

**Prosody and Pragmatics: How preadolescents with
ASD take turns-at-talk during a cooperative
goal-oriented task**

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SUMMARY

Prosodic impairment in autism is widespread. It greatly affects the ability to interact, form relationships, and convey meaning. Yet, despite its prevalence, our understanding of its nature remains incomplete. This study investigates the prosody of six preadolescent children with Autism Spectrum Disorder when playing a cooperative video game with an adult. Utilising Conversation Analysis (CA), it examines twelve hours of data to explore how these children use and respond to prosodic devices for interactional purposes; specifically to manage conversational turns, create information boundaries, signal importance and express emotion. The study also examines the adult's role in accommodating and interpreting the children's prosody. Key findings suggest these children demonstrate competence in managing turns when signalling completion and competing for speakership using prosodic resources aligned with lexico-syntactic structure. They display understanding and competency in using prosody to create meaningful sentences as well as to highlight novel or important information. Moreover, these children produce canonical complaints-relevant designs to express frustration. However, the study reveals how these children have challenges with the articulatory and prosodic timing and coordination of their speech, leading to irregular rhythm and fragmented and dysfluent turns, particularly when using complex linguistic structures. The children appear aware of these difficulties but have problems in modifying and updating prosodic patterns. They tend to resort to less complex lexico-syntactic structures to facilitate progression in the talk. The adult accommodates these prosodic variations, intervening only when shared understanding breaks down. Overall, the children show competence and understanding of prosodic function. However, errors in the timing and coordination of phonetic and acoustic features, alongside linguistic limitations impact prosodic form, limiting communication effectiveness. These findings expand our understanding of the prosodic abilities of children with ASD. The study highlights the need for targeted interventions to address these prosodic challenges and improve communication outcomes for these children.

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DECLARATION

I hereby declare that the work presented in this thesis has not been submitted for any other degree or professional qualification, and that it is the result of my own independent work.

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INTRODUCTION

1.1 Motivation and background

As a practising Speech and Language Therapist who has worked with children and young people with communication impairments for almost forty years, I am committed to adopting an evidence-informed approach to the interventions I design and deliver. For most of my time as a practitioner, I have specialised in the area of autism and Autism Spectrum Disorder (ASD)¹

Over the years, many changes to ‘recommended’ therapeutic approaches have emerged due to multiple explanatory theoretical frameworks. Despite my best efforts, my experience with implementing interventions for children with autism (CWA from here) has left me with a profound sense of dissatisfaction with the efficacy of improving the life chances of these children, particularly with those children who appear superficially linguistically and academically capable and have limited access to Speech and Language Therapy.

I have encountered many children and young people who feel frustrated and confused about why friendships and conversations can be complicated. They often wonder why others perceive them as rude or aggressive, even when they believe they are doing the right thing. Despite their good intentions, they still face challenges in their interactions. Their dissatisfaction and

¹The heterogeneity of individuals with ASD presents a significant challenge for sample characterisation and limits the interpretability and replicability of research studies. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) ([American Psychiatric Association. 2013](#)) replaced the previously defined subtypes of autism, such as Asperger’s Syndrome, with a single category of ASD. Within this category, the DSM-5 identifies three core domains: social communication, social interaction, and restricted and repetitive interests and behaviours (RRBs). This framework allows for substantial variation in symptoms across these core domains and acknowledges that individuals may differ in non-ASD symptoms, such as cognitive ability, expressive language, and comorbid conditions.

frustration have been the impetus behind this project.

Autism, along with its associated disorders, has long been diagnostically recognised as a neurodevelopmental condition (Russell et al. 2022). In the U.K., approximately 1% of the population is known to have some form of the condition, with a possible further 2% undiagnosed (O’Nions et al. 2023; Parkin et al. 2016). Diagnostically, autism is characterised by behavioural deficits in three domains: social communication, social interaction, and restrictive and repetitive behaviours/interests (RRBs). However, as demonstrated throughout this thesis, autism manifests distinct characteristics that vary significantly from one individual to another. The term "High-Functioning Autism" has historically been used to refer to individuals on the autism spectrum with average or above-average intellectual ability. However, it is not a formal diagnostic term under the current DSM-5 (American Psychiatric Association. 2013) classification, which now uses "Autism Spectrum" with levels of support needs.

"High Functioning Autism" (HFA) is frequently referenced in the academic literature. It refers, albeit inaccurately, to a subsection of individuals with autism who have intact structural language and minimal or no cognitive impairment but do have impairments with social communication and interaction with others (Alvares et al. 2020; Yirmiya and Sigman 1991). The DSM 5 classifies this group, along with other previously identified subgroups such as Asperger’s syndrome, under the term ASD. It is this group, and more specifically, the preadolescent age group, that this thesis is about. This thesis uses both terms ASD and HFA to reflect the terminology in the literature related to this cohort.

A frequently overlooked but critical element of communication is prosody. In this thesis, I will refer to prosody as the set of acoustic and phonetic features which refer to the patterns of rhythm, stress, and intonation in speech that contribute to meaning beyond the literal words themselves and its role in social communication. Since the first descriptions of autism (Baltaxe 1984), abnormal or unusual prosody has been identified as a core feature of those people with autism who speak. Often described as having monotonous or motoric voices, erratic or variable pitch and volume, speakers with autism can ‘sound’ unusual. Conversational turn management can be problematic, with frequent interruptions and talking over others or prolonged and awkward pauses. Not knowing when to take a turn in a conversation can have a profound impact on how the individual with autism manages relationships; sometimes, they dominate. One young person commented that they continue to talk until someone tells them to stop. Others smile and nod but avoid engaging in discussions. A substantial body of research has identified prosodic impairments in people with autism, even in those with seemingly mild communication difficulties (Grice et al. 2023; McCann and Peppé 2003; Peppé et al. 2006; Wiklund and Laakso 2019). Nevertheless, the nature of these difficulties remains unclear (Peppé et al. 2006). It is even less evident what we, as therapists, should do about them to

support these individuals towards more natural-sounding speech, or to help them engage more effectively in social interactions. Paul et al., 2008, for example, argue against taking a narrow focus on individual prosodic features, suggesting that a metalinguistic approach, discussing prosody's various functions and how they operate in context, maybe a more helpful approach. However, this perspective does not account for the problem of a high degree of heterogeneity of the prosodic features in autistic speakers, with some showing a clear understanding of prosodic function but unable to produce accurately in context (Shriberg et al. 2001, 2011; Wiklund 2016).

As will be discussed in the Literature Review Chapter 2, studies of the prosodic abilities of CWASD have been traditionally been examined in relation to grammatical functionality (for reviews, see (Grice et al. 2023; McCann and Peppé 2003), such as a phrase or boundary marking in a spoken sentence (e.g. eats, shoots and leaves vs eats shoots and leaves) or emotional recognition (Grossman et al. 2010). However, these studies often analyse speech outside the contextual conversation in which it is naturally produced and understood. Consequently, conflicting results have emerged. More recently, the drive to shift perspective from a cognitive-based, deficit-driven approach towards one which is more interactional, skills-based, has seen the emergence of conversation-based analyses of speech (Antaki and Wilkinson 2012; Muskett et al. 2010; Wells and Local 2009). Some have utilised this methodology to explore prosody in interactions (Couper-Kuhlen and Selting 1996; Geils and Knoetze 2008; Samuelsson 2009; Wiklund 2016). These have provided new insights into the functionality of prosody in these individuals and therefore, offer the opportunity to discover what happens within a conversation to determine more effective ways of cultivating more effective and natural-sounding speech. There is a suggestion that the unusual or even formulaic prosodic designs observed in autistic speakers does not directly correlate with an underlying cognitive deficit but rather emerge as compensatory mechanisms driven by interactional goals and the need to communicate (Dobbinson et al. 2003; Perkins 2014). In other words, prosodic form in autism, which may be restricted and repetitive, is not directly related to its function in context (Walker 2014).

One aspect of prosodic impairment in autism is the segmental or articulatory component involved in the realisation of prosodic form, which has been recognised but is still not fully understood (Shriberg et al. 2001). Speech and language impairments are not included in the diagnostic criteria for autism and autism spectrum. However, as Shriberg et al. (2011) indicate, speech and articulatory errors are prevalent in autistic speakers. The nature of these errors and the impact on prosody in interaction is a topic which requires further exploration.

This interactional approach to prosody is revealing but still emerging. At the time of writing, only a few small-scale or single-case studies analysed CWASD speech concerning prosody in conversation (Bellon-Harn et al. 2007; Kelly and Beeke 2011; Samuelsson 2009; Wiklund 2016) (Wiklund 2016; Kelly and Beeke 2011; Samuelsson 2009; Bellon-Harn et al.

2007). They have utilised an inductive methodological approach of Conversation Analysis (CA) described in Chapter 3, section 3.2.1 which avoids a deficit-driven approach, favouring a holistic and interactional one. Using CA as a tool allows for the exploration of all aspects of communication, both linguistic and paralinguistic, between conversational partners. By analysing the conversations within which atypical prosody may or may not occur, it is easier to conclude the functional impact of the talk. These studies offer exciting and relevant insights into possible therapeutic approaches, and the present study follows in their footsteps to expand our limited understanding of prosodic impairments in autism. However, some studies have revealed that these children's expressive prosodic ability is poorer than their comprehension (Peppé et al. 2011) with some suggestions that the problem may lie in grammatical constraints or speech production deficits (Shriberg et al. 2011, 2001; Wiklund and Laakso 2019). These studies highlight the need for acoustic analysis when exploring prosodic strengths and weaknesses. This study considers this point with a perceptual analysis supported by acoustic analysis where possible.

As mentioned at the outset, the group of children most at risk from a lack of or ineffective intervention would be described as having milder impairments or considered 'high functioning'; those who have seemingly intact structural language skills. Therefore, this study targets this group. Moreover, those who are entering the more socially complex and challenging phase of adolescence are most vulnerable to relationship and interactional problems but do not typically receive any targeted support from Speech and Language Therapy. Consequently, the children chosen for this study are pre-adolescents.

A common issue when working with children with autism spectrum disorder (CWASD from here) is that they often find conversations challenging and may struggle to know what to say unless the topic is engaging. As a result, using a conversation-based approach to analyse their communication may lead to inadequate data. One possible solution is to analyse the social activities and actions within a specific goal-oriented task such as game-playing. It is well-established that children with developmental delays often encounter difficulties in cooperative play, particularly in turn-taking. This has been documented in various studies (see review Lee and Staggs (2021)), and it poses significant challenges for parents and educators who strive to teach these children effective social interaction skills and how to engage harmoniously with their peers. However, the literature reveals that for CWA, irrespective of language ability, interactional game-playing involving technology, as in computer or video games, is highly motivating (Durkin 2010) and, therefore, provides an ideal forum for the analysis of what children do and say and how they accomplish particular interactional goals related to playing a game. This study provides a detailed analysis of the interactions of six pre-adolescent CWASD playing the same interactive computer game with two different adults.

1.2 Research aims and questions

The overall purpose of the study is to understand how preadolescent children with autism spectrum disorder orient to and use prosodic design during a goal-oriented interaction with an adult and the role the adult plays in maintaining intersubjectivity through their orientation to and use of prosody. The study explores the role of prosody in the following aspects of communication.

- Turn management: This involves the use of and orientation to prosodic features to create smooth transitions between speakers, and how potential trouble spots are managed
- Boundary marking: Interpreted here as using prosodic resources to ‘chunk’ speech to represent lexico-syntactic information groups.
- Indicating focus: This aspect examines how prosody is used and understood to disambiguate meaning, highlighting important or contrastive information.
- The expression and recognition of affect: This involves how prosodic resources convey an emotional or affective stance.

The specific questions for each of the above communication areas are:

- What specific prosodic features can be identified?
- What role do they play in maintaining shared understanding?
- How do the participants manage these devices?

This study aims to answer two further questions.

- How are the participants’ roles and actions in the game constructed and interpreted through prosodic design?
- How could the CWASD’s orientation and use of prosody in the context of interactional computer game-playing inform educational and therapy programmes for this cohort?

The analyses are based on video and audio data collected during these gameplay sessions. To investigate the above aspects, the gameplay analysis, based on Conversation Analysis principles (Sacks et al. 1974; Schegloff 1998), provided multiple opportunities to examine how they are realised in directives and complaint sequences. It was possible to focus on three interactional devices: overlapping speech, pauses, and stress marking.

The study falls within the field of applied Conversation Analysis, which Antaki and Wilkinson (2012) describe as an alternative method for analysing talk that may be considered atypical. This project implemented an inductive, data-driven analytical approach. This means that there were no pre-existing research hypotheses at the outset. Instead, the analyses were guided by the data’s observable, recurring points of interest. The findings contribute to a more accurate understanding of these children’s abilities to use prosodic resources to accomplish their interactional goals. They also provide insight into the strategies and responses that facilitate their interactions.

The thesis is organised thus: Chapter 2 reviews the literature and outlines the key theoretical perspectives and methods that inform this study. Chapter 3 describes the methods used more precisely and provides relevant information on data collection and analytical approaches.

Three results chapters present the findings, addressing the communication aspects of turn management, boundary marking, focus and affect. The first of these, Chapter 4 shows how the children use prosodic and linguistic resources to accomplish turn management.

Chapter 5 explores prosodic and linguistic aspects of turn construction, including stress placement, to achieve an interactional focus. It explores how information is marked prosodically. It presents evidence of problems related to timing and coordination.

The third results chapter, Chapter 6, follows from this with an analysis of what occurs prosodically and linguistically during emotive talk, in this case, during complaint sequences. This chapter shows that children are more likely to achieve their interactional goals when they use less sophisticated linguistic constructions with a clear prosodic design.

The discussion following Chapter 7 makes the case for these children's ability to successfully use linguistic and prosodic resources to achieve particular interactional goals. However, their skills are inconsistent and, at times, atypical. This atypicality and inconsistency are presented as evidence of challenges in the temporal coordination of phonetic and linguistic features. Implications for clinical practice and intervention strategies are discussed. The final chapter (8) summarises the study.

In this thesis, I do not speculate on the underlying nature of autism. Instead, I aim to explore the various prosody skills that individuals with autism possess, both in terms of form and function. This exploration seeks to inform more effective interventions. While acknowledging the limitations of the study, I also discuss the potential for future research and its contributions to the field.

LITERATURE REVIEW

2.1 Introduction

Investigations of the prosodic perceptual and production abilities of people with autism have generated inconclusive and, at times, conflicting results. The reasons for this lack of clarity include methodological and task problems, small sample sizes, heterogeneity of participants, and limitations in assessment protocols. However, despite the investigative confounds, there is consensus that autistic individuals have some difficulty with both the perception and production of prosody, but the specific detail is still questionable. A consequence of prosody being under-researched and scantily understood is that clinicians find evaluating challenging. Therefore, it is often overlooked in therapy planning ([Kelly et al. 2018](#); [Peppé 2009b](#)). In this thesis, I do not speculate on the underlying nature of autism. Instead, the aim is to explore the range of prosody skills that CWASD possesses, both in form and function, and their effect on interactions and conversation management. By exploring the current state of research, this chapter aims to offer insights into the advancements made in our understanding of this topic as it relates to the above points. Additionally, it will identify existing gaps, examining the reasons for their presence.

This chapter covers three broad themes. The first theme addresses a foundational background on prosody. It focuses on four key aspects relevant to this study: managing conversational turns, the form and function of boundary marking, stress marking to contrast and emphasise important and novel information, and prosody's role in expressing emotions. The research related to the prosodic abilities in CWASD is critically examined. It specifically addresses the research questions associated with the four communicative functions delineated in

the introduction: turn management, (2.2), boundary setting, (2.3), focus (2.4) and affect (2.5) and a more general overview of atypical prosodic features (2.6).

The second theme addressed in this review examines the existing literature on CWASD's abilities when explored from an interactional perspective. The research is discussed with regards to prosodic skills, the influence of context and the role of the interactional partner section 2.7.

A third theme explores the research from a methodological perspective with the purpose of identifying underlying reasons for the gaps in our understanding of the topic addressed in this thesis. Section 2.8 discusses the methodological challenges of conducting investigations into the prosodic abilities in CWASD.

