

# Studying Misunderstanding and Repair in Adult-Child Interactions: Lessons from Conversations with Typically Developing Children and High Functioning Children with Autism

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**Abstract.** This paper investigates misunderstanding and repair in a corpus of dyadic interactions between an adult and 10 children aged 4-7 years, half of whom were typically-developing (TD), and half of whom had been diagnosed with high functioning autism (HFA). These interactions have been transcribed and analysed using CA conventions and used as the focus of a preliminary examination of similarities and differences in repair behaviour by children with HFA compared with TD children. However, the data give rise to significant questions and issues of a more general nature. In particular, how we understand and define the notion of “repair” and operationalise identifying and categorising it. We call on the concept of grounding in interaction to broaden our understanding of misunderstanding and repair in adult-child interactions and to present our data in a more detailed fashion.

**Keywords:** Repair, misunderstanding, child language, conversation analysis, autism

## 1. Introduction

In any conversation, things can go awry. When this happens, participants usually act swiftly to repair the trouble in order to restore understanding and create meaningful exchange between the interlocutors. However the ability to successfully repair is complex and requires a range of linguistic, social and cognitive skills. The complexity of repair is particularly evident when examining conversations where the interlocutors come to the interaction with differing backgrounds, goals and/or motivations. This is so when considering conversations between adults and children, and even more pronounced when those children exhibit atypical development, as do children with autism.

Developing the ability to repair communication is an important part of the language acquisition process whereby children become intentional and competent communicators (Wetherby et al. 1998). We know that children with autism have particular difficulties understanding the mental states, perspectives and conversational needs of others (Tager-Flusberg et al. 2005). Thus there is the potential for this group to experience greater than usual difficulties associated with carrying out repair. However there is currently very little research specifically devoted to exploring repair abilities in children with autism.

The few studies which have been carried out suggest that the language impairments of children with autism cause the need to repair to arise more frequently in their conversations (Dobbinson et al. 1998; Rendle-Short 2003). Additionally, difficulties in using language greatly limit the ability of an interlocutor with autism to successfully carry out repair, as demonstrated by an increased frequency in inappropriate responses to requests for clarification (Geller 1998; Volden 2004) and multiple attempts to repair the same trouble source (Stirling et al. 2007).

This paper is an exploratory, qualitative foray into an innovative approach to conversational data of child language, which draws on both Conversation Analysis (CA) and grounding perspectives. We use CA's definition of repair, and rely on their solid understanding of the nature and organisation of repair sequences in adult conversation, and apply this to child language discourse, an area which has been less commonly explored within CA. However, we also attempt to integrate the notion of common ground, which views conversation as an alignment of the interlocutors' goals,

and pays constant attention to the establishment of “common ground” between the interactants by tracking their level of understanding within an interaction (Stalnaker 1978; Clark 1996). We suggest that employing both perspectives allows for a more comprehensive examination of our particular data set, which consists of adult-child dyadic conversations, where half of the children taking part have a diagnosis of High Functioning Autism (HFA).

We begin, in the following section, by introducing the corpus of data we have analysed in this paper. In section 3 we give a brief overview of CA, paying close attention to its underlying assumptions, before continuing in section 4 with a definition of repair as it has been examined within the CA tradition. We then discuss autism as a disorder in section 5, and explain why examining repair behaviours in children with autism may potentially be of interest. In section 6 we give a brief overview of previous research into repair and autism, paying attention to the main findings which have influenced the perspective taken in this study. We then turn to our data set, in section 7, to sketch the main trends a CA analysis has revealed, thus far, and discuss some problems associated with the study of misunderstanding and repair. We call on the concept of common ground to illuminate these issues in section 8. In section 9 we use examples to highlight ways in which the application of the idea of common ground builds upon previous research conducted within the CA tradition, to show new aspects of repair behaviours in our data set. This is revealing when examining repair behaviours in children with autism specifically, but also relevant to the understanding of adult-child interactions more generally.

The focus of this paper is on appropriate ways to understand the phenomena of repair, and misunderstanding more generally, in adult-child interaction. While we make some comments about the similarities and differences in repair behaviour between typically developing children and children with autism within our data, a quantitative comparison between the two groups is beyond the scope of this paper. We are driven by a long term desire to compare repair abilities in the two groups, however, we hope this paper helps to highlight the fact that a system to comprehensively account for the complexities within adult-child repair is still needed, before this longer term goal can be achieved.

## 2. The data

This paper draws on conversational data from a corpus collected at the Child Development Unit at La Trobe University by Cheryl Dissanayake and Rachel Kelly. The data was collected as part of Kelly's doctorate of psychology (Kelly 2007) which examined the relationship between executive functioning skills and pretend play abilities in children with and without autism. The complete corpus consists of 40 videotaped dyadic interactions between an adult (hereafter referred to as A) and a child. Each child was brought in to the laboratory for a single session of about 90 minutes, where A administered formal tests (such as an abbreviated IQ test, tests of executive function abilities, more specifically inhibition and generalization, and a test of theory of mind ability). In addition to this, they also engaged in structured play sessions (the test of pretend play) where A guided the direction of the play and created specific scenarios, and a free play session, where the child was encouraged to guide the direction of the play. The conversational data examined here was thus collected in a laboratory setting with the same adult facilitating each session. Even though the data is collected in a laboratory setting, in this paper we focus on the spontaneous conversation which occurs between the adult and the child. This data was not collected with the intention of undertaking linguistic analysis.

