public school system and the ASD children were recruited from a specialized treatment centre (Baltaxe & D'Angiola, 1992, p. 5). Semi-structured play sessions between each child and the same researcher were audio recorded and transcribed for analysis. The results of this study were reviewed in section 2.2.1 above.

Surian et al. (1996) investigated whether children with ASD had mindreading abilities. They tested children with ASD, children with SLI, and NT children in order to identify violations of conversational maxims, as proposed by Grice (1975). The researchers recruited eight children for each group (Surian et al., 1996, pp. 59–61). These children were then presented a pragmatic task wherein they were shown 3 dolls and told that one would always say something 'funny' (in actuality it was a violation of a Gricean maxim). The participants were then played pre-recorded exchanges, each involving one speaker violating one of the Gricean maxims, and then asked to point to the doll that said something 'silly'. After that, the children were given a false belief task, the Sally-Anne task, to assess their theory of mind abilities (Surian et al., 1996, pp. 61–62). The results of this study were reviewed in section 2.2.1 above.

Norbury (2005) sought to replicate Happé's earlier study (1993) with some modifications to distinguish metaphor identification from theory of mind ability. She recruited 94 children between 8 and 15 years of age. She then tested each participant's semantic knowledge and gave each participant a theory of mind task and a metaphor task. It is important to note that while this study was attempting to replicate Happé's earlier study, Happé had both adult and child participants in her study. The results of this study were reviewed in section 2.2.1.2 above.

When looking at these studies together, one of the major issues is the generalizability of the results from studies involving only child participants. In terms of being able to generalize the results to the adult population, the fact that the above studies were only done with children means that they can only truly be generalized to the greater child population. This is not necessarily a problem, except that it highlights a major hole in the current research on pragmatic aspects of language use in ASD: a lack of empirical studies of pragmatic language use involving adult participants. Using studies involving children to inform about the language skills of adults is tricky because language skills are still developing, especially pragmatic skills, and these skills may change by adulthood or in adulthood. I will be addressing studies that include adult participants as well as children in section 2.3.1.2 and studies including exclusively adult participants in section 2.3.1.3 as they have some issues of their own.

#### 2.3.4.2 Child and Adult Participants

Baltaxe (1977) sought to describe some of the pragmatic language use by participants with ASD and the deficits therein. She recruited for her study 5 verbal male autistic participants ranging in age from 14 to 21 years. The participants were from middle-class backgrounds and lived at home with their parents. Their IQ ranged "between 86 and 118 as measured by Wechsler intelligence tests" (Baltaxe, 1977, p. 177). The participants then engaged in an informal but structured interview. The interviews were audio recorded and transcribed. The results of this study were reviewed in section 2.2.1 above.

Happé (1993) investigated differences in levels of theory of mind and how those differences might have affected comprehension of different types of figurative language. She recruited 18 people with ASD ranging in age from 9 to 28 years. They were split into three groups of 6 participants each based on their level of competence at theory of mind tasks: participants who performed poorly on all theory of mind tasks, participants who performed well on first-order theory of mind tasks but poorly on second-order theory of mind tasks, and participants who performed well on both first- and second-order theory of mind tasks. The verbal IQ of the ASD participants ranged from 52 to 101. She also recruited 14 participants with moderate learning difficulties to be the control group and their verbal IQ ranged from 40-89 (Happé, 1993, pp. 104–105). The participants then were given a sentence completion task to determine the difference between simile

and metaphor comprehension, whereby they had to complete five sentences with a single word out of six words they were given. Each participant had to conduct this task three times, once per condition: metaphor, simile, and synonym selection. The participants were also given another task to compare their understanding of metaphor to their understanding of irony. In this task, participants were given a number of stories and in each one were asked questions to determine whether they understood metaphorical and ironic elements of the text. The results of this study were reviewed in section 2.1.3 above.

Volden et al. (1997) sought to investigate perspective-taking skills and referential communication skills in autism. The researchers recruited 10 autistic participants and 10 NT participants. The autistic participants ranged in age from 13 years and 6 months to 24 years and 4 months. The NT participants ranged in age from 13 years and 1 month to 24 years and 4 months. The autistic participants underwent assessment of their verbal IQ and the results ranged from 81 to 111 (Volden et al., 1997, p. 184). It is important to note that the NT participants were not assessed on verbal IQ: “Normally developing subjects were described as ‘average’ by parents and teachers, so it was assumed that chronological age equaled language age for the normally developing subjects. The groups were selected to be similar in terms of verbal IQ.” (Volden et al., 1997, p. 184). While the NT participants may have been described as average by parents and teachers, given that verbal IQ was the matching criterion for this study, the NT participants

should have been assessed for verbal IQ the way the autistic participants were to ensure that the verbal IQs were indeed comparable. The results of this study were reviewed in section 2.2.1.1 above.

Ochs et al. (2004) sought to create an anthropological account of ASD by conducting an ethnographic and clinical study. In their study, the researchers recruited 16 children with ASD between the ages of 8 and 12 who were diagnosed with HFA or AS (Ochs et al., 2004, p. 149). The children were also assessed for IQ (with their results being within the normal range), first- and second-order theory of mind. The children's everyday interactions with family members and others were video- and audio-recorded and analyzed using an ethnographic framework (Ochs et al., 2004, p. 149). In addition to the child participants, conversational data from the adult participant who was the subject of the study by Dobbinson et al. (1998) was included in some of the qualitative analysis (Ochs et al., 2004, p. 161). The study will be explained in more detail in section 2.3.1.3. This participant, named Mary, was 28 years old, had been diagnosed with autism and was assessed as having IQ of 66 (Dobbinson et al., 1998, pp. 115–116). The results of these studies were reviewed in section 2.2.1.1 above.

One study that stands out from the others reviewed in this section in terms of addressing participant age is Fine et al. (Fine et al., 1994). Fine et al. (1994) investigated the use of cohesive ties and reciprocity in conversation by mostly children with ASD. The researchers recruited a total of 23 children with AS, 18

people with HFA, and 34 ‘outpatient controls’ (children with social impairments and psychiatric diagnoses but none that would be expected to affect communication). The age of the participants in the AS and control groups ranged from 7 years to 18 years, while the age of the participants in the HFA group ranged from 7 years to 32 years. No participants who had a history of brain damage were admitted (Fine et al., 1994, pp. 318–319). Each participant was interviewed by a clinical psychologist, blind to the nature of the study. The interviews were loosely structured and they were audio recorded and transcribed for analysis (Fine et al., 1994, p. 319). The results of this study were reviewed in section 2.2.1 above. Regarding the age of the participants in this study, it should be noted that the HFA group’s participants were older (average age 22.8 years) than the participants in the AS and control groups (average ages 14.3 years and 13.7 years respectively (Fine et al., 1994, p. 320). This presents a confound, especially considering the results of Norbury (2005), discussed in section 2.2.1.2, which showed that age can be a significant factor in certain pragmatic language skills. One of the conclusions of this study was that the HFA group used a similar amount of unclear references as the control group and that the AS group used far more unclear references than the HFA and control groups (Fine et al., 1994, p. 326). Given that unclear references are those that are ambiguous or that refer to additional information that may not have been provided, it is possible that the lower usage of this type of reference could be due to age and experience in

communication. That said, the authors acknowledged this confound to ensure that readers would not misinterpret the results: “It is also important to remember that the autistic subjects in this study were all high functioning… and were, on average, older than the other two groups” (Fine et al., 1994, p. 327).

In general, studies with both children and adults could potentially be generalized to both populations as none of the studies, apart from Ochs et al. (2004), split their samples into children and adults. In the case of Ochs et al. (2004), while they included the data of an adult from Dobbinson et al. (1998) in the qualitative analysis, they did not include that data in their conclusions. However, in a few of the reviewed studies, there is another factor to consider: participants’ IQ. In the study by Happé (1993), all participants in the ASD group who failed both the first-order and second-order theory of mind tasks and at least some participants from the moderate learning difficulties group had verbal IQs in a range that could indicate intellectual disability. This was defined recently in the DSM-5 as having an IQ ranging from 65-75 and below (American Psychiatric Association, 2013, p. 37). The average verbal IQ for the group of ASD participants described above was 62.3 and the range of verbal IQ scores was 52-76. The average verbal IQ for the moderate learning difficulties participant group was 55.6 and the range was 40-89. Also, while the average verbal IQ for the other two ASD groups in the study was above the guideline for a diagnosis of intellectual disability, some of the participants in these groups would also qualify

for a diagnosis given the range of verbal IQs reported: 64-100 for the ASD group who failed only second-order theory of mind tasks, and 58-101 for the ASD group who did not fail any theory of mind tasks (Happé, 1993, p. 105). Also, in Ochs et al. (2004), the adult participant whose data was included in the qualitative analysis also had an intellectual disability. Because of this, these studies cannot be properly generalized to all adults with ASD and therefore also not all people on the autism spectrum. Moreover, these studies only represent a part of the spectrum: the part that does not fit the criteria of 'high-functioning'. Again, as long as this fact is acknowledged, a limited generalization to a specific sub-section of a community is not necessarily a problem.

#### 2.3.4.3 Adult Participants Only

Dobbinson et al. (1998) sought to describe the conversational experience of interacting with an adult with autism using Conversational Analysis (CA). The participant, who was named Mary, was 28 years old when the conversation took place and had been diagnosed as having autism at the age of 6 years. She was also assessed as having an IQ of 66 using the WAIS-R (Dobbinson et al., 1998, pp. 115–116). Mary was interviewed by one of the researchers at the residential centre where she had been living for an extended period of time and the interviews were planned to be as informal as possible. The conversations were audio-recorded,

with some being video-recorded, and transcribed using CA conventions (Dobbinson et al., 1998, pp. 116–117).

Hermann et al. (2013) sought to study whether people with AS process metaphors automatically and whether they display an interference effect when processing metaphors. The participants were 20 people with a diagnosis of AS and 20 NT people. The participants ranged in age from 22 to 68 years old. The control participants tended to be younger; the average age of control participants was 35.1 years while the average age of the participants with AS was 42.4 years. This difference in participants' ages was statistically significant. Both groups of participants were assessed with two different IQ tests and the results for both groups of participants were not statistically significant (Hermann et al., 2013, p. S179). All participants were then presented with a metaphor interference task, previously described in section 2.2.1.2, a passive recall task, and a self-assessment questionnaire about the participants' perceptions of their ability to comprehend non-literal language (Hermann et al., 2013, p. S180).

Zalla et al. (2014) investigated whether adults with ASD used occupational stereotyping to aid in the comprehension of irony. The researchers recruited 17 participants with ASD, 6 with a diagnosis of HFA and 11 with a diagnosis of AS. The researchers also recruited 17 NT participants to match the ASD group in terms of age, level of education, verbal IQ and performance IQ. The average age of the ASD participants was 27.3 years and the average age of the NT participants

was 30.1 years. The average number of years of education was 13.4 for the ASD participants and 13.5 for the NT participants. The average verbal IQ for the ASD participants was 99.3 and it was 96.2 for the NT participants. The average performance IQ for the ASD participants was 90.7 and 95.9 for the NT participants (Zalla et al., 2014, p. 3). Participants were individually tested by being given stories and being told the occupation of the storyteller. The rest of the experiment's procedure was described previously in section 2.2.1.2.

The studies described in this subsection have focused on adults. Beyond Dobbinson et al. (1998) the other two studies have looked at adults of average or above average IQs. It is interesting to look at the timing of these studies. The first studies described above involving just child participants or child and adult participants were published in the 1970s and 1980s but the first study described above that involved adult participants with average IQ was not published until 2013. This is in line with the recent changes found in the DSM-5, acknowledging that ASD continues throughout the lifespan as described in section 2.3.1. Also, the difference in volume of studies demonstrates the need for more research on the pragmatic abilities of adults with ASD. Compared to the three studies using adult participants, there are ten that focus primarily on children or use a combination of adult and child participants. As children grow into adults, their language abilities change and develop, however, as much of the research on pragmatic abilities in

ASD is focused on children, this creates a large gap in the knowledge of pragmatic language use in ASD when it comes to adults.

### 2.3.5 Social Determinants of Language

The final aspects of the methodologies used to investigate pragmatic uses of language in ASD that I shall be reviewing here are social determinants of language. There are many different social factors that affect pragmatic language use; the two I will be focussing on below are culture and ethnic background of the interlocutors on the one hand, and gender of the interlocutors on the other hand.

#### 2.3.5.1 Culture

While it is widely accepted that individual languages have differing characteristics in terms of their structure, many theories about pragmatic uses of language have been argued to be universal, while, in fact, they tend to be ethnocentric, usually based on English (Wierzbicka, 2003, p. 25). One example of this is speech act theory. As an example, Wierzbicka presents a quote from Clark and Schunk:

> When people make requests, they tend to make them indirectly. They generally avoid imperatives like *Tell me the time,* which are direct requests, in preference for questions like *Can you tell me the time?* or assertions like *I'm trying to find out what time it is,* which are indirect requests. (Clark & Schunk, 1980, p. 111)

Wierzbicka argues that "it is clear that these authors have based their observations on English alone; they take it for granted that what seems to hold for the speakers of English must hold for 'people generally'" (Wierzbicka, 2003, p. 25). Wierzbicka then uses examples from Polish to demonstrate how these concepts of indirectness of requests being polite are far from universal. She continues: "English has developed some special grammatical devices in which the interrogative form is normally used not for asking but for making an offer, a suggestion or proposal" (Wierzbicka, 2003, p. 27). One of these grammatical devices is the construction 'How about a NP'. A functionally equivalent construction in Polish would not have a distinct form from a genuine question, apart from intonation (Wierzbicka, 2003, p. 27). English and Polish also differ in terms of interrogative offers:

> In English, a tentative offer (even a very informal one) tends to refer to the addressee's desires and opinions … The phrasing of such offers implies that the speaker is not trying to impose his will on the addressee, but is merely trying to find out what the addressee himself wants and thinks. (Wierzbicka, 2003, p. 28)

A literally equivalent construction would not work in Polish culture:

> The English question *Are you sure?*, so often addressed by hosts to their guests, sounds comical to the Polish ear: it breaks the unwritten law of Polish hospitality, according to which the host does not try to establish the

> guest's wishes as far as eating and drinking is concerned by tries to get the guest to eat and drink as much as possible (and more). A hospitable Polish host will not take 'No' for an answer; he assumes that the addressee can have some more, and therefore that his or her resistance (which is likely to be due to politeness) should be disregarded. (Wierzbicka, 2003, p. 28)

This discrepancy in how requests are formed and used in these two cultures is not based on differences between the English and Polish languages at a structural level, but by a difference between cultures. In addition to speech acts, politeness—in the form of face theory from Brown and Levinson (1978)—may be differently valued across cultures and situations, as has previously been argued by Ervin-Tripp:

> While every society probably has evidence of both types of politeness, it is at least a reasonable hypothesis that there are contrasts between societies both in the normal style for stranger talk and in expected styles between friends…. A culture that emphasizes negative politeness would, in the extreme, lead to turn rules like those in Congress, in which it is possible to talk without being listened to, and to speak without any contingent relevance to one's predecessor's speech…. At the opposite extreme, in a society or interpersonal situation emphasizing more heavily positive affect, we might expect that emotional support and empathy would be emphasized, having as a realization indicators of relevance,

> acknowledgements, involvement to the point of intrusions, simultaneous completions, accelerating pace, agreements, corrections, repetitions. (Ervin-Tripp, 1979, p. 394)

The works reviewed above show that some different elements of pragmatics may be affected by culture. People who grow up in different cultures may find that they have idiosyncrasies in how they communicate with each other and these idiosyncrasies can affect pragmatic uses of language.

One key element of pragmatics that can be affected by cultural differences is turn taking and various elements thereof, such as interruptions. Murata (1994) studied differences in the use of and interpretation of interruptions in English and Japanese native speakers and also between English and Japanese native speakers. The researcher recruited seven students enrolled in a pre-university Japanese language course in London (five females, two males), two native English speakers who were post-graduate students (one male, one female), and two native Japanese speakers who were post-graduate students (one male, one female). Participants were arranged into a number of dyads and 15 minute long conversational sessions were recorded. There were seven native speaker of English to Japanese speaker of English dyads (NSE-NSJ), seven native speaker of Japanese to native speaker of Japanese dyads (NSJ-NSJ), and two native speaker of English to native speaker of English dyads (NSE-NSE) (Murata, 1994, p. 391). Murata found that the average number of interruptions was highest in the NSE-NSE dyads (7.0) and lowest in

the NSJ-NSJ dyads (1.57). The average number of interruptions in the NSE-NSJ dyads was 3.43 (Murata, 1994, p. 392). These differences in the average number of interruptions observed are interesting given their wide disparity. Even more interesting is the breakdown of the types of interruptions that were observed. Comparing the use of intrusive-type interruptions to co-operative-type interruptions, co-operative-type interruptions were seen more frequently than intrusive-type interruptions in the NSJ-NSJ dyads and the opposite was seen in the NSE-JSE dyads. The NSE-NSE dyads were split evenly between the two types of interruptions. When broken down even more, out of three types of intrusive interruptions –topic-changing, floor-taking, and disagreements–, only floor-taking interruptions were observed in the NSJ-NSJ dyads (Murata, 1994, p. 393). In reference to the lack of interruptions observed in NSJ-NSJ interactions, Murata argues that:

> The very rare occurrence of intrusive interruptions in the NSJ-NSJ interactions does not seem to be a coincidence. It may reflect a traditional Japanese attitude towards conversation: one must not start talking before the conversational partner has completed his/her utterance, especially when one is talking to one's senior. (Murata, 1994, p. 393)

Referring to the lack of intrusive interruptions, Murata explains that the perceptions of interruptions can vary by culture:

> The use of intrusive interruption can be differently perceived across cultures. Intrusive interruption tends to be interpreted positively, as showing the interlocutor's involvement and participation in conversation, in a society where the 'co-operative imperative', 'solidarity', and 'involvement' are highly valued. On the other hand, in a society where the 'territorial imperative', 'deference', or 'independence' are more valued, the use of [intrusive interruption] may be considered rude or too aggressive. We may, then, assume that this difference in value may have influenced the conversational style of the people in our study. (Murata, 1994, p. 394)

The fact that differences in frequencies of interruptions as well as differences in the distribution of the types of interruptions differed depending on the cultural background of the conversant demonstrates that pragmatic uses of language may not be universal and cultural differences should be accounted for in studies of pragmatic uses of language. In only one of the seven conversational studies involving participants with ASD reviewed in this chapter was the ethnic background of the participants reported. Baltaxe (1977) noted about her participants that they all came from a "middle class white background" (1977, p. 177). Beyond that, however, no further details on the participants' cultural or linguistic backgrounds were provided. The other six conversational studies involving participants with ASD reviewed in this chapter (Baltaxe & D'Angiola,

1992; Bernard-Opitz, 1982; Dobbinson et al., 1998; Fine et al., 1994; Loveland et al., 1988; Ochs et al., 2004) did not address the cultural background of the participants, so it is unclear whether the participant groups were culturally homogenous or whether the results may have been affected by the cultural heterogeneity of the participant groups. This is surprising as most experimental research that focuses on communication includes additional social information on the participants including cultural, ethnic, or socio-economic factors that apply to the participants.

#### 2.3.5.2 Gender

There is an established sex disparity in ASD, with it being more common in men than in women. While the exact ratio is unknown and reported ratios have varied over time, the current ratio is thought to be at least 2:1 - 3:1 men to women (Halladay et al., 2015, pp. 1–2). The exact reasons for this sex disparity are as yet unknown; there are also features of ASD that are less prominent in women compared to men. Girls with ASD show increased functional social behaviour, less repetitive behaviours than boys with ASD (Halladay et al., 2015, p. 2). In addition, the repetitive behaviours that have been observed in girls with ASD are different (Halladay et al., 2015, p. 2). Halladay et al. provide an example of the repetitive behaviour of a woman with ASD: “A young woman with autism noted that carrying several well-worn books everywhere she goes, and constantly

reading them to the detriment of all other social interactions, may be a repetitive behavior that goes undetected" (Halladay et al., 2015, p. 2). Also, girls with ASD may have a circumscribed interest in dolls (Halladay et al., 2015, p. 2). These sorts of behaviours would likely go unnoticed or misinterpreted by a clinician or parent and this suggests that girls with ASD may be under diagnosed due to their differing symptom presentation compared to boys with ASD (Halladay et al., 2015, p. 2). Given that women with ASD are usually more social than men, and the different presentation of symptoms, diagnosis may be delayed or missed altogether and this may account for the abundance of male participants for research into ASD. Of the seven conversational studies reviewed previously in this chapter, two studies had no female participants (Baltaxe, 1977; Bernard-Opitz, 1982). Two studies did not break down their participants in terms of gender (Baltaxe & D'Angiola, 1992; Ochs et al., 2004) making it impossible to know the genders of the participants whose utterances were analyzed. One study (Dobbinson et al., 1998) only had a single female participant, and the remaining two studies (Fine et al., 1994; Loveland et al., 1988) had female participants, though not many: the study by Loveland et al. had ten male participants and two female participants and the study by Fine et al. had 32 male participants and nine female participants. None of these seven studies broke down their results in terms of gender. This is very important to note because, in terms of pragmatic features of language, men and women use them differently.

In terms of turn taking, a key area of study within pragmatics, there has been a widespread belief that it is well established that men interrupt women more than women interrupt men (James & Clarke, 1993, p. 231). A review of the literature on language and gender studies involving interruptions raised questions about this conclusion. In James and Clarke (1993), the authors conducted a critical review of the literature around gender and interruptions and they found that the results from the majority of studies do not support this claim. In fact, in the majority of studies reviewed, the results showed that there was, in fact, no significant difference between men and women when it comes to the total number of interruptions (James & Clarke, 1993, p. 234). While there may not be a difference in the frequency of interruptions by gender, James and Clarke noted that there is some evidence "that females may use interruptions of the cooperative and rapport-building type to a greater extent than do males, at least in some circumstances" (James & Clarke, 1993, p. 268). Given that there is a difference in how interruptions are used based on gender, it would make sense when studying interruptions and other features of conversational turn taking to break down results based on gender to be able to see if those differences affect the conclusions reached based on the data. It is also important not to generalize conversational data from one gender to another, especially in the case of ASD, given that women with ASD may present differently and may be more social than age-matched men with ASD.

# Chapter 3 – Methods

## 3.1 Research Questions

As discussed in Chapter 1, the original intent of this study was to investigate the question of whether people with ASD communicate differently when interacting with other people with ASD compared to when interacting with NT people. Due to methodological issues present in research on pragmatic uses of language by people with ASD, previously discussed in Chapter 2, it became clear that before investigating the research question above, it was necessary to create a new research method for gathering naturalistic conversational research data. This became the primary research question of this study: Is it possible to gather naturalistic conversational data that can be used to compare conversational performance based on the type of interlocutor. The original research question was partially investigated using the methods described in this chapter as the secondary research question: Do people with ASD communicate differently when interacting with other people with ASD compared to when interacting with NT people?

## 3.2 Study Design

The study presented here uses an observational methodology to investigate whether people with ASD communicate differently based on their interlocutors. Research participants engaged in conversational sessions, each lasting two hours.

Each of these conversational sessions involved either one participant with ASD and two NT participants or three ASD participants. There was no group of three NT participants. This was because the primary concern of this study was to gather data on how people with ASD may communicate differently due to the type of interlocutors they may be interacting with; I was concerned that the presence of an NT-only group would reinforce the notion of an NT standard of communication and possibly prompt direct comparisons of NTs to ASD people, which, as previously noted, can skew the conclusions. These sessions were video- and audio-recorded and the middle ten minutes of every half hour was transcribed and coded for various linguistic and conversational measures.

## 3.3 Variables

The independent variable in this study is the type of interlocutor. Participants with ASD interacted either with other ASD participants or with NT participants depending on the conversation session that they attended. Each participant with ASD interacted with both types of interlocutors (ASD or NT) and they therefore acted as their own control. There are a number of dependent variables based on the coding scheme and these are all counts of various linguistic phenomena including units such as words, conversational turns, metaphors, similes, expressions of irony, interruptions, latches, and overlaps.