Section 2.9 summarises the information in this chapter.

2.2 Turn management and prosodic design

Learning how and when to take turns is a fundamental skill developed before successfully participating in a conversation. Taking turns is crucial in maintaining order (Sacks et al. 1974). Intersubjectivity is compromised when speakers talk at the same time. Turn-taking is often considered to be challenging for CWAs and is typically incorporated into autism therapy programmes. Lee and Staggs (2021) point to issues in cooperation and attention as being potential barriers to effective turn-taking. However, as Rieth et al. (2014) point out, addressing the problem by increasing the levels of contingency from a child in response to a behavioural cue may improve one aspect of turn-taking behaviour (such as making a request) but not necessarily translate into others.

More recently, researchers have examined the role of prosody in conversational turn-taking, providing a new perspective on how we interpret this skill in CWASD (Kelly and Beeke 2011; Wehrle et al. 2023). An understanding of the turn management system is needed to understand the challenges faced by CWASD. In section 2.2.1, I explore how researchers understand the role of prosody in conversational turn management. Following this, section 2.2.2 presents an overview of the research findings relevant to CWASD.

2.2.1 Prosodic resources in turn management

As Lee and Staggs (2021) point out in their literature review, turn-taking has varied functions in communication and its purpose varies according to the activity. This section explores the ways in which studies have illustrated the prosodic resources speakers deploy in their speaking turns to project various turn-taking actions.

In conversational terms, Turn Construction Units (TCUs) are the building blocks of a turn-at-talk (Sacks et al. 1974). Speakers use syntactic and prosodic devices to either project turn transitions (Schegloff (1998); Wells and Peppé (1996)), extend them (Walker 2017a) or string several together to create a multi-unit turn (Local and Walker 2004). The end of a speaker's turn is often signalled by specific syntactic cues that indicate a potential transition to a responsive turn. Furthermore, the type of sentence, along with prosodic resources can play a significant role in signalling the conclusion of a turn. For instance, questions that invite a response (such as "What do you think?" or "Do you want to do this?"), as well as imperatives and declarative statements, typically conclude with turn-final prosodic design, including a falling pitch and vowel lengthening to signal turn completion. Examples include phrases like "Turn right!" or "You need to turn right." (Cole 2015; Ferreira et al. 1993).

While recognising the variation in intonation patterns across languages, this study focuses on the English intonation system. A 'tone unit' is the minimum unit of speech that can carry a single coherent intonation contour (Ladd 2008; Snow 2007; Wells and Stackhouse 2016). It is the primary and most fundamental organisational structure, varying in length from a single syllable to a sentence. Tone units serve to structure spoken language into coherent and meaningful segments. This chapter examines their role in emphasising significant information, conveying emotions, and indicating the speaker's attitude or intent. They will be discussed primarily in relation to their form and function in turn management, drawing upon interactional studies that adopt a Conversation Analysis (CA) approach, as proposed by Wells and Local (2009).

Tone units comprise various prosodic elements based on the framework outlined by Ladd (2008):

||(prehead) (head) Tonic syllable (tail)||

A tone unit must contain at least one Tonic syllable indicated by a distinctive, hearable change in pitch direction. The 'Tonic' syllable, therefore, is characterised prosodically by a distinctive pitch change and the location of primary stress. The head carries all stressed syllables before the Tonic. The prehead contains any unstressed syllables before the head. The tail marks any unstressed syllables after the Tonic. When no specific part of a tone unit is emphasised more than others, the entire utterance is considered to be in broad focus. The Tonic, or nuclear syllable, is the most prominent syllable within a tone unit (Snow 2007).

Because a TCU is complete, it will also include a Tonic, which can project the end of a speaking turn when placed in a turn-final position (Wells and Local 2009). However, as researchers have pointed out, the Tonic placement in English can vary (Cole 2015; Ferreira et al. 1993). Anything that follows the Tonic, including a pause, represents a potential legitimate space for another speaker to start talking, (the Transition Relevance Place or TRP) (Wells et al.

2004). When a speaker projects a turn transition, giving a ‘green light’ for the next speaker, the TRP is characterised by a decrease in pitch, loudness, and segmental lengthening (Schegloff 1998; Wells and Macfarlane 1998) and can be followed by pausing.

Some researchers have illustrated that children who are typically developing (TD) begin to understand conversational turn-taking very early (Casillas 2014; Snow 2007; Wells et al. 2004). They learn this through shared interactions and are scaffolded by the adults around them. However, he also suggests that the complex and variable signalling of a TRP is an additional challenge for young children that needs to be acquired over time in conjunction with lexico-syntactic and motor skills development.

Studies using CA have identified the TRP as representing a point at which speakers can legitimately overlap the onset of their turn with the current speaker without interfering with the flow of conversation. This usually occurs because the listener has sufficient information to respond or seeks to acknowledge the speaker’s prior turn. Schegloff (1998) proposed that these turn-incomings are non-competitive in that there is no attempt to steal the floor from the current speaker. In contrast, turn-incomings positioned before the Tonic are designed and treated as competitive. Overlaps in conversation can create difficulties, making a resolution necessary. Typically, this involves one person conceding their turn, followed by some repair, whether a direct self-repair or an ‘other-initiated’ repair. Recognising and addressing these trouble spots in adult conversations relies on understanding prosodic changes and being aware of the context. For instance, when someone narrates an event, there is an implicit social expectation that the narrator can continue speaking until they finish. If another person interjects, the narrator is generally allowed to self-select the next turn, while the interjector is expected to concede.

However, conversation does not always proceed from this legitimacy. Studies examining the prosodic features of interruptions using a CA approach have argued against the view that turn incomings at a TRP are non-competitive and those before are competitive (Wells and Macfarlane 1998; French and Local 1983). Instead, these studies claim that the prosodic design, not the specific location, makes the incoming turn hearable as turn competitive. Studies have consistently found that a cluster of prosodic resources, primarily an increase in pitch and loudness, indicate turn competition (Kurtić et al. 2013; French and Local 1983).

Therefore, there is a difference in the prosodic design and the positioning of a speaker attempting to take the floor compared to what might be considered a recognitional onset, where the speaker is displaying an understanding of what has been said before the completion of the turn (Couper-Kuhlen and Selting 1996; French and Local 1983; Jefferson 1986; Kurtić et al. 2013).

Moreover, Selting (1996) highlights that high and loud turn-incomings are not always competitive and can be context-dependent, requiring speakers to manage these issues locally.

This understanding is crucial for investigating CWASD, as children must learn to navigate these prosodically-driven behaviours based on social norms developed through experience and physiological maturity (Ballard et al. 2012; Snow 2007, 1998).

Managing conversation turns also involves turn-holding strategies, which indicate a speaker's intention to continue speaking. Context plays a key role in projecting Transition Relevance Places (TRPs). For instance, speakers often project TRPs to allow for counterarguments in debates, while a narrator tends to project fewer TRPs to extend their storytelling.

Breaks in the fluency of a speaker's turn present potential opportunities for another speaker to come in. In these cases, the current speaker could indicate they are not ready to relinquish their turn in order to maintain speakership until they have said what they need to say. Although there are linguistic and lexical cues (such as discourse markers and the use of coordinators), which help the speaker maintain their turn, key prosodic resources are critical to the projections of turn-holding. Speakers can maintain their conversational turn using various prosodic strategies. For example, a mid-pitch modulation combined with segmental elongation, as in “So:, I th:i:nk. . .” signals intent to continue. Additionally, controlled micro-pauses provide thinking time without indicating the end of their turn, allowing them to maintain the floor (Kern 2007; Local and Walker 2004).

The features described are typically linked to turn-holding practices during a turn. In contrast, increasing the tempo is one strategy for holding a turn between turns. By speeding up and shortening syllables, a speaker can prolong their turn and avoid signalling that it is coming to an end. Local and Walker (2004) suggest this pattern of an ‘abrupt join’ occurs most regularly where there is a projected upcoming change in the topic, with the speaker signalling both continuation and topic transition. They indicate specific features of pitch, duration, and loudness that are distinctive around these ‘abrupt joins’. Pitch is notable in that it is typically congruent with turn-final features but followed by an upstep in pitch at the onset of the next TCU.

This pitch-rise which can also be observed in the first stressed syllable of the next turn, may be an incidental consequence of an increase in vocal effort required to maintain the breath over a longer duration (Snow 2007). It is notable the turn-ending lengthening is absent. Instead, the turn-end is characterised by a speeding up of the final syllable with a slowing down of the following first stressed syllable of the next turn. Furthermore, a noticeable lack of pausing is facilitated by a coordinated deployment of phonetic features including duration, timing, pitch, loudness and phonatory features to create a smooth transition to the next segment (Ladd and Arvaniti 2023; Walker 2016). This is a subtle and complex action; effective timing and coordination are essential for successful implementation.

Effective turn management, therefore, entails orienting to and projecting prosodic, syntactic,

and contextual resources. It also involves planning effectively for what will occur next in the talk. For neurotypical children, this requires a learning process developed over time, with increasing linguistic competency and awareness of social norms. However, as highlighted in section 2.2.2, the process is more challenging for CWASD.

2.2.2 Turn management: Research on the prosodic abilities of CWASD

A few studies have investigated the prosodic resources involved in CWASD's conversational turn-taking abilities. Most are limited in scope, and data is predominantly based on the non-spontaneous speech of children and adolescents. The findings of these investigations are somewhat inconsistent, with some suggesting that CWASD can manage turns using prosodic devices, albeit atypically, while others suggest problems. This section examines these in more detail.

Peppé et al. (2007) used the PEPS-C assessment battery (Peppé and McCann 2003) to evaluate the prosodic abilities of thirty-one CWASD aged 6-13 years and a larger, typically-developing language-matched control group. They found that the CWASD performed less well than the control group regarding the recognition and expression of turn endings and Tonic marking. They describe a preference for the Tonic placement in a non-final position, contrary to the typical preference for turn-final position placement (Wells and Local 1993). However, as Peppé (2009a) points out prosodic form is influenced by multiple aspects, such as cognition, maturity and articulatory competency which may have influenced the results.

Some studies indicate that the issue with turn-taking is not straightforward. For instance, Heeman et al. (2010) found that twenty-six CWASD aged 4 to 8 years olds, were slower to respond and less sensitive to turn-taking cues by clinicians than age-matched controls. Ochi et al. (2019) have reported comparable results for autistic adults, who produced more protracted silences before taking their turn, suggesting there is a persistent issue over and above developmental progression. The indication here is an issue with the orientation to the prosodic features. However, Heeman et al. also note that what occurs during the interaction is important. An alternative explanation could be that, as the children were playing, their focus of attention was on doing whatever task they were engaged in and, therefore, were less sensitive to the talk.

This tendency to single-channelled attention may be contributory to the findings in the study by Wehrle et al. (2023). They conducted an analysis of conversational turn-taking among 28 German adults, both with and without ASD. The findings indicated no significant evidence of prolonged turn-transition gaps among individuals with ASD, except during the initial stages of dialogue. This observation implies that individuals with ASD exhibit an orientation toward prosodic cues related to turn-taking, although this orientation is influenced by the social actions occurring within the conversation. These social actions, such as working out what is being said,

what to say, understanding the context at the outset of a dialogue, are simultaneously competing for attention, and it may be more difficult for autistic people to initially synchronise all that is required to participate in a conversation, leading to delays in responses.

In the realm of production, evidence indicates that CWASD encounter difficulties in accurately producing the prosodic features essential for effective turn transitions (Shriberg et al. 2001). For instance, Bone et al. (2016) propose that individuals with HFA may struggle to coordinate temporal length, pitch, and volume. Additionally, they report an intriguing but unspecified observation regarding the existence of what they characterise as "articulation distortions" (p1188). These researchers raise questions concerning how these distortions influence the perception of atypical prosody.

Other studies have similarly highlighted issues in phonetic and prosodic realisations that impact turn endings. For instance, Kelly and Beeke (2011) found that in their single case of Sammy (aged 7;11 years), he exhibited prosodic features such as pitch movement, vowel lengthening, and changes in loudness similar to those observed in the speech of typically developing children. Moreover, he could deploy these features at sequentially and grammatically appropriate points to project a Transition Relevance Place (TRP) or to design a turn competitive incoming (TCI) to which his mother can orient. However, they also note atypical features, such as excessive vowel lengthening and creak, which could sometimes create misleading turn-ending cues.

Effective turn management, therefore, entails orienting to and projecting prosodic, syntactic, and contextual resources. For neurotypical children, this requires a learning process developed over time, with increasing linguistic competency and awareness of social norms. However, there is a physical element to the realisation and coordination of prosodic features, which some studies suggest may be compromised in CWASD, subsequently affecting their ability to manage conversational turns effectively. The following section reviews the literature on the prosodic grouping of words to segment speech into 'chunks' and delineating boundaries that often align with linguistic (syntactic) divisions.

2.3 The role of prosody in boundary marking

This section explores the role of prosody in establishing information boundaries. Using the concept of the 'tone group' (Ladd 2008), it explains how the formation of 'chunks' of information enables the speaker to indicate not only that they have completed their speaking turn but also the projected meaning. The methods by which speakers achieve this prosodic effect are discussed, citing relevant literature (Ferreira et al. 1993; Snow 1998). For CWASD, the research is shown to be contradictory regarding their ability to convey differences in meaning

via prosodic resources.

2.3.1 Prosody and boundary setting

When speaking, one generates a semantic and syntactic structure and creates a prosodic representation. This representation has two purposes: one to represent the intonational phrasing associated with the language spoken and the other to represent the decisions made by the speaker to best achieve their communicative goals. This section discusses the prosodic features of the sentential structure and how speakers project meaning and convey information using prosody.

This study concerns native English speakers. Therefore, the prosodic representations discussed here focus on how they are realised in English. In English, a stress-timed language, there is a variable stress pattern of stressed and not stressed syllables, contributing to the rhythmical timing of speech. English is influenced by pitch movement and intonation patterns as well as rhythm (Ladd and Arvaniti 2023; Ladd 2008; Xu and Xu 2005). Although the term "rhythm" in speech is not easily defined (Arvaniti 2020), it typically refers to the patterns and timing of speech sounds, pauses within an utterance, and the arrangement of perceived stress placement. Timing plays a significant role in establishing the rhythm of speech, influencing how syllables, words, and phrases are grouped. This rhythmic structure enhances the flow of speech and helps listeners grasp its underlying patterns.

A notable feature of English rhythm is that it is achieved through emphasising certain syllables, simplifying consonants, and reducing the quality of vowels in unstressed syllables. The result is a pattern where stressed syllables occur at approximately regular intervals while unstressed syllables are shortened to fit the rhythm. The outcome is a distinctive rhythmic flow in which the timing between strong syllables remains relatively consistent, regardless of the presence of weaker syllables in between. There is a lack of precise phonetic representations detailing how to achieve relative prominence in speech. The realisation of prominence can be accomplished through various means and may vary significantly among speakers, influenced by specific contextual factors. A substantial body of experimental literature examines the nuances and variations of the acoustic correlates of stress, as reviewed by Arvaniti (2020).

As discussed in the previous section, the default sentence stress typically places the Tonic on the last content word in the TCU. This is important information to project to the listener to know when the speaker is relinquishing their turn. However, within this broad focus, the speaker may need to group the syntactic and lexical information to convey a specific meaning. Peppé et al. (2007) illustrate this 'chunking' with an example from their test, the PEPS-C (Peppé and McCann 2003) distinguishing between simple and compound nouns in the phrase "cream buns and jam". "Cream" and "buns" can be projected as two single nouns or one compound noun, depending on the prosodic representation. Moreover, English lexical stress rules, such

as in bisyllabic nouns like "apple" and adjectives like "juicy", where the stress is typically on the first syllable, can change depending on the context.

This is particularly noticeable when the same word is used as a noun and a verb. For example, the word "perfect" is stressed on the first syllable when used as an adjective, but when it functions as a verb, the stress shifts to the second syllable (e.g. "I should perfect my homework for it to be perfect"). Sometimes, the word's meaning can change unexpectedly, depending on where the stress is placed. Getting the stress wrong in these instances can lead to misunderstandings. This might be the case in a word like "content". The meaning of "a content creator" changes depending on which syllable of "content" has the stress.