The data set which informs the current study comes from a randomly selected subset of 10 of these children, 5 of whom are Typically Developing (TD) and 5 of whom are classified as having High Functioning Autism (HFA), which means the children have a diagnosis of autism and have an IQ within the normal range. The children ranged in age from 4;0 to 7;6 years. Session times varied from 46 minutes to 1 hour and 52 minutes. We viewed a total of 12 hours and 10 minutes of video data; with 5 hours and 40 minutes of this total consisting of sessions involving the TD children and the remaining 6 hours 30 minutes from sessions with the HFA children. In each case we reviewed the complete session identifying instances of repair and misunderstanding which occurred in the conversation and then transcribed these sections using the conversation analysis conventions outlined in Jefferson (2004).

### 3. Conversation analysis

Conversation Analysis (CA) is a type of discourse analysis which originated in the late 1960s from the discipline of sociology, and more specifically, from the tradition of ethnomethodology. CA views conversation as a site for social action and a fundamental assumption of CA is that every interaction is structurally organised. CA's underlying aim is to uncover these organisational rules of sequences of events within interaction (Heritage 1995). These organisations are structures in their own right, and are independent of the motivational, psychological or sociological characteristics of the participants involved (Heritage 1995:396). Whilst this organisation of interaction is something that interlocutors adhere to, it is also something which they help to generate. Every contribution to a conversation is not only relevant to the previous utterance but also helps to create the conditions for what follows. Therefore no detail in an interaction should be dismissed as disorderly, accidental, or interactionally irrelevant.

As it is this “messy”, “disorderly” type of language which CA is especially interested in, there is a focus on the use of naturally occurring conversation as data, and more specifically, ordinary, mundane conversation. This is seen by conversation analysts as the fundamental domain of interaction and the primary means through which a child is socialised (Heritage 1995:394). Conversation analysts typically work with audio files, or in more recent years video files, as their primary source of data and create highly detailed transcripts of these to aid analysis.

CA shies away from quantification because of its emphasis on analysing linguistic phenomena within the interactional context in which they naturally occur (which is not to be confused with “context” outside the interaction, such as race, gender or socio-economic background of participants). Everything within an interaction both builds on what has previously been said and influences what will occur next. Thus within a CA framework, token counts are viewed as problematic as they necessitate a particular feature being examined outside its interactional context. Some areas of research within CA have reached a time when quantification is acceptable, or even appropriate, as we now have a solid understanding about their normative interactional organisation (see Heritage 1999, for discussion). However, very little is currently known about the organisational structures governing repair behaviour in

child-adult interactions. Therefore we do not consider this research domain to be at a stage where quantification is suitable and we do not present quantified results of our analyses in this paper.

#### 4. Repair

The concept of “repair” is one organisational phenomenon which derives from work in CA and has been regarded as important within interaction since Schegloff et al.’s seminal paper in 1977 began to systematically categorise repair sequences in conversations amongst adults. Research into repair has continued and developed, largely driven by the work of Emanuel Schegloff (1979, 1987, 1992, 1997, 2000), and is currently at the stage where we can understand some interactional trends in the conversation of white, English-speaking, American adults. This body of work has a particular focus on identifying repair sequences in accordance with who initiates and who carries out the repair (“self” versus “other”), and also where in the turn sequence this repair is initiated (e.g. same turn, next turn, third turn).

Schegloff’s definition of repair is: “practices for dealing with problems or troubles in speaking, hearing and understanding the talk in conversation” (2000:207). This definition specifies “talk in conversation” to focus on misunderstandings in the way something has been said and to rule out misunderstandings in the conversational content (for example, an interlocutor’s lack of knowledge about how the internet works) (2000:207). The definition is deliberately broad as the part of the talk which a speaker chooses to repair is not necessarily an “error” or “mistake” and the repair does not necessarily involve a replacement of the problematic speech (Schegloff et al. 1977). Hence repair is a more general practice than the word “correction” implies and everything in an utterance is potentially repairable.

The concept of repair is perhaps best illustrated by an example. Example 1 shows two instances of repair (see appendix 1 for transcription conventions). In this example, LS is a typically developing male child aged 6 years, 6 months (denoted as 6;6) and A is the adult. In example 1, line 3 LS (the child) initiates a topic of conversation whilst A is not orienting towards him. We can see that A has not heard or understood LS’s utterance by her response to it in line 4 which is *sorry* produced with a questioning intonation. This response by A shows us that line 3 was problematic in some

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way, and therefore line 3 is identified as a trouble source. As LS was the speaker of this trouble source, he is now known as the “self” in this repair sequence whilst A is the “other”. Thus A’s *sorry* in line 4 becomes an initiation of repair by the other. LS adequately responds to this “other initiation” by repeating what he has previously said in line 3 but modifying it so that it is now produced with correct grammar and it is said whilst he already has A’s attention. As the same interlocutor who has spoken the trouble source has also repaired the utterance, this is called self repair. Thus this sequence becomes an example of “other initiated self repair” where initiation occurs in the next turn (the turn following the trouble source). We can see that understanding has been resolved, and thus the repair attempt in line 5 has been successful, by A’s response in line 6 where she repeats LS’s utterance.

Example 1: LS, TD, 6;6

- 1 ((stop watch beeps twice))  
2 ((3.0: as A flips through her testing notes))  
3 LS: I got a timer on my watch [Trouble source]  
4 A : sorry? ((as A turns head towards LS)) [Other initiation]  
5 LS: I’ve got a timer on my watch [Self repair]  
6 A: you’ve got a timer on your watch?  
7 ((1.0: as LS shows A his watch))  
8 oh::=  
9 LS: =see=  
10 A: = is that a- is that a pokemon watch? [Self initiated self repair]  
11 LS: yep  
12 A: [wow]  
13 LS: [thats] the timer  
14 A: oh that’s pretty cool

There is a second example of repair in example 1, which occurs in line 10. In this example the trouble source, initiation and repair are all produced by the adult, A,

who becomes the “self” in the analysis of this example. The trouble source is the cut off intonation unit in the beginning of the turn and the remainder of the turn is thus an example of “self initiated self repair” which occurs in the same turn as the trouble source.