## 3.4 Sample

This project focused on studying adult males with 'high-functioning' ASD. In terms of ASD, ‘high-functioning’ has previously been defined as "autism absent of cognitive delay" (Sanders, 2009, p. 1562), and this is the definition that was used in this study with some specific conditions. The remaining participants were age-, culture- and education-matched NTs. The general population of people with ASD is heterogeneous and varied and people with ASD have, in the past, been categorized in terms of functioning based on their ability to interact socially, their language ability, and their IQ (Baron-Cohen, 2006, p. 868). For the purposes of this study, I was looking only for participants with ASD that would be considered 'high-functioning': participants with ASD who were verbal, who had a verbal IQ over 70 and had no co-occurring difficulties in structural language skills. By excluding participants with co-occurring difficulties in structural language skills, differences in communicative performance in this study can be related to their pragmatic competence. Participation was also limited to people who had completed high school. If they had any post-secondary education, they could not have more than 1 year of graduate school to participate. This was necessary to ensure that the participants would have had a similar degree of formal language instruction. These criteria also mean that the ASD participant group may be more homogeneous and consistent than usually seen on the autism spectrum and more easily allow for comparisons with each other. Only males

were recruited for this study as there is a widely noted sex discrepancy in ASD; it is documented to be around four times more common in men than women (Klin, 2006, p. S5). In addition, men and women may communicate differently in terms of various pragmatic and social aspects, including use of interruptions (Anderson & Leaper, 1998). This was discussed in more detail in section 2.3.5.2 of the previous chapter. In order to minimize this potential for confounded data, I limited this study to men. The participants were from a Caucasian, Anglophone cultural background. The reasoning behind the cultural restriction was that many of pragmatic behaviours characterized in the literature as impairments, such as issues with turn taking may be affected by one's cultural and ethnic background, as discussed in the previous chapter in section 2.3.5.1. For this reason, I sought to recruit a culturally homogenous sample to reduce the likelihood of other cultural factors influencing the data.

## 3.5 Screening

### 3.5.1 Additional Inclusion and Exclusion Criteria

The inclusion and exclusion criteria for this study were designed to minimize the possibility of cross-cultural pragmatic skill norms influencing the conversational performance of the participants. This allowed me to achieve a comparable sample of participants in both populations, and to ensure that pragmatic difficulties were not simply symptoms of underlying impairments in

structural language skills. For the participants with ASD, the inclusion and exclusion criteria were slightly different as to ensure that the participants with ASD would be considered 'high-functioning' in an attempt to observe a consistent homogeneous group of participants in a population that is heterogeneous. It was important for NT participants to be naïve to ASD and to other disorders involving communication differences. This was done to try to preserve the naturalism of the observation and the generalizability of the results. If the participants had previous experience with people with ASD, they may adjust their speech to match expectations based on previous experiences. This would not necessarily reflect the world-at-large, whereby NTs may interact with people with ASD in passing, without knowing that their speaking partner has ASD.

The inclusion criteria for this study for both groups of participants were:

- Male
- Between 18 and 35 years of age
- Completed high school
- Native speakers of English
- Grew up primarily in an English-speaking community
- Ability to sit and have a conversation unassisted.

Participants with ASD had an additional inclusion criterion:

- Had to have been diagnosed with some form of ASD previously by a clinician

The exclusion criteria for this study were:

- Verbal IQ (Receptive Vocabulary) under 70 (as determined by the Peabody Picture Vocabulary Test, as administered during the screening process for this study)
- Participant has taken advanced courses in Psychology, Linguistics, Special Education or English as a Second Language teaching
- Participants with ASD could not participate in the study if they had a comorbid structural language impairment, as indicated by a score of 6 or lower on the language structure subscale of the Communication Checklist for Adults (CC-A), which was used as part of the screening process and was filled out by a parent, family member, or partner of the participant.
- Has any other disorder that could affect the participant's language skills
- NT participants could not participate if they had had previous experience in communicating with people with developmental disabilities or mental health conditions that may have required the participant to adjust the way that they communicated.

- Neurotypical participants could not participate if they had any score under 7 on the CC-A as scores of 6 or below in a category can indicate a language impairment (Whitehouse & Bishop, 2009, p. 12).

### 3.5.2 Screening Tests

To determine the suitability of the participants, a 3-step screening process was conducted. Participants gave informed consent before each stage of the screening. The first stage of the screening consisted of questionnaires. Neurotypical participants filled out a questionnaire to identify their age, educational and cultural background, and naïveté to ASD. Participants with ASD were given two questionnaires. The first was similar to the one filled out by the neurotypical participants, while the other focused on what medical or therapeutic interventions they had experienced for ASD- and language-related issues. Some of the interventions, past and current, that the participants were asked about on the questionnaire included Applied Behavioural Analysis (ABA), speech therapy, nutritional supplements, and prescription medications. The purpose of gathering intervention information was to see if any patterns occurred in the data based on the interventions used with the participant in childhood.

The second stage of the screening was the administration of the Peabody Picture Vocabulary Test IV (PPVT-4) (Dunn & Dunn, 2007). The PPVT was chosen because it is quick and easy to administer, can be used as a proxy measure

for verbal intelligence (Emerson, Einfeld, & Stancliffe, 2010, p. 580) and it has been used widely in experimental studies to match children with autism to NT controls (Tager-Flusberg, 2000, p. 321). The PPVT-4 gives a standardized score which, as has been studied with previous versions, correlates well with verbal intelligence scales on other IQ tests such as the WISC-R (Emerson et al., 2010, p. 580; Hodapp & Gerken, 1999; Spreen & Strauss, 1998, p. 468) and the WAIS-III (Bell, Lassiter, Matthews, & Hutchinson, 2001). For this study, participants were excluded if their standardized PPVT-4 score was below 70 (two standard deviations below the norm). This test narrowed the studied population to people who would be considered to be 'high-functioning', and less likely to have comorbid structural language problems that would exclude them from the study.

People, who based on the results of the first two screening tests were ineligible for the study, were not invited to participate in the third stage of the screening. At this stage of the screening process, three potential ASD participants were excluded due to coercion, or due to scoring below 70 on the PPVT. Seventeen potential NT participants were also excluded at this stage for either having personal experience with people who had language or neurodevelopmental difficulties, having taken courses that dealt with language research or neurodevelopmental disorders, or for not having grown up in an English-speaking community. The third stage of the screening was the administration of the Communication Checklist for Adults (CC-A) (Whitehouse & Bishop, 2009). In

the majority of cases, this checklist was administered over the phone to a parent or other close family member of the participant. This test was chosen because it has specific scales for measuring pragmatic language and social engagement separate from structural language skills. Two potential NT participants were excluded at this stage of the screening due to their CC-A scores indicating that they had an ASD language profile or other pragmatic language impairment. One potential ASD participant and one potential NT participant were considered eligible but withdrew before the start of the study.

### 3.6 Recruitment

Two separate recruitment processes were used to recruit participants for this study. Neurotypical participants were recruited from the undergraduate students at McMaster University via posters and presentations to large lower-year classes in geography, economics, history, and other subjects unrelated to linguistics, psychology, medicine, or education. Participants with ASD were recruited from McMaster University, Mohawk College, Redeemer University College, several local charities and programs for people with ASD, using posters and emailed flyers. I also used chain sampling—sending recruitment materials to people I had met that might know people who fit the criteria for the study but were unlikely to be exposed to the materials, and asking them to pass the materials along to others—to assist in recruitment of participants with ASD. To

ensure that NT participants were naïve as to the purpose of the study, the recruiting materials described the study as one examining communication between young adult males; there was no mention of ASD whatsoever. This was done to try to capture as natural interactions as possible. If they had known the nature of the study beforehand, the participants might have altered the way they communicate beforehand based on personal preconceptions of or previous experience with people with ASD. Participants were debriefed individually after their conversation sessions were finished and were informed of the true purpose of the study. Participants were also questioned informally about their experience in the study and to ascertain whether they had determined the experimental paradigm. Participants were compensated $20 per hour of conversation sessions along with a $20 bonus to compensate for the screening process assuming the participants completed both of their two-hour conversation sessions.

The study was reviewed and cleared by the McMaster Research Ethics Board. The study was also cleared to allow for recruitment at other sites by the Mohawk College Research Ethics Board, the Redeemer University College Research Ethics Review Committee, and the Hamilton Integrated Research Ethics Board. For further discussion of the ethics review process of this study, please see Salt (in press).

## 3.7 Participants

A total of twelve participants were recruited: six NT participants and six ASD participants. The number of participants in this study reflects a balanced participation paradigm, namely that all participants participated in the same number of sessions and never interacted with the same participants twice. Recruitment and screening of the twelve participants in this study took almost ten months. Given that this study is a pilot study to determine the feasibility of this new methodology, no specific sample size was determined. The selected participants ranged in age from 18 to 32 years of age and their PPVT-4 scores ranged from 74 to 141. The ages and PPVT-4 scores of NT and ASD participants are listed in Tables 3.1 and 3.2 respectively below. Due to a low number of ASD participants available, one participant was admitted to the study, despite having a low Language Structure score on the CC-A. In the ASD participants group, there are three types of language profiles that emerge when considering the CC-A scores. One participant had low scores in all areas of communication meaning that he likely has some global language impairments. Two other participants, who have low scores in Pragmatic Difficulties and Social Engagement but have normal scores in Language Structure fit a profile of a person with high-functioning ASD, having normal structural language skills while having impairments in pragmatic and social communication (Whitehouse & Bishop, 2009, pp. 12–13). The other three participants with ASD have CC-A language profiles of a person without a

clinical language impairment. Among the NT participants, only one participant had a notable CC-A profile given that he performed at ceiling, however all NT participants have profiles of people without a clinical language impairment. Due to the number differing language profiles among the ASD group and the small sample size, there was very low statistical power in this study and thus the analysis only used nonparametric statistical tests.

*Table 3.1 - NT Participant Profile Data*

| **Participant** | | **PPVT-4** | | **CC-A (Scaled Scores)** | | |
|---|---|---|---|---|---|---|
| **Name**[9] | **Age**[10] | **Standard Score** | **Percentile** | **Language Structure** | **Pragmatic Difficulties** | **Social Engagement** |
| Simon | 18 | 141 | 99.7 | 14 | 9 | 8 |
| Adrian | 18 | 124 | 95 | 8 | 8 | 8 |
| Zack | 18 | 129 | 97 | 8 | 7 | 9 |
| Cole | 18 | 129 | 97 | 10 | 10 | 11 |
| Gabriel | 19 | 117 | 87 | 9 | 9 | 10 |
| Ivan | 29 | 110 | 75 | 14 | 14 | 15 |

*Table 3.2 - ASD Participant Profile Data*

| **Participant** | | **PPVT-4** | | **CC-A (Scaled Scores)** | | |
|---|---|---|---|---|---|---|
| **Name**[9] | **Age**[10] | **Standard Score** | **Percentile** | **Language Structure** | **Pragmatic Difficulties** | **Social Engagement** |
| Darryl | 20 | 79 | 8 | 5 | 4 | 5 |
| Robert | 20 | 101 | 53 | 8 | 3 | 2 |
| Bernard | 32 | 74 | 4 | 9 | 10 | 7 |
| Trevor | 27 | 88 | 21 | 9 | 10 | 7 |
| Hugo | 26 | 86 | 18 | 10 | 4 | 6 |
| Frederick | 23 | 123 | 94 | 9 | 7 | 7 |

[9] Names are pseudonyms to maintain the confidentiality of the participants
[10] Age is measured in years

In terms of culture, all participants were raised in English-speaking communities in Canada. When asked if they identified themselves as part of an ethnic or cultural group, most participants did identify themselves with additional non-English-speaking ethnic and cultural groups but did not attend cultural school programs, events, or cultural language instruction.

In terms of language, all participants identified English as their native language (the earliest language that they learned and still understand). In terms of regular language use, all participants use English as the main language of communication with two participants indicating that they have passive comprehension of other languages, based on the language their parents sometimes used at home, but they do not speak these languages themselves. Given that all participants had gone through the school system in Canada, it is likely that some participants may have had some exposure to French in the form of French as a Second Language (FSL) courses as required by the Ontario curriculum. Students with disabilities are sometimes granted exemptions with regard to FSL curriculum requirements. Participants were not specifically asked about whether they took FSL courses in school; however, three participants indicated French as a language that they have spoken at some point. No participants reported French being spoken at home.

All participants had completed high school and all of the NT participants were current undergraduate students at McMaster University. Of the ASD

participants, two were current college students in programs for people with disabilities, two had college diplomas and were working at the time of this study, and one was a first-year graduate student at McMaster University.

All NT participants indicated on their questionnaires that they were naïve to ASD and other conditions with disordered speech. In debriefing interviews with the participants however, two said that they in fact did know people with ASD: one had a cousin with ASD and the other attended an elementary school that had a program for people with ASD. When asked if they had determined the true purpose of the study, before it was revealed to them, both of these participants said that they had recognized that other participants in their sessions had ASD but otherwise did not determine the full purpose of the study.

In terms of interventions for ASD and ASD-related symptoms, most of the ASD participants had had some sort of intervention. Darryl has had 16 years of Applied Behaviour Analysis (ABA) and social skills training and was still receiving these interventions at the time of this study. He had also had two years of speech therapy that started when he was five years old. Robert had not received formal social skills training but he has attended social programs for people with ASD at a local treatment centre. Neither Bernard nor Trevor had had any intervention. Hugo had had ten years of social skills training which continued during the course of the study. Frederick had not had any interventions.

In terms of diagnosis, the ASD participants all had different formal diagnoses: Robert, Hugo and Frederick had been diagnosed as having Asperger's Syndrome (AS); Bernard and Trevor had been diagnosed with Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS); and Darryl had been diagnosed with Mild Autism/PDD-NOS. These diagnoses were made by medical doctors and were based on clinical assessments. These diagnoses were reported to the researcher by the participants and/or their parents.

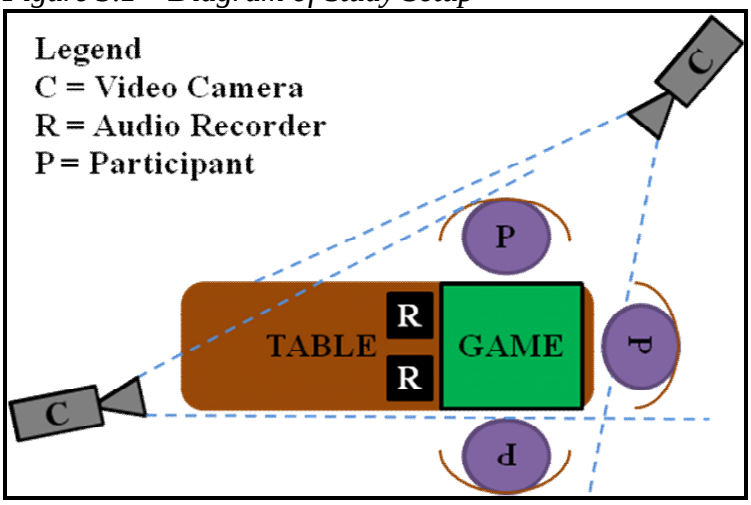
### 3.8 Procedure

All participants attended two conversation sessions and all conversation sessions were video- and audio-recorded. There were two types of sessions: the first type consisted of two NT participants and one ASD participant (this type of session will be called a Mixed session) and the second consisted of three ASD participants (this type of session will be called an ASD session). Each ASD participant attended one mixed session and one ASD session. No participants interacted with any of the same people twice. This allowed each participant to act as their own control and there would not be a familiarity or practice effect created due to the participants initially being strangers to each other. The ASD participants attended the ASD-only sessions after the ASD-NT mixed sessions. While it would have been preferable to counterbalance the sessions so that only some ASD participants completed the mixed group session before the ASD group

session, due to the extended recruitment period, the difficulty in recruiting ASD participants, and the timeline that I was under, the ASD-NT mixed sessions had to be run first. I was able to recruit NT participants fairly quickly, while ASD participants were far more rare. By the time I was able to recruit the first two ASD participants, I had already recruited most of the NT participants. By this point, it was coming up to the end of the school year and most of the NT participants were going home for the summer and had already participated in a single session. To avoid having to wait until the start of the next school year to finish running these sessions, and to minimize the chances of losing participants due to attrition, I ran the mixed sessions first so that the NT participants could finish their participation before the summer break. As the participants with ASD lived in the greater Hamilton area, it was not a problem to run the ASD sessions in the summer after the NT participants had returned home. Participants always had at least five days between sessions. After participants completed the screening and were determined to be eligible, the conversation sessions were held at a local community centre for people with ASD, the Mischa Weisz Centre for Autism Services in Hamilton. When asked by the NT participants about why this location was chosen, they were informed that this was a space provided by people connected with my supervisor and I thought that it would be more comfortable and quiet than a space at the university. The ASD participants did not ask about why this particular location was used, though some had attended events there previously.

When participants arrived, they were asked whether they still would like to participate and if they agreed, they entered the conference room where the study was to take place, which was set up as shown in Figure 3.1. Once all participants were seated around the table, games were made available for them to play if they so wished (Phase 10, Scrabble, Uno, One Eyed Jack, and a deck of playing cards) and I told them that I would be in every 45 minutes or so to check the recorders to make sure that they were still working. All of the recorders were then set to start recording and I left the participants to their own devices after clapping once to synchronize the devices. I used separate audio recorders as well as video cameras to ensure that good quality audio was captured, given that the video cameras were some distance from the participants or were behind them, where the microphones might not be able to capture the best quality sound. They were also used for redundancy. I did not tell them to talk or otherwise directly elicit communication from the participants. Once the session was over after two hours, I entered the room, thanked the participants, and told them that they could go and that I would see them at the next session.

*Figure 3.1 – Diagram of Study Setup*




After their final session, each participant was compensated for their participation and then debriefed. The participants were each compensated at a rate of $20 per hour of conversational session participation. To encourage participants to attend both conversational sessions, they were also given an additional $20 as a bonus if they attended both conversational sessions. Participants were given their remuneration before they were debriefed. Each participant was debriefed individually to find out what they thought about the experience, to see whether they had gleaned the true objective of the study or of what their role was being in the study at the end of their second conversation session. I then fully explained the nature of the study and allowed them to decide whether they re-consented to their data being used for the study, given that the participants had not been informed of the true nature of the study at the beginning of their participation.

## 3.9 Transcription

For the purpose of analysis, four 10-minute segments from each conversation session were transcribed and coded. These segments were at specific periods of time: the middle ten minutes of every half hour of each session. This would give a representative sample of the conversation sessions and would be comparable and this way the data could be analyzed using time and familiarity as variables[11].

For this study, transcriptions were made in a spreadsheet in Microsoft Excel 2007 for ease of statistical analysis. The transcription was done in a single tier format similar to SALT (Systemic Analysis of Language Transcripts) (Miller & Iglesias, 2010), as opposed to a multi-tier format such as that used by CLAN (Computerized Language ANalysis) (MacWhinney, 2015). I used and adapted some of the transcription conventions from the CHAT and CHAT-CA transcription formats used in CLAN and from SALT and I did create some of my own codes or used codes from other sources. Specific codes and the decisions around them are explained in the next subsection.

[11] The sampling procedure and the frequency at which language samples were transcribed and analysed from the sessions were suggested to me by Dr. Joanne C. Volden, a speech pathologist and professor of communication science and disorders in the School of Rehabilitation Sciences at the University of Alberta and Dr. Aparna Nadig, a cognitive scientist and associate professor at the School of Communication Sciences and Disorders at McGill University.

### 3.9.1 Coding

I transcribed and coded the data in two passes. In the first pass, the goal was to accurately record what was said and to code the conversational features below. The second pass was used to code the non-literal language measures, which are listed separately from the conversational feature codes.

#### 3.9.1.1 Conversational Codes

##### 3.9.1.1.1 Utterance

The segmentation procedure for utterances used in this study was adapted from the procedure used by the Language Documentation Project at the University of Chicago in their transcription guide (LDP Documentation Team, 2010). An utterance in this study is defined as a word, phrase or sentence, as in the Language Documentation Project (LDP Documentation Team, 2010). Utterances in this study are segmented based on their topic, or whether long pauses are interrupted by other participants. For this study, multiple utterances by the same speaker are transcribed as separate utterances, on separate lines, based on utterances each containing a single thought being expressed, to a maximum of one complete sentence per utterance (LDP Documentation Team, 2010). If an utterance contained long pauses that were filled by interruptions by other participants, the utterances were segmented at the boundaries created by the interruptions. Otherwise, an utterance with long uninterrupted pauses was only

segmented when a change of thought/topic occurred. Utterances that were abandoned before the thought was completed were considered separate utterances from the subsequent utterances, which had complete thoughts.

#### 3.9.1.1.2 Turns

For the purpose of this analysis, conversational turns switch when a new participant speaks an utterance. In the case of a single participant who speaks multiple utterances sequentially, this is only a single conversational turn.

#### 3.9.1.1.3 Latches

Latching, as used in this study, refers to a specific type of interruption whereby a participant interrupts another and builds on to the first participant's utterance, maintaining the same conversational topic. One participant finishing another's sentence would be an example of a latch. Latching is marked with the "approximately equal" sign (≈) at the end of the interrupted utterance and at the beginning of the interrupting utterance. This also allows the showing of data on whose utterances are latched on to and who is doing the latching. The term latching has traditionally been used to refer to utterances whereby a speaker begins their utterance with no pause after another speaker finishes their utterance (Du Bois, Schuetze-Coburn, Cumming, & Paolino, 1993, p. 63). As the current study does not measure pause lengths, and in a desire to avoid subjective judgements, this study uses the stricter definition presented above.

#### 3.9.1.1.4 Interruptions

Interruptions occur when one participant begins their turn while another participant is still talking and the interrupted participant stops talking, thereby ceding the floor and ending their conversational turn. The difference between an interruption and a latch, as they are defined in this study, is that a latch continues the same conversational topic as that of the interrupted utterance. The interrupting utterance is started with an ampersand and the interrupted utterance is ended with a hyphen (as with truncated words, see below). While other studies have defined and subdivided interruptions into various types and subtypes (Anderson & Leaper, 1998; Murata, 1994), previous researchers into pragmatic language and ASD have not used these types of subdivisions and have focused solely on whether interruptions occurred and the subjective frequency at which interruptions occurred (Kanner, 1943; Ochs et al., 2004). To make the coding most relevant to the previous pragmatics and ASD literature, I decided only to code interruptions at the most functional level. In Chapter 4, where I discuss the conversational examples and carry out some qualitative analysis of the conversations, I discuss some of the possible functions or motivations for the interruptions that were observed in the study. Those discussions are not based on a particular theoretical framework, to avoid possible pigeonholing, but are instead based on the observed behaviours of the participants.

#### 3.9.1.1.5 Truncated Words

When a participant stops talking mid-word either by stopping himself or by being interrupted by someone else, this was coded with a hyphen (-) added to where the word was cut off. This convention was also used as part of coding interruptions but not when latching occurred, as the latching symbol was used instead.

#### 3.9.1.1.6 Overlaps

Overlapping speech occurs when two or more participants are speaking simultaneously, effectively taking their conversational turns at the same time. Overlaps are coded at the point when the overlap starts and when it ends. Overlaps are also further designated as happening between two or three participants. Overlaps between two participants were marked using a square bracket ([ ]) and overlaps between three participants were marked using an angle bracket (< >). As with interruptions, there have been other ways of classifying overlaps that focus on speaker intentions or other functions of the overlaps (Tannen, 1990; Yngve, 1970). In addition, similarly to the case of interruptions, I felt it important to code overlaps in a way that is as functional as possible while avoiding subscribing to a particular theoretical framework. In the next chapter, I qualitatively discuss some of the possible functions or motivations for the overlaps that were observed in the study, based solely on the observed behaviours

of the participants.

#### 3.9.1.1.7 Words

Words were coded with a number of considerations to ensure that calculations involving words, such as the Mean Length of Utterance in Words, would be neither overrepresentative nor underrepresentative of the participants' linguistic abilities. In addition to specific word codings listed below (mazes, filler words, cut-off words, and unintelligible speech), words were also delineated in specific ways. Concatenatives, words that are phonetic blendings of multiple smaller words, were coded in their full, expanded forms. For example, the common concatenative ‘gonna’ was coded as ‘going to’. This gives the participants credit for knowing each of the words in the concatenation. Given the participants' age, verbal ability and educational background, I felt that it was appropriate to assume knowledge of the underlying words in concatenatives. For similar reasons, contractions were coded in their full forms. Hyphenated words were transcribed without the hyphen to avoid confusion with cut-off words. Spoken numbers were transcribed as their Arabic numerals, meaning that numbers that are represented by multiple words would only be considered one word for calculations. Due to the use of Scrabble in the conversation sessions, there were frequent occurrences of words being spelled aloud. Spelled words had their letters in all capitals and these letters were joined by an underscore to make sure that

each letter was not counted as a word. This was also the case with multiword names. Multiword names were joined by underscores and were counted as a single word.