Ferreira et al. (1993) propose two distinguishable features in achieving these information boundaries: vowel lengthening and pausing. They suggest a difference between timing-based pauses within a turn, with more prolonged segmental lengthening necessitating shorter pauses to fit the 'rhythm', compared to longer turn-ending pauses and 'planning pauses' (White 2014). Ferreira et al. (1993) argues that these pauses' duration is affected by the complexity of the upcoming syntactic structure and the speaker's ability to translate the syntactic structure to motor patterns.

Other researchers have highlighted the importance of articulatory resources in the prosodic realisation of stress and boundary marking. de Jong (1995) proposes a continuum of relative salience varying between stressed and unstressed items. He describes the phonetic realisation of stress as an articulatory phenomenon of two competing forces: an economy of effort (weak stress) and the need to be understood (strong stress). De Jong suggests that the perception of strong stress is achieved by locally exaggerating specific segments or syllable or 'hyperarticulation'¹. This localised hyperarticulation is contrasted with unstressed segments and syllable, which are achieved via an economy of effort. Two key articulatory processes facilitate this relative salience: elision and coarticulation. Both contribute to an economy of effort in opposition to hyperarticulation, thereby achieving the previously described relative salience. Elision is achieved via the omission or reduction of specific segments and syllables or changes to the vowel length and quality, within or between words. Coarticulation occurs where the articulatory properties of one sound overlap an adjacent one. Across syllable and word boundaries, these two processes in concordance with hyperarticulation facilitate the smooth flow between unstressed and stressed items.

With reference to the previously mentioned example, "cream buns and jam", it is crucial to examine the role of pitch and pausing in establishing information boundaries. When considering

¹In this context, "hyperarticulation" refers to the deliberate exaggeration of speech sounds achieved via the complex coordination of acoustic and phonetic features. Due to the exaggerated quality of hyperarticulated segments, there is a natural increase in duration on vowels, but also longer voice onset times and more forceful articulatory closures and releases. Consequently, the listener perceives slower and more precise speech and additional emphasis.

the concept of the tone unit, it becomes apparent that this phrase can be structured into either two or three tone units, depending on a collection of prosodic resources, including the placement of the Tonic and pitch accents and pausing. Specifically, placing the Tonic on "buns" and "jam" delineates two items, whereas placing it on each of the nouns, followed by a micropause ("cream", "buns" and "jam") categorises three items. Therefore, in English, two levels of stress can be distinguished: the primary stress to indicate the Tonic, and a secondary stress to denote meaning within the tone unit. These stress patterns are achieved through prosodic and phonetic resources to mark a relative saliency.

It appears that from a developmental perspective, an infant's primary resources for learning how to achieve these patterns are pitch and pausing. A neonate's ability to recognise the ambient language and that of their primary carer is critical for survival (Kuhl 2004). They can do this via the early development of the hearing mechanisms, which can perceive and discriminate pitch. An infant's ability to match carers' pitch patterns and pitch movement is critical to their socialisation and their ongoing language acquisition (Wells and Stackhouse 2016). Moreover, infants show sensitivity to both prominence marking and pausing at these informational boundaries as early as 7 months of age (Holzgreffe-Lang et al. 2018; Speer and Ito 2009). In terms of production, the capacity to develop this relative pattern of saliency is facilitated by the child's advancing motor control competencies, which are, in turn, supported by the adults with whom they engage (Bottema-Beutel et al. 2014; Wells et al. 2004)

Peppé et al. (2007) highlight that issues in this area can lead the speaker to appear 'dysfluent' or to generate lengthy, monotonous, unbroken strings of speech. From the listener's viewpoint, misunderstandings and confusion may arise when processing extended utterances. Given that these characteristics are observed in CWASD (Irvine et al. 2016; Wiklund and Laakso 2019), researchers have endeavoured to investigate this subject in greater depth. These studies and their relevant findings are now addressed.

2.3.2 Research on CWASD and information boundary setting

The evidence concerning CWASD's ability to orient and delineate information boundaries prosodically exhibits certain inconsistencies, which complicates the process of reaching definitive conclusions. The sources of these contradictions are primarily rooted in methodological challenges, a topic that is explored in greater detail in section 2.8. This section provides a general overview of the findings to date.

Some studies have indicated that children with CWASD do not have issues with the perception of prosodic phrasal boundaries compared to typically developing children matched for language (Diehl et al. 2015; Grossman et al. 2010; Lyons et al. 2014; Peppé et al. 2006). Given that this skill is acquired early in development and precedes lexico-syntactic development, this

is perhaps not surprising. However, [Diehl et al. \(2008\)](#), in their study of twenty-one adolescents with HFA, found that they were less capable of using prosodic stress marking to disambiguate meaning than a control group. They concluded that the difficulty lies in their ability to process prosodic cues. They propose that the issue may not stem from an inability to process prosodic cues; rather, the challenge appears to be in the simultaneous integration of both prosodic and linguistic information. [Järvinen-Pasley and Heaton \(2007\)](#) further suggested that it is not that CWA may have an oversensitivity to specific acoustic features ([Plaisted et al. 1998](#)) but that they preferentially process linguistic information over perceptual cues. Neurological impairments in perceiving acoustic features, such as this, could be a contributing factor to the tendency in ASD to focus on specific features rather than integrating the information into a cohesive whole ([Diehl and Paul 2009](#); [Eigsti et al. 2012](#); [Järvinen-Pasley and Heaton 2007](#)).

Studies exploring expressive abilities present contradictory findings. Overall, problems appear to be associated with prosodic form rather than function. For example, early studies by [Fine et al. \(1991\)](#) (age group 7–32 years) and [Shriberg et al. \(2001\)](#) (age group 10–50 years) investigated prosody in conversational speech. Both studies report inappropriate prosodic marking of information structure and frequent incidences of marking prominence of typically unstressed function words. Notably, these two studies cover a wide age range, making it difficult to evaluate the impact of maturation on these observations.

Using an eye-gaze paradigm, [Diehl et al. \(2015\)](#) found no differences in the abilities of CWA aged 8 and 18 years to disambiguate sentences using prosodic cues. compared to language-age-matched typically developing controls. However, an interesting finding arose with subsequent trials where the CWA aged between 7 and 12 years formed a strong supposition about syntax based on prosodic information over several trials but had difficulties overriding these expectations when prosody changes. It took time for them to shift their interpretation. They note that some children exhibited what they describe as “unusual expressive prosody” (p697) without any apparent loss of communicative function. There appears to be a link between language ability and prosodic function and atypical forms that do not affect communicative function ([Peppé et al. 2007](#)).

Several studies have indicated problems associated with pausing and segmental duration. For example, [Grossman et al. \(2010\)](#) examined the perception and production of lexical stress as part of their investigation of sixteen adolescents with HFA. They found that the HFA group demonstrated no differences in perception compared to a typically developing control group. However, while the HFA group produced appropriately differentiated lexical stress patterns, they demonstrated longer segmental productions and longer pauses between syllables than the control group. This had the effect of their being more awkward and less fluid than the controls.

Several studies have examined the frequency and place of pauses in utterances in the speech

of CWA with conflicting results. Fosnot and Jun (1999), for instance, compared four CWA, four typically-developing children and four children who stuttered (aged between 7 and 14 years). The CWA were more likely than the typically-developing children and those who stuttered to use pauses that occur within phrases rather than at phrase boundaries), creating dysfluencies. Meanwhile, Thurber and Tager-Flusberg (1993) found that CWA used fewer non-grammatical pauses than their typically developing group. Shriberg et al. (2001) reported that 40% of adults with HFA in their study had inappropriate or dysfluent phrasing in more than 20% of their utterances. Similarly, Peppé et al. (2007) reported the CWASD in their study were less likely to produce the prosodic pauses necessary for disambiguating syntactically ambiguous sentences (Thurber and Tager-Flusberg 1993). Non-grammatical pauses signal hesitation and are assumed to reflect cognitive demand. The fewer pauses in the ASD group could be interpreted as a lack of communicative investment (see Arnold et al. (2003) on the role of dysfluencies in marking information structure).

The conflicting findings may be due to the sample size and the age ranges of the participants. Another issue when comparing these studies is that the authors considered pausing to impact fluency and be influenced by cognitive load and its role in prosodic phrasing. However, determining the intended phrasing by the speakers is difficult, and a judgment of appropriateness does not sufficiently capture this aspect. The issue stems from the points already discussed, where it is noted that there are no definitive interpretations of prosodic form and no clear relationship between form and function (Walker 2014).

The findings regarding the prosodic perception and realisation of stress to highlight information in broad focus suggest that CWASD can sufficiently differentiate stress. However, there are atypicalities in the realisation of this function. The topic to address now is what happens when the focus is required to shift from broad to narrow to differentiate or highlight important information.

2.4 The role of prosody in marking focus

This section explores prosody's role in disambiguation and in highlighting contrastive or information information. It discusses the prosodic features involved in this process, citing relevant literature. Several studies have examined CWASD's ability to orient to ambiguity and disambiguate. However, as already indicated in previous sections, the research is contradictory.

2.4.1 Prosody and signalling important information

Within a stretch of talk, overriding the default pattern by shifting the Tonic plays a critical yet nuanced role in clarifying and emphasising significance or highlighting new information,

transitioning from a broad to a narrow focus. In the example "the cat sat on the mat", if the speaker chose to emphasise the cat rather than the dog, which sat on the mat, the Tonic would fall on "cat", rendering the rest of the clause less prominent. If we consider the contrastive function of stress, or marking relative prominence on particular words in an utterance to highlight their salience relative to another word, it has consequences for meaning and the achievement of intersubjectivity. Examples might be exchanges such as, "Which car do you want? I want the blue car, not the red car", and, "Do you want the red car? No, I want the red bus". As discussed in the previous section, this shifting of focus can also occur at the lexical level, where there may be contrastive meanings depending on the relative prominence of the syllables, such as 'to insult' and 'an insult', and they change depending on the context.

Contrastive stress is characterised by the greater perceptual prominence of the syllable on which it occurs compared to the remaining syllables in an utterance (de Jong 1995; Ladd and Arvaniti 2023). Its occurrence on a particular element, in turn, is linked to specific situational and contextual aspects of discourse and to speaker-hearer presuppositions. It is related, in particular, to the speaker's intent and to their selection of the element they wish to place into focus.

Prosodically, the relative prominence is achieved, as discussed in the previous section, through a cluster of increased intensity, pitch and vowel lengthening on the prominent syllable while maintaining the overall rhythm and timing of the turn. The question remains as to whether there is a measurable prosodic difference between generic and contrastive stress. Breen et al. (2010) discovered that stressed elements were realised through greater amplitude, pitch, and duration in comparison to unstressed syllables. In a direct examination of contrastive versus non-contrastive stress, the authors demonstrated that when speakers were cognizant of prosodic ambiguity, words receiving contrastive stress were characterised by increased amplitude and duration relative to those receiving non-contrastive stress.

Conversely, non-contrastively stressed words were primarily distinguished by higher pitch compared to their contrastively stressed counterparts. In summary, non-impaired adult speakers deploy all three prosodic resources of pitch, amplitude and duration to mark stress generally but make particular use of amplitude and duration to mark contrast or emphasis. Young children acquire this skill by learning to 'defocus' (see Wells and Stackhouse 2016, pp. 50-54). This involves the child learning to attend to the louder, more prominent syllable in a speaking turn, over and above the Tonic, shifting attention from pitch movement to amplitude and duration. The acquisition of this skill is developmentally driven. The observation of children's early marking of contrastive stress (discussed above) has also been complemented by acoustic analyses in a few studies. Patel and Brayton (2009) examined the prosodic features involved in contrastive stress marking in twelve American English-speaking 4-, 7- and 11-year-old children by analysing

listener identification. They found that although by age 11, all the children could deploy all three modalities of pitch, intensity and duration to mark contrastive stress, younger children rely predominantly on durational cues. They suggest a physiologically developmental process of achieving prosodic control parallels segmental acquisition. For all age groups, acoustic marking was more prominent on subjects than objects. [Speer and Ito \(2009\)](#) point out that, although, the acquisition of the skill in marking prominence continues to be refined over time, children acquire a sophisticated use of stress marking at a very young age.

The subsequent section examines the research findings related to how CWASD manipulate the tonal patterns to signify focus.

2.4.2 The prosodic abilities of CWASD in marking narrow focus

The placement of stress to signal important or contrastive information in an utterance has been extensively addressed in the research on the prosodic abilities of CWASD. Despite this, the findings remain inclusive. The contradictory conclusions are predominantly due to methodical issues discussed in section 2.8.

Some studies address perceptual recognition of stress ([Baltaxe 1984](#); [Paul et al. 2005](#); [Shriberg et al. 2001](#)). These studies suggest that prosodic marking of contrast is a problem in speakers with autism. However, they often fail to specify the specific contexts in which the stress marking is inappropriate. Regarding expressive abilities, several studies have indicated that CWASD are able to produce stress in broad focus but have more problems when it comes to shifting the stress placement to mark a narrow or contrastive focus. [Peppé et al. \(2007\)](#) for example, found that prosodic marking of contrast was problematic for autistic children (6–13 years), with significantly more ambiguous productions compared to the control group. In [Diehl et al.'s \(2015\)](#) study, however, they found no differences in the CWASD's abilities compared to language-age-matched typically developing controls. Still, they did have more challenges when required to shift their prosodic focus to mark a change in meaning.

In their review, [Grice et al. \(2023\)](#) suggests that the available evidence shows that generic prosodic patterns that are less context-dependent and more rule-based, such as those used for broad focus structures, are only problematic for very young autistic children but not for older ones. However, stress marking dependent on contextual information, for example, evoking contrastive meaning, tends to differ across groups ([Gargan and Andrianopoulos 2022](#); [Paul et al. 2005](#); [Peppé et al. 2007](#)).

Although inconclusive, studies using acoustic measures did not always confirm this difference. They do, however, suggest a developmental progression. For example, [Nadig and Shaw \(2015\)](#) found that CWASD could mark prominence reliably, and both the HFA and typically developing (TD) groups used both amplitude and duration to do so. However, subtle variations

exist. They draw attention to the possibility of a lack of defocus or reduction of prominence on unstressed items. This may have an effect on the listener if the speaker does not exhibit clear differences in meaning.

2.5 The role of prosody in affect

In addition to the study of linguistic prosody, several research efforts have explored the capacity of CWASD to recognise and utilise prosody when conveying emotions or attitudes. As discussed in this section, this line of inquiry presents numerous methodological and theoretical challenges.

2.5.1 Affect and Attitude: prosodic form and function

Emotional recognition, displays of affect and the role of prosody have been extensively studied in CWASD; however, the findings have yielded conflicting results. This is unsurprising given that, as just described, no direct correspondence exists between affect and prosodic form.

Studies on emotional prosody perception of CWASD have yielded inconsistent findings. Most have reported prosody perception deficits of varying forms (Brooks and Ploog 2013; Globerson et al. 2015; Peppé et al. 2007; Rosenblau et al. 2017). However, these studies vary considerably in what they conclude is the deficit. For example, Globerson et al. (2015) suggest the problem lies in auditory perceptual abilities whereas Wang and Tsao (2015) suggest emotional recognition is selective. Conversely, other studies have reported relatively intact prosody perception (Grossman and Tager-Flusberg 2012; Paul et al. 2005). The issue lies in a combination of methodological confounds, not least because performance may be task-dependent (Plaisted et al. 1998).

Most studies on emotional expression and recognition in CWASD tend to present information in a formulaic pattern. As an example, Brooks and Ploog (2013) examined the prosodic perception of thirteen 5-17-year-old CWA and a typically developing control group, using a series of pre-recorded sentences of similar syntactic construction but different content ("Bob parked the car" vs "Tim shut the door") said in ways which would characterise two different emotions, 'grouchy' and 'enthusiastic'. They found the CWA showed atypical or selective attention to emotional 'tone of voice' despite having no deficits in perceiving the prosodic features in a grammatical task. The task involved selecting a forced-choice alternative. However, as illustrated, this is not how emotions are expressed in interactions. Moreover, CWA prefer repeatable patterns (Crespi 2021). This type of study may be more illustrative of problems in learning rather than reflective of prosodic abilities (Gebauer et al. 2014).