We can see that the question of where repair occurs is very much intertwined with who initiates it and who carries out the repair. Whilst there are different practices of repair and different ways of organising repair, they are highly systematic with reference to the turn position and who the initiator is (Schegloff et al. 1977). Self repair is the preferred<sup>1</sup> sequence type in repair amongst adult American English speakers (Schegloff et al. 1977). Other repair can also occur but is heavily dispreferred. Even in cases where the “other” proves to know what the “correct” version of the trouble source should be, they overwhelmingly still give the speaker the opportunity to repair it themselves (Schegloff 2000). Furthermore, Schegloff (2000) points out that repair is typically very quick and extremely effective with most repair initiated and successfully completed in the same turn space. It is rare for interlocutors to require more than one attempt at repair before it is successful (Schegloff 1979). However, there is some variation to these generalisations. As previously stated, not all “errors” in interaction are repaired. One or more speakers must orient to talk as being problematic before the CA tradition will regard this as miscommunication requiring repair. Additionally, even after repair is attempted, on rare occasions it is not successful and the repair sequence is abandoned by the interlocutors.

## 5. Autism

Autism is classified by the DSM-IV as a pervasive developmental disorder characterised by impairment in reciprocal social interaction skills, impairment in language and communication, and the presence of restricted and repetitive patterns of behaviour (American Psychiatric Association 2000:65-67). Although autism is not a language disorder, delay in language development or atypical language development

<sup>1</sup> The use of the term “preferred” here means “most frequent” or “most common”. It is not intended to imply a conscious decision on the part of the speakers; see Bilmes (1988) for discussion.

recognized before the age of three is inherent in a diagnosis of autism. The aspects of language which are most impaired in autism are the pragmatic or social aspects, and these have been a strong focus of language research in autism over the last few decades (Tager-Flusberg et al. 2005:351). Children with autism are often described as unlikely to initiate conversation and whilst verbal autistic children and adults are able to use language to achieve certain ends, they rarely do so to share extraneous information, explain events, build social rapport or acknowledge their listener (Tager-Flusberg et al. 2005:352). Studies have shown that they are less likely than typically developing participants to correctly identify topics being initiated and are more likely to respond to an interlocutor's remarks with irrelevant information (Tager-Flusberg et al. 2005:352). It has also been shown that adolescents with autism tend to have unrealistic ideas about what their listener can be expected to know or want to know and have difficulty gauging how much information a hearer requires when they are answering questions, often replying with far too much or far too few details (Tager-Flusberg et al. 2005:352).

Because of the difficulties children with autism demonstrate in using language in social settings, research into conversation skills of children with autism has grown over the last few decades. Repair in particular is of special interest to the study of autism because of the well documented difficulties experienced by individuals with autism in acquiring a Theory of Mind (ToM).

The term "Theory of Mind" (ToM) has been used in a variety of ways over the last three decades, but is best understood as an umbrella term for an individual's understanding of mental states (Doherty 2009). It is generally believed that the most central of mental states are desire and belief and it has been these two areas which have gained the most attention. Children with autism have been at the centre of the debate about ToM since Baron-Cohen et al. (1985) posited the question "Does the autistic child have a theory of mind?". In this study the authors tested the ability of 20 children with autism to understand a short scenario where a character's beliefs concerning a series of events are different from the reality of the situation (a "first-order false-belief task"). Additionally they tested two control groups matched by verbal mental age and non-verbal mental age respectively. Both control groups performed well on the task, with a pass rate of 85% and 86% respectively. However, in the

group with autism, only four out of the 20 children were able to recognise the demonstrated mismatch between belief and reality (20% pass rate). This result strongly suggested that children with autism have difficulties representing mental states and thus the authors suggested that impairments in ToM abilities may be a central deficit in autism. This finding generated a plethora of research into ToM abilities in autism, and the results of these studies have overwhelmingly supported Baron-Cohen et al.'s original finding (e.g. Perner et al. 1989; Baron-Cohen 1989; Happé 1995).

ToM abilities should affect an individual's capacity to successfully repair at three separate stages of the repair process. The first stage concerns audience design, also known as recipient design. This is basically the ability to accurately tailor an utterance to meet a conversational partner's needs before the utterance has been produced. Thus the success of a speaker in doing this is important in avoiding misunderstandings from the outset, which then diminishes the need for repair. Secondly, after a trouble source has occurred, if a speaker can recognise their interlocutor's behavioural, gestural and linguistic cues which signal misunderstanding, then they have an increased chance of swiftly repairing this trouble. And finally, again after the need to repair has arisen, if a speaker can make an accurate judgment with regards to which part of the talk needs to be modified to aid their interlocutor's understanding, repair is more likely to be quick and successful. We would expect children with autism to have difficulties at each of these three stages of the repair process.

Currently much research into autism uses participants from the autism spectrum as a whole. Autism Spectrum Disorder (ASD) is an umbrella term used to refer to autism, Asperger Syndrome (AS) and Pervasive Development Disorder-Not Otherwise Specified (PDD-NOS). These are all pervasive developmental disorders which share deficits in social interaction and communication, and restricted behaviours and interests. The DSM-IV currently differentiates a diagnosis of AS from autism on the basis of children with AS displaying typical linguistic and cognitive abilities in the first 3 years of life (Klin et al. 2005). Thus AS is diagnosed later in life than both autism and PDD-NOS. PDD-NOS is also known as atypical autism and like autism its symptoms are present in the early years of life. However, the severity or scope of these symptoms do not fit into the strict criteria for autism (Towbin 2005). There is much debate over how closely these disorders are related, which is an argument be-

yond the scope of this paper, but we mention it here as much of the previous research into autism and repair abilities (outlined in the following section) has used participants from the spectrum as a whole.