#### 3.9.1.1.8 Mazes

Mazes (which include repeated words, false starts, and rewordings) are marked with a preceding plus sign (+). The definition and term 'maze' is similar to that used in SALT (Miller & Iglesias, 2010, p. 21) except that in this study, filler terms and filled pauses are coded separately. An example of this would be: He +w- +w- +was +not did not want to go +t- to the store. Mazes are optional in terms of meaning of an utterance therefore, when mazes are removed from the utterance, the utterance must be able to stand on its own with no lost meaning or grammaticality.

The choice was made to not code echolalia, “immediate and delayed repetition of speech heard elsewhere” (De Villiers et al., 2007, p. 293), as mazes because previous research has argued that echolalia can be functional (Eigsti, Bennetto, & Dadlani, 2007, p. 1008; Prizant & Duchan, 1981, p. 247) as opposed to word-finding problems or utterance formulation problems that mazes can otherwise indicate (Miller & Iglesias, 2010, pp. 41–44). Therefore, echolalia was not explicitly coded at all, to avoid subjective judgements on what may or may not be echolalic.

#### 3.9.1.1.9 Filler Words

Words that serve as filler for pauses or conversational lulls and that have no semantic, pragmatic, or grammatical content in the context of the utterance were transcribed and were coded with a preceding percent sign (%).

#### 3.9.1.1.10 Unintelligible Speech

When a participant speaks and some words cannot be understood, this was coded as unintelligible and marked with a capital triple-x (XXX).

#### 3.9.1.1.11 Questions

Utterances that have a clear interrogative meaning, through either syntax or intonation, are marked with an utterance-final question mark (?).

### 3.9.1.2 Non-Literal Language Coding

For identifying and coding most types of non-literal language use listed below, I used the procedures set forth in “MIP: A Method for Identifying Metaphorically Used Words in Discourse” (Pragglejaz Group, 2007). The procedure includes reading the entire transcript, to get an idea of the context, and then going word by word through the transcript so the non-literal language coding was done on a second pass.

#### 3.9.1.2.1 Metaphors

A metaphor is a figurative use of language whereby a comparison is made by cross-mapping features of one conceptual domain onto another (Lakoff, 1993). The result is that a metaphorical word has two meanings: a contextual meaning, and a literal meaning. The contextual meaning of a metaphorical word or phrase is different from the literal meaning of the word or phrase and the contextual meaning can be compared to the literal meaning in some way. Words used metaphorically are coded by enclosing them in parentheses ( ( ) ). In the case of metaphorical phrases that cannot be decomposed into their constituent words without a loss of meaning, whole phrases were enclosed with parentheses.

The Metaphor Identification Protocol (MIP) is a multistep process to try and empirically determine metaphorical elements in a text. The first step is to read the entire text (or in this case, watch the video of the entire session) to understand the context. The second step is to determine the words in the utterance, decomposing phrasal verbs and other idiomatic expressions into individual words if they can still have meaning as individual words (Pragglejaz Group, 2007, p. 4), which in this case was taken care of by the first pass of transcription and coding. The next step in the MIP is to determine the meaning that each word has in the context of the utterance. Then, for each word, the researcher/interrater has to determine if there is a more basic contemporary meaning for the word than the

contextual meaning used in the utterance. These basic meanings were evaluated using four criteria: they had to be more concrete, they had to be related to bodily action, they had to be more precise than vague and the basic meaning could be historically older (Pragglejaz Group, 2007, p. 3). For the purpose of determining this basic meaning, my interrater and I distilled these criteria into a scenario. If one was approached by an alien entity who did not speak our language, and we wanted to convey to them the meaning of a specific word, what was the most readily demonstrable meaning that could be expressed using what we had on our persons, our bodies, and the environment. If a word has a different basic meaning from the contextual meaning, coders then had to decide whether the contextual meaning contrasts the basic meaning but can be understood in comparison with the basic meaning. If this was the case, the word was marked a metaphorical (Pragglejaz Group, 2007, p. 3).

Challenges to this model are homonymy and polysemy. Homonymy is "the relation between words whose forms are the same but whose meanings are different and cannot be connected" (Matthews, 2014a, p. 177). An example of this would be *bank* as 'financial institution' and *bank* as 'the land beside a body of water'. Polysemy is "the property of a single word which has two or more distinct but related senses" (Matthews, 2014b, p. 309). An example of this would be *life* as a 'way of living' and *life* as 'living things' (Pragglejaz Group, 2007, p. 30). The Pragglejaz group argues that their set of criteria for what constitutes a basic

meaning mitigates the subjectivity of the decision of which meaning is more basic (Pragglejaz Group, 2007, pp. 30–31). This does not mean that the decision is easy. In the case of homonymy and polysemy, words may have multiple meanings and they may be so different that it is difficult to establish which meaning is the most basic. Steen et al. (2010) argues that in these cases, it may not be possible to establish that one meaning sense is more basic than another. Steen et al. resolved some of the cases that they encountered by using the etymology of the word to determine the oldest meaning (Steen et al., 2010, pp. 53–54). Since the definition of a basic meaning is different in this study than the one used in MIP, and the fact that most speakers may not be aware of the etymologies or the basic meanings of words from which their contemporary meanings have been derived (Steen et al., 2010, p. 52), a different method was devised to resolve this type of issue with homonymic or polysemic words. For word forms that could be homonymous or polysemous, if there was not a distinct entry for each meaning, each sense was analyzed to determine if there was one that was more basic than others were. If two or more senses were not likely derived from a single etymology, those senses were considered equally basic. In the case of a sense having multiple subsenses, they were evaluated to determine which one of them was the most basic. The most basic sense or subsense was then used as the basic meaning and the rest of the procedure continued as previously described.

There are certain classes of words for which it is nigh impossible to

establish a basic meaning given the criteria above and those are grammatical function words (Pragglejaz Group, 2007, p. 28). Using the WordNet Stop List (Pedersen, n.d.) as a reference list of grammatical function words with little semantic meaning, no words on the stop list were marked or evaluated for being metaphorical with the exception of prepositions with distinct meanings related to spatial positioning such as: in, on, inside, upon, etc. There were several decisions made about the decomposability of the constructions in the transcripts and how they would be treated using the MIP. In terms of constructions that were treated as decomposable, any construction whereby any of the broken down elements had no meaning, were not decomposed. This included phrasal verbs (e.g. put up with), idioms, and polywords that do not inflect (e.g. let alone). Multiword units, including phrasal verbs, idioms, polywords, and fixed collocations, that could be decomposed without losing semantic meaning were decomposed and the words then evaluated individually (e.g. the idiom 'salt of the earth' can be decomposed and all words would have semantic meaning). Fixed collocations, such as 'give a presentation' were also treated as decomposable. Lastly, there was no difference in coding dead and novel metaphors. Dead metaphors are "words that have metaphoric origins, but no longer retain these roots in contemporary use" (Pragglejaz Group, 2007, p. 30). However, to code whether a metaphor is dead or not can be tricky. While some metaphors may be dead for some contemporary speakers, for others, the metaphors may be very much alive. Speakers who have

limited experience with the language, or those who have had limited social interaction, may not be familiar with the expression and to them the metaphor may not be dead and have quite an active meaning. In an effort not to presuppose the language abilities or social experience of the participants, I have decided not to code dead metaphors differently from novel or active metaphors.

To demonstrate how the steps of the process worked, I have included below as Conversational Example 3.1, a short utterance from Conversational Example 4.10, listed in full in section 4.3.3.3 in the next chapter.

*Conversational Example 3.1 (Mixed Group)*
*Darryl: Your {turn}?*

In Conversational Example 3.1, Darryl is talking to Zack during a game of Scrabble. The utterance contains two words, ‘your’ and ‘turn’. Accounting for the context, the word ‘your’ has the meaning of relating to Zack. The basic meaning in this case is the same, relating to the interlocutor with which one is conversing. Because the contextual and base meanings are identical, the word ‘your’, in this utterance, is not metaphorical. The contextual meaning of the word ‘turn’ in this utterance refers to an opportunity for a player to take an action in the game and this opportunity follows a sequential order among all players. The most basic definition of ‘turn’ refers to the act of doing a rotation around a central point or axis. In this case, the contextual and basic meanings are different; however, the contextual meaning is related to the basic meaning in a specific way. To take turns

in a sequential order, as is the case when playing a board game, involves the players sitting around a central point (a table, or the game board), and the sequence repeating in a single direction as in the case of a person or object turning around a single point. Because the 'turns' in playing a board game do not necessarily involve physical movement but can be understood in comparison to the basic meaning because of a rotation of players playing in sequence, the word 'turn' in this utterance is metaphorical.

#### 3.9.1.2.2 Similes

Similes are comparisons using connective words such as 'like', 'as', 'as if' or 'as though' (Pragglejaz Group, 2007, p. 32). Their meaning is literal compared to metaphors. They do not assert identity but only some level of similarity of two phenomena. Similes are coded by putting the section symbol (§) preceding the connective word of the simile. Similes may contain metaphorical elements, which were coded as such, but are not wholly metaphorical.

#### 3.9.1.2.3 Irony

Irony is the use of words to express a meaning opposite of the literal meaning of the words (Happé, 1993, p. 109). Sarcasm, the use of language in order to criticize someone or something in a humorous way, is a type of irony and thus is subsumed by this category. This type of construction is surrounded by the

dagger symbol (†). As with idioms and similes, some words in ironic utterances may also be metaphoric under the Metaphor Identification Procedure.

#### 3.9.1.3 Interrater Reliability

Twenty-five percent of the tapes were transcribed and coded by another rater, a speech language pathology student with experience in transcription and coding. She was given access to the video files for two conversation sessions, including one of an ASD-only group and one of a NT-ASD mixed group. She transcribed and coded these files independently, after which point we compared our coding and discussed our disagreements and inconsistencies between our transcriptions. Interrater reliability was calculated both before discussing the disagreements and inconsistencies and afterward, as listed in Table 3.3. One code, for elongated speech, was dropped from the analysis because it was decided that it was too unreliable and that using this code did not help answer the research question being asked in this project. Interrater reliability was calculated by dividing the number of agreements of a code in a transcript by the sum of the total number of agreements, disagreements, and omissions of said code from the transcript. In cases whereby the number of occurrences differed between the researcher's transcript and the interrater's transcript, the larger number of occurrences was used. This number is represented as a percentage with 100% representing total agreement between raters. The individual codes used and their

definitions and rationales for their use are listed below.

*Table 3.3 - Interrater Reliability of Codes*

| **Code** | **Pre-discussion Agreement** | **Post-discussion Agreement** |
|---|---|---|
| Speaker | 93.79% | 99.92% |
| Word | 94.50% | 99.90% |
| Utterance | 91.45% | 99.92% |
| Latch | 60.00% | 100.00% |
| Interruption | 66.67% | 100.00% |
| Mazes | 72.55% | 99.53% |
| Overlaps | 78.24% | 99.85% |
| Filler | 72.02% | 99.56% |
| Cut-Off | 70.28% | 99.73% |
| Unintelligible | 54.26%[12] | 98.57% |
| Question | 84.93% | 100.00% |
| Simile | 68.75% | 92.86% |
| Metaphor | 72.84% | 99.23% |
| Irony | 100.00% | 100.00% |

## 3.10 Data Analysis Plan

The data analysis plan below summarizes the research questions being investigated in this study, and how the analysis will proceed in the next chapter including information on the participants, group design, and variables.

[12] One reason for this low level of initial agreement on unintelligibility could be due to my own hearing impairment. I am deaf on one side which makes it very difficult to differentiate speech sounds from significant background noise, or when multiple people are all talking at the same time. After calculating the interrater reliability, I suspected that my hearing impairment might have been an issue with regard to unintelligible words. Senior undergraduate linguistics students were recruited to transcribe the recordings; however, instead of doing a full transcription using the full coding manual, they were only asked to transcribe the words that were said. I then transcribed the recordings myself using the coding manual and compared the unintelligible sections to the word lists from the students to see if I could fill in those gaps.

### 3.10.1 Research Questions

#### 3.10.1.1 Primary Research Question

Is it possible to gather naturalistic conversational data that can be used to compare conversational performance of young adults with ASD based on the type of interlocutor?

#### 3.10.1.2 Secondary Research Question

Do people with ASD communicate differently when interacting with other people with ASD compared to when interacting with NT people?

### 3.10.2 Participants

| | |
|---|---|
| Number of participants (total): | 6 ASD Participants (Experimental group)<br>6 NT Participants |
| Number of participants (analyzed): | 3 ASD Participants |
| Sub-Groups: | ASD participants being analysed fit into 3 different subgroups based on CCA-2: NT, ASD, global language impairment |
| Excluded Participants: | 1st-Stage Screening: ASD 3; NT 17<br>2nd-Stage Screening: ASD 0; NT 2<br>Eligible but did not participate: ASD 1; NT 1 |

### 3.10.3 Variables

| | |
|---|---|
| Independent Variables: | Type of interlocutor (ASD, NT) |
| Dependent Variables: | Word Count |
| | Turn Count |
| | Metaphor Count |
| | Simile Count |
| | Irony Count |
| | Interruption Count |
| | Latch Count |
| | Overlap Count |

### 3.10.4 Data

| | |
|---|---|
| Study Type: | Observational |
| Data Type: | Conversational transcripts |
| Analysis Type: | Quantitative and Qualitative |
| Analysis Tool Used: | Microsoft Excel 2007 (No Additional Statistics Packages) |

# Chapter 4 – Analysis

## 4.1 Introduction

Based on the data collected through the experimental part of this research project, this chapter attempts to achieve two objectives. The first is to demonstrate the proposed methodology at work and the types of data that can be collected and the analysis that can be done on it. In the demonstration of the proposed methodology, these data also serve to create a foundation for future research into whether people with ASD communicate differently when interacting with other people with ASD compared to when interacting with NT people.

I chose not to go into this study with particular expectations of what would be observed. This study is intended to be descriptive rather than prescriptive, and I wanted to keep an open mind. Based on the generalizations and findings from the previous research that has been done in this area, one would expect there to be no differences between groups as the previous research has not considered context and thus would assume a global deficit in pragmatic language.

## 4.2 Overview

### 4.2.1 Descriptive Statistics and Baseline Data

Graphs showing the MLUw (mean length of utterance in words) for all participants for both sessions (ASD vs. Mixed) are presented in this chapter. They give a good insight into the base structural language skills of the participants. They also depict whether the participants' conversational performance differs structurally depending upon with which type of interlocutor the participants are interacting.

### 4.2.2 Primary Variables

I am comparing the ratios of the usage of all of the non-literal language measures to either words or utterances, depending on the specific measure, for each participant across the two sessions in which they took part. This comparison has been done using a two-tailed binomial test, which compares the ratio of metaphors being used over the overall number of words in the ASD group to the ratio of metaphors used over the number of words from the mixed group. This test was used to determine the probability of the proportion of the number of metaphors observed in the ASD group occurring given the ratio of metaphors to words in the mixed group. If the probability were sufficiently low, the number of metaphors observed in the ASD group would not have been by chance. This would demonstrate that there is a difference in metaphor use when interacting

with different types of interlocutors. The same analysis was done with irony and similes, however instead of the number of uses of irony or similes being over the number of words, uses of irony and similes were instead compared to the total number of utterances. The reason for this was that irony and similes are coded as phrasal and not by the word. For these data, I was looking at the participants as individuals representing different subgroups based on their CCA-2 profiles. The resulting binomial probability density functions were graphed to represent these data visually.

### 4.2.3 Secondary Variables

I have also analyzed several measures of turn taking. I am comparing ratios of how many times a participant interrupts, latches over, and overlaps another participant to the overall number of turns taken by the participant using two-tailed binomial tests. This is compared across both types of sessions to show whether ASD conversational turn taking behaviour changes depending on the type of interlocutor. For these data, I am looking at the participants as individuals representing different subgroups based on their CCA-2 profiles. I am also graphing the resulting binomial probability density functions to represent these data visually.

### 4.2.4 Qualitative Analysis

Examples of conversational data from the coded transcripts made from the

video recordings of the conversational sessions are analysed qualitatively, examining and illustrating any patterns of usage that emerge as well as possible explanations for these patterns. Notable examples from the transcripts are also be broken down and analyzed. I have also included section 4.3.1 below wherein I discuss overall how each of the conversation sessions went, what was discussed, and any additional notable qualitative information about the sessions.

### 4.2.5 Statistical Significance

Due to the multiple statistical tests of hypotheses being done on data from each participant, I did a Bonferroni correction on the level of statistical significance to account for possible inflation of Type I error. There were six variables that were tested for each participant: latches initiated, interruptions initiated, overlaps initiated, metaphors, similes, and irony. The level of significance has been corrected to 0.0083.

This study is intended to propose and demonstrate a new methodology for studying pragmatic language in ASD and generate hypotheses, rather than testing hypotheses, especially due to the small sample size. However, I felt it was important to be conservative in the statistical analysis as I felt that the results of the analysis and the entire methodology could be dismissed out of hand if the statistics were not done in a rigorous manner. So that readers can see the significance of the tests done at both the uncorrected 0.05 level of significance as

well as the corrected level of significance, the p-values of all the binomial tests that were performed are listed in Table 4.6 at the end of this chapter. That said, my analysis below reflects only the corrected level of significance.

### 4.2.6 Interconnectivity

It should be noted that while each participant participated in a separate mixed group session, all three participants participated in the same ASD group session that is analysed here. I am analysing one conversation between the three ASD participants and while I am analysing the data for each participant separately, it is still one conversation so the results may be interrelated, as conversational data does not exist in a vacuum; speakers respond to and play off each other and create a conversation together. The participants were strangers to each other when each session started so previous familiarity was not a confounding variable.

### 4.2.7 A Note on Language Coding in Speech Examples

All of the language examples from the transcripts have been partially cleaned up with some of the coding removed to make for easier reading. All speech examples are also in italics to set them apart from the rest of the paragraph. Coding symbols that remain have been illustrated in examples in Table 4.1 below.

*Table 4.1 - Coded Speech Examples*

| **Code** | **Example** | **Explanation** |
|---|---|---|
| Metaphors | The {battle} in the senate was a {bloody} one | Metaphorical words are enclosed in curly brackets. |
| Irony | Oh look, it is raining again. It is going to be a †beautiful day† | Ironic phrases are enclosed with daggers. |
| Similes | Her eyes are §like marbles | Similes are indicated by a section marker before the connective word in the simile. |
| Overlap (Two people) | A: What are you [talking] about?<br>B: [Baseball] | Text enclosed in square brackets ([]) indicates that this text was overlapped by one other person, whose overlapping text is also marked with square brackets. |
| Overlap (Three people) | A: What is that Rolling Stones song <called?><br>B: <Satisfaction><br>C: <Satisfaction> | Text enclosed in angle brackets (<>) indicates that this text was overlapped by both other participants, whose overlapping texts are also marked with angle brackets. |
| Truncated Utterance | A: I was going to grab som- | Utterances that end with a hyphen are utterances that stopped abruptly. |
| Interruption | A: Did you talk to the-<br>B: &Which bus did you take? | Utterances in which a participant initiated an interruption are marked with an ampersand at the beginning of the interrupting utterance. The interrupted utterance usually ends abruptly. |
| Latch | A: What do you want≈<br>B: ≈For dinner? | Utterances that begin with a wavy almost equals sign (≈) are latches; they are latched onto a preceding utterance which end with the same symbol. |
| Unintelligible | A: I was talking to the librarian and [XXX]<br>B: [XXX] | Segments of speech that are unintelligible are marked as 'XXX'. |

## 4.3 Analysis

The data of three ASD participants, representing three unique communication profiles, and four conversational sessions is analysed below. These participants are Darryl, Robert, and Trevor. The screening information for these participants is below in Table 4.2.

*Table 4.2 - Screening Information from Analysed Participants*

| Participant | | PPVT-IV | | CC-A (Scaled Scores) | | |
|---|---|---|---|---|---|---|
| **Name**[13] | **Age**[14] | **Standard Score** | **Percentile** | **Language Structure** | **Pragmatic Difficulties** | **Social Engagement** |
| Darryl | 20 | 79 | 8 | 5 | 4 | 5 |
| Robert | 20 | 101 | 53 | 8 | 3 | 2 |
| Trevor | 27 | 88 | 21 | 9 | 10 | 7 |

According to the CC-A, areas of language that recommend clinical attention are those with a scaled score of 6 or below; however, it also gives a caveat that a single score of 6 or below is not likely cause for clinical concern (Whitehouse & Bishop, 2009, p. 12). Based on the CC-A data above, the participants represent three different clinical language profiles. Darryl presents with a clinical language profile of a person with a global language impairment, showing clinical impairments in all three areas. Robert presents with a clinical language profile of a person with ASD, showing clinical impairments on the Pragmatic Difficulties and Social Engagement subscales. Trevor presents with no clinical language impairment and therefore has a neurotypical language profile. These profiles

[13] Names are pseudonyms to maintain the confidentiality of the participants
[14] Age is measured in years

demonstrate the heterogeneity of ASD and the data gathered using this methodology gives a balanced picture of the linguistic behaviour across people at different points on the autism spectrum.

### 4.3.1 Qualitative Session Overviews

In this section and its subsections, I give a qualitative summary of each of the conversations that occurred during the analyzed samples of the conversational sessions. I will discuss how the conversations went, what was discussed, and any notable qualitative aspects of the conversation sessions. As explained previously, the conversational sessions were two hours in length however, I only analysed 10-minute samples taken from the middle ten minutes of every half hour. I will not be discussing anything that occurred in the conversation session outside of those samples. The screening information for the NT participants who took part in the conversations described below is listed in Table 3.1 - NT Participant Profile Data.

#### 4.3.1.1 Darryl's Mixed Session

In this session, Darryl interacted with Zack and Ivan. The first sample begins with Darryl and Zack shuffling cards and playing the card game 'War' when Ivan walks in and they then introduce themselves to Ivan and Ivan reciprocates. After introductions, Zack suggests that they play Scrabble and they briefly discuss Scrabble while they pack up the playing cards. Zack and Ivan then talk to each other about which session they are on, with Zack mentioning that this

happened to be his second session and that they had played Scrabble the first time too. Ivan then asks Darryl if this was his first session too and Darryl initially responds with the name of other community programs that he does but realizes his error and corrects himself indicating that it is his first session. Zack and Ivan then begin talking with each other about where they live and how they got to the sessions. During this time, Darryl focuses on watching Zack set up the Scrabble game. After about ten seconds of silence after the conversation between Darryl and Zack ends, Darryl breaks the silence by asking how many tiles he needs to start the game. This begins an ongoing discussion of the rules of the game. After each player takes a single turn, the conversation dies down, but starts up again as the players discuss the word that they have played and the points that it is worth. An interesting behaviour to note is that Darryl frequently repeats things that the other participants say. During a discussion of the rules in which Darryl has not been contributing, Zack explains a rule to Adrian and Adrian responds with ‘Ah, okay’ and then laughs. Right after Adrian is finished speaking, Darryl repeats what Adrian said quietly, seemingly to himself, including the laughs. As was mentioned previously in section 3.9.1.1.8, this repetition fits the definition of echolalia and it is observed with Darryl throughout all samples of both his ASD and NT sessions. In addition, whenever Darryl plays a word, he quietly says a phrase including that word to himself. Throughout his mixed session, none of the other participants seemed to notice or comment about this behaviour.