A noteworthy finding from a study conducted by Grossman and Tager-Flusberg (2012) reveals that the twenty-two adolescent participants diagnosed with High-Functioning Autism

(HFA) exhibited greater challenges in orienting to stimuli characterised by lower emotional intensity compared to the TD control group. This finding is interesting, as many CWASD I have encountered in a clinical setting have reported frequently missing subtler prosodic cues associated with emotional expression. Moreover, these individuals have indicated that they often interpret louder speech as an indicator of heightened emotional states.

Some of the studies mentioned above investigated, alongside linguistic prosody, the ability to use prosody to express emotions. However, these studies tend to be restricted to imitative abilities instead of naturally occurring episodes (Baltaxe and Simmons 1985; Hubbard et al. 2017; Shriberg et al. 2001). Hubbard et al. (2017) found that autistic children could imitate prosodic cues to emotion, although with greater variability than the typically-developing controls, suggesting issues with accuracy in prosodic form. However, they were less successful in conveying emotion prosodically in non-imitative tasks, such as completing stories that evoke a clear emotional response (happy, sad or angry). They occasionally used explicit statements describing emotions ("This makes me angry") instead of prosody, suggesting they used compensation strategies.

Peppé et al. (2007) examined CWA's ability to use 'affective prosody' to express their preferences for food items. Their responses were judged as significantly more ambiguous than those of the control group. However, the general view that there are differences in some aspects of affective prosody in CWASD is highly subjective, given that some researchers have indicated the underlying problem may be due to more generalised prosodic production deficits.

'Odd' prosodic characteristics have been extensively reported in the literature (Baltaxe and Simmons 1985; Filipe et al. 2014; Nadig and Shaw 2012; Paul et al. 2005). Nadig and Shaw (2012) for example, found that the speech of fifteen CWASD had higher pitch ranges in conversational speech. Diehl et al. (2015) found that CWASD had difficulties controlling the precise temporal aspects of word production. Acoustic differences, including longer segmental durations, suggested that the timing of stressed and unstressed syllables is less differentiated.

Atypicalities in production, even relatively minor ones (Wiklund 2016), can profoundly affect interactions, including how a person expresses emotion. Some studies have noted that atypical segmental and syllable duration can affect the overall rhythm of speech (Bellon-Harn et al. 2007; Shriberg et al. 2001; Wells and Local 1993). Displays of affect involve a complex coordination of multimodal features, including prosody. Therefore, it is perhaps not unexpected that CWASD may encounter challenges in tasks that require the active and conscious production of specific prescriptive features on demand. As alluded to previously, the critical aspect of emotion and displays of affect can only be understood in the context of the interaction occurring at the time. To my knowledge, no studies explore the prosodic realisations of affect in CWASD and how the listener responds to these in naturally occurring interactions. This study seeks to

address this gap.

This section examined the challenges associated with the imprecise correlation between a speaker's vocal characteristics and their emotional state. For CWASD, two issues arise: one relates to the learning process and the other to how they sound to others and the resultant value judgements. Questions arise regarding how CWASD sound and the feasibility of identifying specific deficits in prosodic form. The following section examines the research.

2.6 General prosodic features in CWASD

Identifying and locating deficits in prosodic function can be challenging. Nonetheless, the research consistently highlights deficits in prosodic expression, with many cited atypicalities in production (Filipe et al. 2014; Peppé et al. 2011; Shriberg et al. 2001; Wiklund 2016). Early studies offer imprecise, poorly defined qualitative assessments of how autistic people sound to the listener, such as 'improperly modulated, dull, and wooden and as having a singsong quality' (Baltaxe and Simmons 1985) or as 'monotonic', 'machine-like', 'exaggerated', or 'singsong'. These descriptions indicate the disparate and unpredictable nature of the prosodic form in autism. Furthermore, there appears to be something unusual about the speech of autistic people, which is challenging to isolate. Developments in acoustic measurements have prompted researchers to investigate prosody in autism, more specifically regarding the realisation of prosodic features. This has shifted the focus from function to issues related to form, indicating a problem with the coordination and timing of phonetic and prosodic features. For example, Shriberg et al. (2001), in their investigation of motor imitation in fifteen adolescents with HFA and fifteen adolescents identified as having Asperger's syndrome, found some minor effects involving variations in pitch and volume from the target utterance, which affect the accurate production of prosodic features. They attributed these effects to difficulties in fine-tuning speech production and inappropriate phrasing, which they suggested are due to increased demands on coordinating motor control with social cognition.

More recent studies have also focused on the identification of prosodic markers in autism with some indicators of increased pitch range and variability which were not functionally problematic but perceived as atypical (Filipe et al. 2014; Nadig and Shaw 2012). However, the impact of anomalies on function is highlighted by Hubbard and Trauner (2007), who, in their study using an imitation task, described increased pitch range and variable pitch peak location. This finding indicates difficulties in the placement of prominence, which is used to highlight important parts of the message.

Research suggests that it is not only pitch which shows variability in CWA. The effect of seemingly minor prosodic variations on conversation is noticeable in a study by Wiklund

(2016). Wiklund used a CA approach to study the talk of 11-13-year-olds with HFA with their therapists. She noticed some specific prosodic and non-verbal features associated with trouble source turns. These included overlaps, creaky voice, low volume and large pitch excursions. Stretched syllables and jerky speech rhythms affected the overall fluency of the interactions. The two most common problems in understanding were overly literal interpretations and topical discontinuity. These minor effects contribute to the overall listener perception and the smooth flow of conversation. As a result, interpreting form often leads to ambiguous descriptions such as ‘odd’, ‘atypical’ or ‘unusual’.

As emphasised thus far in this chapter, prosodic functions are realised through the coordinated combination of phonetic and articulatory exponents, which require precise motor control. Children acquire greater prosodic proficiency with the maturation of their fine motor skills (Wells and Stackhouse 2016, pp133-135). Impaired motor control in acquired or neurodevelopmental conditions, such as Parkinson’s Disease or Childhood Apraxia of Speech (CAS), often affects the realisation of prosodic features in speech, leading to atypical rhythm and timing. CWA likewise frequently experience difficulties in motor coordination, although these challenges are not well understood (Kent 2000; Talkar et al. 2020).

Diehl et al. (2015) investigated this topic by examining the prosodic imitation abilities of twenty-four adolescents with HFA (8-16 years), compared to sixteen with learning difficulties (9-16 years) and twenty-two with typical development (8-17 years). They used the standardised PEPS-C, a test designed to examine prosody perception, production, and imitation in typical and atypical populations. Because the production content is standardised across participants, a comparison could be made of multiple acoustic characteristics of prosody such as pitch range, duration, and intensity. They point to differences in pitch and longer duration in the ASD group, which they postulate could be that there is a distortion in the timing of speech units in connected speech. Contrastively, and to highlight the variability in this group, Shriberg et al. (2011) did not find a difference in speech rate. They pose the question as to whether these timing differences are attributable to motor coordination difficulties affecting the speed of segmental execution or transition from one segment to another.

Some recent studies investigating the motor coordination of CWASD have highlighted that motor and temporal coordination challenges frequently observed in CWA could be consequential to their prosodic realisations. These indicate atypical forms of temporal synchrony due to challenges in the precise integration, coordination, and execution of movements. Murat Baldwin et al. (2022) systematically reviewed studies examining temporal synchrony in autism. Despite the research’s ever-present methodological issues, they conclude that the evidence points towards CWA’s reduced ability to integrate multiple actions across the motor, auditory, and visual-tactile domains (Talkar et al. 2020). The realisation of prosodic form is complex

and variable, relying on the precise coordination and execution of clusters of acoustic and articulatory features. If coordinating these actions proves complex, deviations from typical are likely to occur.

In summary, despite the inconsistency in findings and widely differing task designs, there are some indications that deficits predominantly lie in prosodic form rather than function. Some researchers have pointed towards the need to consider linguistic and grammatical competency and the interactional implications of prosody. The suggestion is that CWASD may have reduced linguistic competency, impacting their prosodic abilities (Bone et al. 2014; Lewis et al. 2007; Peppé et al. 2011; Wiklund and Laakso 2019). One clear indicator is an issue related to the integration of linguistic, perceptual and prosodic cues and the ability to coordinate all domains simultaneously. Most studies utilise a deductive approach to measure performance or provide precise classifications. While it is generally observed that deficits primarily occur in prosodic form rather than function, our overall understanding of the issue remains unclear. The lack of consistent definitions for both prosodic form and function, along with challenges in methodological design, complicates research in this area. To enhance our understanding, addressing these confounding factors and pursuing more practical and realistic investigations in context (Peppé and McCann 2003; Wiklund 2016). Therefore, understanding how prosody is understood in context is critical.

2.7 Autism from an interactional perspective

This study specifically investigates the interactions between adults and children to understand how this social dynamic influences their communication during play. A significant portion of historical research on autism and its diagnostic criteria adopts a cognitive psychological perspective. This approach involves a specific type of instructional interaction in which the child is expected to complete tasks directed by adults. Judgments are made regarding the child's performance based on a predefined set of criteria that defines what is considered 'correct' (Maynard and Turowetz 2017a,b). This deficit-driven model of autism presumes the existence of distinct categories of communicative competence that can be isolated and 'modified' through teaching and intervention strategies.

Recently, researchers using an ethnomethodological approach, including Conversation Analysis, have provided compelling evidence that when we observe the conversations and behaviours of autistic individuals in context, what is typically seen as a deficit or deviation in a medical model can be understood as relevant and adaptive. Within this framework, language and communication are viewed as multilayered (Muskett and Body 2013; Sterponi and de Kirby 2016), socially constructed, and context-dependent (Maynard and Turowetz 2020; Sterponi 2004).

Such studies, summarised in this section, have played a key role in recognising the influence of social context and power dynamics on autistic communication, emphasising the importance of listening to autistic voices to inform policy and research (Dinello and Gladfelter 2025; Maynard 2024). Section 2.7.1 highlights studies that offer an alternative to the psycholinguistic analytical approach by redefining the deviant and atypical features of autistic talk as interactionally appropriate. Section 2.7.2 continues with a review of the literature on adult-child interactions, analysing the role of the adult in co-constructing meaning. The final section 2.7.3 examines the research, adopting an interactional approach to evaluate prosody in autism.

2.7.1 Interactional research and a redefining of autistic features

Some researchers, in particular, Maynard and Turowetz (2020), propose reexamining the characteristics of autism that have traditionally been regarded as deviant or dysfunctional from a cognitive-behavioural perspective. They contend that a growing number of interactional studies demonstrate how features that may appear meaningless and communication barriers can signify displays of interactional competence within their particular contexts.

Repetitive talk is a frequently studied ‘autistic’ feature. Two specific aspects have been the focus of interest for researchers: formulaic speech, including repetitive speech or ‘echolalia’, and topic perseveration. From a cognitive perspective, echolalia is seen as a form of formulaic language where whole units of language, or *gestalts*, are stored as memorised phrases and scripts and used as single communicative units. It is often observed in autistic speakers and is especially common in younger CWA (Local and Wootton 1995; Sterponi and Shankey 2014; Tarplee and Barrow 1999).

Many behavioural intervention approaches have considered echolalia as abnormal or dysfunctional and have promoted its reduction or elimination (Dinello and Gladfelter 2025). However, research on echolalia in context has expanded our understanding and definition of this phenomenon, shifting it from being viewed as merely an abnormal or dysfunctional form of language to one that is interactionally meaningful and, indeed, a natural part of communication (Maynard 2024).

Interactional studies reveal that echolalia serves many different communicative functions, which can be identified by analysing the prosodic patterning. Repetitive speech functions to align, verify, and emphasise (Curl et al. 2006; Perkins 2014; Tarplee and Barrow 1999), and they serve as typical strategies in language development (Tarplee 2009). For CWA, there is clear evidence of functionally relevant use of echolalia and formulaic language structures, even though these are atypical in design (Wells and Local 2009). For example, case studies examining the specific features of echolalia reveal that the children involved make subtle, yet distinctive modifications to both the segmental and prosodic aspects of echoed speech. These

modifications occur in sequentially relevant positions and suggest a communicative function in extending dialogue (Local and Wootton 1995), initiating social interactions (Tarplee and Barrow 1999), acknowledging prior speech, or making repairs (Sterponi and Shankey 2014).

Another common and diagnostically significant feature is topic perseveration, or repetitive talk which is characterised by a tendency to focus on and revisit favoured topics. This behaviour is frequently targeted in interventions because it is thought to hinder conversational reciprocity. However, it can also be understood differently when viewed in context. Stribling et al. (2009), for instance, explored interactions between a school-aged boy with ASD, an adult researcher, and a mobile robot to understand how conversation topics were organised and maintained. The child's topic perseveration was directed towards the adult and supported by eye contact. The adult's treatment of the child's seemingly repetitive talk as interactionally salient, rather than merely an obsessive tendency, highlights the significance of context and the behaviours of those in the interaction.

Korkiakangas et al. (2012) highlight the importance of the adult's role in a study of a 10-year-old Finnish girl with autism interacting with her trained teacher. The focus is on the child's responses to the teacher's repeated phrases, which show her awareness of timing and prosody. These responses either introduce new topics or indicate points of confusion. This interaction mirrors the matched repetitions observed between a mother and her autistic son in Tarplee and Barrow's (1999) case study. Additionally, Muskett et al. (2010) in a study of an eight-year-old autistic girl during a free-play session found that her repetitive use of "Do you know what. . . ?" kept the conversation focused on her interests, preventing the adult from shifting the topic. The adult participated collaboratively in this behaviour, despite its unusual nature and potential to hinder reciprocal interaction.

These studies suggest that children are aware of the effects of their repetitive talk, as evidenced by their timing, prosody, and nonverbal cues. They can adapt their speech to distinguish between different actions, suggesting that what may seem linguistically atypical can be meaningful when considered in the context in which it occurs. Their studies also demonstrate the critical role of the situational context and co-participant in the co-construction of meaning. The following section provides a more detailed examination of this research.

2.7.2 The role of the adult in interactions with CWA

For communication to succeed, two main factors are essential: first, the speaker must convey their intended meaning clearly, and second, the listener must accurately interpret the message. The studies discussed in the previous section illustrate how CWA demonstrate the ability to use a complex interplay of verbal and nonverbal cues, including gestures, eye contact, facial expressions and prosody to extend beyond just the words used to convey meaning.

Inductive approaches also suggest that the behaviour of conversation partners, their interpretations of communicative actions, shared knowledge, social expectations, and the context of the interaction are all crucial for achieving shared understanding (Heller and Kern 2021; Maynard and Turowetz 2020; Muskett and Body 2013; Wiklund and Määttä 2021). Research demonstrates that when one partner's communication is impaired in some way, the other partner must assume more responsibility to interpret and adapt the interaction to sustain its coherence (Antaki and Wilkinson 2012; Rae and Ramey 2020).

Maynard and Turowetz (2017b) (also Milton (2012)) suggest that the social communication challenges observed in individuals with autism stem from reciprocal misunderstandings between autistic speakers and those who are not autistic. From this perspective, autism is partially defined by how society labels and reacts to the communication and behavioural differences that are both observable and audible. This section discusses research on the co-participant's role and social context in interactions with CWA, and its impact on the child's ability to engage successfully.

In a clinical setting, particularly during assessments involving psychometric testing, a defined interaction dynamic often establishes clear social expectations for both the adult and the child. In this context, the professional typically employs a question-and-answer approach to elicit responses from the child Korkiakangas et al. (2016); Maynard and Turowetz (2017b). These responses are then evaluated for correctness and accuracy against a predetermined set of criteria.