## 6. Previous research

Previous research into repair behaviours can be broadly categorised as falling into two different approaches. On the one hand is research which has taken a qualitative perspective and more specifically come out of the field of conversation analysis, and to a lesser extent ethnomethodology. On the other hand are studies which have been designed as quantitative research which have their origins in the psychological and speech therapy traditions. The former has focused on questions such as who initiates the repair, who carries out the repair and where in the turn sequence the initiation and repair occurs. This approach is exemplified in the discussion of example 1 in this paper. The latter approach has been largely focused on repair strategies used by children, both typically and atypically developing, and has been limited to instances of “self repair” which are initiated by an “other”. Understandably, this emphasis has been driven by the desire to inform intervention programs.

There has been a lack of research devoted to exploring repair behaviours in children with ASD. The following brief literature review focuses solely on research devoted to repair in individuals with ASD and does not discuss research on repair by adults and children more generally. We begin by covering the work from the qualitative perspective and then move to the quantitative approach.

The qualitative research which has been carried out has not specifically focused on repair abilities but has aimed to investigate interactional management in individuals with autism more broadly.

Rendle-Short’s (2003) CA analysis focuses on telephone conversations involving an 8 year old girl diagnosed with Asperger Syndrome. In this study she found that the participant was largely able to manage the conversation and obtain all the information she was seeking. However, she also had a tendency to take unusually long pauses which sometimes created trouble or breakdown in the conversation, as the various interlocutors with whom she was engaged in phone conversation were often confused by such atypical pause lengths.

Dobbinson et al. (1998) undertook a CA analysis of conversations between an adult diagnosed with autism and a researcher. This study was focused on topic initiation and maintenance so did not explicitly analyse repair, but in support of Rendle-Short's (2003) study, their findings suggest that unusually long pause lengths utilised by the interlocutor with autism contributed to creating trouble sources in the discourse. Additionally they found that the interlocutor with autism produced overlapping speech in atypical environments which also contributed to creating trouble in the speech.

In addition to this, Kremer-Sadlik (2004) analysed question and answer sequences recorded at meal times in families which included a child with HFA or AS. She found that the children with ASD could understand turn-taking conventions, and could engage in joint-attention and understand perspective-taking in fairly sophisticated ways. An underlying finding of this paper was the important role of family members in assisting and facilitating communicative competence. This suggests that children with autism perform better when in supportive environments where family members can provide interactional scaffolding for the child.

Finally, Stirling et al. (2007) examined oral retells of a common children's story produced by one 8 year old child diagnosed with autism. They found that this child tended to make multiple attempts at repairing the same trouble spot before he was satisfied, particularly in contexts of reported speech by multiple characters or complex mental state attribution. This study focused solely on "self initiated self repair", as the data consisted of monologic productions rather than interaction, nevertheless the finding supports the idea that children with autism may formulate repairs in an atypical manner.

The findings from these qualitative studies which are of relevance to us here are that more sources of misunderstanding arise in talk involving interlocutors with ASD. However these sources of misunderstanding can be kept to a minimum if the conversational partner is adept at scaffolding the interaction. Additionally Stirling et al. (2007) suggest that children with ASD may have increased difficulties in repairing trouble sources and may need multiple attempts at repair before they are successful.

While the qualitative studies summarised here have been interested in examining conversation management as a whole, and have not attempted to specifically single

out repair behaviours for analysis, the quantitative approaches have focused on “other initiated self repair” by children with ASD and have largely focused on repair strategies or identifying how children carry out repair.

Volden (2004) looked at nine children diagnosed with autism or PDD-NOS and nine language-age matched controls. Volden had a researcher interact with the children and deliberately issue requests for clarification as stacked sequences. Stacked repair sequences are created when an interlocutor repeatedly misunderstands the speaker’s attempt to communicate the same utterance. This occurs when the first attempt to repair an utterance is unsuccessful and requires a second or third attempt. This study divided the children’s verbal responses into five categories based on type of strategy used: “repetition”, “revision”, “cue”, “meta-comments” and “inappropriate”. Volden found that the children with ASD recognised the need to repair breakdown and used a variety of strategies to do this at similar levels to their language-matched controls. As the sequence of requests for clarification progressed, so too did the strategies of repair that both ASD and TD groups used. However, children with ASD were much more likely to respond to a request for clarification with an “inappropriate” response, as judged by content.

Geller (1998) looked at five children diagnosed with autism ranging in age from 7;1 years to 12;9 years. The children were individually engaged in free play with an adult who was not attempting to create or respond to breakdown or repair. The type of communication breakdown which occurred, the type of request issued by the adult, and the repair strategies used were all analysed. Geller found that 34 % of breakdowns occurred from problems in language form (unintelligible or inaudible speech, and syntactical errors), 17% were attributed to problems in content (confusing lexical substitutions and unclear referents) and 15% were due to problems in language use (unclear intentionality and confusing topic shifts). The type of repair requests from the adult were categorized into requests for confirmation (40%), specific requests for information (33%), indefinite requests (23%) and comments (4%). The children’s repair strategies were categorised as ambiguous (26%), acknowledgements (25%), informatives (21%), no attempt (14%), indeterminate (13%) and non-linguistic repairs (1%). The findings from this study show that the children made some attempt at repair in 73% of instances of communication breakdown and

were successful in 35% of these utterances at resolving the listener's confusion. This is a fairly low success rate at repairing misunderstandings for children of this age and it needs to be contextualized by noting that the children with ASD in this sample were lower functioning than the participants in our study. As this was a within group study, no control group was used.