The second sample starts with Ivan talking to himself about what word he is going to play. This leads to suggestions from the other participants in limited exchanges. At this point, the participants are nearing the end of their game of Scrabble and are finding it difficult to play more words in the space that they have left. Because of this, as each participant takes their turn and assesses the board, they ask the other participants for advice and this leads to more conversational exchanges. Throughout these exchanges, all the participants are focused on the Scrabble game board and do not attempt to look at each other very much while talking. This continues for half of the sample. At that point, Ivan declares that he can no longer play and Zack volunteers to total the score while the other participants select a new game to play. The participants then decide on playing cards. While they are packing up Scrabble, Ivan asks what year they are in and this starts a conversation about student life as well as careers and plans for the future. This conversation continues for a couple of minutes until Ivan realizes that they selected to use playing cards but they forgot to decide what card game they wanted to play. While discussing what card games to play, Darryl is shuffling the playing cards and Zack and Ivan are focusing most of their attention on Darryl shuffling cards, despite the fact that Darryl does not contribute much at all to the conversation. The sample ends with the participants deciding that they will play the card game called ‘President’.

In the third sample, the participants are just finishing a game of ‘President’ and they are discussing how the game went. Darryl then collects up the cards and starts shuffling them. The participants briefly discuss Darryl’s shuffling skills and then the conversation dies down. Once gameplay begins, the participants actively discuss the cards that they and the other participants are playing contemporaneously. At times during this conversation, Ivan gets excited, starts using hyperbole, and jokingly insults the other participants. This conversation continues for the rest of the sample.

The final sample from this session begins with the participants still playing ‘President’ and discussing their favourite types of music. Zack asks Darryl what kind of instrument he has played but Darryl does not respond and begins talking to himself about his cards. After a minute or so of silence, a conversation begins, discussing the game and all participants are contributing to the discussion. After the game ends, Zack and Ivan talk about the space where they were having the conversation sessions and Darryl is shuffling the cards. When Darryl is finished shuffling the cards, the gameplay starts again and the ensuing conversation is focused strictly on gameplay for the rest of the sample.

#### 4.3.1.2 Robert’s Mixed Session

In this session, Robert interacted with Simon and Cole. The first sample starts with Robert and Simon setting up a game of Scrabble when Cole has just

entered. After the participants introduce themselves, Simon tells Cole that he is a McMaster University student. Simon pauses slightly and then tells Cole that Robert is a Mohawk College student when Robert does not volunteer the information himself. After that, Simon and Cole talk amongst themselves about various aspects of life at McMaster. Robert watches Simon and Cole talking to each other but shows little interest in joining the conversation as he is focused on looking at the table and the Scrabble board and selecting his Scrabble tiles. Robert does not join the conversation again until the game of Scrabble starts. The participants then start discussing who should take the first turn, the order of play, and the rules of the game. This conversation continues for a few minutes, discussing what words are appropriate to use, how the scoring system of the game works, as well as what happens if you cannot make a word. Once the game is underway and everyone has had a turn, Simon and Cole begin talking to each other again about the logistics of the conversation sessions and what courses they were taking at McMaster. Robert only chimes in when the conversation is about the game of Scrabble that the participants are playing. Near the end of the first sample, Simon asks Robert about his program at Mohawk College and about his courses and Robert responds directly to the questions. The conversation then goes back to the game at hand and Robert freely asks questions of the other participants without prompting.

In the second sample from this session, there are stretches of silence broken up by occasional conversation and questions about the game and the rules. It should be noted that Robert actively asks questions of the other participants and engages them in conversation. Near the end of the second sample, Simon and Cole again talk to each other about their McMaster programs while Robert is taking his turn at Scrabble and staring at the table and game board.

The third sample starts with the participants cleaning up the Scrabble game. Simon suggests that maybe they should spend some time talking before playing another game as they felt that they were not talking enough. Simon and Cole then talked to each other about travel and trips that they had taken. While Simon and Cole were talking to each other, Robert would look at whoever was speaking and rarely interjects affirmatively with ‘yeah’ and ‘cool’. After a couple of exchanges, Simon asks Robert about his travels to engage him in the conversation and he responds to questions usually with a single utterance. When the participants shift the conversation to talking about where each of them is from, Robert seems more excited and engaged, though this topic of conversation ends quickly. Cole then asks about hobbies and Simon jumps in to talk about some of his favourite hobbies, including music and movies. After Simon finishes talking about his favourite movie, there is a pause and then Robert starts talking about his favourite movie without being asked. After discussing movies and movie music, the participants then discuss musical instrument experience but the topic ends

rather abruptly. Robert then brings up the topic of movies again and the participants start discussing their top 10 favourite movies. It is interesting to note that Simon shifts the topic to movie soundtracks, with no external prompt, and then back to favourite movies. After this last shift of topic occurs, the remainder of the sample shows all participants actively engaging each other in conversation.

In the final sample, the participants were discussing movies they had seen recently and local movie theatres. When they are discussing local movie theatres, they talk about the price of concessions at the movie theatre and that leads to a conversation between Cole and Simon about the McMaster University meal plan and diets. When Cole and Simon are engaging in conversation with each other, Robert looks at them and around the room. He also periodically interjects filler words, possibly to show that he is paying attention or otherwise following the conversation. While doing this though, he does not try to interrupt with longer utterances possibly ruling out the impression that he is actively trying to take a conversational turn. Robert stops interjecting when Cole and Simon shift their conversation to their courses at McMaster and discussing their assignments and professors but does laugh along with the other participants when they make jokes. Cole asks Robert about his plans after college and he actively responds with what he plans on doing for the immediate aftermath but the topic is quickly dropped when each participant admits that they are unsure of their plans for the months beyond graduation. Cole then asks Robert if he likes sports but Robert responds

that he is not much of a sports person. Simon then engages with Cole directly about sports and for the rest of the sample, Simon and Cole converse amongst themselves while Robert observes the two other participants as they speak through the end of the sample.

#### 4.3.1.3 Trevor's Mixed Session

In Trevor's mixed session, he interacts with Adrian and Zack. When the first sample commences, the participants already have a game of Scrabble underway. Their conversation is focused on the game including previous words played, talking about strategy, as well as discussion of the rules. The conversation fades to silence on occasion, until another person makes an interesting play or has a question about the rules. During the game, Trevor appears to be uncomfortable or bored; he fidgets, changes position in his chair often, and frequently rests his head on his arm. It is interesting to note that when the participants are talking, Adrian and Zack mostly look at the game board while Trevor always looks toward the faces of the other participants, both when talking to them and when they are talking to him.

In the second sample, the participants are still playing Scrabble and their conversation is again focused solely on the game. Also as before, the conversation waxes and wanes. About halfway through the sample, Adrian and Zack begin discussing their school schedules. This exchange is quite short however, and the

topic of conversation shifts back to the game at hand and remains the main topic of discussion for the remainder of the sample.

In the third sample, the participants have just finished a game of Scrabble and are looking for something else to do. They discuss their options and decide to play the card game 'President'. Trevor does not remember the rules so Adrian and Zack explain the rules as Trevor asks questions. This continues as the participants begin to play the game including exchanges discussing play strategy in addition to discussions about the rules. About halfway through the sample, Adrian and Zack briefly discuss their university courses, after which Trevor asks a question about the game and the conversation shifts back to being about the game. After the current game finishes, Adrian and Zack discuss changing the rules for the next game. Trevor does not contribute much to this discussion, but when he does, Adrian and Zack talk down to him and dismiss his questions or ignore him entirely. See example 4.1 below.

*Conversational Example 4.1(Mixed Group)*

*Adrian: we will put we will put we will put the XXX*
*Zack: do you want to deal or um*
*Zack: I am a terrible dealer*
*Adrian: alright I will [I will shuffle and] deal*
*Trevor: [yeah I am never dealing]*
*Trevor: I do not I cannot [shuffle cards]*
*Zack: [did you did you] want to throw in the uh jokers*

Adrian and Zack are discussing the new rules that they are proposing for the subsequent game, however Zack looks at Adrian and changes the topic, saying

that he is a terrible dealer, implicitly looking for one of the other two players to deal the cards. Trevor looks at him and leans in as if to speak however, Adrian starts talking about how he will shuffle and deal. Trevor overlaps him, saying that he should never deal and that he cannot shuffle cards, however, no one acknowledges his statements or responds to him. In fact, Zack overlaps Trevor in talking to Adrian about whether to put the joker cards back in the deck. After that, Trevor does not speak again until the new round was about to start. Near the end of the sample, the topic of discussion briefly shifts as Zack asks Trevor about his age, but after a short exchange, the conversation goes back to the game that they are playing.

In the final sample, the participants are playing another game of 'President' and talking about their plays and the rules of the game. Once their current round of play is over, the participants then start to compare the game to 'Poker' in terms of what is required to win at either game. After discussing the nature of 'Poker', they begin another round of 'President' and then shift to talking about their current game. This remains the topic of conversation for the remainder of the sample.

#### 4.3.1.4 ASD-Only Session

This session involved interactions between Darryl, Robert, and Trevor. The first sample started while they were playing a game of Scrabble. The first

conversation during the sample is one about the gameplay and rules of Scrabble. During the conversation, at one point, Darryl is taking a long time to complete his turn and he tries to pass his turn multiple times. Trevor responds to him with encouragement telling him not to give up so easily and not to worry about how long the game will be. Later in the same conversation, Trevor gives similar supportive words to Robert when Robert makes a good play. Nearing the end of the sample, Darryl calls Robert by a short-form of his name and this leads to a slightly heated exchange whereby Robert corrects Darryl and mentions to Darryl and Trevor that he does not like his name to be shortened. The conversation then shifts quickly back to discussing the game for the remainder of the sample.

The second sample begins while the participants are still playing Scrabble, though it could be a new game from the one in the first sample. The participants are talking to each other about the game for about a minute. Then Darryl asks if he can leave and use the bathroom. He follows this up by saying that he would return as quickly as possible. Trevor and Robert tell him that that is fine and that he should take all the time he needs. While waiting for Darryl to return, Robert and Trevor take both of their turns and then talk amongst themselves about the weather, where they live, and their ages. They also speak about their living situations. When Darryl returns, Robert leaves to use the restroom. Trevor then explains that it is Darryl's turn and explains what they did on their turns while he was gone. He also tells Darryl that he really likes how after Darryl plays a word,

Darryl then says a phrase containing the word that he just played. This is an interesting behaviour that Darryl does in the Scrabble games in both the ASD and mixed sessions. However, this is the only time whereby another participant acknowledges it in the analysed conversational samples. When Darryl engaged in this type of behaviour in the mixed group, the other participants did not seem to notice or respond to it. At that point Robert returns and he is informed by the other participants that it is his turn. The conversation then shifts back to the game for another minute or so until Robert asks how many sessions each other participant has done. After each participant answers, the topic shifts back to the game they are playing for the rest of the sample.

The third sample starts after the participants have put away the board games and they are discussing their hobbies. After about a minute Trevor notices a bracelet on Darryl's wrist and he asks him about it. The conversation then becomes very personal, discussing their personal lives and the nature of autism diagnosis. The conversation gets a little heated when Darryl notes that his brother does not have autism and is 'perfectly fine' and Robert and Trevor respond to that that there is nothing wrong with being autistic. The conversation then shifts to discussing how some aspects of autism may be helpful. The participants then talk about trips or vacations that they and their friends or families have taken. After that, the participants begin discussing their plans for after the session. This leads the conversation to the topic of dinner and cooking, briefly. Trevor then asks the

other participants how old they are and what school programs they are in. This leads to the topic of birthdays and when the best time of year is to have a birthday. Trevor then starts asking the other participants about various things around the room, but the topic does not really go anywhere. Trevor then asks about the other participants favourite movies. Darryl responds that he does not watch movies but he would still like to know what Trevor's favourite movie is. Trevor is unprepared to name one move his favourite but he says that he likes superhero movies. This triggers a debate between Robert and Trevor as to who is the best movie superhero for the remainder of the sample.

The final sample begins with one of the participants yawning, which leads into a discussion about yawning being contagious, but the discussion is very brief. After a few moments of silence, Trevor starts talking about what he is going to have for dinner when he gets home that evening. This begins a group-wide discussion on their favourite foods. At one point, Trevor is describing how he makes a smoothie and explains that he puts an egg in his smoothie. Darryl responds, sounding quite concerned, asking if he puts in the shell. Trevor, replies tiredly that he does not add the shell and says that he should have been more specific in the way he spoke, which causes Robert to laugh and Trevor then smiles. After some silence, Darryl starts making comments about having to get blood taken but Robert and Trevor do not respond. A little while later, a low humming sound can be heard and the participants begin talking about it

postulating different theories on what it could be or where it could be coming from. After about a minute, the conversation goes back to food. Darryl asks Trevor what he is going to have for dinner; however, Robert reminds him that he already asked him that question. After continuing to discuss food, the conversation dies down. Trevor then says he should get a cell phone, which starts another discussion on the pros and cons of cell phone ownership. This discussion does not last long. After a moment of silence, Trevor then grabs a piece of paper and asks the other participants if they like paper airplanes and this conversation continues for about two minutes. Near the end of the sample, Trevor asks if Robert and Darryl like board games and this conversation continues to the end of the sample.

### 4.3.2 General and Baseline Data

In terms of general conversational data, there is a fair amount of information that can be gleaned by looking at counts of words, utterances and turns. It should be noted that word counts, utterance counts, and turn counts are not independent in the ASD group and therefore are described based on their observed counts, rather than a parametric test. One of the important concepts to understand for the baseline data to be meaningful is the Mean Length of Utterance in Words (MLUw).

The MLUw was originally used to help determine the stage of language development of a child (Nice, 1925). This was calculated by counting the number of words in a sample of dialogue and dividing the total number of words by the number of utterances in the sample. The sample utterances would preferably come from ordinary conversation and not be one of primarily recitations or monologues. Also, the sample should also be more than 100 utterances (Nice, 1925, p. 378). Later, Brown (1973) proposed that instead of counting whole words that researchers should instead count morphemes. This calculation is referred to as the MLUm or mean length of utterances in morphemes. Under this paradigm, researchers did not include mazes or filler words in their calculations and divided the total number of morphemes by the sample size of 100 utterances (R. Brown, 1973, p. 54). A more recent study has shown that MLUm and MLUw are highly correlated (Parker & Brorson, 2005, p. 372). In the current study, I calculated MLUw similarly to how it is done in one of the main transcription protocols, Systematic Analysis of Language Transcripts (SALT). In SALT, MLUw is calculated by dividing the number of total words (excluding mazes and unintelligible words) by the number of utterances which may exclude, at the researcher's discretion, utterances that are partially or completely unintelligible, abandoned, or are incomplete (Jon F Miller, 2009). In this study, MLUw was calculated by dividing the number of words (excluding mazes, filler words, and

unintelligible segments) by the number of utterances (excluding utterances that only contained mazes, filler words, and unintelligible segments).

Below, I present the baseline data in Table 4.3. I have also plotted some of the data in Figures 4.1 and 4.2 below. These plots represent the overall communicative abilities of the participants, rather than a specific utterance, by illustrating the number of words per utterance used by each participant in each type of session. Figure 4.1 is scaled to show the MLUw more accurately while Figure 4.2 is scaled to show the maximum number of words used per utterance per participant per session.

*Table 4.3 - Base General Conversational Data per Participant per Group*

| | **Darryl** | | **Robert** | | **Trevor** | |
|---|---|---|---|---|---|---|
| **Measures** | **Mixed** | **ASD** | **Mixed** | **ASD** | **Mixed** | **ASD** |
| Utterance Count | 181 | 278 | 206 | 362 | 261 | 504 |
| 0-Word Utterance Count[15] | 4 | 23 | 54 | 81 | 5 | 11 |
| Word Count | 579 | 824 | 554 | 849 | 1350 | 3138 |
| MLUw | 3.27 | 3.23 | 3.64 | 3.02 | 5.27 | 6.37 |
| Turn Count | 143 | 216 | 167 | 277 | 189 | 334 |
| Min. Words per Utterance[16] | 0 | 0 | 0 | 0 | 0 | 0 |
| Median Words per Utterance | 3 | 2 | 1 | 2 | 4 | 5 |
| Max. Words per Utterance | 10 | 13 | 40 | 20 | 27 | 35 |

[15] This count is the number of utterances that contain only mazes, filler words, or unintelligible segments.

[16] Mazes, filler words, and unintelligible segments are not considered words in this calculation. For example, an utterance that consisted of just a filler word such as ‘uh’ would be considered to have an utterance length of 0 words.

*Figure 4.1 - Words per Utterance by Participant and Session, scaled to accurately show the MLUw (purple diamond) – exact values listed.*

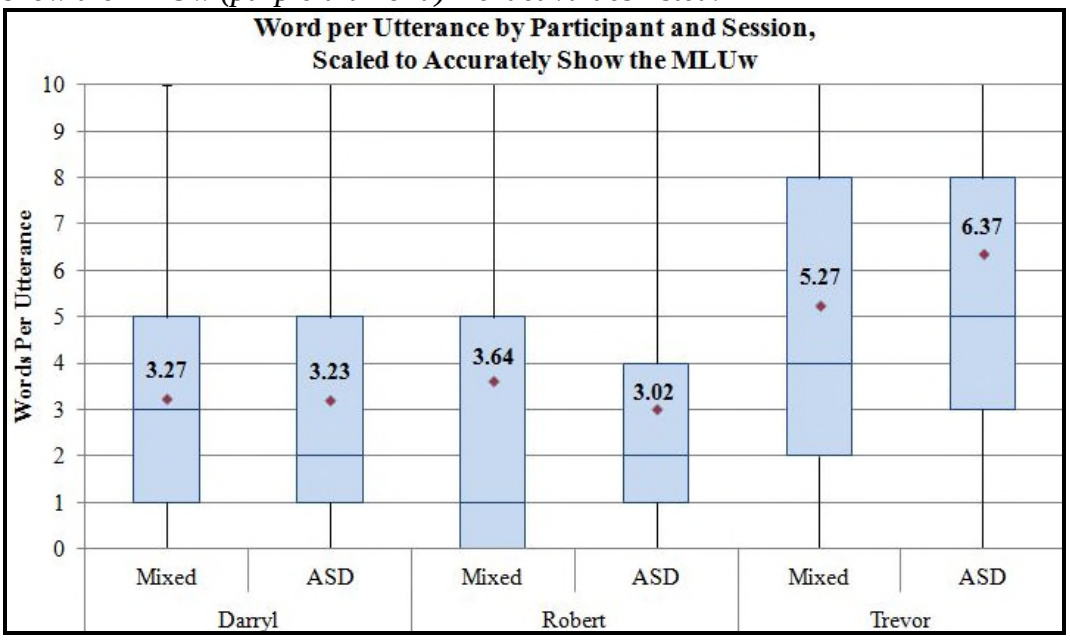
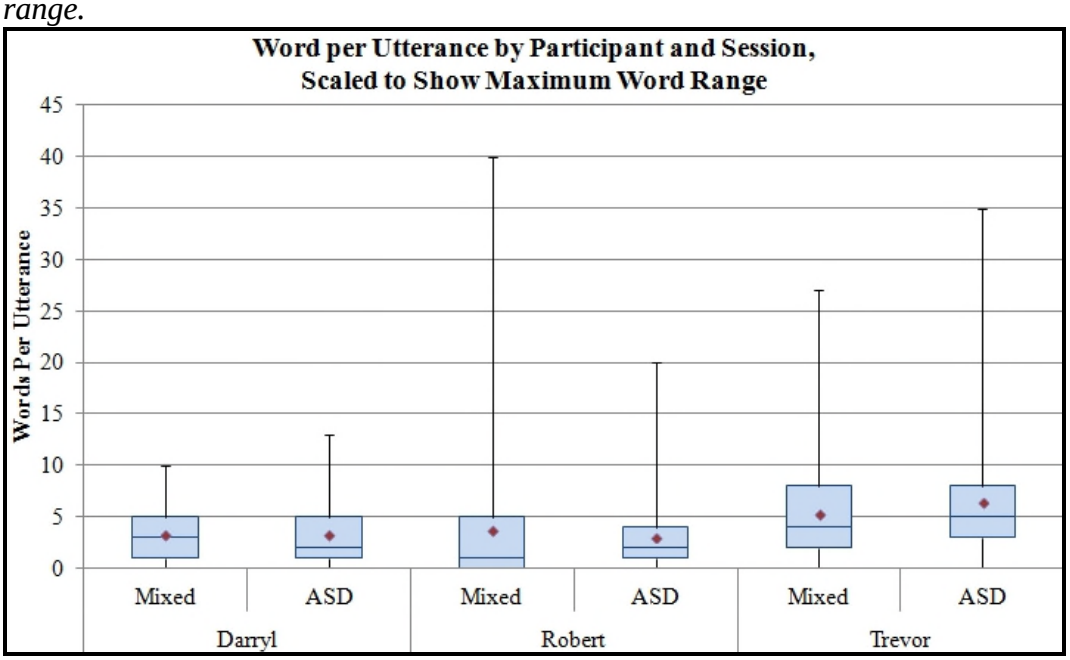



*Figure 4.2 - Words per Utterance by Participant and Session, scaled to show max range.*



Darryl's MLUw ranged from 3.23 to 3.27 depending on the session and Robert's MLUw ranged from 3.02 to 3.64 depending on the session. By contrast, Trevor's MLUw was much higher, 5.27 to 6.37 depending on the session. A basic simple sentence in English consists of around five words, ex. "The boy kicked the ball". With an MLUw of around and just above three, Darryl and Robert tend to give quite short answers and do not always speak in full sentences, especially compared to Trevor, who has a higher MLUw and tends to use more complex and longer constructions more regularly. Darryl's communication profile, looking strictly at the MLUw and word counts per utterances, is the most consistent between the ASD and mixed groups, of the three participants. All participants take less conversational turns and speak fewer utterances in the mixed group compared to the ASD group. An interesting distinction becomes apparent when we consider the word count and how it relates to the utterance count. The MLUw for both Darryl and Robert are higher in the mixed group compared to the ASD group. This, combined with Robert's higher maximum words per utterances in the mixed group, supports the conclusion that Robert spoke less often but in longer utterances in the mixed group compared to the ASD group. Trevor is a complete contrast to this. He speaks in longer utterances than Darryl and Robert in both groups but he speaks less often in the mixed group. In the mixed group, Trevor only tends to speak when addressed directly or if the conversation is on a topic he is interested in. When the neurotypical participants are discussing something

Trevor is not interested in, he does not engage them until they address him directly. Robert, on a similar vein, only talks without prompting in the mixed group when it is about a topic that he is interested in. Otherwise, most of his answers are extremely short. Darryl presents an interesting scenario. He actively asks questions and is willing to talk about pretty much anything that his conversational partners are talking about but he seems to exhibit a great deal of echolalia. Echolalia is a behaviour that can be observed in ASD whereby a person with ASD may repeat phrases, words or imitate other things that the person has heard. Echolalia was not coded separately in the data gathered as echolalia can be functional and judgements on whether repetitions are instances of echolalia or just repetitions seemed to be fairly subjective. In the case of Darryl, he frequently repeats others as well as himself, which could account for his higher MLUw while having a lower score on the CC-A on the Language Structure subscale. These conclusions are only based on two variables and serve as a general description of the participants' overall communication during the conversation sessions.

### 4.3.3 Non-Literal Language Measures

As stated previously in the Methods chapter, for this project, this analysis focuses on several different types of non-literal language. These are similes, metaphors, and irony because they have been previously observed in the research literature to be difficult for people with ASD and they have been used in the

research literature as proxies for measuring theory of mind in ASD. Table 4.4 below shows the number of observed uses of these different types of non-literal language as well as the number of words and number of utterances for comparison.