This limited range of actions can affect a child's communication in various ways. For some CWASD, this style of interaction might be somewhat beneficial. It is linked to a unique prosodic pattern that the child can predict and respond to suitably. Additionally, the repetitive patterns used in assessment procedures and therapy tasks can promote learning effects that may impact the results (Diehl and Paul 2009; Muskett et al. 2010). There are also signs that a child's preference for patterns can influence their communication (Diehl et al. 2015). Furthermore, since the format often primarily consists of questions and answers, the child is generally not encouraged to initiate or engage in reciprocal social conversations. This limited social interaction can be helpful for some, especially when starting and maintaining conversations is difficult (Rendle-Short 2014).

Maynard and Turowetz (2017b), however, emphasise that assessment protocols are highly prescriptive, requiring clinicians to operate within administrative constraints when administering them. Their research suggests that clinicians may overlook evidence of interactional competency in CWASD because they anticipate specific responses to the questions asked, rather than observing the talk and behaviour of both themselves and the child within the context. Testing requires the skill to extract meaning from the context, yet CWASD often rely on embedded, experience-based associations to answer questions; consequently, the child might

not be recognised as competent because their answers do not meet the test criteria. Moreover, their responses can be influenced by subtle and often unintentional interactional signals and adjustments, both verbal and non-verbal, employed by the clinician (Muskett and Body 2013). Similarly, Korkiakangas et al. (2016), using a CA methodology to evaluate the interactions between an examiner and two boys with ASD, aged 10 and 13 years, during a mind-reading task ² found that the children demonstrated interactional competencies in responding to the examiner's questions, albeit in unexpected forms (Wiklund and Määttä 2021).

These findings have significant implications for the established belief regarding social communication difficulties in autism, which proposes a deficit in perspective-taking. Several studies exploring natural interactions suggest that CWASD do display the ability to take perspective and understand social rules and expectations when these actions are situated and unfold sequentially within context (Henderson 2019; Maynard and Turowetz 2017b; Sterponi 2004; Wiklund 2016).

These studies demonstrate the importance of the language environment in facilitating effective communication. Unlike strict assessment protocols, studies examining natural interactions between adults and CWA in supportive and dynamic settings show that these children demonstrate greater interactional competence and learn more effectively when engaged with interactional partners who respond to and scaffold their communication attempts turn-by-turn (Bottema-Beutel et al. 2022, 2014; Heller and Kern 2021; Korkiakangas et al. 2012; Rae and Ramey 2020; Stribling and Rae 2009). Interactional research has shown joint engagement and reciprocity throughout childhood, where adults adopt specific strategies to promote participation in activities or conversations.

Even young CWA can engage in reciprocal play when facilitated by adults using structured strategies, such as directive sequences which draw attention to salient objects and upcoming actions (Bottema-Beutel et al. 2014; Rae and Ramey 2020). Studies show that CWA are responsive to interactional signals (Maynard and Turowetz 2017b), so providing specific feedback through repair strategies is crucial. When adults identify and address issues in a child's communication, it promotes progressivity in interactions (Korkiakangas et al. 2012; Tarplee and Barrow 1999; Tarplee 2009; Wiklund and Määttä 2021).

This social reciprocity can also be observed in older CWASD. Furthermore, they do show the capacity to consider social dynamics (Sterponi 2004; Wiklund and Määttä 2021). Henderson (2019) noted that these children can reflect on their actions and consider others' perspectives

²The concept of 'mind-reading', also known as 'Theory of Mind' (Happé 2015) has for many years underpinned the cognitive psychological frameworks used to explain, at least in part, the lack of empathy (Baron-Cohen et al. 2009) and social communication difficulties associated with autism. It refers to the perceived ability to know or interpret another person's thoughts, feelings or intentions, without them being explicitly stated. It involves the ability to infer another's mental states via observation of social cues and empathy. In autism, this skill is often considered to be impaired (Tager-Flusberg 2007)

within a turn-by-turn sequence. Their communication improves in predictable interaction environments with consistent feedback (Maynard and Turowetz 2017b). According to Rendle-Short (2014), such predictability needs to be supported by adult interactants. In unpredictable situations, children may struggle with delayed responses and topic initiation, often preferring familiar topics to ensure successful engagement (Chen et al. 2019; Stribling and Rae 2009).

In summary, interactional research demonstrates that the social context has a significant influence on CWA's ability to exhibit social competence. Rigid interactional dynamics with a strict agenda, detached from the context, can easily lead to misunderstandings and misinterpretations of a child's abilities. Problems occur when adults judge whether a child's responses are appropriate or relevant. Conversely, interactions that are contextually situated and allowed to develop sequentially, with an adult providing clear, step-by-step feedback, enable CWA to showcase their interactional skills and resourcefulness. In this setting, they can demonstrate a much deeper understanding of social communication than is currently captured by our diagnostic and testing methods.

2.7.3 Prosody in autism from an interactional perspective

When explored from an interactional perspective, prosody in autism can present differently. Local and Wootton (1995) describe the prosodic abilities of a boy with HFA when talking to his mother. The boy in question demonstrated that he could use prosodic features such as pitch movement, vowel lengthening, and intensity like other typically developing children. He could also orient to, and project turn endings using prosodic features. However, atypical features such as excessive vowel lengthening and vocal creak caused problems with smooth turn transition.

Although his prosody sounds unusual, his mother does not treat it as such, and thus, he and his mother can manage to progress the conversation. Likewise, Wells and Local (1993) in their study of children with severe autism, describe their ability to manage turn-taking despite the use of highly unusual prosodic forms. We have seen that research involving CWA presents methodological challenges.

Communication impairments, including those observed in autism, are rarely reduced and confined to a single 'deficit'. There is a wide heterogeneity of features, comorbidity, and overlapping symptoms (Grzadzinski et al. 2013). Social experience and learning also affect a person's communication ability (Lewis et al. 2007). These factors hold particular significance in the context of autism. Furthermore, the ongoing theoretical debates regarding the fundamental nature of autism present challenges to the identification of optimal approaches for autism research. Consequently, any attempts to form reliable generalisations across the spectrum are challenging. Therefore, some researchers argue for an individualised approach by exploring

interaction in context (Antaki and Wilkinson 2012; Cole 2015; Geils and Knoetze 2008; Muskett and Body 2013).

In contrast to a deficit-based approach to prosodic impairment, an interactional one helps clarify how the speaker's design is perceived and responded to by the listener. This understanding is essential for identifying a child's strengths and areas for improvement as it is not always the case that what may be considered a 'deviation' from an arbitrary norm causes a problem for the listener (Kelly and Beeke 2011). However, very few studies have employed a CA-based approach to explore CWA's use of prosodic resources, which serves as the foundation for the present study.

Using a CA approach to investigate is advantageous because it examines both the form and function of prosody in context. Existing studies indicate that CWA possess skills that may remain unnoticed in a static task-based design. Conversely, minor atypicalities may be overlooked in conversation. Wiklund (2016) suggests that variations in prosodic and phonetic realisations are more likely to occur when there is the additional complexity of turn organisation and not necessarily due to a lack of functionality in prosodic design (Perkins 2014; Samuelsson 2009; Wells and Local 1993),

The single case study presented by Wells and Local (2009) of an eleven-year-old boy with severe autism and limited verbal communication reinforces this point. It highlights the child's ability to deploy prosodic resources recognisable to the adult (his mother) to produce well-formed intonation contours to signal turn endings and orient to some basic interactional practices that exploit the features of his mother's prior turn. However, this ability is less evident in his initiations, rendering his competency context-dependent.

A single case study conducted by Kelly and Beeke (2011) builds upon this topic. Here, the interactions of a boy aged 7;11 years with HFA and his mother were analysed to explore turn management abilities in light of atypical prosodic features. He was found to use pitch movement, vowel lengthening and changes to loudness similar to those found in non-impaired children (Wells and Macfarlane 1998).

It was also found that he deploys these resources at sequentially appropriate places and could successfully converge these with grammar to predict a turn ending. However, two points emerge. First, pitch movement is his primary resource to signal turn completion and holding instead of vowel lengthening. Being the most salient acoustic feature, this is the most reliable resource for his mother to orient. It is also one of the earliest prosodic feature to be acquired in infancy (Nazzi et al. 1998). Second, it is demonstrated that his deployment of prosodic resources is inconsistent, with some features, such as vowel lengthening and creaky voice, occurring in a mid-turn position, preventing a smooth transition across the turn. They suggest a mismatch between the intention to continue talking and the timing of prosodic cues, which

disrupts a smooth transition.

These cases demonstrate that children classified as prosodically ‘impaired’ can demonstrate competency in natural interactions. Interactional studies suggest that something uniquely atypical about the prosodic abilities of CWA is not found in a general developmental delay or other communication difficulties.

In summary, the evidence using CA adds to the existing premise that CWAs have prosodic competencies which are ill-formed but not necessarily ill-used. In essence, they can recognise the need to deploy certain prosodic features at particular places in conversation but may select atypical ones. Moreover, interactional research points to problems being dependent on competency and context. To help improve communicative competence, the therapist must set functional and realistic goals. Therefore, it is essential to understand how and why prosody may be ill-formed and the consequences this has for achieving their interactional goals.

This study seeks to contribute to the existing body of knowledge by precisely identifying the prosodic behaviours exhibited by CWASD during interactions. However, as discussed throughout this chapter, inconsistencies in the research impede our understanding of this phenomenon. These inconsistencies stem, in no small part, from the methodological challenges that arise when investigating prosody in conjunction with the diverse nature of autism. This subsequent section will delve into these issues further.

2.8 Methodological issues

To understand the prior research on the prosodic abilities of CWASD, it is important to recognise the methodological challenges involved. Three critical issues regarding research design are discussed. The first concerns the population being studied. The heterogeneity and diversity within autism pose significant challenges. Comparing CWASD’s language abilities to typical development is not straightforward. This is accentuated by the fact that the typical developmental trajectory of prosody is still not fully understood and is subject to a great deal of variation (Wells and Stackhouse 2016; Wells et al. 2004). Some have attempted to compensate for some confounds by matching CWA and language-matched, typically developing controls (Bone et al. 2015; Chevallier et al. 2009; Grossman and Tager-Flusberg 2012; Ploog et al. 2009; Wang and Tsao 2015). However, this is not easy to achieve on any large scale, considering that comorbidity factors in autism are so prevalent. Problems with attention deficits, learning difficulties and speech and language disorders all create challenges for researchers (Belmonte et al. 2013; Grzadzinski et al. 2013; Parkin et al. 2016).

Consequently, many studies involve small sample sizes that often span a wide age range. Furthermore, gender differences also complicate research outcomes. Since, in the U.K. at least,

autism is more frequently diagnosed in males (Russell et al. 2022), most studies primarily include male participants. Mandy and Lai (2017) point to the notable gap in the literature concerning gender differences and the moderating influence female-typical manifestations of autism will have on research outcomes and on the generalisability of findings to the general cohort of autistic people.

The second challenge relates to research strategy and data collection. A wide variety of data collection methodologies exist. Many adopt a forced-choice selection approach including word/phrase imitation or selection (Rosenblau et al. 2017; Diehl et al. 2015; Grossman and Tager-Flusberg 2012; Nadig and Shaw 2012; Järvinen-Pasley et al. 2008a). Some include acoustic measurements by way of validation (Dahlgren et al. 2018; Filipe et al. 2014; Nadig and Shaw 2012), with others taking a more subjective judgement (Shriberg et al. 2001). Yet others, have pursued a neurologically-based approach (Bidet-Caulet et al. 2017; Charpentier et al. 2018; Eigsti et al. 2012). As a consequence of this diversity of methodologies, our ability to draw conclusions from and make sense of the results is impeded, and our progress towards understanding the nature of impairment is protracted.

In an attempt to control for this variability in task design, several studies have used the non-standardised psycholinguistic assessment PEPS-C (Profiling Elements of Prosody in Speech-Communication) PEPS-C (Peppé and McCann 2003) or adaptations thereof (Filipe et al. 2018; Hesling et al. 2010; Peppé et al. 2006).

The assessment is designed to incorporate a variety of tasks to tap into differing aspects of prosodic form and function. In an updated version from the original assessment, Peppé et al. (2007) used with thirty-one CWASD aged between 6 and 13 years and seventy-two typically-developing children, matched for language age, to examine the understanding and use of four prosodic functions; turn-end prosody (understanding and using questions versus statements), affect, chunking (prosodic phrase boundaries) and focus (contrastive stress). Two types of form tasks were included: auditory discrimination and imitation.

This assessment has unique strengths, particularly in evaluating receptive and expressive skills, eliminating the need for time-consuming transcriptions. Moreover, it allows for some differentiation between various forms and functions by categorising them into meaningful sections. The test also provides some normative comparisons. However, it does have significant limitations, as outlined in a commentary by Diehl and Paul (2009) evaluating the assessment and treatment of prosodic disorders. It aims to assess a broad age range of 4-16 but does not provide age-appropriate task variations. Furthermore, children's receptive and expressive abilities change as they mature as does prosodic abilities (Wells et al. 2004). Limitations in the standardisation and available normative developmental data makes it impossible to ascertain whether the performance is delayed or disordered.

As Peppé et al. (2007) point out, a fundamental problem is that many tasks resemble language assessments, often presenting forced-choice alternatives based on static visual and auditory information. Consequently, whether the tasks evaluate prosodic skills or cognitive abilities is unclear. Likewise, the PEPS-C require modelling and practice to understand the task requirements, thereby increasing the risk of drawing attention to specific prosodic patterns and features (Paul 2008). This drawback is particularly relevant when evaluating the skills of CWASD, who benefit from domain-specific learning tasks (Crespi 2021; Diehl et al. 2015; Filipe et al. 2018).

Moreover, these learning effects are further facilitated through the task design. The use of two-choice forced alternatives significantly reduces the margin of error. It becomes difficult to evaluate whether the correct response is due to mastery over the task or prosodic competence. Task fatigue is a significant issue to consider. The PEPS-C assessment is lengthy and follows a repetitive format. Younger children, as well as those with learning or attention difficulties (which is often associated with autism) are prone to becoming tired or losing interest. This fatigue can increase the likelihood of making errors during the assessment.

Other researchers have similarly adopted a forced-choice paradigm, which can be particularly problematic when evaluating emotional prosody. Data is collected from face-voice matching paradigms (Brooks and Ploog 2013; Grossman and Tager-Flusberg 2012). These types of task designs are prone to learning effects and raise questions about CWASD interpreting information from still images compared to natural interactions (Chaidi and Drigas 2020). Furthermore, prior discussions in this chapter have indicated that there is no direct correlation between emotional states and prosody, raising the question of what these tasks are actually evaluating.

A further methodological issue arises concerning which specific aspect of prosody should be studied. Prosody is a complex and essential aspect of communication, and no single study can cover all its components. As a result, research studies often focus narrowly on specific elements. Paul et al. (2005) postulate that autistic people strategise these tasks by focusing on specific information. Some researchers, spearheaded by Peppé and McCann (2003) argue for the necessity for examining prosodic forms in context rather than isolating specific forms or functions (Samuelsson 2009; Wells and Macfarlane 1998; Wiklund 2016). However, this approach raises a whole new set of challenges considering prosody and social communication being developmentally and socially dependent (Peppé et al. 2006).

Children's use of language is highly dependent on the language experiences to which they are exposed, and this is true also of CWA (Bauminger-Zviely et al. 2018; Bottema-Beutel et al. 2014; Speer and Ito 2009). Another factor which deserves consideration is that typically-developing children show a motivation to engage with their environment, and there is a mutual

back-and-forth interaction between adult and child. However, where the child does not provide the expected feedback in the interaction, there may be a change in the adult's interactive style to facilitate compliance and affiliation (O'Nions et al. 2018). Those children who are less responsive to adult engagement, either because of learning difficulties or autism, prompt a more directive style and use shorter utterances, reducing the level and complexity of exchanges (Lewis et al. 2007; Terzi et al. 2016).

Where there is a tendency for adults to use directive speech to modify behaviour or teach a task (Kloth et al. 1998), there is also a tendency for CWA to acquire this pattern in their expressive language. Samuelsson (2009), for example, points out that systematic linguistic and prosodic structures used in test situations could impact the child's constructions used in response. Consequently, what could be interpreted as impairment may, in actuality, be a learned pattern.