Finally, Keen (2005) examined nonverbal repair strategies in young children with autism (aged 2 to 5 years) interacting with their primary caregiver. In particular, she was concerned with repair strategies and their possible links to problem behaviours, however, she also commented on the high frequency of communication breakdown in the data. In accordance with Volden's (2004) and Geller's (1998) results, Keen also found that children with autism were eager to attempt to repair communication breakdown. Additionally, she exposed a possible link between the use of emphatic prosody as a repair strategy and a greater likelihood of the child resorting to problem behaviours.

Rendle-Short (2003), Dobbins et al. (1998) and Keen (2005) all support the finding that there is an increased need to repair in conversation involving individuals with ASD, however, Kremer-Sadlik (2004) suggests that the need to repair can be minimized when the child is in supportive interactional environments, where scaffolding is provided. Volden (2004), Geller (1998) and Keen (2005) have all shown no lack of motivation, on the part of the children with ASD, to attempt repair when it is initiated by an "other". This suggests that difficulties with repair experienced by children with ASD lie in their abilities to repair in an adequate fashion, rather than in any lack of awareness of the need to repair. This is supported by the high usage by this group of "inappropriate" strategies to repair (Volden 2004) and their low success rate of resolving listener confusion (Geller 1998).

## **7. Analysis and discussion: Conversation analysis**

In the following section we discuss some examples in our data set which have been analysed within a CA framework. Preliminary results of the current study suggest that the TD children & children with HFA have similar profiles of self repair behaviour. In both groups "self initiated self repair" is the more common type of repair, as would be expected from the adult literature on repair. Both TD and HFA children

are able to utilise sophisticated methods to self repair trouble sources. All examples which follow are from the corpus outlined in section 2; in each of them A is the adult.

Example 2 occurs in a session involving a TD female child aged 5;10. The trouble source occurs in line 4 when BM cuts off the intonation unit after *they're puppets*. She then goes on to spontaneously self repair the incomplete intonation unit by producing the more detailed utterance *they are hand puppets*. We can see that this is a successful repair attempt because of A's response to it in line 6, agreeing with her that *they are hand puppets*.

Example 2: BM, TD, 5;10

- 1 A: I might just have a little drink? (.)  
 2 before we do the next thing?  
 3 (3.6)  
 4 BM: they're puppets-  
 5 they are hand puppets.  
 6 A: mm they are hand puppets.  
 7 (.) tsk I like them- we don't have winnie the  
 8 pooh (.) but we've got tigger and piglet.

Children from the group with HFA were also able to self repair in fairly sophisticated ways. Example 3 depicts an example where CT is a female child with HFA, aged 4;8. This example is from the structured play session and it begins with A laying out objects for the child to utilize in play and asking her what the doll they are playing with can do with the objects. After a pause, CT responds with an utterance in line 5 which is poorly articulated and does not receive a response from A. After a 2 second pause, CT self repairs with the well formed utterance *a knife* said with a questioning intonation. This utterance receives an encouraging response from A which shows us that the repair was successful. Interestingly, a remarkably similar example occurs in lines 13-16, when CT offers the utterance *and a tou*. Again after a

non-response from her interlocutor, CT is able to repair the trouble source with a well articulated alternative and thus resolve the misunderstanding.

Example 3: CT, HFA, 4;8

- 1 A: now,  
2 ((3.3: A lays out a stick, a counter and a cloth))  
3 what could doll do with the:se.  
4 (1.1)  
5 CT: a nye:f.  
6 (2.0)  
7 a knife?  
8 A: a knife! good one!  
9 CT: cut it?  
10 A: yeah sh- (.) and what's this?  
11 CT: plate.  
12 A: oh it's a plate good idea =  
13 CT: = and a: tou.  
14 (2.0)  
15 a towel.  
16 A: oh and a to:wel (.) ve:ry nice idea.

The above example is also illustrative of the way in which additional language difficulties of some of the children with HFA may create more contexts where repair is needed. In this case it is not atypical pausing or overlapping which is at issue, but rather problems with articulation.

The most striking difference between the two groups concerns the number of attempts to repair before the repair is successful. Whilst the children with HFA often take multiple attempts to successfully repair, we are yet to come across an example of these extended repair sequences in the TD group. Multiple attempts at repair are demonstrated in example 4 below.

This example takes place during the beginning of the unstructured play session where A is attempting to get LT, a male child with HFA, aged 5;7, to lead the play session. LT appears to be slightly fatigued by the day's activities and asks to go to another room in the lab (line 2 and 3). LT has a fairly dysfluent turn beginning with a false start and moving on to a poorly articulated repair in line 3. We can see that the turn was problematic from A's response in line 4 where she initiates repair by saying *the other room* with a questioning intonation. LT's response to this request for clarification, *yep*, is not sufficient to solve the difficulty A had with the trouble spot and A issues a more detailed repair initiation in line 7. Again this gains a fairly minimal affirmative response token from LT. We can see that this has not resolved the misunderstanding as A issues a more specific initiation of repair, *where your dad is?*. This utterance suggests that A's difficulty with lines 2-3 seemed to be more a problem related to understanding a referent, rather than a more general problem with hearing or understanding. In other words, A was unsure over what *the other room* actually refers to. However LT's minimal turns were not sufficient to resolve the misunderstanding. After four question and answer sequences the repair is finally successful in line 14, which we can see has reached resolution by A's turn in line 15 which closes the topic before moving on to the next part of the session.