*Table 4.4 - Observed uses of different types of non-literal language per participant per session*

| | Darryl | | Robert | | Trevor | |
|---|---|---|---|---|---|---|
| **Measures** | **Mixed** | **ASD** | **Mixed** | **ASD** | **Mixed** | **ASD** |
| Utterance Count | 181 | 278 | 206 | 362 | 261 | 504 |
| Word Count | 579 | 824 | 554 | 849 | 1350 | 3138 |
| Simile Count | 0 | 0 | 0 | 0 | 1 | 4 |
| Irony Count | 0 | 0 | 0 | 1 | 1 | 2 |
| Metaphor Count | 23 | 14 | 11 | 12 | 36 | 80 |

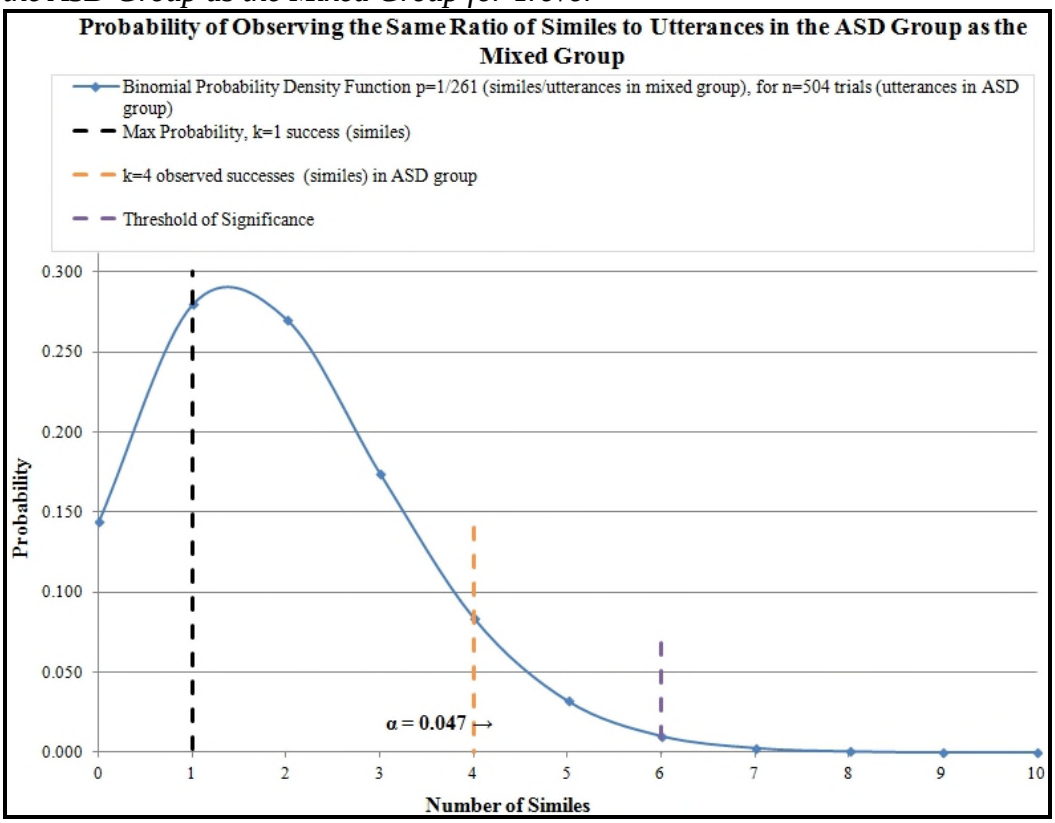
#### 4.3.3.1 Simile

Interestingly, similes and irony were not used at all by Darryl and Robert, with the exception of Robert using irony once in the ASD session. Because of this, it was impossible to examine statistically their uses of those types of language. Trevor used both similes and irony but the observed number of uses was very small. To analyze these measures, I use the binomial test.

The binomial test is an exact, non-parametric test that determines the probability of observing *k* number of successes (in this case, similes observed in the ASD group) among *n* number of trials (in this case, utterances) compared to another distribution (in this case, the ratio of similes to utterances in the mixed group session). This is ideal for answering the secondary research question, which

seeks to investigate whether people with ASD communicate differently with other people with ASD compared to communicating with NT people. Therefore, this analysis compares the probability of observing a given measure of the participant in the ASD group to the distribution of observations of the same measure in the mixed group. Due to this test being an exact test, rather than an approximate test, it works equally effectively with small numbers and large numbers. In cases whereby a measure is not observed at all in the mixed group, this test cannot be used as the ratio of the measure in the mixed group would be zero.

*Figure 4.3 - Probability of Observing the Same Ratio of Similes to Utterances in the ASD Group as the Mixed Group for Trevor*



It can be seen in Figure 4.3 that there was a non-significant trend for Trevor to produce more similes than expected, based on the distribution of similes he produced in the mixed group, while he was in the ASD group ($p = 0.093$). As similes were not used by the other participants at all and rarely used by Trevor, this could indicate a couple of different things.

A possibility is that similes are simply not that common in general, but one variable that has not been addressed here is the topic of conversation. It is likely that casual conversations over Scrabble and other board games do not lend themselves to a great number of similes. Trevor does not use similes when talking about games but rather when discussing the nature of autism, as well as when relating hypothetical entities to the real world. For example, Trevor was explaining the nature of a "Mechanical Soft Drink" to the other participants in the ASD group and essentially said that if a meal is processed in a blender so that it can be imbibed, it is a mechanical soft drink. He then gives an example for clarification wherein he uses the following simile:

*Conversational Example 4.2(ASD Group)*

*Trevor: So you can even you could throw Wendy's in a blender if [you wanted to]*
*Darryl: [Wh- wh- wh- wh- wh- what d-]*
*Trevor: &It would taste §like crap*

In example 4.2, from the ASD group session, Trevor is comparing the hypothetical mechanical soft drink consisting of food from Wendy's put in a blender to what it might taste like in the real world if one were to prepare and

drink it: crap. Below are the other examples of similes that were in the transcripts.

*Conversational Example 4.3 (Mixed Group)*

*Zack: poker is is more like≈*
*Adrian: ≈poker is mind games*
*Zack:: yeah let us say like-*
*Trevor: &yeah it does seem [§like kind of a mind-]*
*Zack: [because] it has a lot of strategy*

In example 43, Trevor is reiterating Adrian's earlier comparison of poker to mind games as a simile, though he abandons the utterance when overlapped by Zack.

*Conversational Example 4.4 (ASD Group)*

*Trevor: This is the worst looking airplane I have ever seen*
*Robert: Hm*
*Trevor: It is more §like a boat*

The exchange in example 4.4 occurred when the participants were coming toward the end of the session and were getting bored of the board games. They decided to make paper airplanes instead of playing more board games. Trevor folded a paper airplane that did not fly very well and he mused that it was the worst looking paper airplane that he had ever seen and compared its design to that of a boat.

*Conversational Example 4.5 (ASD Group)*

*Robert: I do not consider I do not consid- I am just [going to say I do not consid-]*
*Trevor: &[You got to look at it] as a difference not a disorder*
*Robert: Yes*
*Trevor: Yeah*
*Darryl: My goodness*
*Trevor: Because there is lots of talents that {come} with autism too*
*Robert: [Yeah]*
*Darryl: [Yep]*
*Trevor: Yeah*

*Trevor: It is just §like people with OCD and Tourettes [and] all these things you know most of the time you do not even notice it [because] people just control it in public*
*Robert: [Yeah]*

The exchange shown above in example 4.5 is an excerpt of a much larger conversation, which is analysed more fully later in this chapter as example 4.19. This exchange is part of a larger conversation about the nature of ASD and the individual views that the participants have about ASD. Trevor likens the situation of people with ASD to that of people with obsessive-compulsive disorder and Tourette's syndrome, namely that they can be 'invisible' disorders.

*Conversational Example 4.6 (ASD Group)*

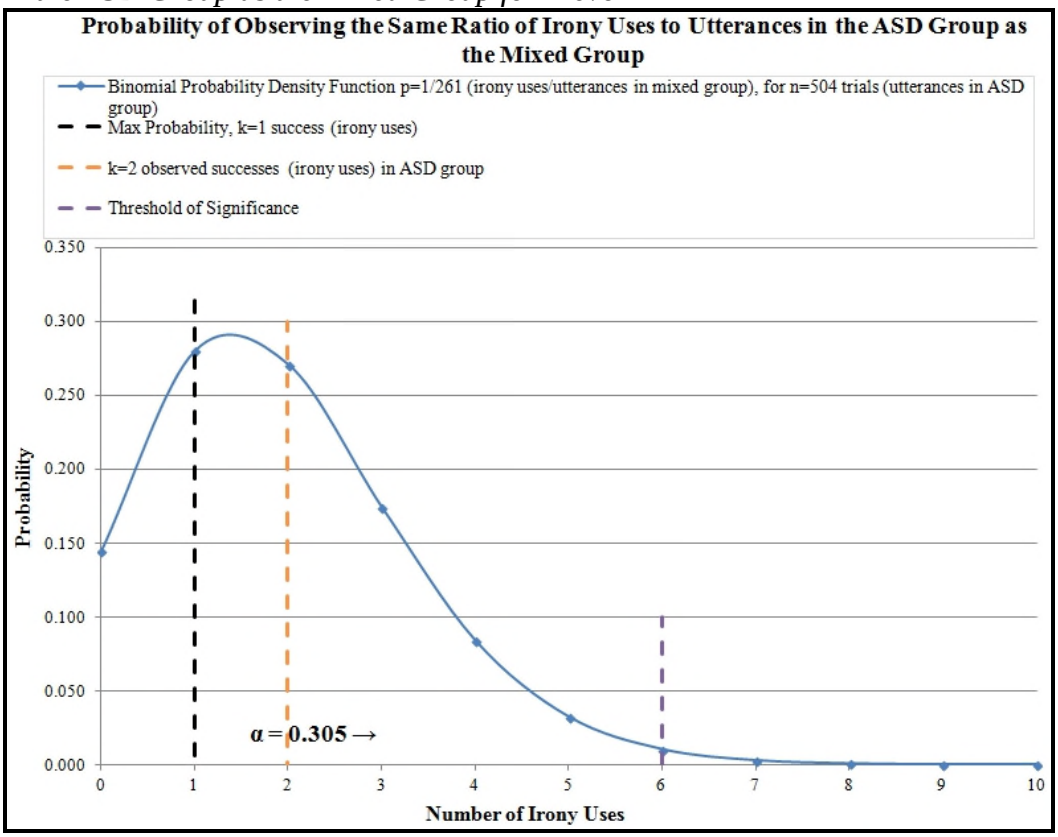
*Trevor: But I {find} uhm I am really {into} Iron_Man*
*Trevor: I think he was probably one of my favourites*
*Darryl: Ah*
*Trevor: Just because it is like-*
*Trevor: If you had ever read the comic he is actually that is actually Robert Downey Junior is exactly §like Iron Man*

This final simile occurred while the participants were discussing popular superhero movies. In this simile, Trevor likens the character Iron Man to the actor who plays him, Robert Downey Junior.

#### 4.3.3.2 Irony

Trevor's usage of irony between the mixed group and the ASD group was not statistically significant ($p = 0.609$), indicating that there is no evidence that his use of irony differs between the mixed group and the ASD group.

*Figure 4.4 - Probability of Observing the Same Ratio of Irony Uses to Utterances in the ASD Group as the Mixed Group for Trevor*




Irony was not frequently used at all in these sessions. The main type of usage of irony seen was sarcasm directed toward either their own, or another participant's performance at the board games they were playing, such as in the examples below from the ASD group.

*Conversational Example 4.7 (ASD Group)*

*Trevor: 1, 2, 3 points*
*Robert: Alright*
*Trevor: That is the lowest yet*
*Trevor: †Gotta love it†*

In the above example, Trevor is sarcastically talking about his performance on his most recent play. He also signals that he is speaking ironically by using a downward intonation as opposed to the upward intonation of enthusiasm.

*Conversational Example 4.8 (ASD Group)*

*Robert: Hey Darryl*
*Darryl: XXX*
*Darryl: Okay*
*Darryl: Okay*
*Darryl: So*
*Darryl: Okay so uh what do we have so far?*
*Trevor: So †interestingly enough† it is your turn.*

In conversational example 4.8 above, Trevor had been waiting for his turn for some time and was getting a bit frustrated with how long it was taking for Darryl to finish his turn. Over the minutes preceding the transcript excerpt shown above, Trevor and Robert had been talking amongst themselves about the weather while waiting for Darryl to take his turn. After their conversation about the weather ended, Darryl had still not taken his turn so Robert tried to get his attention and after a while, Darryl then responded, wondering what was going on. At this point, Trevor responds in a deadpan voice that it was ‘interestingly enough’ still Darryl’s turn.

*Conversational Example 4.9 (Mixed Group)*

*Zack: It could be cool playing multilingual scrabble*
*Zack: XXX from the start [that we’re going to] we’re going to we’re going to accept only English and Spanish*
*Trevor: [†oh gee that’s not {hard}†]*
*Zack: and then you can use English and Spanish words*

In example 4.9, Trevor is in the mixed group and he was not enjoying playing Scrabble and was not doing well in the game. He made a remark about how he could not play a word with the letters he had and then Zack started musing about what it would be like to play multilingual Scrabble. Zack starts talking about how it might work and Trevor overlaps him saying "oh gee, that's not hard" while speaking in a deadpan voice. Trevor was clearly not interested in playing multilingual Scrabble.

*Conversational Example 4.10 (ASD Group)*

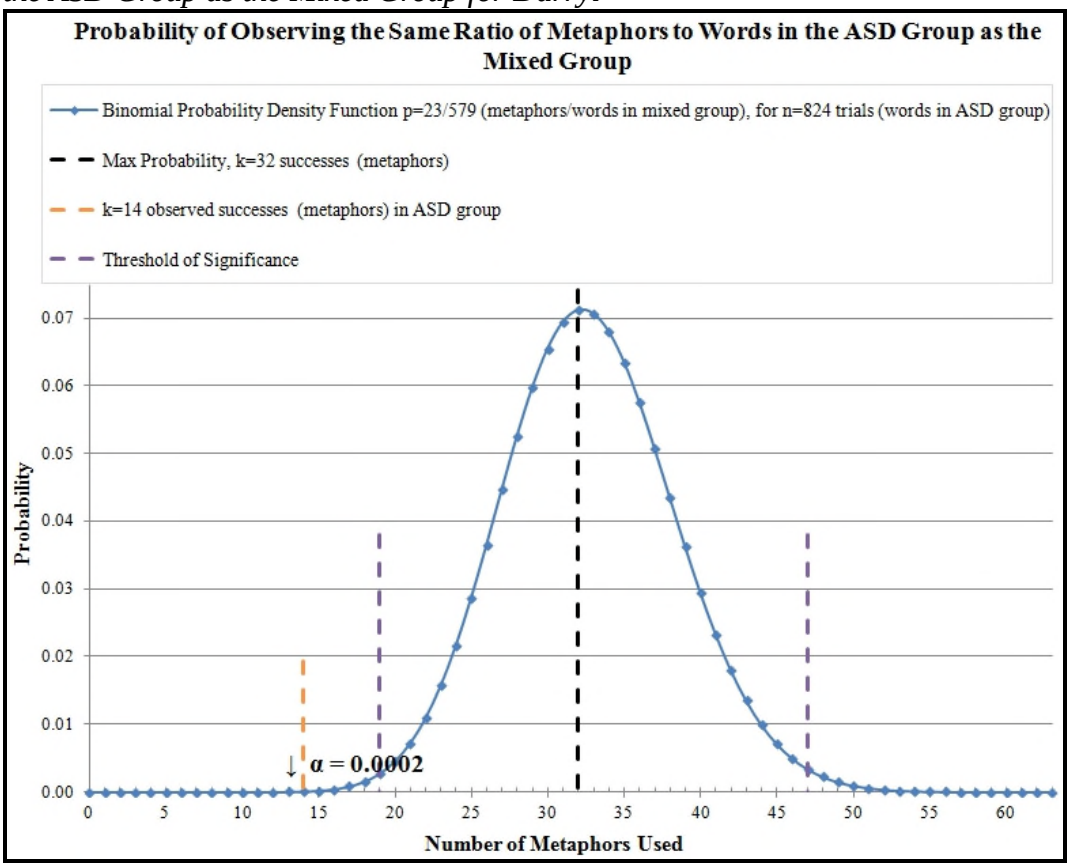
*Darryl: [But Andrew is not-]*
*Darryl: B- But my old [But my oldest brother Andrew] is not autistic*
*Robert: [I never heard the term altogether]*
*Robert: Okay*
*Darryl: He is perfectly fine*
*Robert: †[good] for him†*
*Trevor: [Hm]*
*Darryl: Yes*
*Robert: We're perfectly fine too*

This example occurs earlier in the exchange from which example 4.5 also originated, which is presented in its longer form in example 4.19. This is Robert's only example of using irony in the transcripts. At this point in the conversation, Darryl has been discussing other members of his family and whether they are autistic and if so, how severe their autism is. When Darryl mentions that his oldest brother is 'perfectly fine', Robert shifts his gaze down and away from Darryl, furrows his brow and says in a deadpan voice 'good for him'. Darryl agrees with him but Robert immediately follows up by saying, 'we're perfectly fine too'.

#### 4.3.3.3 Metaphor

In contrast to the other non-literal language measures, the usage of metaphors is present with all of the participants in both types of sessions.

*Figure 4.5 - Probability of Observing the Same Ratio of Metaphors to Words in the ASD Group as the Mixed Group for Darryl*




As was shown in Figure 4.5, Darryl uses far less metaphors in the ASD group session than would be expected given the amount of metaphors he used in the mixed group session. This probability is statistically significant (p = 3.047E-04). During the mixed sessions, all of the metaphors that Darryl uses are related to the game of Scrabble.

*Conversational Example 4.11 (Mixed Group)*

*Darryl: Your {turn}?*
*Zack: Yeah*
*Zack: Damn it*
*Darryl: Cannot {go}?*

In this example, 'turn' and 'go' have specific metaphorical meanings that are related to the context of game-playing. In the mixed group session, Darryl and the other participants use these words commonly.

In the ASD group session, a very different pattern was observed. Only one of the metaphorical words that Darryl uses in the ASD group session is related to the game being played. The rest are related to other discussions.

*Conversational Example 4.12 (ASD Group)*

*Darryl: &That is that is something that tells me what to do*
*Trevor: Leave and breathe?*
*Darryl: Yep*
*Trevor: Nice*
*Trevor: So if you ever do not know what to do you look down?*
*Trevor: Like XXX*
*Darryl: Yep*
*Darryl: Whenever I er-*
*Trevor: &What would you-*
*Darryl: &Whenever I need a break- whenever I need a {break} or something*
*Darryl: Whenever whenever Samuel is losing his {losing} his {marbles}*

This example shows a number of metaphoric words including constituent words in the idiom 'to lose one's marbles'. These words are more traditional examples of creative metaphors. These show that Darryl does not seem to have an issue with

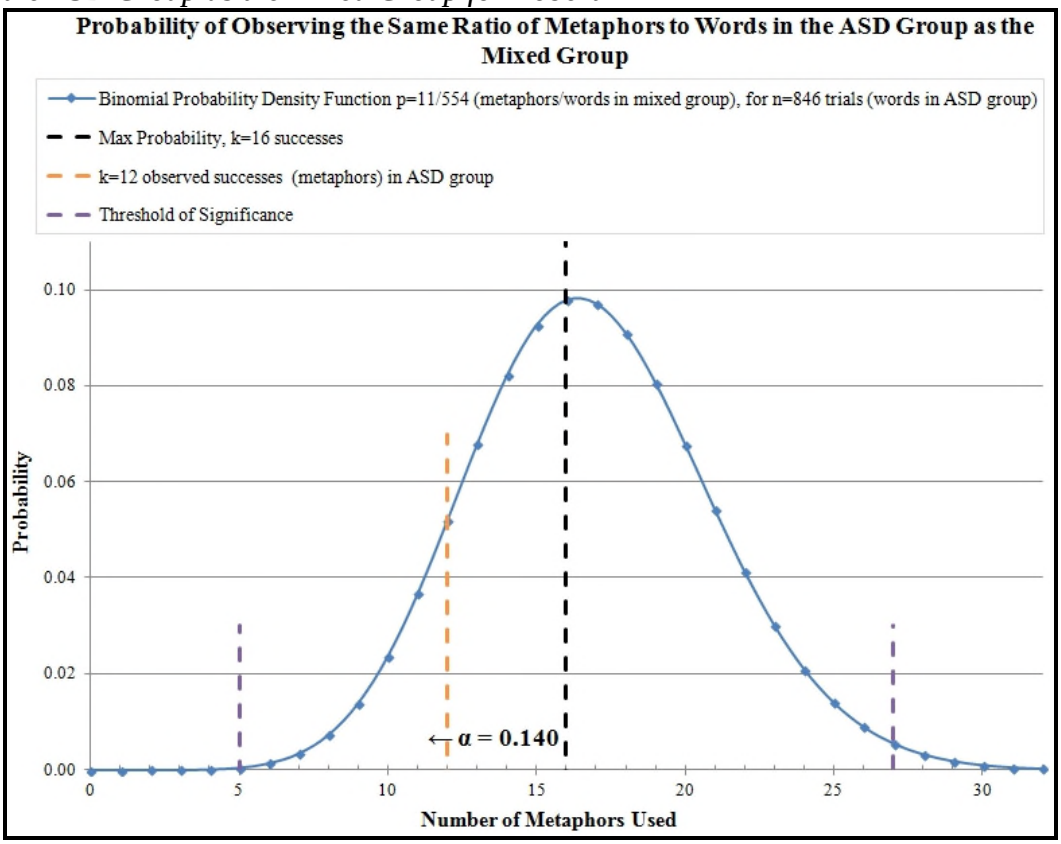
using metaphors to help explain and illustrate a situation. Particularly fascinating is the example below:

*Conversational Example 4.13 (ASD Group)*

*Trevor: Who is Samuel?*
*Darryl: That is my middle brother*
*Darryl: I have 65 percent {autistic} brother*
*Robert: Okay?*
*Trevor: So h- how is it 65 percent {autistic}?*
*Darryl: 65 percent or more more worse*
*Robert: Hm*
*Trevor: How how do you get a d- diagnosis of that though?*
*Darryl: Oh that is the way we are made*
*Robert: Okay?*
*Darryl: Eventually-*
*Trevor: &Is that how you were diagnosed?*
*Trevor: Like did the doctors said you were like 65 percent {autistic}?*
*Trevor: [So what is the] other 35 or whatever?*
*Darryl: [No no no no no no]*
*Darryl: I- I- I- If Samuel Samuel is 65 percent [and I am only] 25 percent mild*
*Trevor: [Oh I just never-]*
*Robert: [Okay]*
*Trevor: [Oh]*

This exchange is interesting: Darryl creates a novel metaphor that Trevor and Robert question, and then Darryl goes on to explain it. His metaphor changes autism from a binary condition, that one either has or does not have, to something that people have in varying percentages as a metaphor for severity. It is a very unique conceptualization and shows a great deal of creativity especially in its accessibility to a wider audience.

*Figure 4.6 - Probability of Observing the Same Ratio of Metaphors to Words in the ASD Group as the Mixed Group for Robert*




Similarly to Darryl, Robert uses fewer metaphors in the ASD group than expected, though this is not statistically significant in Robert's case ($p = 0.279$). In the mixed group, Robert uses only metaphors related to gameplay, as seen in conversational example 4.14 below as that was the topic that dominated this mixed group session.

*Conversational Example 4.14 (Mixed Group)*

*Simon: you can uh you mean like you cannot make a word {out} of them?*
*Robert: I can't d- don't {see} how I can honestly*
*Robert: well I could make a {dirty} word but I do not know if I can-*
*Simon: &you could ah well I can I can see the word see*
*Simon: Uhm*

In this example, Robert uses metaphors of 'seeing' a move to play in the current game of Scrabble that he was playing and creating a 'dirty' word, meaning an inappropriate word. In the ASD group, Robert's use of metaphors is evenly mixed between game-related and non-game-related; he uses six metaphors related to an ongoing game and six that are not, as seen in the two examples below.