Therefore, for children with ASD, there is a complex interplay of reduced or impaired sensory attentional abilities, which in turn impacts how the child responds to the adult. It is essential, therefore, to consider the role of the adult and the situational context in investigating the abilities of CWA.

This section highlights several critical issues and challenges in investigating CWA's prosodic abilities. The diverse nature of autism poses significant hurdles in collecting empirical data and utilising diagnostic instruments effectively. Furthermore, the need for more information on prosodic competence has only gained attention in recent years. As a result, developmental profiling has begun enabling therapists to make meaningful improvements to their approaches to intervention.

Emerging evidence from neurological studies provides an essential context for viewing autism, not from a deficit-based model but from an integrative domain perspective (Järvinen-Pasley and Heaton 2007). It appears then, that the understanding and use of prosody for pragmatic purposes can only be thoroughly and reliably understood when examined within context. However, due to its time-consuming nature and the heterogeneous nature of autism, this is most reliably achieved through the cumulative effect of small-scale or single studies, adopting an interactional approach informed by an ethnomethodological³ framework. It is this approach which is adopted in this project.

³Ethnomethodology is a sociological approach examining how people make sense of their everyday world and accomplish social order through social interactions. It focuses on the methods people use to navigate and produce social reality, rather than on pre-existing preconceived ideas around social structures.

2.9 Summary

This chapter has identified and synthesised key themes as they relate to this study and gaps in our understanding of prosodic impairment in CWASD. The literature has been reviewed in three broad themes. The first theme addresses a foundational background on prosody, covering a basic definition, significance to communication, and developmental trajectory in neurotypical children.

It emphasises four key aspects relevant to this study: managing conversational turns, the form and function of boundary marking, stress marking to contrast and emphasise important and novel information, and prosody's role in expressing emotions. For each topic, research related to the prosodic abilities in CWASD was discussed. It has explored the research on prosodic form in CWASD to determine the underlying nature of prosodic impairment.

The discussion highlights two fundamental points. First, as [Peppé \(2009a\)](#) points out, the lack of consensus among researchers on how to talk about prosody, what it is that needs examining and how to examine it, presents a major challenge to those of us who are involved in attempting to help those with prosodic impairments. Second, the heterogeneous nature of autism complicates the process of drawing definitive conclusions regarding the specific atypical characteristics associated with the condition. As a result, there are gaps in our understanding. Is prosodic function compromised? If so, how and why? It appears research is somewhat conflicted on this point. Additionally, is the form affected? Once again, the question arises regarding the mechanisms and reasons behind this impairment. Research from more recent acoustic studies is helpful, but there is still insufficient evidence.

A second theme discussed the literature related to the prosodic abilities in CWASD when explored from an interactional perspective. Studies examining prosody in context have shown that prosodic impairment in CWASD is less related to functional deficits and more to issues in form, specifically problems in the timing and coordination of prosodic features, thus pointing towards a neurological basis for the disorder. There is still limited information, which means there is very little support for interventions. The limitations in our knowledge are largely a consequence of the third and final theme of this chapter.

The final theme examined the research from a methodological viewpoint, with the objective of identifying the underlying reasons for the conflicting and inconsistent findings. This review establishes a foundation for the thesis by emphasising the significance of analysing the complexity of prosody within context and its implications for developing effective interventions for CWASD.

METHODOLOGY

3.1 Introduction

This chapter outlines the project design and the methodological approach adopted to address the research questions. It begins by outlining the qualitative research design employed in this project (section 3.2). It proceeds to cover the key aspects of the methodology, including recruitment processes (section 3.3). Ethical issues related to research involving children with autism and how consent was gained are addressed in section 3.4. Relevant information about the participants are provided in section 3.5. Section 3.6 outlines data collection procedures used, including the modifications made due to the COVID-19 pandemic. The chapter also addresses the details of data management (section 3.7) and how the data was processed following collection (section 3.8). Finally, it provides an overview of analysis procedures (section 3.9) as an introduction to the subsequent results chapters (4, 5, 6). The final section 3.10 briefly summarises the chapter.

3.2 Project design

The initial project plan was to video and audio-record, collect and analyse the conversations between eight and sixteen CWASD with an age range of 8 to 12 years old and two different adults: an adult who has specific, university-level training in speech and language and communication disorders and techniques used in communication with children with speech, language, and communication needs and an adult who has not studied to university level in speech, language,

and communication disorders. These conversations were to be recorded while the pairs played an interactive video game.

The aim was to determine whether there were any differences in the interactions depending on the adult's experience level and skill in interacting with CWASD.

The age range of the children was chosen to encompass a preadolescent group of children with sufficient language skills and physical competency to participate in a shared activity with an adult, which would not be overly affected by the physical and social changes typically accompanying adolescence.

Each child was to take part in 3 sessions.

- 1) An initial session with normative data collection
- 2) A session playing the game with an experienced adult
- 3) A session playing the game with an inexperienced adult

Each adult was to participate in

- 1) An orientation session
- 2) One or more sessions playing a game with a child

The purpose of the normative session was twofold: first, to allow the child to familiarise themselves with the environment, and second, to provide some comparison information regarding what is 'typical' in terms of prosody for the child when speaking a narrative, e.g., overall rate, pitch range, and use of stress.

The project's objectives were to create data sets by making audiovisual recordings of the interactions between CWASD and an adult conversational partner while playing an interactive video game and to analyse the collected data using Conversation Analysis (CA) principles. Ethics approval was granted for this project plan on 25th June 2019 (see Appendix A).

Due to COVID-19 'stay at home' restrictions (between 23rd March 2020 and 19th August 2020) preventing in-person data collection, only 6 hours of data were collected using the above design. The plan was modified with ethics approval obtained on 1st September 2020 (Appendix B), and a further recruitment drive was embarked upon.

The amended plan included adaptations to reduce the number of in-person contacts and contact time with research participants. To this end, the initial normative data session requirement was withdrawn, and instead of two separate gameplay sessions, the data were to be collected during one more extended session. Furthermore, the requirements for the adult participants were amended to include one family member, with the other adult player (swapping with the adult family member at a convenient point in the game) being the researcher.

3.2.1 Conversation Analysis

The methodological framework of Conversation Analysis (CA) was selected for its relevance in addressing the research questions outlined in Chapter 1 and for its effectiveness in exploring the complexities of the investigated phenomena. This section provides an overview of the CA methodology and its application in those interactions involving atypical speakers.

Conversation Analysis is a micro-analytical, qualitative methodology focused on understanding language use during social interactions, known as talk-in-interaction (Sacks et al. 1974; Sacks 1984; Schegloff 1998). Participants in talk are understood to collaboratively shape expectations, accomplish actions, and achieve shared meaning or intersubjectivity (Schegloff 1998). CA aims to discover how actions are carried out in communication by analysing features like turn-taking, topic shifts, and repairs. It explores why a particular aspect of conversation occurs at a specific moment, how the recipient responds, and what purpose the action serves, such as making a request, giving direction, or expressing a complaint (Schegloff 1998). In this philosophy, talk is organised and structured at every level, guided by implicit rules that the interlocutors orient within any given context (Sidnell 2012).

The underlying premise is that, in all interactions, there is an orderliness and sequential organisation through which participants perform these various social actions. CA seeks to describe the structures underlying social interaction in minute, finely-graded detail. Therefore, the data required for analysis is naturally occurring social interaction, which has been audio and/or video recorded. The participants' observable orientation to sequential organisation and local management in progressing talk and co-constructing meaning is described on a turn-by-turn basis.

3.2.2 About the game

CWASD are often described as having difficulties with pragmatic actions such as explaining (Lewis et al. 2007; Terzi et al. 2016) complaining, and managing conflict (O'Nions et al. 2023) in their interactions with others. Therefore, the situational context of an interactional cooperative game where the players must collaborate in solving problems presents multiple opportunities to examine these specific communicative actions. In this context, aspects of communication concerning the sequential organisation, lexico-syntactic, and prosodic design of these types of social accomplishments, which may not be readily available in CWASD's natural daily interactions can be observed (Davidson 2010). Moreover, as children, and more specifically, CWASD often prefer playing games with others on a computer, computer-based game playing can provide an ideal opportunity to examine readily reproducible interactive sequences across different dyadic interactions (Chen et al. 2019; Durkin 2010).

The computer game used is a commercial cooperative puzzle video game for two to four players called "SnipperClips: Cut it out together!©". It is played on the "Switch™" Game Console (released by Nintendo in 2017). The game has a PEGI (Pan European Game Information) rating of '3', the video game equivalent of a film with a 'Universal' rating, which is suitable for all ages (3 years and up). It is easy to play and fun. It contains no sounds or pictures likely to frighten or upset children. The game's limited sounds also help reduce conflicting background noise on the audio recordings. The characteristics of this game make it an ideal context to explore shared interactions.

"Snipperclips" is a cooperative, goal-oriented game that is sometimes time-constrained. In this game, the players each have a controller which allows them to control the two paper characters named "Snip" and "Clip". These characters can be manipulated to turn, rotate, move left and right and jump. They can have portions of their bodies cut out to change their shapes when they overlap.

The players must work collaboratively to solve various puzzles, such as carrying objects like a basketball or cutting out a shape to a pointed end to pop balloons. Table 3.1 gives a list of the tasks undertaken in the data with a brief description.

To complete the puzzle the players must engage in shared interactions, such as giving directives, negotiating, and repairing. A key skill is providing sufficient and accurate information so the other player can respond appropriately.

In this context, getting things done relies on two conditions being met. Firstly, there is a requirement for mutual agreement regarding who is directing at any time, with the recipient accepting the other player's speakership rights. In short, an agreed shared entitlement to direct needs to exist. Secondly, it is incumbent on the 'director' to give sufficient and accurate information, be responsive to potential barriers, and repair accordingly. Thus, there is a need for clear, unambiguous instructions to perform successive and progressive actions.

To this end, imperatives and declarations are critical in giving clear, unequivocal instructions, such as "Turn left now! Then jump!". If they are not clear, then trouble spots emerge which require repair. Non-compliance or resistance from the recipient in this context can be an issue of ability or willingness. The instructor must be aware of what it is that needs repair.

3.3 Recruitment

The following section discusses the participant recruitment process for this study and details of those who took part. It also covers the ethical approval process prior to data collection and details of gaining consent.

Given that CWASD are highly variable in their presentation and behaviour, less than 8

Task	Description
Shape Match	Players analyse a silhouette outlined on screen and then work together to cut their paper characters to match its exact form, fitting perfectly within the outline.
Baseballin'	Players manipulate the paper characters to catch a baseball on one side of the screen, carry it and drop it in a hoop on the other side.
Mockingbirds	The characters must guide an egg at the top left of the screen into the basket at the bottom. The characters need to cut each other into bowl shapes and work together to guide the egg towards the basket.
Firefly Flicker	The aim is for the characters to guide a firefly at the top of the screen toward a lamp to trap it.
Crane grab	A ball is on a ledge to the upper right of the screen. The characters must get up to the ledge by being picked up by a crane moving across the top, then drop the character onto the ledge to push the ball off into a basin.
Hamster helper	The paper characters must guide a hamster from a tube on one side of the screen to one on the other. They need to cut one of the characters into a ramp to cover the gap in the floor for the hamster to run across.
Sharpen up	The characters must carry a pencil released from a tube on one side of the screen and into a sharpener on the other.
Fish Splash	The characters have to collect two specific fish (red and green) out of a large fish tank and drop them down a tube.
Balloon Burster	The characters must pop three balloons that are floating around by cutting a sharp hook from one of the characters.
Princess PowerUp	The aim is to help a princess reach a series of gems by removing obstacles and guiding her direction.
Gene Machine	A complex sequence of actions to make the characters navigate a series of obstacles to complete a puzzle, such as manipulating a screw and raising a platform.
Cage Free	A complex sequence of actions to make the characters manipulate keys and locks to free two birds from a cage.

Table 3.1: 'Snipperclip©' tasks used by the players

hours of data was considered insufficient to see any emerging themes or patterns. Contrastively, as this was intended as a three-year project, it would not be possible to analyse more than 16 hours of data within the time allocated to complete it. Under the original design, approximately one hour of data was anticipated to be collected from each child participant. Therefore, it was targeted to recruit between 8 and 16 children. It was anticipated that at least four adults would be recruited to participate in approximately two data sessions each.

Four child participants and four adults were recruited between July 2019 and November 2019. One family withdrew before data collection for personal reasons. The data collection sessions were held in December 2019 and January 2020, avoiding the holiday period. The data collection sessions produced approximately 6 hours of recording. Following this, a further recruitment drive was planned for to complete data collection by August 2020.

Due to COVID-19 restrictions, the second recruitment drive was amended and delayed until September 2020. Three more children, each with an adult family member, were recruited, and their data sessions took place during December 2020 and January 2021 avoiding the holiday period. These sessions yielded a further 6 hours of recorded data. As explained in more detail in section 3.7 where there are episodes in the recordings where there are interactions with a third party or breaks away from the game, these were discarded from the total dataset as they were irrelevant to the study.

Section 3.3.1 and section 3.3.4 describe the two recruitment processes.

3.3.1 Initial recruitment process

The initial study design was to recruit three groups of participants with the following characteristics:

- 1) Children with a diagnosis of autism spectrum, which could include HFA, ASD or Asperger's Syndrome.
- 2) Adults trained to university level in speech and language and communication disorders and techniques used in communication with children with speech, language and communication needs.
- 3) Adults who had not studied at university level in speech, language and communication disorders

The following criteria were requested for the child participants:

- A clinical diagnosis of ASD as determined by assessment using the National Institute for Health and Care Excellence (NICE) guidelines for autism spectrum diagnosis i.e. meet the criteria of DSM 5 ([American Psychiatric Association. 2013](#)) or ICD 10 ([World Health Organisation 1993](#))

- At least ‘phrase-level’ verbal language
- Hearing within normal limits
- No known additional impairments, e.g. cerebral palsy
- They were monolingual English speakers

The adult participants were requested to meet the following criteria:

- No diagnosed speech, language or communication difficulties.
- Monolingual English speakers with either a Northern English or non-specific regional variation/ accent.
- Hearing within normal limits.
- No known neurological impairments.

As the project explicitly explored prosody in CWASD, some participation criteria were required. The children would need to have a diagnosis of Autism which is representative of the cohort of interest. Depending on the diagnostic criteria used, the label attached to the diagnosis is known to vary. For example, the DSM-5 ([American Psychiatric Association. 2013](#)) has two criteria, Autism and Autism Spectrum, with the latter including less severe features of autism. In contrast, the ICD-10 ([World Health Organisation 1993](#)) criteria, used in some diagnostic assessments, include variations such as Asperger’s Syndrome. For this assessment, any of these was considered sufficient. It was, however, important to exclude any other neurodevelopmental conditions, such as Childhood Apraxia of Speech (CAS) or neurological conditions, such as cerebral palsy, which are known to impact speech production significantly. Similarly, it was also important that the child’s hearing was within normal limits. Both congenital and conductive hearing difficulties, even in a mild loss, can have a marked impact on language comprehension, listening, speech production, and prosody ([Northern and Downs 2002](#)). Moreover, as the video game relies on listening to the other player, excluding hearing difficulties as a potential confounding factor was important. Similarly, the requirements for the adult participants excluded those known to have any additional neurological conditions that may affect their speech or language or their ability to manipulate a game controller. Children with visual impairments were not necessarily discounted, provided they could clearly see a screen while wearing appropriate lenses.

The data in this study were to be analysed based on English’s prosodic form and function. As English language dialects can vary in their prosodic structure ([Wells and Peppé 1996](#)), the requirement was that all the participants be monolingual English speakers. As the study was based in a northern county in England, with a particular regional accent and dialect, and the participants were recruited locally, it was important that, as far as possible, any significant differences to the adult’s regional accent were minimised. To illustrate, an individual with a

strong accent markedly different from the regional area could present the children with more difficulties in understanding them than someone with a more recognisable accent.

Ethical approval was gained for these requirements on 25th June 2019 (Appendix A). Following this, letters and email requests were sent to schools and charitable support organisations in the local area, the University of Sheffield Speech and Language Therapy department and Leeds Beckett University requesting assistance with recruitment. Information sheets outlining the project and its aims were included (Appendix A). This included the participant inclusion and exclusion criteria as outlined above.