Example 4: LT, HFA, 5;7

- 1 A: you can just do anything whatever you want [really]  
 2 LT: [can] you-  
 3 (cai) stay by the other room today?  
 4 A: the other room?  
 5 LT: yep  
 6 (1.2)  
 7 A: you want to go into the other room?  
 8 LT: yeah  
 9 A: where your dad is?  
 10 (1.0)  
 11 LT: no =

- 12 A: = or another room?  
13 (1.0)  
14 LT: the other room  
15 A: we can have a look in the other room later

Example 4 takes a total of eight turns to achieve successful repair. Based on findings from conversations amongst normal adults, Schegloff states that repair is most often achieved in the same turn as the trouble source (1979). However, examples such as this are consistent with findings from Stirling et al. (2007) who, as reported above, discussed a similar phenomenon in self initiated self repair in one child with autism.

Example 4 draws attention to another interesting aspect of this data set. The repair sequence closes with A orienting to the trouble source being resolved and she then moves on with the session. However, it is unclear whether A actually knows what *the other room* refers to (there are four other rooms in the lab which it could potentially refer to and she had only ruled out one of these; the room with LT's father in it). Essentially A checks to see if LT is requesting to see his father, and as it becomes clear in line 11 that LT does not require a break, she moves on to the next task in the session.

This highlights the fact that there are certain features of the corpus which illuminate an underlying mismatch between interlocutors' goals within the interaction and are reminiscent of institutional interaction. The adult in this corpus is particularly engaged and enthusiastic with the children. She asks them many questions and is typically very quick with responding to their utterances in a positive manner, even occasionally when it appears that she has not understood the child. Her primary aim in the session is not to engage in conversation with the child. She has a research agenda which she needs to fulfil; however, she also has an ethical responsibility for the child's wellbeing.

The adult has the goal of carrying out a required number of tasks within a set time period. This necessitates closely managing the events which take place in the lab and guiding the course of the interaction so as to achieve this. This is perhaps not so different from many situations involving adult-child dyads whereby the adult is in a position to guide the interaction and often has specific motives behind their involve-

ment in the interaction (such as in teacher-student interactions, where the teacher wants the child to complete set course work, or parent-child interactions, where the parent wants the child to complete an action, such as get ready for bed). Thus in this data set there is occasionally evidence within the interactions of differing motives behind the adult's actions and interactional contributions, and those of the child.

It is this misalignment of goals between the adult and the child in this corpus which makes the data particularly complex. Misunderstandings in conversation can occur and operate at different levels of understanding. This makes the concept of grounding a particularly informative framework in which to understand repair, and misunderstanding more generally.

## 8. Grounding

We thus propose that an additional and complementary mechanism for exploring repair and misunderstanding in the conversation of TD children and children with ASD is through Clark's concept of "common ground" (Clark 1996). The idea of common ground builds on Schegloff's research into repair and similarly to the CA tradition, views conversation as a collaborative process. When two or more people engage in a conversation, they bring a body of prior knowledge and beliefs to the interaction, some of which they will take to be "common ground" or presupposed mutual knowledge (Clark & Schaefer 1989). During the course of the conversation the common ground in the interaction changes. In successful interaction, interlocutors aim to add to this common ground via accumulation. They come to mutually believe they are participating in the same joint action and assume that their common ground is close to identical. However misalignment can occur between the two interlocutors' representations of the common ground in the interaction, which can give rise to misunderstandings.

Clark & Schaefer (1989) represented the states or stages of understanding as follows:

- State 0: B didn't notice that A uttered any *u*.
  - State 1: B noticed that A uttered some *u* (but wasn't in state 2).
  - State 2: B correctly heard *u* (but wasn't in state 3).
  - State 3: B understood what A meant by *u*.
- (Clark & Schaefer 1989:268)

Each state presupposes the state before it. The interlocutors' mutual goal is to make sure B is in state 3 for the entire conversation. Each interlocutor has an obligation to "ground" each utterance in order to indicate that this has occurred (for example with a minimal response or an appropriate second pair part). The only way that either A or the analyst knows what state B is in, is by their responses to A's utterances.

After a misunderstanding has become "public" or obvious, one or both of the interlocutors will usually draw attention to it and take steps to repair it. Clark differentiates between invisible and public repairs. Invisible repairs are instances such as false starts which speakers often quickly fix without an interlocutor even processing that a repair was carried out (1996:284). However some repairs become obvious in a conversation. Clark calls these "public" and states that these present a joint problem for the interlocutors to fix. These are known as public for two reasons. Firstly, it is often difficult to attribute "blame" for communication breakdown as it can be unclear whether the problem lies with the speaker encoding or with the listener decoding. Secondly, and perhaps more importantly, as both interlocutors are attempting to achieve common ground within their interaction, it is in their best interest for both interlocutors to attend to the problematic speech (Clark 1996:285).

Clark and colleagues offer a model for understanding the interactional alignment of interlocutors more broadly, also. As Clark (1996) notes, two people engaged in any activity must come to mutually believe that they are participating in the same "joint action". It seems to us that in interactions between adults and children, there is often likely to be some kind of misalignment between the way the adult views the joint actions being undertaken, and the way the child does. "Private" agendas for joint action may also conflict with "public" agendas in ways which may affect the nature of the interaction. Thus negotiations or misunderstandings over the nature of the joint action being undertaken may be relevant to our analysis of the minutiae of the conversational interaction.

## **9. Analysis and discussion: Grounding**

In this section we present some examples which are explained using the concept of common ground. Our intention is to argue that the common ground framework provides an additional level of flexibility in examining instances of misunderstanding

which do not explicitly constitute repair by a CA definition. Rather than viewing this as an alternative to a CA approach, we see this as building on the foundations of misunderstanding and repair which three decades of research in the CA tradition has laid down.