*Conversational Example 4.15 (ASD Group)*

*Robert: Okay I could uh or I could use the R and {go} {up}*
*Trevor: Yeah or you could use the R and {go} {up} but you would have to form the word-*
*Robert: [Oh-]*
*Trevor: [I do] not think you can-*
*Robert: I think I could*

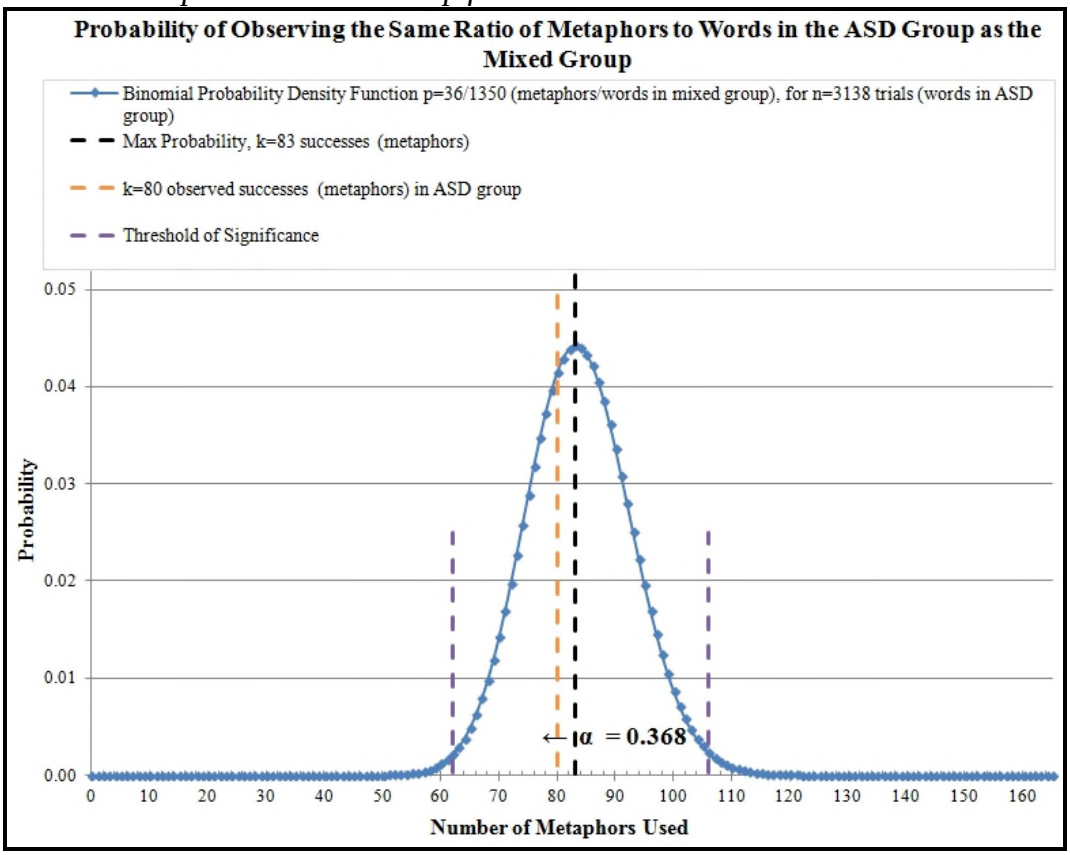
In this example, Robert is referring to playing letter tiles toward 'the top' of the board starting with an already played R tile.

*Conversational Example 4.16 (ASD Group)*

*Robert: Well my my brother's birthday {on} the other {hand} is near the end of the month on the thirtieth of December*
*Robert: [End of the year]*
*Trevor: [See that is the worst] time to be born is at the right at the end of the year because you are younger than everybody*
*Darryl: Yeah*
*Robert: Mhm*

In this example, the participants are discussing birthdays and Robert brings up how his brother's birthday is at the end of the year. Robert uses the idiom 'on the other hand' containing the metaphorical words 'on' and 'hand'.

*Figure 4.7 - Probability of Observing the Same Ratio of Metaphors to Words in the ASD Group as the Mixed Group for Trevor*




Trevor, similarly to the other participants, uses fewer metaphors in the ASD group than was expected given his use of metaphors in the mixed group. The difference in Trevor's usage of metaphors in the ASD group compared to the mixed group was not statistically significant ($p = 0.736$). However, the numbers do not tell the whole story. What is interesting about Trevor's metaphor use is the

pattern of usage that emerges. Trevor's conversations are far more varied than those of Robert and Darryl are. Not being a fan of board games, Trevor only plays a single game of Scrabble in each session. He does not talk much about the game, except to ask about the rules, in either session. He tends to talk about other subjects given the chance. That said, in the mixed group, his use of metaphors always occurs during conversations about games including the excerpt below from the mixed group session:

*Conversational Example 4.17 (Mixed Group)*

*Adrian: [He is done]*
*Trevor: [So you are] done so you are the {asshole} <> right?*
*Adrian: <He gets {president}>*
*Zack: <I am the {president}>*
*Trevor: I thought the person who got {eliminated} first is the {asshole}*
*Zack: I am not {eliminated} I got rid of all my cards first*
*Zack: You want to get rid of your cards*
*Trevor: [Okay] so you won technically [] so now we are placing se-*
*Adrian: [Yeah right]*
*Zack: [Yeah]*
*Adrian: &So now we play for {neutral}*
*Trevor: Now we are [placing XXX] for the {bronze} and {silver}*
*Adrian: [We are playing for {neutral}]*
*Zack: Yeah pretty much*

In this example, the participants are discussing the results of the first round of their game and they use metaphors to refer to their rankings in the game. Trevor changes metaphors part-way through, from the terms specific to the game denoting the placement of players based on when they were removed from the game, the a medal ranking system such as that used in the Olympics. It is

interesting that this change takes place and that the cohesion and comprehensibility of both metaphors are maintained. This demonstrates a level of comfort and adeptness at using metaphorical language. In the ASD group, there are many examples of Trevor using metaphors not related to game playing. In the ASD group, Trevor tended to dominate the conversation and thus he chose topics besides game-playing.

*Conversational Example 4.18 (ASD Group)*

*Robert: Mhm*
*Robert: I think uh I think Captain America can actually be a perfectly interesting hero if you know XXX-*
*Trevor: &If he had personality he would be better though*
*Robert: No he-*
*Trevor: &Like he is kind of just very {straight} faced*
*Trevor: Like he he is good at kicking {ass} do not {get} me wrong but-*
*Darryl: [XXX]*
*Robert: [No he has a pers-] no he has a personality*
*Robert: He is an idealist though*
*Trevor: Yeah I just {find} like-*
*Trevor: Like when you watch The Avengers especially you can see that Hulk I {find} and Iron Man were the ones that {stood} {out} versus Thor and Captain America I {found} were a little bit {1lame} but-*
*Trevor: They are still good I guess*

The participants are discussing their favourite comic book characters in film and, as can be seen by this example, there is some difference of opinion between Trevor and Robert. Most of Trevor's metaphors from this example are parts of idioms and phrasal verbs. Before moving on to the turn taking measures, it is important to look at one final extended example that shows not only more metaphor use by Trevor but is a conversation that engages all of the participants in

a very personal way about the nature of autism itself. This excerpt, from the same ASD group, immediately follows the last example listed for Darryl:

*Conversational Example 4.19 (ASD Group)*

*Robert: [I see]*
*Trevor: [I never] heard of of it said that way because I am mild too but [I they] just say Autism Spectrum Disorder*
*Darryl: [You are mild]*
*Trevor: They <do not say> you know it is really mild so it is only this percentage or-*
*Robert: <Yeah>*
*Darryl: <Yeah>*
*Robert: &Yeah*
*Trevor: [It is very {mathematical}]*
*Robert: [I never hear- I never heard that term]*
*Darryl: [But Andrew is not-]*
*Darryl: B- But my old [But my oldest brother Andrew] is not autistic*
*Robert: [I never heard the term altogether]*
*Robert: Okay*
*Darryl: He is perfectly fine*
*Robert: †[good] for him†*
*Trevor: [Hm]*
*Darryl: Yes*
*Robert: We are perfectly fine too*
*Robert: I do not consider I do not consid- I am just [going to say I do not consid-]*
*Trevor: &[You got to {look at} it] as a difference not a disorder*
*Robert: Yes*
*Trevor: Yeah*
*Darryl: My goodness*
*Trevor: Because there is lots of talents that {come} with autism too*
*Robert: [Yeah]*
*Darryl: [Yep]*
*Trevor: Yeah*
*Trevor: It is just §like people with OCD and Tourettes [and] all these things you know most of the time you do not even notice it [because] people just control it {in} public*
*Robert: [Yeah]*
*Darryl: [Yep]*
*Robert: [Yeah]*

*Darryl: [Yeah]*
*Robert: Mhm*
*Trevor: You know?*
*Darryl: Very {hard}*
*Robert: Huh yeah*
*Darryl: Okay then*
*Trevor: Seems like we all have tics too*
*Trevor: I like that*
*Trevor: I have tics*
*Robert: Mhm*
*Trevor: It is kind of just uh something that {comes} {along} with it I do not even know if it is Tourettes or Autism or what*
*Trevor: Everyone is different*
*Trevor: Does not matter*
*Robert: Mhm*
*Robert: That is a great way of {looking at} it*
*Darryl: Yep*
*Darryl: great way of {looking at} it*

In this example, taken from the ASD group session, all of the ASD participants are discussing autism and what it entails and the public perceptions of it. This example also contains Robert's only use of irony from the data (*†[good] for him†*) which was previously discussed in example 4.10. The participants, especially Robert and Trevor do not believe that there is anything wrong with being autistic and that it is a difference rather than a disorder and by the end of the exchange Darryl seems to agree. It is interesting to observe that Darryl interjects a number of times in agreement after expressing shock early in the exchange 'my goodness'. It could be that instead of actually agreeing with the others, Darryl is instead trying to end the conversation after realizing that the other participants might have been upset or offended by what he had said. If that were the case, it

would indicate a level of conversational insight that is quite notable given his scores on the CCA-2.

#### 4.3.3.4 Non-Literal Language Measure Results Summary

The use of similes in the conversation sessions was quite limited. Similes were only used by one participant, Trevor. Trevor's use of similes seemed to depend on the topic of conversation and casual conversations over playing board games may not lend themselves to producing similes or irony, for that matter.

The use of irony in the conversation sessions was also limited. Robert only used irony in the ASD group while Trevor used irony in both types of sessions but neither used irony much at all. All of Trevor's uses of irony were in relation to board games, as he did not really like board games at all. Robert's only use of irony occurred during a discussion of the nature of ASD.

In terms of metaphors, all of the participants used metaphors, however, only Darryl's use of metaphors differed between the mixed and ASD groups in a statistically significant way. That being said, it is important to note the patterns of metaphor use. In the mixed group, Darryl only uses metaphors related to playing board games. In the ASD group, Darryl only uses a single game-related metaphor and the rest of his metaphor use is to explain and provide examples of concepts. Like Darryl, in the mixed group, Robert only used gameplay-related metaphors. In the ASD group, however, Robert used both game-related and non-game-related

metaphors evenly. Trevor displayed a different pattern of metaphor usage than Robert and Darryl. Trevor abhorred board games and in the ASD group did not really speak about them, let alone use many metaphors about them and he instead spoke about other topics. In the mixed group, however, his main use of metaphors was related to board games. The fact that most of the participants used more metaphors about specific situations, in this case playing board games, is supported by previous research. Several qualitative studies that have looked into use of conceptual metaphors have shown that metaphors are more commonly produced in situations that are difficult to explain or understand such as in grieving (Moules, Simonson, Prins, Angus, & Bell, 2004) or experiencing serious illness (Gibbs & Franks, 2002). These studies focused on creative metaphors rather than dead metaphors but it stands to reason that there may be circumstances whereby dead metaphors are more commonly produced, such as in the case of playing board games.

One of the only studies looking at metaphor production in everyday conversation looked at interactions in same-gender dyads over chat software in different situations (Hussey & Katz, 2006). In that study, the researchers asked undergraduate university students to engage in conversation over internet chat software about university courses. The students were organized into single gender dyads, half in which the participants were friends and half in which the participants were strangers. Each dyad had two online conversations, both lasting

18 minutes. One conversation occurred in which both participants were told to collaborate and come up with a way to convince other students to take a particular university course. The other conversation involved one participant being asked to persuade the other participant to take a particular university course and the other participant was instructed to be skeptical about the course (Hussey & Katz, 2006, pp. 79–81). In that study, each participant produced an average of 19.95 metaphors over the course of two 18-minute online conversations (Hussey & Katz, 2006, p. 85). There were no differences in the usage of metaphors across the two types of conversations (Hussey & Katz, 2006, p. 85). The researchers also found that men produced more metaphors than women did and that men did not differ in how they produced metaphors based on familiarity with the other interlocutor (Hussey & Katz, 2006, p. 88). While the number of metaphors observed in that study does not match what was observed here, it should be noted that the study by Hussey and Katz (2006) was more controlled and participants therein were given the task of persuading the other interlocutor or working together to persuade a third party and instructed accordingly. This task was chosen specifically because the researchers felt that the conversations therein "would be more likely to elicit metaphors" (Hussey & Katz, 2006, p. 78). It is also possible that computer mediated communication may not be completely analogous to face-to-face interactions in terms of metaphor production (Hussey & Katz, 2006, p. 92).

### 4.3.4 Turn Taking Measures

As stated previously in the Methods chapter, three turn taking measures are being analyzed here: latches initiated, interruptions initiated, and overlaps initiated. Latches occur when a participant starts their conversational term early, causing the previous participant to cede their conversational turn, but continues the previous participant's utterance and specific topic. Interruptions occur when a participant begins their conversational turn early and the previous participant cedes their conversational turn. Overlaps occur when a participant commences their conversational turn early but the previous participant does not give up their conversational turn and keeps talking, ending up with two or more participants talking at the same time. Table 4.5 below contains the following counts per participant per group session: utterances, conversational turns, latches initiated, interruptions initiated, and overlaps initiated.

*Table 4.5 - Observed uses of different types of turn taking measures per participant per session*

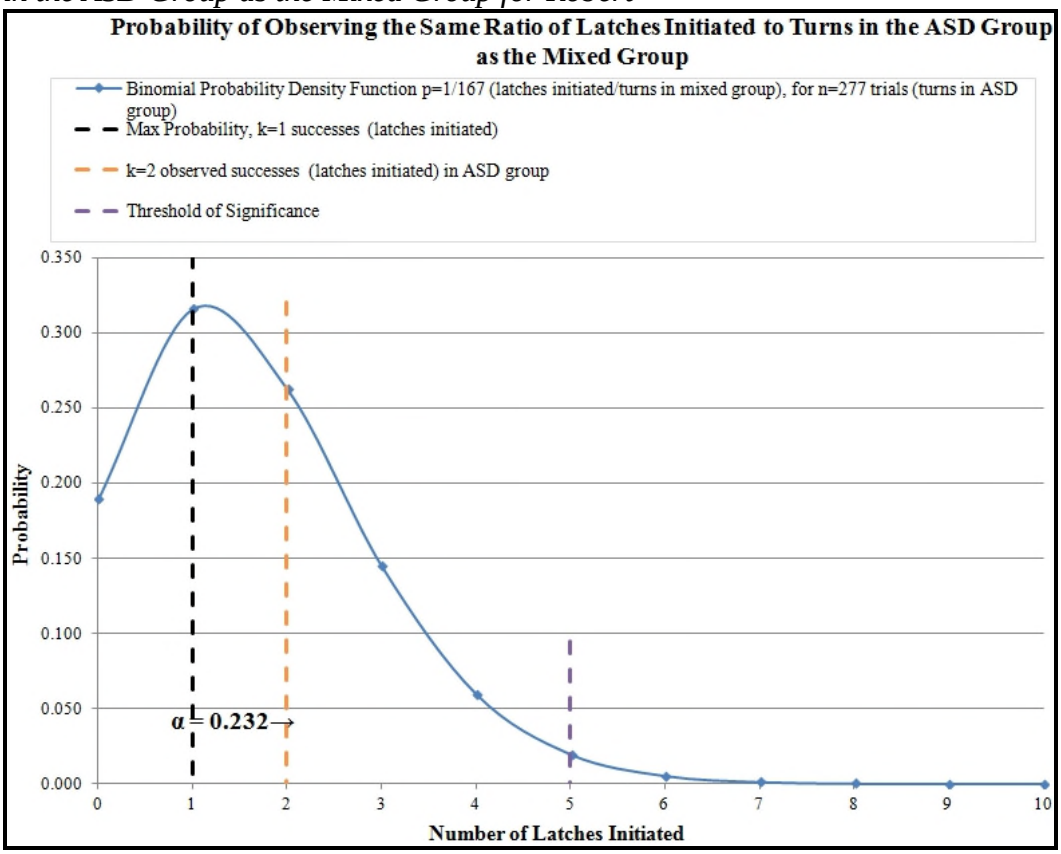
| | **Darryl** | | **Robert** | | **Trevor** | |
|---|---|---|---|---|---|---|
| **Measures** | **Mixed** | **ASD** | **Mixed** | **ASD** | **Mixed** | **ASD** |
| Utterance Count | 181 | 278 | 206 | 362 | 261 | 504 |
| Turn Count | 143 | 216 | 167 | 277 | 189 | 334 |
| Latches Initiated Count | 0 | 0 | 1 | 2 | 4 | 3 |
| Interruptions Initiated Count | 1 | 6 | 1 | 6 | 9 | 26 |
| Overlaps Initiated Count | 11 | 51 | 57 | 53 | 40 | 50 |

#### 4.3.4.1 Latches

It is important to separate latches from interruptions because they indicate

a different type of communicative behaviour: instead of disrupting conversation to change a topic, latches are done for clarification, support, and interest, which could be considered more positive social behaviours. Darryl did not use any latches in either group so I was unable to run a binomial test for this measure for him.

*Figure 4.8 - Probability of Observing the Same Ratio of Latches Initiated to Turns in the ASD Group as the Mixed Group for Robert*




The difference in Robert's initiation of latches in the ASD group compared to the mixed group was not statistically significant (p = 0.463). Robert uses more latches in the ASD group than in the mixed group but only one more (two latches

in the ASD group compared to one latch in the mixed group). The example of a latch in the mixed group is one whereby Robert attempts to finish Simon's utterance while Simon pauses. However, Simon resumes speaking, overlaps him and finishes the utterance himself.

*Conversational Example 4.20 (Mixed Group)*

*Simon: double letter {on} the≈*
*Robert: ≈[1]*
*Simon: [1] that is 2 5 6*

Of Robert's two latches in the ASD group, the first is one occurs when Robert pipes in to remind Trevor of Darryl's name.

*Conversational Example 4.21 (ASD Group)*

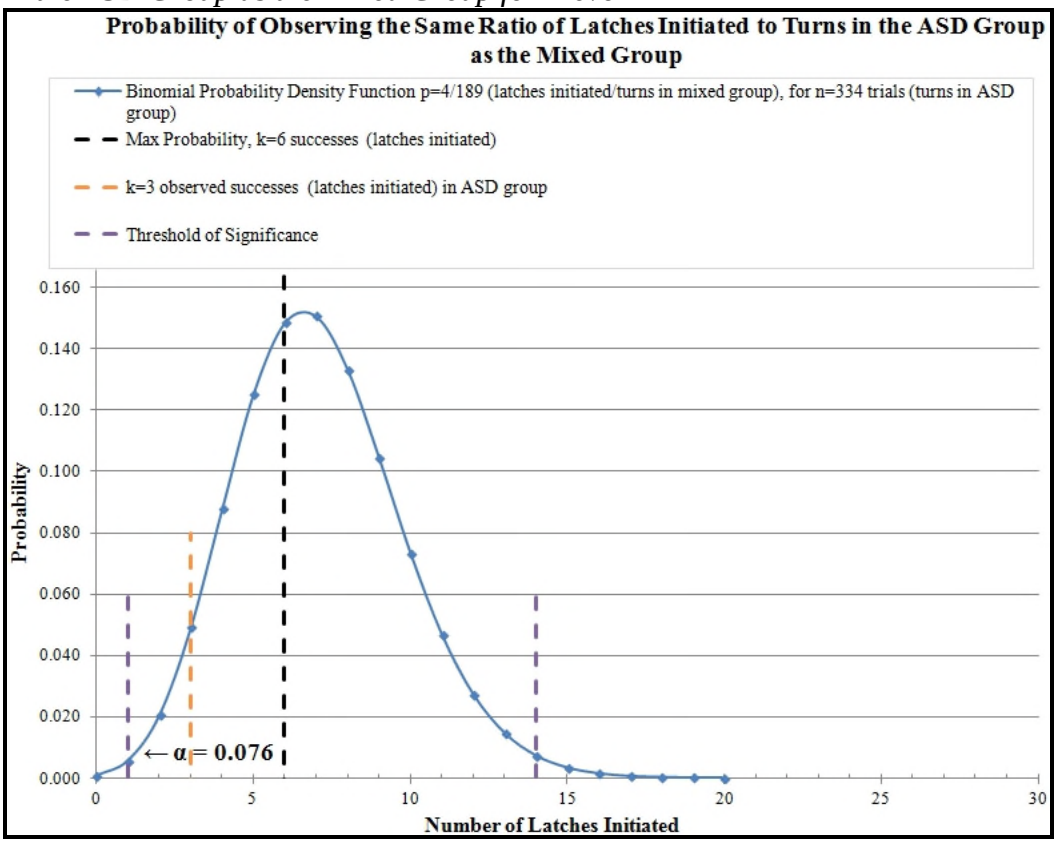
*Trevor: And now it is your turn≈*
*Robert: ≈Darryl*
*Trevor: Darryl*

The second use is a situation more akin to his usage of latches in the mixed group, related to gameplay and point counting.

*Conversational Example 4.22 (ASD Group)*

*Robert: So how much is Dar- many does Darryl have?*
*Darryl: Uh 12ish*
*Trevor: Oh he has uhm≈*
*Robert: ≈10?*
*Trevor: No he has more*

*Figure 4.9 - Probability of Observing the Same Ratio of Latches Initiated to Turns in the ASD Group as the Mixed Group for Trevor*




The difference in Trevor's initiation of latches in the ASD group compared to the mixed group was not statistically significant ($p = 0.152$). Trevor uses fewer latches in the ASD group than the mixed group. In the mixed group, Trevor uses latches two different ways. The first is to ask clarifying questions as in example 4.23 below.

*Conversational Example 4.23 (Mixed Group)*

*Zack: so basically you are going to have 3 {positions}*
*Zack: you are going to have a a {president} a neutral and a {bum} {ass} whatever you want to call it≈*
*Trevor: ≈isn't this the same game as 'asshole'?*
*Zack: yup*
*Zack: they are the same game*

The second use is to continue and build upon an existing conversation of interest as seen in the example below.

*Conversational Example 4.24 (Mixed Group)*

*Adrian: there is math there is there is math people who basically say oh i have a 53 percent chance of winning this {hand}*
*Zack: yeah*
*Adrian: all prob≈*
*Trevor: ≈probability [possibility]*
*Adrian: [and based on that] i will put this much in the pot or I will fold*
*Zack: yeah*
*Adrian: like if if≈*
*Trevor: ≈but then you got high risk the riskier people [] or*
*Zack: [yeah]*

In the ASD group, Trevor uses latches the same way as the previous example, as well as to assist in counting points and speed that process along. This can be seen in example 4.25 below.