3.3.2 Recruiting potential CWASD

The researcher contacted local schools and support agencies directly via email or telephone to discuss the project and inquire if they would be willing to contact potential participants with information about this study. Twenty-five mainstream and special provision schools in the area were contacted. Five local support groups and five independent clinical psychology services offering autism diagnostic assessments were also contacted.

The researcher provided a packet containing an information sheet, consent and assent forms and questionnaire to send home. The questionnaire asked for information about the inclusion/exclusion criteria for the child participants. The children were also provided with a modified information sheet and assent form (Appendix A). The researcher also met the children in advance to explain verbally what would happen and give them the opportunity to ask questions.

3.3.3 Recruiting adult participants

Experienced adults were recruited via local Speech and Language Therapy practices and at the local universities' speech and language therapy departments. Registered Speech and Language Therapists and 2nd, 3rd, and 4th-year Speech and Language Therapy students were targeted as they would have specific experience and knowledge of interacting and engaging with children with communication impairments. Non-experienced adults were recruited via local schools, playgroups, and charitable organisations. Four adults consented to participate in this initial part of the project. These potential participants were given time to consider and make an informed decision.

In summary, for this part of the project, four children and four adults (two trained Speech and Language Therapists and two untrained adults) agreed to participate. One family did not proceed with the data sessions and withdrew from the project for personal reasons. This initial recruitment drive was temporarily halted in December to allow for the holiday season

in December 2019. The data collection sessions for these participants took place in December 2019 and January 2020. It was anticipated that a further recruitment drive would take place during March and April 2020. Recruitment, however, was halted on 23rd March, 2020 due to COVID-19 ‘stay-at-home’ restrictions.

3.3.4 Second recruitment process post-COVID

Once COVID-19 restrictions were eased and in-person data collection was permitted, an amended recruitment procedure was followed (Appendix B). The child participant criteria remained the same, but the adult criteria were amended to reduce the number of in-person contacts required. The new criteria specified that the participant was a child’s immediate family member. As a Speech and Language Therapist and the project’s researcher, I assumed the role of the trained adult for each of the children recruited in this section. The family member and I played the game with the same child consecutively in one arranged session.

Four more children and their mothers were recruited from this procedure. Due to unforeseen circumstances, one family was forced to drop out at short notice.

3.4 Informed consent

Consent was sought from potential adult participants (see Appendix B). Although the children’s parents needed to consent on behalf of their children, it was also important to have the children’s agreement. Their motivation and willingness to participate were crucial for this study. Having autism does not mean that the children participating cannot understand and provide their agreement to their participation. It is also important to recognise that CWA are often anxious about new situations and unwilling to engage with unfamiliar people. To this end, the children met with me, the researcher, and the parents to discuss the project and were provided with a communication-friendly information and assent form. As a trained Speech and Language Therapist, I am skilled in communicating with people with communication difficulties, particularly CWA. The verbal and written information was designed to mitigate any anxieties and provide them with a schedule they could refer to.

I played the game in advance to check its suitability and ensure the equipment was working. It was the only game loaded on the Switch console in the data sessions. At the beginning of the session, it was preset to two-player mode, preventing the child from accidentally choosing single-player mode.

Adult participants were apprised of the following procedures regarding confidentiality and the security of the use of video material:

- Detailed information regarding data storage was provided in the consent forms.

Transcript reference	Gender	Age at recording
Simon	male	12yrs;03mths
Andy	male	11yrs;09mths
Henry	male	11yrs;02mths
Tom	male	11yrs;04mths
John	male	08yrs;00mths
Brad	male	12yrs;11mths

Table 3.2: child participants

- Opt-in/out options regarding who may view the recordings, and use of data.
- The data collection sessions were arranged at times convenient to the participants and where there was minimal contact with other people with access to the office. This involved organising sessions on weekends and in the evening. All the participants were reminded they could withdraw from the project anytime.

Following COVID-19, additional consideration was given to the health and safety measures in place at the location of the data sessions to reduce the spread of the virus. These were included in the information provided to parents during this recruitment process.

3.5 Participants

The data include six children in total. The adult participants included three trained Speech and Language Therapists and two untrained adults. The mothers of three of the children are also included. All the children attended mainstream schools full-time and all met the requested criteria. Some children had received Speech and Language Therapy, but no details were sought to avoid bias during analysis. All were familiar with playing video games, but none had played the game chosen for this project prior to the data collection. The child participants are listed under their pseudonyms in Table 3.2.

The adults were all familiar with communicating with children. Three were trained Speech and Language Therapists, one was a playgroup worker, one a hospital administrator and Scout leader, and three were the mothers of the child participants. Identities are protected using pseudonyms are used for all participants except the researcher. Where the parent is the adult player, they are referred to as ‘mum’, as this is how they are referred to in the data. There are no instances where the parent is referred to by their name. The adults as they are referenced in the transcripts, are listed in Table 3.3. Name pseudonyms were chosen for their relevant gender, syllable and proximal phonemic structure so that the prosodic integrity of the turn in which they appear is preserved.

Transcript reference	Gender	relationship to child
Rebecca	female	experienced adult
Ann	female	experienced adult
Julie	female	experienced adult
Katy	female	non-experienced adult
Cath	female	non-experienced adult
Mum	female	parent to Tom
Mum	female	parent to John
Mum	female	parent to Brad

Table 3.3: adult participants

3.6 Data collection

As previously mentioned, data collection was necessarily paused and resumed after several months due to the COVID-19 pandemic. This section outlines what took place in these two episodes and provides a justification for the setup.

3.6.1 First data collection

The sessions were all arranged at the participant's convenience. They were held at the researcher's place of work outside working hours. The place was chosen because it was convenient for the participants and had the available space to allow the equipment to be set up in advance and remain in place throughout the sessions. One other adult with security access to the building was on-site during these sessions as a Health and Safety precaution.

The setup included a fixed microphone between the two players on the desk and one camera behind the computer. Using lapel microphones attached to the individual player's clothing would have increased the accuracy and quality of the recording. However, CWASD often have attention challenges and can have sensitivity issues. Therefore, a lapel microphone could be rejected or dislodged during the recording, so a centrally placed fixed microphone was decided to avoid such potential disruption. As the study aimed to explore the role of prosody in interaction and the analyses to be based on listener perception, it was considered unnecessary to risk any disruptions due to microphone problems.

Similarly, the decision to have only one video camera and an audio recorder placed in unobtrusive positions, where the recording quality would not be significantly affected, helped settle the children and avoid disrupting the recording. As illustrated in Figure 3.1 the video camera was set up on a tripod on the desk to one side of the computer screen, with the players' chairs positioned so that both players would be in shot. The audio recorder was positioned on the other side of the screen. The microphone was fixed midway between the two players in front of the screen. This way the players could move freely without disturbing the equipment.



Figure 3.1: Data collection set-up 1

The following equipment was used:

- Marantz audio recorder (PMD670)
- Video recorder (Panasonic 90x VCHC Progressive) plus stand
- External microphone (Beyer)
- Monitor (Technika 22F228-FHD/DVD)
- Nintendo TM Switch
- Video Game "Snipper Clips" (SFB games for Nintendo TM ([Nintendo 2017](#)))

In this initial round, the three children recruited at this stage attended a preliminary orientation session with their parents and the researcher. The lead researcher asked the child to tell or retell a story using a picture-based story sequence during this session.

This task had two purposes:

- 1) To allow some time for the child to become familiar with the recording equipment and environment.
- 2) To allow some comparison information regarding what is 'typical' for them in terms of prosody for the child when speaking a narrative e.g. overall rate, pitch range, use of stress.

This session took place in a quiet room with minimal distractions, prepared as in Figure 3.1. The researcher recorded the story recall using the audio and video recording equipment, as previously described.

Session	Simon	Andy	Henry
orientation	Researcher	Researcher	Researcher
Session 1	Cath	Katy	Rebecca
Session 2	Ann	Ann	Katy
Total data	138mins 30secs	109mins 53secs	117mins 25secs

Table 3.4: data collected in initial round

The adult volunteers had a separate orientation session of 15-20 minutes at the same location and in the same room. They were shown the video game and had a brief training session on how to play.

Two further sessions were arranged for each of the three children; one in which they would play the game with one of the adults, trained or untrained, and in the second, they would play with the other adult. Each data set included the child's interaction with a trained and untrained adult.

The data was collected from the conversations between the children and the participating adults during gameplay. At the start of each data collection session, there was a brief orientation time (10-15 minutes) to familiarise the child and adult with each other and where the participants could look around the building and adjust to the set up. Since the main focus was to be on playing the computer game, it was expected there might be some initial awkwardness in front of the camera. However, it was anticipated this interest would likely fade quickly as engagement with the game increased.

The camera and audio recorder were switched on at the beginning of the interaction and off at a suitable game endpoint. The players did not need to use the equipment other than the game controllers. They were requested to alert the researcher, who stayed in another room but within hearing distance, if they noticed a problem with the equipment or needed to stop for any reason. Any such pauses, as were any interactions with a third party, were excluded from the data collection.

The instructions were minimal, as the study aimed to examine natural conversation. The two players were to play the game together to solve the puzzles. The game was pre-set to two-player mode. No guidance was given on how long to play or what they needed to say. Each participant was told that they could stop at any point.

Table 3.4 shows the data collected during this episode from each dyad in total recorded minutes.



Figure 3.2: Data collection set up 2

3.6.2 Second data collection

In the second data collection period, the researcher assumes the role of the ‘experienced’ adult, while the ‘non-experienced’ adult participant is a family member. In all three cases, the adult was the mother accompanying the child.

The preliminary orientation sessions were omitted, and both adults engaged with the same child in a single session arranged consecutively. The sessions were arranged at the family’s convenience at the same location as previously described, outside of working hours. As before, one other adult with security access to the building was on-site during these sessions. Although there was no separate orientation session, the players were allowed time to explore the building, adjust to the set-up, and ask questions before the game started.

The amended data set-up is illustrated in Figure 3.2

Figure 3.2 shows that a larger room was selected for this round to accommodate the recommended two metres of space between interactants. The same recording and game equipment were used as in the first round. As before, the microphone was centrally fixed, and the video recorder was placed in a position that would capture both players on camera. The purpose of the marked squares was to indicate to the players that, to remain in shot, they would need to stay in the squares as they played. The chairs, on the occasion, were adjustable for height, again to ensure both players were in camera shot.

Under the COVID-19 recommendations, PPE (personal protective equipment) was required for health professionals. This included wearing masks and/or visors. It was not required for parents, and because children were low-risk, they were exempt from mask-wearing. Because

Session	Tom	John	Brad
Total data	132mins	113mins 21secs	118mins 14secs

Table 3.5: quantity of data collected in the second round

the faces needed to be seen in the video and because masks would affect the sound quality, a visor was worn by the researcher during the data collection sessions. At this point in the pandemic, the children were used to seeing adults wearing this equipment and it was clearly explained to the parents and children beforehand.

The sessions for each child were recorded in one episode. The researcher played the game first with the child and swapped with the parent after approximately 45-60 minutes. Then, the researcher withdrew to another room, leaving the parent and child to play by themselves. Table 3.5 outlines the quantity and type of data collected from each child during this episode.

The total amount of recorded data collected over the two data collection episodes = 12 hours 15 minutes.

3.7 Data management

This section summarises the nature of the data collected. It describes the procedures undertaken to manage and organise it to ensure the participants' confidentiality and to provide accessible and reproducible data.

3.7.1 Data preparation

As soon as practicable after recording, the data was transferred to the researcher's secure university account to be stored in line with Data Protection legislation. After the transferred data was checked, the original data was securely erased from the recording devices. The video data was recorded in high-definition MP4 format, which most software uses. Due to the FAT32 format of the video camera's SD card, video files are split at approximately 4 GB. Each video file lasts 20 minutes. The audio data was recorded in WAV (uncompressed PCM) format. These standard file types can be easily stored and maintained for future use.

3.7.2 Data storage and organisation

The data collected was loaded onto and stored on an external hard drive, a secure, password-protected computer at the University of Sheffield, and a secure, password-protected laptop in an unidentifiable, anonymised form (i.e. using a key code) for the project's duration. This includes audio and video recordings and any scanned paper documents. Once transcribed, all the data names were changed, and a consistent naming system was used to code the data files.

Folder name	participants	Data type	Length	File size
AA2	Andy/Ann	MP4	66mins 03secs	11.100GB
AK1	Andy/Katy	MP4	62mins 11secs	10.150GB
HK2	Henry/Katy	MP4	55mins 36secs	8.74GB
HK1002	Henry/Katy	WAV	44mins 44secs	452MB
HR	Henry/Rebecca	MP4	57mins 08secs	9.9GB
HR1025	Henry/Rebecca	WAV	55mins 57secs	564MB
SC1	Simon/Cath	MP4	52mins 38secs	8.21GB
SC003	Simon/Cath	WAV	52mins 40secs	521MB
TJM	Tom/Julie/Mum	MP4	100mins 31secs	15.40GB
TJM1003	Tom/Julie/Mum	WAV	2hrs 14mins	1.32GB
BJM	Brad/Julie/Mum	MP4	112mins 06secs	22.20GB
BJM1002	Brad/Julie/Mum	WAV	1hr 58mins	1.59GB
JJM	John/Julie/Mum	MP4	122mins 06secs	22.20GB
JJM1002	John/Julie/Mum	WAV	1hr 53mins	1.11GB

Table 3.6: quantity of data collections

Table 3.6 presents information on the storage of video and audio recordings. The data files are organised according to the participant initials.

Due to the large video data file sizes, the video files are stored in 3.70GB chunks (22mins 01secs), sequentially organised. The orthographic transcripts and audio files are stored as single files. The example below illustrates the coding system used to identify extracts.

- HR001_0253

The first column shows the filing convention for the transcripts and the extract references: the first two letters refer to the participants' pseudonym initials followed by a number code for the video recording section (001 refers to the first 20-minute segment of the recordings for this dyad. The audio recordings and the transcripts are coded similarly to facilitate easier reference between the transcripts, audio and video recordings. Extracts from the recordings are additionally marked with a start time in minutes and seconds for easy access to the appropriate point in either the audio or video recordings. In this case, the extract can be located 2mins 53secs in the first video file of the interaction between Henry and Rebecca, 24mins 53secs into the audio recording.

Extracts used in the analysis are named after the file from which they are taken and then with an identifying feature of the talk. For example, the transcript extract SC001_01_20-physics can be found at time stamp 1mins 20secs in the first video file for the dyad Simon and Cath and 21mins 20secs in the audio file. The final extracts used in the analyses presented in this thesis are stored in a separate file from the primary database to maintain the integrity of the primary source data. These are stored as either MP3 or WAV files. If the extracts were taken from the video recordings, not the audio, they were converted from MP4 to MP3. This allows for further

Simon	Andy	Henry
1hr 37mins	1hr 49mins	1hr 48mins
Tom	John	Brad
2hrs 07mins	1hr 45mins	1hr 53mins

Table 3.7: analysable data

analysis in other programmes, particularly PRAAT (Boersma and Weenik 2001), which does not accept MP4 formats.

3.8 Data processing

This section details the editing and subsequent analysis of the data. It outlines transcription methods and provides information on collection building and subsequent selection processes. It also includes information on the software and tools used for data analysis.

3.8.1 Transcription processes

Each recording was subject to an initial broad orthographic transcription process of the talk. Following an initial viewing of the recordings, it was found that some of the data would not be usable. For example, at the beginning or end of the recordings, there are brief interactions with the researcher as the recording equipment is checked before the players start the game. There are also instances where the child asks for a break, and the recordings are paused and restarted. These episodes are not included in the analysis.

The recordings from the orientation sessions during the first round were also discarded as these were not replicated in the second round and were not ultimately used as part of the analysis. This resulted in approximately 11 hours of analysable data. Table 3.7 indicates the amount of analysable data per child. As indicated, the amount of data collected from each of the children that was ultimately used in the study is comparable.