When using naturalistic data there are benefits from perspectives which view discourse as a collaborative event, as both CA and grounding approaches do. Let us first consider an example of repair which illustrates this. Example 5 occurs when SI is engaged in eating a fruit stick and attempts to initiate a new topic of conversation. As her mouth is full of food she is quite difficult to understand and we can see by A's response in line 3 that she has not fully understood what SI was attempting to say in line 2. A initiates the repair in line 3 by uttering *your mum?* with high rising intonation. This demonstrates to us that she is aware that something has been said, thus is beyond state 0 of understanding on the grounding model, but is somewhere in state 1 or 2 as she is requesting clarification. We suggest she is in state 1, as SI's previous turn was difficult to hear. In line 4, SI attempts to repair her utterance from line 2 by adding in the required missing auxiliary *is* and repeating the final part of her original utterance, *called (Dan)*. This is a well formed reply to A's request for clarification in line 3 and we can see from A's agreement response in line 5 that she has understood what SI was attempting to communicate. Thus A is now in state 3 as the repair has been successful with SI requiring one turn to complete the repair.

Example 5: SI, HFA, 4;11

- 1 A: there's something I'd like you to do so I'll just get you to sit down there?  
 2 SI: my- my mum called (dan) ((muffled))  
 3 A: your mum? **[A is in state 1]**  
 4 SI: is called (dan). ((muffled))  
 5 A: you're right she is. **[A is in state 3]**  
 6 SI: ((coughs))  
 7 A: mm her name is jan.

We can see that both interlocutors in example 5 are aiming to create mutual understanding. Although this is clearly an instance of "other initiated self repair", it is

difficult to say that SI has repaired this trouble source independently. This is more accurately described as joint repair. It is more complicated than simply an adult (A) initiating repair from a child with the child then producing the necessary repair in line 4. It is a collaborative process whereby A is able to highlight the aspect of the conversation which she did not understand by repeating back the part which she did. In effect A is performing the first half of the repair and SI is completing it by finishing the collaboratively produced sentence.

Both CA and grounding frameworks have the flexibility to emphasise the (potentially) co-constructed nature of repair as demonstrated by example 5. This is in contrast to approaches to repair from the quantitative literature which limit their scope to focusing only on strategies of self repair produced by the child, and only when this has been elicited by an adult (such as Volden 2004 and Geller 1998). Thus, CA and grounding frameworks are better suited to the level of detail which needs to be accounted for in naturalistic conversational data. Additionally, the concept of grounding allows us to unpack sequences involving misunderstandings which do not necessarily constitute repair within a CA analysis.

Example 6 represents an interaction in which it is difficult to say that repair has taken place but it is clear that there is misunderstanding within the interaction. A is attempting to interest TP in completing some puzzles as part of an intelligence test. TP is a TD male who is 4 years of age. In line 1, A asks TP if he likes puzzles to which he replies *yes*, after a hesitation. This prompts TP to tell a story beginning in line 5. It is very difficult to understand what TP is referring to when he uses the terms *wope* and *rove*, but it becomes clear to us in line 9 that TP is referring to an animate object when he refers to it using the shortened pronoun *'e* and the also from the fact that the referent is capable of moving as indicated by his use of the verb *came*. Therefore for the entirety of this example TP appears to be in state 1 with regards to A's utterance in line 1.

Additionally, there is little in A's responses to suggest that she has understood TP's story. Her responses in lines 6 and 10 are both rephrasing the previous utterance, which she has heard correctly even if she has not understood the referent mentioned back in line 5 (contrast this with her response in line 14 where, we argue, she has understood TP's previous turn and responded by repeating part of the utterance but

also encouraging the child to expand on the story by asking a novel question about the topic). Further, in line 8, A replies to TP's previous utterance with the new information marker *wow* and then attempts to change the topic (presumably to bring the conversation back to puzzles) with the term *now*. It appears that A remains in state 2 throughout the entirety of TP's story.

Example 6: TP, TD, 4;0

- 1 A: now do you like puzzles TP?  
 2 (0.88)  
 3 TP: y:es .  
 4 A: yes? we've got some =  
 5 TP: = once (.) one was on my (wope). [TP is in State 1 with regards to 1]  
 6 A: on your rope ah:: [A is in State 2 with regards to 5]  
 7 TP: on (.) top of my (rove) wope. [TP is in State 1 with regards to 1]  
 8 A: ah: ok wow(.) now- [A is in State 2 with regards to 7]  
 9 TP: and then 'e came to the other side,  
 10 A: did it? it went to the other side? [A is in State 2 with regards to 9]  
 11 TP: yeah.  
 12 A: wow.  
 13 TP: where (.) my tubby house was.  
 14 A: oh where the cubby house was (.) is it a nice cubby  
 15 house?  
 16 TP: yeah.  
 17 A: yeah oh cubby houses are good.

As it is also unclear whether the fact that the child is orienting to A's utterances is evidence of misunderstanding; for example we have no conclusive evidence that TP intends line 7 as a repair rather than as an elaboration of line 5. Thus from a CA perspective there is minimal basis for describing this sequence as one of trouble and repair. However, there is little evidence that either participant understands what the

other is saying. For instance, it seems clear from the examples mentioned above that TP has not understood A's question in line 1 (possibly hearing *puzzles* as *possums*) and A has not understood TP's story in lines 5-13 (possibly about a *possum* on top of his *roof*).