*Conversational Example 4.25 (ASD Group)*

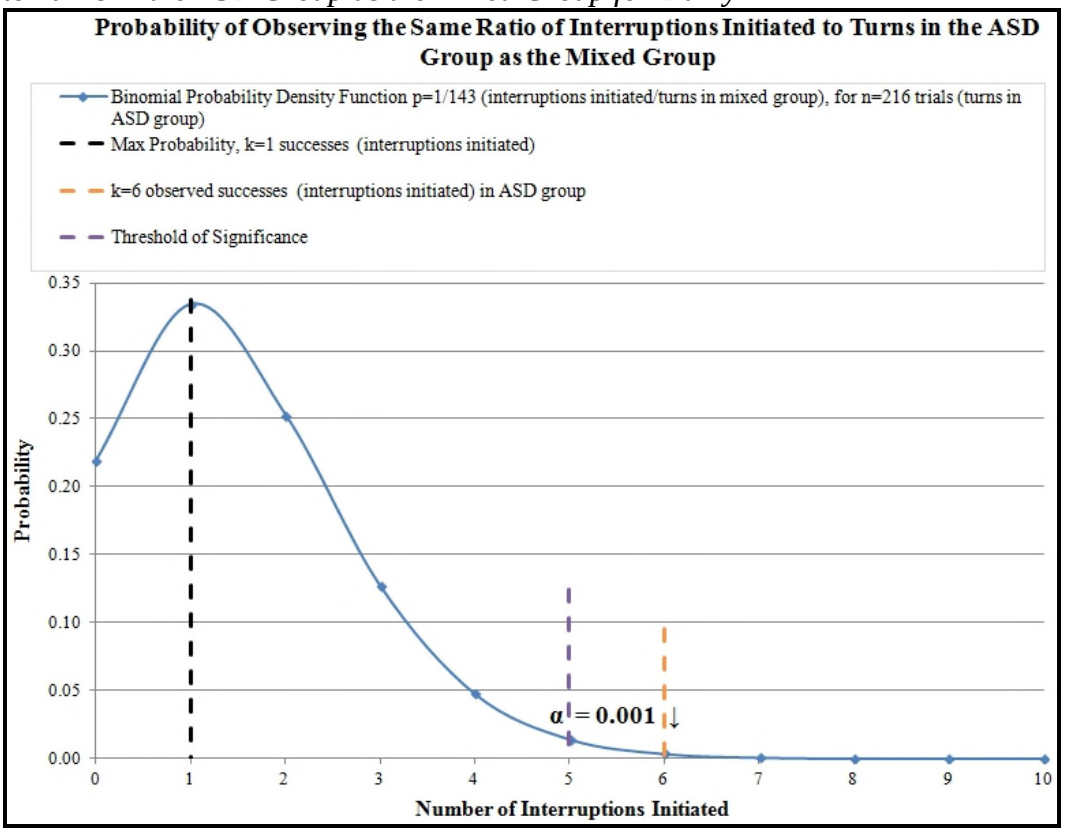
*Trevor: Makes you wonder how people did it though {back} before cell phones*
*Robert: Yeah they used to have to uh≈*
*Trevor: ≈You would have to wave somebody {down}*
*Robert: Yeah*
*Trevor: There you go*
*Trevor: That works*
*Robert: Okay now uh*
*Trevor: So uh [add a point]*

*Robert: [That is a 1] 2 3 and≈*
*Trevor: ≈4 5*
*Robert: Yeah*
*Darryl: Okay*

#### 4.3.4.2 Interruptions

Interruptions have been previously cited as a frequently observed behaviour in ASD (De Villiers et al., 2007), however in these previous studies, this behaviour has always occurred in an ASD-NT conversational pairing and the interaction observed tends to be in the course of a structured interview, rather than in a naturalistic interaction.

*Figure 4.10 - Probability of Observing the Same Ratio of Interruptions Initiated to Turns in the ASD Group as the Mixed Group for Darryl*




Darryl uses more interruptions in the ASD group than the mixed group. The difference in Darryl's initiation of interruptions in the ASD group compared to the mixed group was statistically significant ($p = 0.002$). In his only interruption in the mixed group, Darryl interrupts another participant to try to get the game started.

*Conversational Example 4.26 (Mixed Group)*

*Zack: Anyways uh 7 letters*
*Ivan: Right right*
*Zack: Each*
*Zack: That is [1 2 3 4 5] 6*
*Darryl: [How many do we each take]?*
*Zack: 7*
*Zack: Make sure you have 7 there*
*Darryl: I think I got 7*
*Ivan: 7 sweet*
*Zack: So um-*
*Darryl: &What word should we start off with?*
*Zack: Well w- I do not think it- I do not really care who {goes} first so*

In the ASD group, Darryl tends to interrupt to say things that are usually socially appropriate but may or may not have anything to do with the conversational topic as can be seen in the two examples below.

*Conversational Example 4.27 (ASD Group)*

*Robert: Alright my turn*
*Darryl: Can I go to bathroom?*
*Robert: You want to-*
*Darryl: &Can [I go to bath-]*
*Trevor: [You can do whatever] you want man*
*Darryl: Thank you*
*Darryl: Be right {back} as quickly as I can okay?*
*Trevor: Hey there's no rush man*
*Darryl: No rush*
*Trevor: No rush*

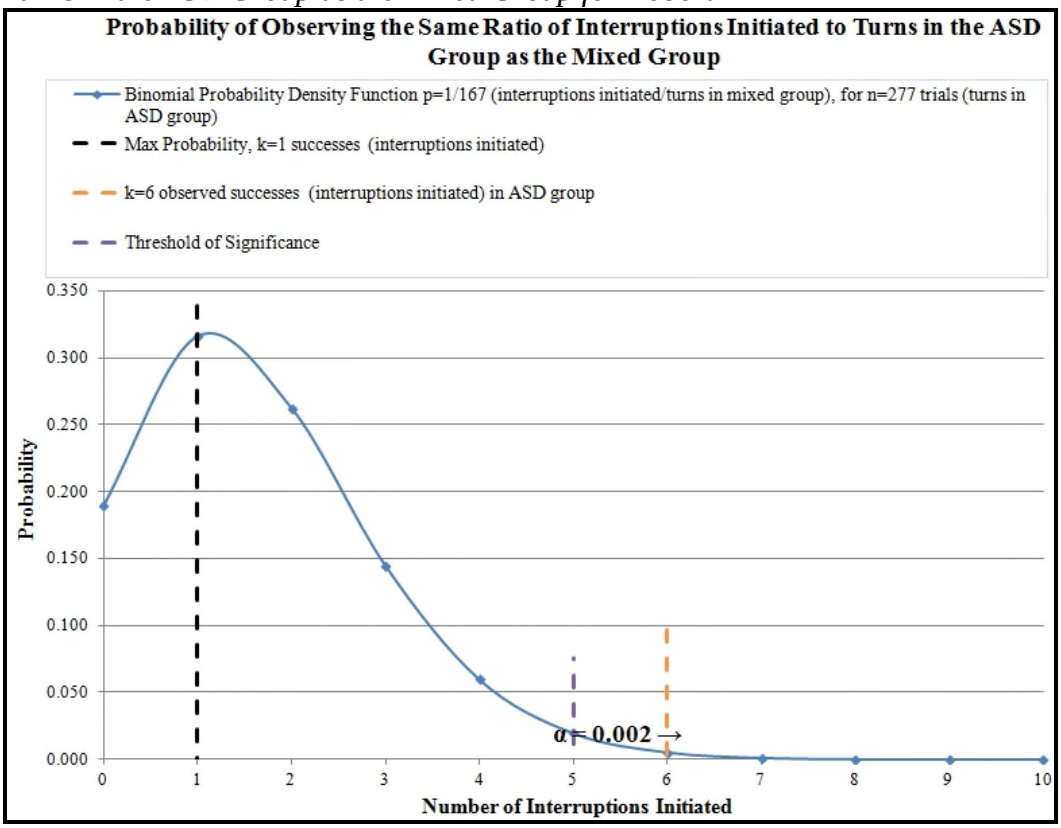
In this example, Darryl, is interrupting to repeat his question about going to the bathroom. It could be because he expected a quick response or the question was urgent but this is a common reason for interruption in conversation.

*Conversational Example 4.28 (ASD Group)*

*Trevor: So now you have more options because peer was just formed*
*Trevor: That will make it a little easier*
*Darryl: Hm*
*Trevor: Because when you got lots of _E_s-*
*Darryl: &Because you got to get get the right gear gear to do that*
*Trevor: [Well done]*
*Robert: [Okay]*
*Robert: Gear*

In this example, Robert has just played the word ‘gear’ in their game of Scrabble. Trevor is discussing the strategy of that particular move when Darryl interrupts and says a sentence containing the word gear. The other participants seem to ignore Darryl’s interruption and go back to their previous topic of discussion. Whenever Darryl plays a word in this game of Scrabble, he then follows it up with a sentence containing that word but this is the only time he does this for another player’s word and interrupts another person to do this.

*Figure 4.11 - Probability of Observing the Same Ratio of Interruptions Initiated to Turns in the ASD Group as the Mixed Group for Robert*




Robert uses more interruptions in the ASD group than would be expected given the number of interruptions initiated in the mixed group. The difference in Robert's initiation of interruptions in the ASD group compared to the mixed group was statistically significant ($p = 0.003$). In the mixed group, Robert's only interruption occurs when Robert is unsure if he can play on a word with the letters that he has during a game of Scrabble. Simon is listing off things that Robert could do to play and after four suggestions, Robert interrupts him and says 'Alright', acknowledging that there are other options.

*Conversational Example 4.29 (Mixed Group)*

*Robert: So is there any that I can continue off of?*
*Robert: Like I guess I could use the G but-*
*Simon: &Yep I mean there is a whole bunch of things you could do*
*Simon: if you have an S you could add an S to the end of a [word and {work}] off that*
*Cole: [Which XXX XXX anything]*
*Simon: Yeah you could uhm-*
*Simon: Even if you did something uhm-*
*Simon: You could just {plop} 1 tile down you know somewhere that completes a couple words or something like-*
*Robert: &Alright*
*Simon: Yeah*
*Robert: Alright*
*Simon: Yeah {take} your time though no rush at all we got lots of time*

In the ASD group, Robert interrupts mostly with an acknowledgement, similarly to the usage in the first group, as can be seen in the examples below.

*Conversational Example 4.30 (ASD Group)*

*Trevor: [I think] you have to form a new word*
*Robert: how c- how can I then?*
*Trevor: Well you can either go {up} to {down} or you can-*
*Robert: &I know*

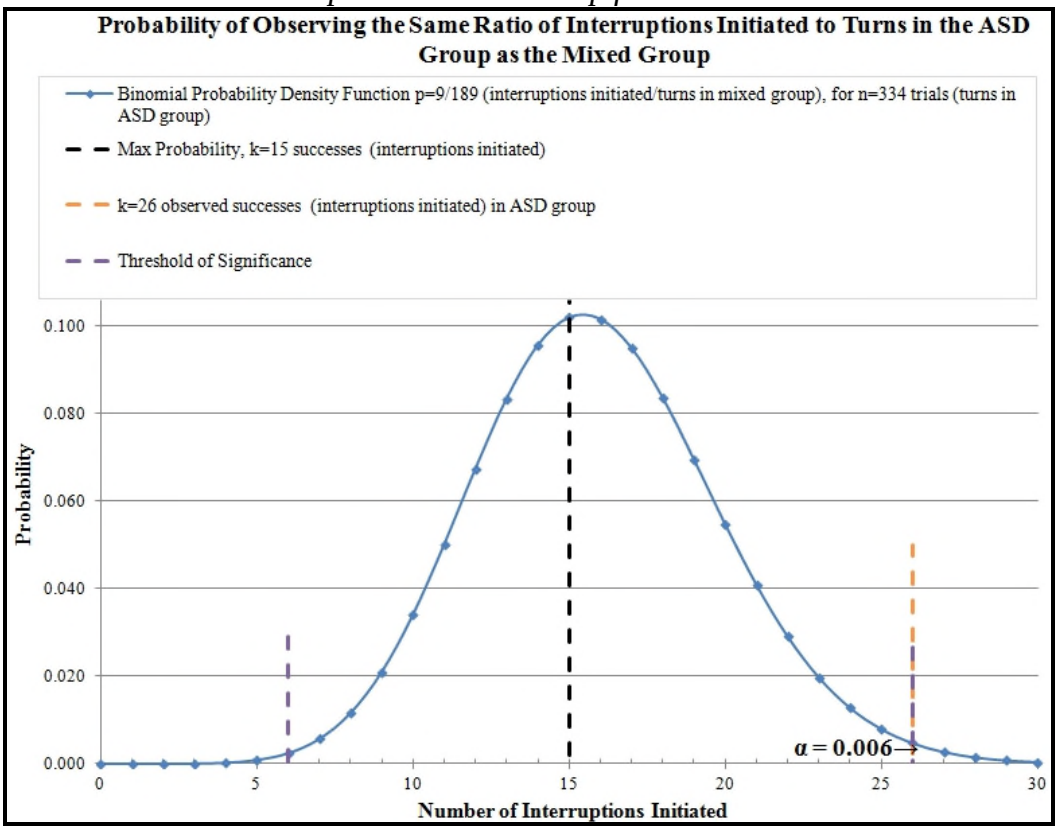
*Conversational Example 4.31 (ASD Group)*

*Trevor: [I do] not think you can-*
*Robert: I think I could-*
*Trevor: &I think you would have to read the rulebook to see if you can form a word {going} {up}*
*Trevor: Because I think you have to have it-*
*Robert: &Okay*

In both examples 4.30 and 4.31, Robert interrupts Trevor to acknowledge the information that Trevor has given him or otherwise cut Trevor off. Robert tends to be more passive in his social interactions, which may account for his overall lack

of interruptions. His interruptions with acknowledgements could also be indicative of frustration, especially given that Trevor interrupts him first in example 4.31.

*Figure 4.12 - Probability of Observing the Same Ratio of Interruptions Initiated to Turns in the ASD Group as the Mixed Group for Trevor*




Trevor initiates more interruptions in the ASD group than would be expected based on how many interruptions he initiated in the mixed group. The difference in Trevor's initiation of interruptions in the ASD group compared to the mixed group was not statistically significant but was in the tail of the distribution ($p = 0.011$). In the mixed group, Trevor used interruptions either to express his

surprise or to speed things along if he feels things are moving along too slowly. You can see both uses in the extended example below.

*Conversational Example 4.32 (Mixed Group)*

*Zack: bilingual scrabble trilingual scrabble would be pretty cool*
*Trevor: pretty {hard}*
*Trevor: it only suits people who speak multiple languages*
*Zack: eh a decent number of Canadians are bilingual*
*Zack: XXX-*
*Trevor: &oh*
*Zack: there is an e in axe*
*Trevor: oh is there?*
*Trevor: I thought it was just-*
*Trevor: oh okay*
*Trevor: I thought it was just an X*
*Trevor: alright*
*Zack: um but that is good*
*Zack: so you got um 10*
*Zack: 10 points*
*Adrian: oh that will be your {downfall}*
*Zack: yeah that is a good that is a good use of that*
*Adrian: okay so-*
*Trevor: &axed trade you just made two words then*
*Zack: yeah*

Trevor seems to be surprised by the information that Zack puts forward, namely that a decent number of Canadians are bilingual, and he interrupts with an exclamation. In addition, Trevor seems to be annoyed by the slow pace of gameplay and the back and forth between Zack and Adrian so he interrupts and summarizes the situation helping the gameplay to move on. In the ASD group, Trevor uses interruptions to move gameplay along and he uses interruptions when he is excited and talking about a topic that he enjoys such as in the example 4.33 below.

*Conversational Example 4.33 (ASD Group)*

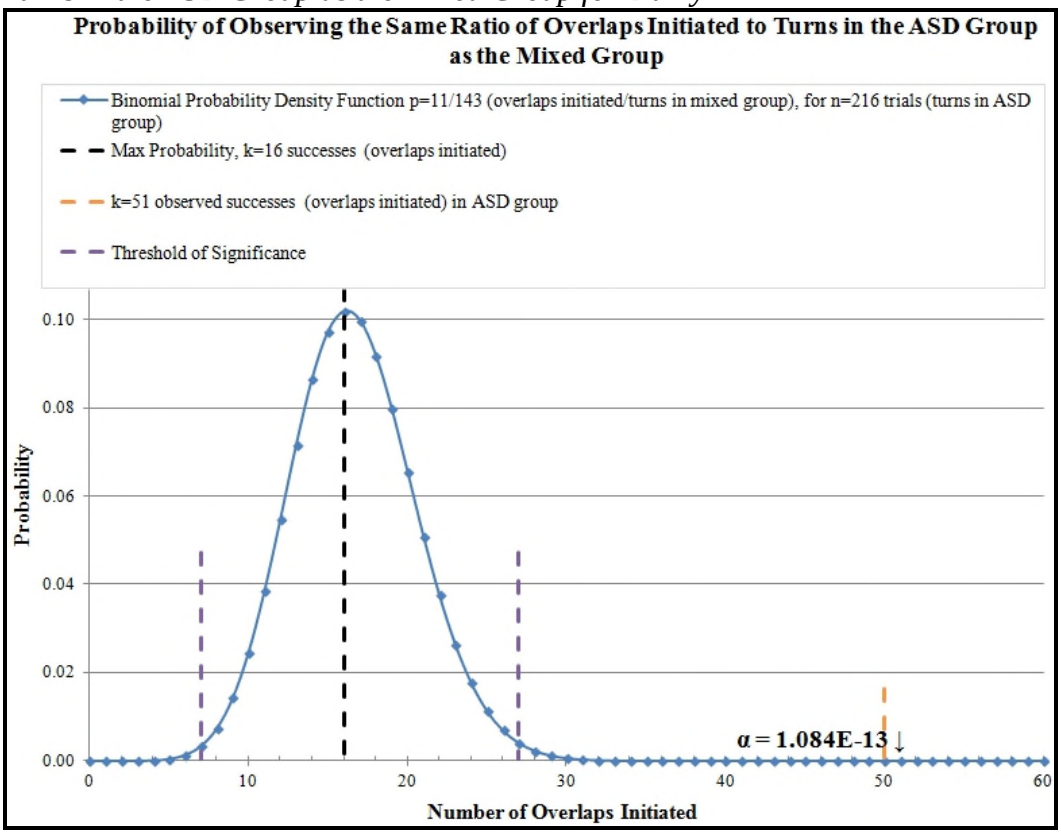
*Trevor: I have been cooking a steak in the crockpot at home*
*Darryl: The crock-*
*Trevor: &Let it cook for 8 hours and when I come home it is done*
*Trevor: Ready to go to eat ps*
*Darryl: Okay then*
*Trevor: I have been looking forward to this damn steak all day*
*Darryl: Uhuh*
*Trevor: What kind of stuff do you eat?*
*Darryl: Do I eat?*
*Trevor: What is your favourite foods?*
*Darryl: Huh steak and uh-*
*Trevor: &There you go*

In this example, Trevor is very excited about food and cooking, so much so that he interrupts Darryl with more information including the recipe and his agreement with Darryl that they both like the same foods. It is interesting to note that Trevor interrupts other participants, but is rarely interrupted himself, especially in the ASD group. This may be due to him being the most social of the participants and in turn dominating the conversation.

#### 4.3.4.3 Overlaps

Overlaps occur when a participant starts talking before another participant is finished and the participant being talked over refuses to yield their conversational turn. This leads to both participants talking over each other for a period of time and is the final type of turn taking violation that is addressed here.

*Figure 4.13 - Probability of Observing the Same Ratio of Overlaps Initiated to Turns in the ASD Group as the Mixed Group for Darryl*




Darryl initiates far more overlaps in the ASD group than would be expected based on his performance in the mixed group. The difference in Darryl's initiation of overlaps in the ASD group compared to the mixed group was statistically significant ($p = 2.17E\text{-}13$). Darryl's overlaps in the mixed group tend to be delayed repetitions of things other participants have said while the other participants are still talking, as can be seen in the examples below.

*Conversational Example 4.34 (Mixed Group)*

*Ivan:* *Did you get the≈*
*Zack:* *≈Yeah I [included] the double*
*Ivan:* *[Oh okay]*
*Ivan:* *oh right [here]*
*Darryl:* *[Double]*
*Ivan:* *My bad*

*Conversational Example 4.35 (Mixed Group)*

*Zack:* *I am sure you can make [something]*
*Ivan:* *[Aw] I totally can*
*Ivan:* *Bush*
*Zack:* *Aw you {took} my place*
*Ivan:* *[Oh]*
*Zack:* *[that] is alright*
*Zack:* *that is cool*
*Zack:* *Um 4 [5] 6 7 times 3 is 21*
*Darryl:* *[Bush]*

In both of these examples, Darryl overlaps other participants, repeating words said by another participant previously. At other times, Darryl overlaps other participants with utterances that do not seem to relate to the overall conversation.

*Conversational Example 4.36 (Mixed Group)*

*Zack:* *[Uh well] like {down} the {line} I would like to be a professor*
*Ivan:* *[Any idea yet]*
*Zack:* *[In history] or classics [and] thing is if not*
*Ivan:* *[Yeah that would be cool]*
*Ivan:* *[Sure]*
*Ivan:* *[Yeah] absolutely*
*Zack:* *[yeah]*
*Zack:* *[Just not so much]*
*Zack:* *[Yeah it happens]*
*Zack:* *[I am not] the uh I do not know a {ton}*
*Ivan:* *[Yeah]*
*Darryl:* *[Which president]?*
*Zack:* *[Yeah]*

In the example above, Darryl says ‘which president’ overlapping Zack when the conversation is not related to presidents or games involving presidents.

In the ASD group, most of Darryl’s initiated overlaps occur while the other participants are talking amongst each other and Darryl wants to add something to the conversation. The rest occur when he attempts to answer a question before the previous participant is finished speaking.

*Conversational Example 4.37 (ASD Group)*

*Trevor: It is really nothing it is not really that {hard}*
*Trevor: uh baking is actually {harder} than than cooking because baking is more of a science*
*Robert: [I see]*
*Darryl: [Yeah]*
*Trevor: Everything has to be exact mathematics*
*Robert: Uhuh*
*Darryl: [Yeah]*
*Trevor: [And everything]-*
*Trevor: With cooking you can do whatever you want*
*Robert: Yeah*
*Darryl: Yeah*

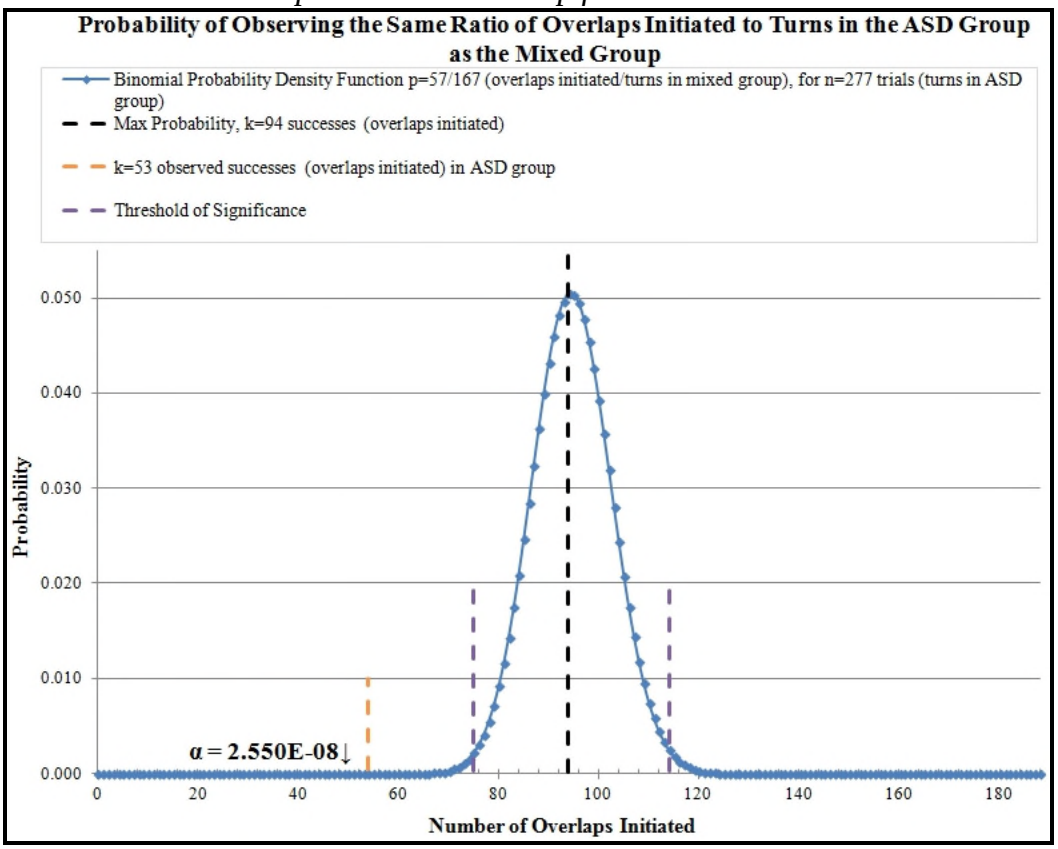
In this example, Darryl is overlapping Trevor and Robert when they are talking amongst themselves. This could be to try to get them to let him into the conversation or it could be him trying to signal to them that he is being left out. It could also be just a phatic ‘yeah’ signalling that he is following the conversation and is not voicing any dissention.

*Conversational Example 4.38 (ASD Group)*

*Trevor: I do not think you can add to a word that has already been [made]*
*Darryl: [how about] [this?]*
*Trevor: [yeah] you can do that*

In this example above, Darryl begins responding to Trevor's concerns about not being able to add to a word before Trevor has even finished his utterance.

*Figure 4.14 - Probability of Observing the Same Ratio of Overlaps Initiated to Turns in the ASD Group as the Mixed Group for Robert*




Robert initiates fewer overlaps in the ASD group than would be expected based on the number of overlaps initiated in the mixed group. The difference in Robert's initiation of overlaps in the ASD group compared to the mixed group

was statistically significant (p = 5.1E-08). In the mixed group, Robert only initiates overlaps to express surprise or agreement, as in the example below.

*Conversational Example 4.39 (Mixed Group)*

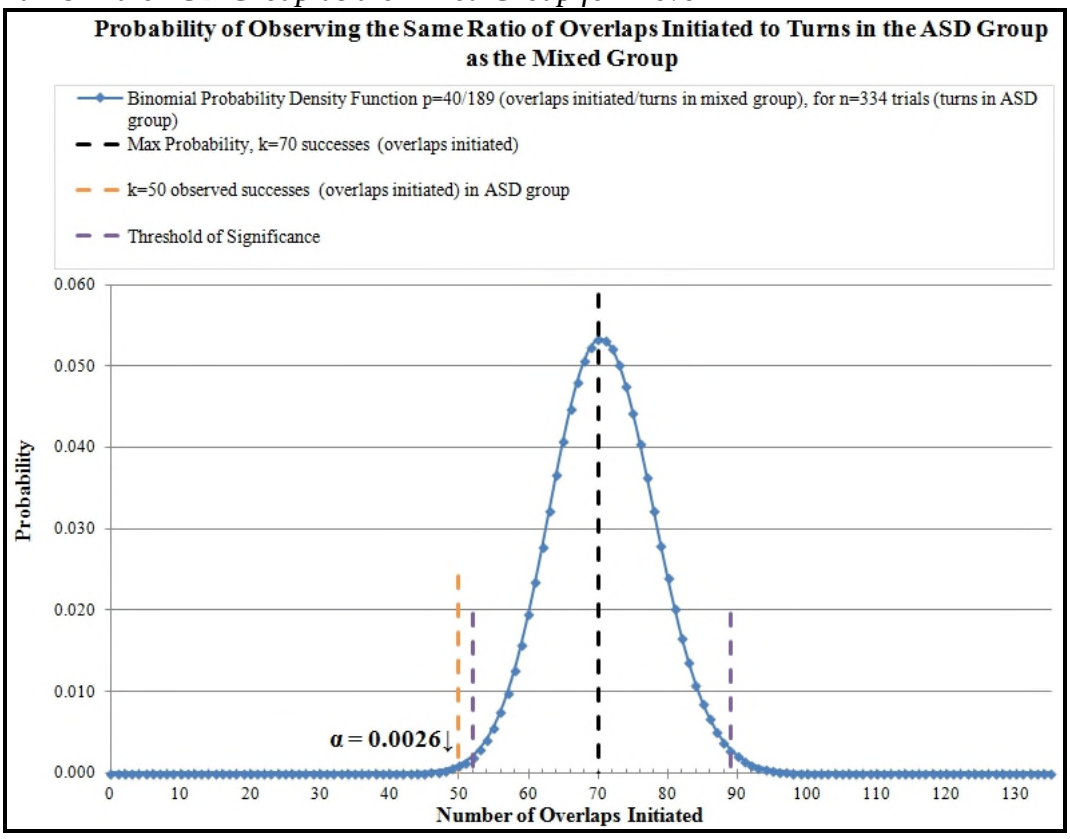
*Simon: Yeah music is kind of my thing [I play it]*
*Robert: [Wow]*
*Simon: I collect and like refurbish {vintage} guitars and uh-*
*Simon: Like I got my radio show and all that [stuff]*
*Robert: [Ah]*
*Simon: collect {vinyl} and stuff like that*

In the ASD group Robert's overlaps, similarly to Darryl's, tend to answer questions before the questioner has finished their utterance.

*Conversational Example 4.40 (ASD Group)*

*Robert: You should watch have you watched Winter Soldier?*
*Trevor: No [I I I] did not like the first one too much*
*Robert: [Well you should]*

*Figure 4.15 - Probability of Observing the Same Ratio of Overlaps Initiated to Turns in the ASD Group as the Mixed Group for Trevor*




Trevor initiates fewer overlaps in the ASD group than would be expected based on the overlaps initiated by Trevor in the mixed group. The difference in Trevor's initiation of overlaps in the ASD group compared to the mixed group was statistically significant ($p = 0.005$). In the mixed group, Trevor initiates overlaps either to express short sentiments or to ask questions that move the conversation along.

*Conversational Example 4.41 (Mixed Group)*

*Zack:* *XXX get me some letters*
*Adrian:* *that is not bad*
*Zack:* *not great but um [] 6 7 8 [16]*
*Trevor:* *[safer]*
*Adrian:* *[16]*
*Zack:* *in general scrabble games like mostly use most words should be worth between 20 and 30 points*

In the example 4.41 above, Zack and Adrian are counting up points when Trevor overlaps Zack saying the word that they are scoring aloud, 'safer'.

*Conversational Example 4.42 (Mixed Group)*

*Adrian:* *yup*
*Zack:* *or if say you made a word here and you can {go} left from there*
*Zack:* *there are tons of ways*
*Zack:* *eventually it will happen*
*Adrian:* *something like [] this*
*Trevor:* *[so when does] the game end then?*

Trevor is not a fan of board games and he makes this very clear when he is trying to get to the point of quickly learning the instructions so that they can start and end the game as soon as possible in this example.

In the ASD group, like in the mixed group, Trevor initiates overlaps of other participants to express short sentiments, such as agreement.

*Conversational Example 4.43 (ASD Group)*

*Robert:* *Alright your turn now Trevor*
*Robert:* *Alright Trevor I think it is your turn [now]*
*Trevor:* *[Yeah]*

Another more common way that Trevor overlaps other participants is that he starts speaking at the same time as another participant and keeps talking after

the other participant stops. Therefore, many of his initiated overlaps are at the beginning of utterances and generally do not last very long.

*Conversational Example 4.44 (ASD Group)*

*Robert: Well my my brother's birthday {on} the other {hand} is near the end of the month on the thirtieth of December*
*Robert: [End of the year]*
*Trevor: [See that is the worst] time to be born is at the right at the end of the year because you are younger than everybody*

#### 4.3.4.4 Turn Taking Measures Results Summary

Robert and Trevor both initiated latches in both types of sessions but the differences between their usages in the ASD group compared to their use in the mixed group were not statistically significant. Darryl did not initiate latching at all. Robert uses latching to try to help other speakers by providing point counts and names when other speakers are having trouble. Trevor uses latches this way in the ASD group some of the time but in the mixed group, he uses latching to ask clarifying questions and to build on existing conversation.

All participants initiated more interruptions in the ASD group compared to the mixed group. This is statistically significant for Darryl and Robert and approaches statistical significance in the case of Trevor. Darryl uses interruptions either to ask questions that are not relevant to the conversational topic or to try to refocus the conversation or the social situation to another topic or task. Robert uses interruptions to acknowledge information. Trevor uses interruptions to either speed things along when he is bored and to express surprise in the mixed group.

In the ASD group, Trevor uses interruptions to speed up the group's game of Scrabble as in the mixed group. Trevor also uses interruptions in the ASD group when he is excited and talking about a topic that is important to him. It is important to note that while interruptions may not seem to be desirable in terms of conversational turn taking, in this case, the majority of the interruptions are cooperative in nature and serve to move the conversation along rather than change the topic of conversation. This could indicate a high level of comfort between the participants, as interrupting a conversation pulls the attention of all interlocutors in that conversation to the interrupter. Interlocutors who are uncomfortable with their conversational partners may not feel comfortable enough to interrupt them.

In terms of the number of overlaps initiated in the ASD group compared to the mixed group, Darryl and Trevor used far more overlaps in the ASD group and Robert used far less overlaps in the ASD group. These trends were statistically significant for all participants. Darryl's initiated overlaps in the mixed group are mostly delayed repetitions of other participants' utterances. In the ASD group, Darryl tends to initiate overlaps when the other two participants are talking amongst themselves. Robert only initiates overlaps in the mixed group to express agreement or surprise, whereas in the ASD group, Robert initiates overlaps to answer questions before the question is finished. Trevor initiates overlaps in the mixed group to ask questions and to express opinions. In the ASD group, Trevor initiates overlaps to express opinions and agreement with other speakers.

### 4.3.5 Overall Summary

As has been demonstrated in this chapter, there is a wide variety of usage of non-literal language and turn taking strategies in ASD. This supports the idea that there is great heterogeneity in pragmatic language use in ASD. Due to the small sample size of this study, it is difficult to make solid conclusions, however these data are useful in that they provide information to fill some of the gaps in the research on pragmatic uses of language and ASD. For example, while some of the previous studies described in Chapter 2 of this dissertation have focused on comprehension of various types of non-literal language (Happé, 1993; Norbury, 2005), this study has provided data on how often those types of non-literal language are produced by speakers with ASD, including showing that metaphoric words are produced by all participants. In addition, this chapter demonstrates the feasibility and usefulness of this methodology as the use of both qualitative and quantitative research methods allows interpretations to be made about why particular linguistic behaviours are observed and why they may have occurred.

*Table 4.6 - Summary of Results of Binomial Tests (p-values)*

| **Measures Tested** | **Darryl** | **Robert** | **Trevor** |
|---|---|---|---|
| Similes | N/A[α] | N/A[α] | 0.092623 |
| Irony | N/A[α] | N/A[α] | 0.609256 |
| Metaphors | 3.047E-04[βγ] | 0.279615 | 0.736164 |
| Latches Initiated | N/A[α] | 0.463284 | 0.152175 |
| Interruptions Initiated | 0.001815[βγ] | 0.003128[βγ] | 0.011407[γ] |
| Overlaps Initiated | 2.17E-13[βγ] | 5.1E-08[βγ] | 0.005112[βγ] |

The data analysed in this chapter also raises a number of questions for further investigation. For example, while previous research studies have claimed that people with ASD interrupt frequently (Ochs et al., 2004), the research data in this study show that the participants with ASD interrupted far less when interacting with NT people compared to when interacting with people with ASD.

In a recent study looking at the nature of gender and what effect it might have on language, Hancock and Rubin (2014) looked at various language measures in 3-minute-long dyadic conversations between a participant and a trained conversation partner. The researchers found that depending upon the gender pairings, the average number of interruptions to occur in the conversations ranged from 1-2.9 and the observed range of interruptions was 0-9 (Hancock & Rubin, 2014, p. 53). In the case of male-to-male speaker dyads, which would be most comparable to this study, the average number of interruptions was 1.8 and the range was 0-7 (Hancock & Rubin, 2014, p. 53). Given that the speech samples

[α] Binomial tests could not be performed on any measures whereby there were no observations of that measure in the mixed group for that participant
[β] Significant at $p < .0083$
[γ] Significant at $p < .05$

used in this study (4 x 10 minute conversation samples per session) are over 13 times longer than the 3-minute conversations they used, the data from this study would seem to support that people with ASD may actually interrupt others in conversation far less than NT speakers.

Overall, the ASD participants spoke more comfortably and freely with other ASD participants and had conversations that were more personal in nature. When interacting with the NT participants, Darryl and Trevor spoke less often and in shorter utterances, whereas, by contrast, Robert spoke less often but in longer utterances with NT participants. There are many possible reasons for this, as have been discussed previously in this chapter, but the pattern is interesting to note, especially given that each participant exhibits a different language profile based on the CCA-2.

In the next chapter, I discuss the implications of this study as a whole, the need for further research, possible future directions of this type of research, and its potential effect on language research in the autism community.

# Chapter 5 – Conclusions and Discussion

## 5.1 Conclusions

### 5.1.1 Research Questions

As discussed in chapters 1 and 3, there were two research questions that this study was designed to investigate.

The primary research question was ‘Is it possible to gather naturalistic conversational data that can be used to compare conversational performance of young adults with ASD based on the type of interlocutor?’ Using the research paradigm presented in Chapter 3, this study provides a positive answer to this question: it is possible to gather naturalistic conversational data that can be used to compare conversational performance based on the type of interlocutor and it is applicable to not just ASD but to other speech communities as well. The data and analysis demonstrated in Chapter 4 show that the data gathered using the research methodology presented in this study is useful and can be quantitatively and qualitatively analysed in ways that are already well-established

The secondary research question was ‘Do people with ASD communicate differently when interacting with other people with ASD compared to when interacting with neurotypical (NT) people?’ In terms of pragmatic uses of language, there are distinct and differing trends that occur depending on the type

of interlocutor, some of which are statistically significant. That said; the heterogeneity of ASD makes it difficult to generalize these trends in a study with such a small sample size. For example, all of the participants initiated interruptions more in the ASD group than the mixed groups, with the results of these trends either being significant or approaching significance. However, in terms of overlaps initiated, one participant initiates far more overlaps in the ASD group and the other participants initiate far less overlaps in the ASD group, with all these trends being significant. Therefore, the question cannot be conclusively answered in this study, however, this study has demonstrated that this question has merit and has provided a basis for future research in this area.

### 5.1.2 Contributions

The research method proposed in this study makes a number of contributions to the body of research involving pragmatic language abilities in ASD, this body of research having already been reviewed in chapter 2. Firstly, the research method gathers naturalistic data representing language use in natural situations. Data gathered by other methods, such as interviews and experimental studies can be limited by those approaches and may not accurately reflect the language abilities of the participants in everyday situations. This study uses observation, which allows for more realistic conversations and more naturalistic data to be observed, recorded and analysed, compared to other methods. This

approach is also modular; if a researcher is investigating different aspects of language and wants to gather naturalistic data, the coding scheme can be tailored to that approach by adding, removing, or changing codes to fit their research question.

One of the other benefits to the research method described in this dissertation is that it can gather data on language production. As discussed in section 2.3.2, many experimental studies looking at pragmatic uses of language in ASD focus on comprehension by providing examples of pragmatic language constructions and asking participants to match the example with definitions or with categories of speech. While this information is useful, it is only one side of the equation; it is also important to gather data on production of these constructions. It is important to understand that just because a participant may have difficulty comprehending an individual example does not mean that a person will not understand or use other examples of the same construction that the researchers had not considered to put in their stimuli. For example, a metaphoric expression like “his ink is pale” (Sperber & Wilson, 1986, p. 237) may be one that is not accessible to many speakers at large, especially out of context, while another metaphoric expression like ‘a sea of faces’ may be far more accessible. With the methodology proposed, data on production can be gathered and produced constructions can be coded and quantified.

It is also important to consider the significance of the context in which language research is conducted when it comes to making conclusions and generalizing the findings. As discussed previously in chapter 2, interviews are not analogous to typical, spontaneous, day-to-day conversation. The context of an interview is one of an isolated exchange between participants with asymmetrical power; the interview usually takes place away from others, with usually just the interviewer and interviewee present and participating. The interviewer asks the interviewee questions and the interviewee responds. This is quite different, and far more formal than the back and forth of typical conversation. In experimental studies, the data that is gathered is not actually linguistic data at all but data that is used as a proxy for linguistic data. The contexts of experimental paradigms in language research are contrived and while they can gather excellent data for other types of research, this data cannot be generalized to representing typical conversation because the contexts of experimental language studies do not reflect typical conversation. The methodology proposed in this study is a significant improvement on the previous research methodologies for pragmatic language research. The context created in this study is one that is more natural and meaningful than those of the previous research methods used in the area of pragmatic language impairments in ASD. Creating or using a natural context, or one that otherwise could be analogous to typical conversation, is crucial for generalizing pragmatic language research because pragmatics is "the study of the

aspects of meaning and language use that are dependent on the speaker, the addressee and other features of the context of utterance" (SIL International, 2015). One must account for context because context is an essential element of the interpretation of pragmatic language.

### 5.1.3 Impact of Research

As discussed above, this study has improved upon the previous research methods into pragmatic language abilities in ASD in a number of ways. That said, I believe that this study can have an impact on the field of studying pragmatic language abilities in ASD.

The approach taken in this study is new and innovative. It is one of the studies, if not the first one that looked in detail at ASD-ASD communication in adults. The previous studies have looked at ASD-NT communication and that in itself can create a situation whereby people with ASD are compared to NT people. While this can be helpful, conclusions from those studies about the pragmatic language abilities of people with ASD are only truly generalizable to interactions between people with ASD and NT people. However, ASD-ASD communication opens a new area of study to determine whether the pragmatic language difficulties previously described in the literature are actual deficits and if so, how global or limited they may be.

This research presented here is also important to the study of pragmatic

uses of language in general. It presents an alternative type of research methodology that can be used to gather new and different types of data that can help to answer many other types of research questions. The research methodology presented in this study avoids some of the pitfalls of other research methods as discussed in chapter 2 and section 5.1.2 above. This study can serve as a springboard for many new lines of inquiry, including investigating pragmatic language abilities in various speech communities, not just ASD.

This study also challenges some of the previous thinking on pragmatic abilities in ASD. As discussed in Chapter 4, the results from this study show that, contrary to previous assertions, people with ASD may interrupt other people far less frequently than NT speakers may. In addition, while previous studies have observed that people with ASD have had trouble understanding metaphors, the participants in this study all used metaphorical words in both types of groups. These contradictions demonstrate the need for further research in pragmatic language abilities in ASD. They also point to the fact that some of the previously reported pragmatic language difficulties in ASD may not be as conclusive or severe as once thought.

### 5.1.4 Limitations

While the method presented in this study is versatile, some limitations should be noted. This method works well for studying naturally occurring

behaviour, or determining how common a behaviour might be in a given scenario, however, the researcher must be very careful not to over- or under-design the context or scenario of the study. For example, if the scenario were over-designed and excessively controlled, it may be possible to elicit the behaviour the researcher wishes to observe with higher frequency. However, the scenario may be quite removed from one that is naturally occurring, meaning the results would be misleading if generalized as representing naturally occurring situations. If a scenario is under-designed or not controlled enough, it may be difficult to observe the specific behaviour the researcher is looking for at all. For example, if a researcher were to set up a scenario whereby participants were asked to sit in a room and given no guidance as to what to do, the range of behaviours that would be observed would likely be too varied to be useful, depending on the scope of the project. Other possibilities are that the target behaviour may not occur at all or that there may be too many confounding variables to be able to make a definitive conclusion.

Another limitation in this particular case is that the video data may only be of limited usefulness if one were to try to use it for a study that would include the use and role of body language and gesture. While there were three participants per group, there were only two cameras in fixed positions as the space was limited in size and while between the two camera angles, all participants' faces were visible, some of the camera angles did not allow full front view of each participant. This

was particularly the case for the participants who sat at the end of the table. While their faces were always visible via one of the cameras, another participant frequently obscured the camera's view of much of the front of the participant sitting at the end of the table below the neck, making studying the body language of that individual from the neck down, difficult. Therefore, an important consideration for researchers to mitigate this limitation would be to try to anticipate many of the future possible uses of the data during the design phase of the study and consider those uses in building the context or scenario for the study.

## 5.2 Discussion

### 5.2.1 Deficit or Difference? A Problem of Definitions

Probably the most significant issue affecting the research into pragmatic language abilities and ASD is one of definitions. As discussed in chapter 2, the definition of pragmatics varies depending on the field of study. The term pragmatics is rarely defined in each paper in which it is used, however, based on the field it is possible to make an educated guess as to the definition being used. The majority of the research studies on pragmatic language impairments in ASD have been done in clinical fields, such as speech language pathology, psychology, and psychiatry. Because of this, it would make sense if in these fields a more clinical definition were used. The definition of pragmatics in speech language pathology is "appropriate social language use" (Volden et al., 1997, p. 181) and

the definition in psychiatry is “the social use of language and communication [with difficulty therein] manifested by deficits in understanding and following social rules of verbal and nonverbal communication in naturalistic contexts … and following rules for conversations and storytelling” (American Psychiatric Association, 2013, p. 48). As discussed in section 2.1, the clinical definitions used in speech language pathology and psychiatry, have referred to ‘appropriateness’ and the ‘following of social rules’ respectively. These abstractions are rather vague. By contrast, the linguistic definition of pragmatics is “the study of the aspects of meaning and language use that are dependent on the speaker, the addressee and other features of the context of utterance” (SIL International, 2015). The difference between these conceptualizations is striking. While the linguistics definition is one of description, the clinical definitions are ones that impose standards. For something to be ‘appropriate’ there must be rules or standards that must be met. The DSM-5 definition refers to ‘social rules’ that need to be followed but it does not spell out what those social rules are. As discussed in chapter 2, one of the social determinants of language is culture and different cultures may have vastly different social rules. This is also true of disability cultures, such as the Deaf community (Barnett, 1999). Therefore, to not be impaired in pragmatic language use from a clinical standpoint, one must follow social rules, but it begs the question: whose social rules must be followed? This clinical notion of rules or standards is one that instantly puts at disadvantage

speakers who do not communicate in the same way as the majority. For people with ASD, for whom language skills in many areas vary quite widely, this creates a conundrum. However, I believe that the study presented in this dissertation may provide a possible solution for this challenge. In this study, I observed many uses of various types of pragmatic language thought to be impaired in ASD. I also observed differences in the patterns of usage of some of them from the mixed group to the ASD group. Given that social rules can change from culture to culture, including in disability cultures, it is possible that the pragmatic language 'impairments' in ASD are more akin to cultural differences than global impairments.

In this study, all participants communicated well in both groups, however, the communication in the ASD group was more personal, more involved and two of the three participants spoke more often and in longer utterances in the ASD group with the third participant speaking more often but in shorter utterances in the ASD group compared to the mixed group. There were conversations about life, the nature of ASD, careers, family, and other personal topics in the ASD group. All of the participants used less metaphorical words in the ASD group than in the mixed group, with this trend being statistically significant for only one of the participants. In addition, two of the three participants overlapped each other less in the ASD group than they did in the mixed group. All participants initiated more interruptions in the ASD group than the mixed group and this was

statistically significant for two of the participants and approached statistical significance for the third. While these results may seem to be inconsistent given that one might think that a larger number of interruptions might make for worse conversation, there is no evidence of that here. The conversations amongst the ASD participants were productive, effective, and did not break down. With that being said, the pragmatic skills of people having productive and sophisticated conversations cannot be considered impaired. With the previous research on pragmatic language abilities in ASD focusing on ASD-NT interaction, this study suggests that it is very possible that the pragmatic language 'deficits' in ASD are more akin to cultural miscommunications between people with ASD and NT speakers and that people with ASD have their own social expectations, different from those of NT speakers. While this study cannot provide definitive answers, it does raise this important question.

### 5.2.2 Future Directions

In terms of the future directions for this research, I think the obvious next step would be to analyse data from the remaining participants in the existing study. I would also like to eventually replicate this study with a larger sample size to confirm the findings in the data in this study with regard to the non-literal language and conversational turn taking measures. When looking for studies that have quantified non-literal language use or conversational turn taking measures

from naturalistic conversational data, I could not find many and I think it would be an excellent idea to use this methodology with people with typical development to establish some possible baseline rates of usage for these types of language use in this population. This would allow me to quantify and clarify what have up until now been mostly qualitative conclusions.

Given that the majority of the main studies into pragmatics and ASD did not have many female participants, I think it would also be a valuable step to expand the study of pragmatic uses of language to see what differences, if any, exist in that type of language abilities between men with ASD and women with ASD. I also see this research methodology being used in the future with other speech communities, not just ASD and NT speakers. Other speech communities that I think would particularly benefit from this research methodology are people with dementia and people with schizophrenia because previous research has shown that both of these populations have difficulties with various aspects of pragmatic language (Keller & Rech, 1998; Langdon, Davies, & Coltheart, 2002), and these difficulties would likely be very affected by the context communication and by the type of communication partners.

As discussed above in section 5.2.1, if a linguistic, descriptive, definition of pragmatics were to be used to analyze communication patterns of members of special populations, it would not presuppose the notion of a standard and would

therefore not put members of non-standard speech communities at a conceptual disadvantage for speaking differently. Cultural differences and diversity of speakers can change the context of a conversation and by extension, the pragmatic language skills on display may differ. However, if speakers can communicate with each other and get their meanings across to each other without causing the conversation to break down, I do not think it matters how they do it and if they do it differently, they are not necessarily 'impaired' or 'deficient'. One of the participants of this study said this best. When Darryl spoke of his brother being 'perfectly fine' because he did not have ASD, Robert said 'Good for him. We are perfectly fine too'.

## Chapter 6 – References

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