Additionally, the following example demonstrates a clear misalignment in understanding between the interlocutors, which a grounding framework potentially offers us scope to discuss. In this example, BM is a TD female child. This example occurs during the structured play session. During line 1, A demonstrates an action of Teddy (a teddy bear) pretending to be a bridge. After BM has mimicked this action, A appeals to the child to pretend Teddy is something else in line 5. BM replies to this by suggesting Teddy could be a *boat*. When A requests that BM shows her in actions rather than words in line 7, A clearly uses the term *goat* rather than *boat*. This shows us that A has not correctly heard BM's utterance and thus is in state 1 with regards to line 6. However both interlocutors act as if A is in state 3. BM then demonstrates an action using the teddy which A appears to find acceptable to account for the teddy bear pretending to be a goat, as judged by her response in line 9.

Example 7: BM, TD, 5;10

- 1 A: teddy's being (.) a bridge ((A demonstrates suitable action using teddy))
- 2 BM: ( )=
- 3 A: =yeah can you see how teddy's being a bridge? (.) show me how teddy
- 4 could be a bridge. ((BM demonstrates suitable action using teddy))
- 5 A: that's it ve:ry good! what else could teddy be?
- 6 BM: um (.) he could be a boat
- 7 A: yeah could you show me how he could be a goat [A is in state 1]
- 8 ((BM demonstrates suitable action using teddy))
- 9 A: Ah I see very good clever teddy.

Example 7 demonstrates an instance where the two interlocutors have experienced a misunderstanding which is evident to the analysts examining the data. However, neither of the interlocutors involved in the interaction have noticed this, or if they

have, they have not drawn attention to it for one reason or another. As neither interlocutor orients towards the misunderstanding as being problematic there is no way within a CA analysis to discuss such a problem. However, if we are interested in providing a general profile of the amount of misunderstanding (“potential repair spots”) in interactions involving TD children compared with children with autism, we would presumably not want to disregard such sequences. The literature has suggested that for various reasons, more occasions for repair arise in conversations with children with autism. What if, for whatever reason, some of these go unremarked by an interlocutor – either as here, where the addressee seems not to notice the problem, or where the interlocutor is either oriented to providing additional scaffolding, or has overarching conversational goals which result in a choice not to pursue grounding to state 3? If we exclude them from our analyses, we may end up with a profile of misunderstanding in the interaction which is skewed towards the norm.

## 10. Conclusion

The CA approach to the study of repair in conversation has begun to shed light on how this phenomenon operates as an organised sequence of events in interactions between English-speaking, neurotypical adults. However, the study of conversational repair within child language domains is still in its infancy. This paper began by applying a CA style analysis to dyadic interactions between an adult and 10 children; 5 of whom are Typically Developing (TD) and 5 of whom have High Functioning Autism (HFA). In line with what is known about adult speakers, we found that both TD and HFA groups have a preference for self initiated, self repair, and additionally subjects from both groups were able to utilize a range of techniques to achieve this end. However, the children with HFA sometimes needed multiple attempts at a repair before they were successful, and these extended sequences of repair did not occur in the TD group.

However, whilst analysing this data set, we were faced with issues of a larger methodological concern surrounding the presence of misunderstanding within the interactions which the participants did not orient to, and which were thus not analysable within a CA approach to repair. We then attempted to examine these examples from a grounding perspective, which allows a broader portrait of misunderstanding and

dysfluency, so that we are not restricted just to examining the issue of misalignment when the repair becomes obvious or public. We believe this to be a novel discourse analytic perspective to the study of repair abilities in children (with and without autism) interacting with an adult. Further, we feel that combining the two approaches allowed for a fuller account of this phenomenon, with respect to this data set.

Previous researchers have commented on the extended load the conversational partners of children with autism take on. Kremer-Sadlik (2004) found that family members of children with ASD tailored questions to both ensure a high response rate of appropriate answers and encourage the children to attend to socio-cultural and interpersonal perspectives. Additionally, Rendle-Short (2009) has demonstrated that adults interacting with children with ASD are skilled at scaffolding the interaction or doing more of the “work” in the interaction, such as providing assessments, giving response tokens and closing sequences to create interaction which sequences in a similar pattern to so called “normal” discourse.

The extra workload undertaken by the adult in interactions between adults and children with autism may well reduce the occurrence of repair sequences. However, absence of a repair sequence does not necessarily signify that true understanding has been established within the interaction. In our data set, there are examples where repair, as defined by Schegloff (2000), does not occur, but where there still appears to be a breakdown of communication. These require a broader analytical framework to account for the degree and complexity of dysfluency within the interaction which otherwise remains unexplained.

### **Acknowledgments**

We are indebted to Cheryl Dissanayake and Rachel Kelly for kindly making available their data corpus for this research. We also wish to express thanks to everyone who commented on the examples and ideas in this paper, especially Rod Gardner, Ilana Mushin, Kerry Mullan and two anonymous reviewers. All remaining errors are the authors’ own.

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## Appendix 1: Glossary of transcription symbols

Adapted from Jefferson (2004).

[	point of overlap onset
]	point at which an overlap terminates
=	one at end of line and at the beginning of the next line indicates no time gap between the utterances or latched utterances
(0.0)	elapsed time in silence by tenths of a second, eg (1.3) means one and three-tenths of a second has lapsed without speech present
:	short prolongation of the immediately prior sound
::	long prolongation of the immediately prior sound
.	a full stop indicates a falling tone
,	a comma indicates a continuing tone
?	a question mark indicates strongly rising terminal intonation contour or questioning intonation
<u>Under</u>	underlining indicates speaker emphasis
(( ))	descriptions of non-linguistic sounds in the recording
( )	unknown utterance. Used when a transcriber cannot hear what is being said. Number of spaces represent the number of syllables.
(word)	unsure of utterance. Used when the transcriber is unsure if this word was heard correctly
-	a cut-off