The orthographic transcripts underwent a comprehensive analysis in conjunction with the video recordings. Initially, the video recordings were used for transcription as they provided context to the interactions, for example, if embodied actions occurred during pauses in the talk.

More detailed transcripts of the interaction were then generated, supplemented by the audio recordings. The overall purpose was to include sufficient information to determine the prosodic features deployed by the speakers, their functionality and the context in which they occur.

The data are transcribed using Jefferson's 2008 (see Appendix C). Incorporating relevant multimodal aspects of interaction, such as gestures, body posture, facial expressions, and gaze direction (Goodwin and Goodwin 2008; Mondada 2011) along with prosodic features, provides

Stressed Syllable	High Onset	Fall	Rise	Fall-rise	Rise-fall	Mid-pitch
'yes	↑yes	`yes	´yes	˘yes	ˆyes	ˉyes

Table 3.8: Tone Diacritics

a solid empirical basis for the research. This approach enhances the credibility and replicability of the findings (Sidnell 2012).

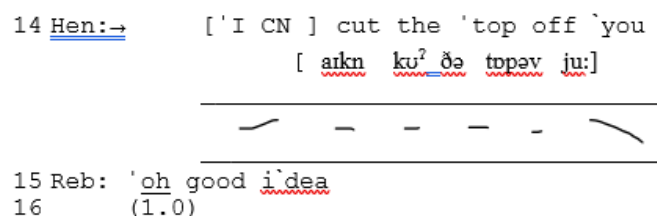
As the primary focus of this study is prosody, additional steps were included in the transcripts once the relevant collections had been made. These were to elucidate the various speech characteristics relevant to this study, including pitch variation, stress and intonation patterns, duration of silence, instances of overlap, and latched speech. Included in these transcripts are specific features related to prosodic and phonetic features. Tones and tone directions are marked using the conventions as illustrated in Table 3.8.

Table 3.8 illustrates the diacritics used in the transcription. The diacritics represent the pitch direction on the stressed syllables in a TCU. The vertical stroke represents a stressed syllable. The high-onset diacritic placed before a syllable denotes the syllable beginning with a higher-than-average pitch onset. The remainder of the diacritics represent pitch accents on the Tonic syllable.

The transcripts of extracts are used within this thesis to exemplify the resulting analysis, with the videos themselves remaining the primary data. The transcripts are not intended to replace the videos. They aim to provide sufficient detail to inform the reader's understanding and evaluation of the presented analysis while remaining readable. Advice was asked of from colleagues and the project supervisor on the transcription procedures and for inter-reliability through sharing relevant audio clips via the University shared drive.

Impressionistic phonetic information is additionally transcribed where relevant using International Phonetic Alphabet (IPA) conventions. Some transcribed extracts contain impressionistic information regarding intonation contours. The tramlines indicate the top and bottom of the speaker's pitch range. These were created in Microsoft Word using the Draw tool. These features are illustrated in Figure 3.3.

Where appropriate, this perceptual analysis is supported by acoustic analysis using the

**Figure 3.3:** Figure to illustrate transcription features

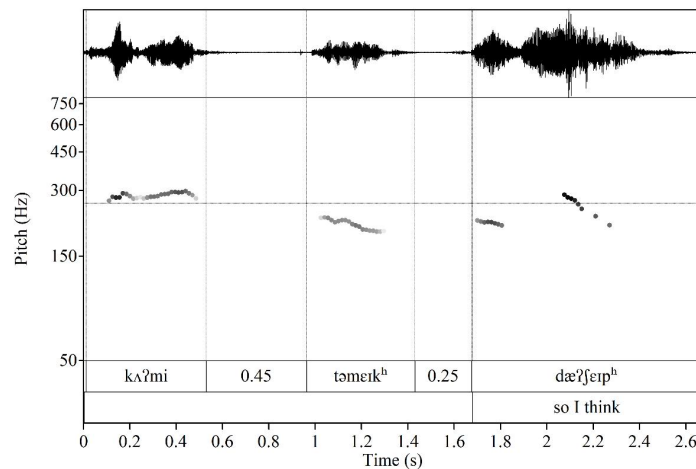


Figure 3.4: Illustration of a visual representation of prosody in a speaking turn using Praat

speech analysis programme PRAAT 4.4.22 (Boersma and Weenik 2001).

3.8.2 PRAAT analysis

For some analyses, additional information on specific prosodic features was obtained using the PRAAT programme. These were used primarily to clarify pitch and intensity contours used in a speaking turn. This additional information extracted from Praat provides the basis for a more detailed analysis of the collected data. This aimed to create a clear visual representation of the prosodic features within the selected sound file.

Sections of a selected turn were extracted for the sound file of the extract to be analysed and edited in the PRAAT programme. The smaller selected sound file was edited using the analysis tools to examine the speech properties. The aim was to create a clear visual representation of these properties. For this investigation, the visual representations of acoustic data representing pitch and intensity were created by applying an additional PRAAT script to the data using a nonlinear (logarithmic) scale (Walker 2017b). An example is presented in Figure 3.4.

The key analytical features are:

- the spectrogram (visual representation of the frequencies over time).
- pitch (represented as the fundamental frequency measured in Hertz (Hz)).
- intensity (represented as the loudness of the sound measured in Decibels Db).

Some modifications were made within the programme to clean up the pitch trace manually. This was necessary to remove as many extraneous noises or pitch anomalies as possible. The programme cannot always accurately interpret raw data. Considering some conflicting and competing sounds, this was the researcher's best attempt at representing the sound as it is heard.

Feature	Praat setting
Default Pitch range	50-500Hz
Modified Pitch range	50-800/900Hz
Adult median pitch	262Hz
Child median pitch	232Hz
Time x axis	0.2msecs
Modified time x axis	0.1msecs
Intensity	30Db

Table 3.9: Praat settings used in analysis

For these analyses, visual representation is needed to represent the pitch and intensity contours of a segment of speech while maintaining information about the rhythm of the turn (Walker 2017b). Pitch range was also an important feature to consider. An approximate median was established from a general pitch range setting of 50 to 500Hz (Hirst and de Looze 2021). This calculation was not carried out individually but based on approximate data of the relevant population. Although there is limited information in the literature, as all the child participants were male and preadolescent, and all the adults were female, there is some evidence that the median pitch for both these groups is similar (Hirst and de Looze 2021). Although a general approximation, the medial pitch was set at 262 for the females, and slightly lower at 232 for the children. In those instances where there were seen to be wide pitch variations, the range was extended upwards from 500 to 800 Hz. The settings used are represented in Table 3.9.

For this investigation, the visual representations of acoustic data representing pitch and intensity were created by applying an additional PRAAT script to the data using a nonlinear, (logarithmic) scale (Walker 2017b).

3.8.3 Data anonymisation

In the transcripts, the child and adult participants have been assigned pseudonyms to protect their identities, apart from the researcher, who is referred to by her first name. If the mother is the adult participant, she is referred to as “mum” in the transcripts to distinguish her from the other adults. There are no instances where the parent is referred to by their name.

These pseudonyms have been consistently utilised throughout the project, including during transcription, written documentation, and disseminated materials. The selection of pseudonyms was guided by the intention to retain the syllable length and stress pattern of the participants’ original names, facilitate the possibility of variations (for example, Andrew may be represented as Andy, and maintain considerations of gender, ethnicity, and the level of name rarity. For this study, it was important to consider an appropriate pseudonym that maintains the prosodic integrity of the turn, for example maintaining the basic syllabic and phonetic structure. There

were no other noted identifying features during any of the recordings.

3.9 Data analysis

This section outlines the data analysis procedures based on the CA principles described in section 3.2.1. It provides an overview of the collection building and extract selection processes that inform the analyses.

3.9.1 Data collections

Once the transcripts were prepared, the data was subjected to an initial general exploration (Sidnell 2012). Analysis began with repeated viewings of the recordings to identify potentially interesting phenomena relevant to the topic of this project.

Insofar as the project focuses on the prosodic aspect of communication, a data-driven approach was adopted, consistent with the traditional method of Conversation Analysis that involves examining data without preconceived notions (Sacks 1984). While I was specifically looking for features in the data related to prosody in communication, I did not have any prior assumptions about the phenomena that would ultimately shape this thesis.

3.9.2 Collections and extract selection

Following repeated viewings, initial patterns emerged from episodes in which the prosodic design of the talk appeared to be performing a particular function or something was interesting about them. These formed the basis of the initial collections. One of the areas of interest in this project is the prosodic design of turn management. It was noticed that during sequences where instructions were given to the other player, there were extensive instances of overlapping talk. These episodes produced the first stage of collections. Initially, 21 collections of overlaps were made, with 625 instances noted. Therefore, overlapping talk, particularly in gameplay, is very frequently occurring. It is also messy and difficult to isolate. Precise details regarding where they start and finish are difficult to determine. Moreover, the lack of high-quality separate-channel audio-recordings, which would allow for the isolation of individual speech meant that the collections were refined through multiple viewings and progressively more refined transcriptions to include those episodes where the prosodic features and what the prosodic design does within the talk at these points can be identified.

Another aspect of interest noticed during directive sequences relevant to this study was the instances of fragmented and disjointed turns made by the children. This led to building separate collections of two prosodically-driven phenomena: turn holding and fragmentation. These are

also frequently observed in the data, and the extracts presented in this thesis are representative examples of the features noticed in the data.

Gameplay results in frequent complaining when things do not go according to plan (Hofstetter 2020), and the data contains frequent episodes where complaints occur. Complaint sequences were collected based on who initiated the complaint, the lexico-syntactic structure, and the prosodic design. The extracts from these collections were selected for inclusion in the thesis because they were clear examples of the features of interest.

3.10 Summary

This chapter has outlined the methods employed by this study. It discussed the use of conversation analysis as the chosen methodology for achieving the project's aim and described the video game chosen to form the context of the interactions. It has reported the approaches to recruitment and provided details of the people who ultimately participated, including the strategies involved in maintaining the project's integrity due to the COVID-19 pandemic. It also explained how the recordings were collected and the data managed and processed. The chapter discussed how the data has been transcribed and subsequently analysed with a focus on the prosodic design of the talk. Finally, it has outlined the decisions involved in the data selection methods that ultimately inform this thesis.

TURN MANAGEMENT: THE ORIENTATION TO AND USE OF PROSODIC MARKERS

4.1 Introduction

The issues explored in this chapter relate to questions regarding the children's competency in deploying prosodic resources to manage their turns-at-talk during their interactions. Specifically, the analyses investigate the exchange of speaking turns, including overlapping talk, to offer insight into how the conversational partners monitor their ongoing interaction in real time to achieve their interactional goals. Recognising children's skills in managing conversational turn-taking is important to help children and significant others better understand each other during conversations.

An exploration of the directive sequences in the data offers insights into the communication strategies used during interactive gameplay ([Davidson 2010](#)). This chapter explores the following specific interactional features of turn management: turn transition, turn competition, and turn holding. Each feature requires a complex interplay of linguistic and prosodic resources to signal, manage, and resolve issues. The analyses aim to identify and understand the children's competence and the consequences for their interaction.

Considering the critical interactional role directives play in the game, it is essential to consider these analyses within their situational context. As [Goodwin \(1990\)](#) claims, it is only by looking at how the sequence unfolds, how the directives are shaped and designed, and the function they serve that it is possible to understand how and why particular features are displayed at any given time.

A preliminary data analysis revealed particular patterns of interest around turn transitions made during directive sequences. These transitions were analysed more deeply, focusing on the temporal placement and phonetic design of the vocal turns produced by the children and their conversational partners, including those in which they talk in overlap and the strategies used to manage such turn transitions. These analyses address children's competencies and challenges in using prosody to meet their interactional goals.

To this end, the following questions are addressed:

- How do the children achieve and manage turn transitions by deploying linguistic and prosodic features?
- How do they achieve and manage bids for turn competition?
- How do they signal and orient to an intention to continue speaking and holding the turn?

Section 4.2 presents data relating to the prosodic resources observed in and around points of turn transitions. The two analyses in this section exemplify the most frequently observed patterns of turn projection and focus on the linguistic and prosodic features observed in and around the transition points. Evidence supports the case that these children have primarily acquired the skill of projecting a turn-ending using prosodic resources and successfully orienting to the adult's signalling of TRPs. The second extract (Extract 2 *That shape*) also illustrates the most frequently occurring challenge in turn projection, where the child appears to have difficulty shifting the Tonic placement.

Turn competition, where the two players vie for the floor, often leads to intercepts or overlapping speech. Overlapping speech is not uncommon in gameplay but presents a unique challenge in that there may be a legitimate reason why one participant may need to interject. In this data, the predominant design of overlaps between children and adults includes turn-competitive features. However, this is not the only design observed. For example, an event may occur on screen, and one speaker may overlap the other player's speaking to acknowledge the ongoing talk and display their understanding.

As this study is concerned with prosodic design, the focus of analysis is on those turn incomings which are prosodically designed as turn competitive. These are most frequently occurring in the data and are more perceptually salient in the ongoing talk. Section 4.3 explores specific episodes in detail. The representative analyses show that the children can deploy linguistic and prosodic resources to achieve an interactional goal. However, there are problems. Section 4.4 presents analyses of turn-yielding practices indicating that these children can recognise and interpret bids for turn competition, but they manage these ineffectively. Moreover, although they can and do recognise turn competition, they often continue with their talk, maintaining speakership.

Turn-holding practices are examined in section 4.5. Linguistic features such as incomplete

sentences, conjunctions, and discourse markers alongside prosodic elements such as the use of pitch modulations in the midrange, prolongations and controlled pauses work together to signal that the speaker is not ready to give up their turn and help maintain control of their conversational turn. The analyses presented illustrate the children's use of prosodically-driven turn-holding practice strategies to indicate to the other player that they have not yet completed their turn. They show how the children use these practices during turns where they have difficulty articulating their points and organising their conversational turns clearly and coherently. However, these can be prone to problems associated with timing.

Section 4.6 presents an overview of the findings related to the children's ability to manage turns using prosodic resources.

4.2 Turn transitions

Directives provide instructions or commands that guide the other player's actions, ensure that the gameplay proceeds as intended, clarify the rules, and set expectations for how the players should proceed. Therefore, it is incumbent on the speaker to design turns with sufficient prosodic and grammatical information so that the other player can carry out the instructions.

The data reveals that the children can design turns using sufficient prosodic and grammatical resources to project the tonic and an upcoming TRP and facilitate a smooth transition. The first extract has been chosen to represent the typical pattern observed in the data, and the subsequent analysis illustrates the features deployed.

Extract 1

This extract is taken from the beginning of the recording of the interaction between Rebecca (adult) and Henry (child). They have been playing for a few minutes, getting familiar with the controls. Neither of them has played "SnipperClips" before, but both have experience with computer and video games.

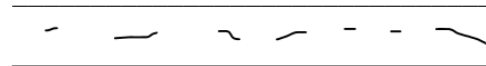
They have chosen to play "Shape Match" (Table 3.1). Figure 4.1 illustrates a dotted outline centred on the screen. The objective is to work together to fill this space. Players achieve this by trimming portions of each character and then rotating them to the right or left. As illustrated, there is an area where the two shapes overlap, which is coloured green.



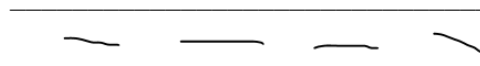
Figure 4.1: Screenshot of "Shape Match". Used under fair use for educational purposes.

Extract 1: Connect in the Middle

1 Reb: 'a know let's 'star? a'gain
 2 (1.0) ((computer noise - cutting))
 3 Hen: 'I've cu? you 'up so 'now °you're °good°
 4 Reb: 'righ? (.) so 'you stay 'there::
 5 Reb: be'cause we nee?to 'tryn make this 'shape 'don we
 6 Hen: 'yeh
 7 Reb: an 'then if 'I: (.) hm wha?
 8 Hen:→ we're gunna conn'ect in the 'middle
 [wɪə ɡʊnə kən'eɪtɪŋ ðə mɪdəl]



9 Reb: 'that's i?
 10 (2.0)
 11 Reb: .hh to 'know which 'bits to cut 'off=
 12 Reb: =~so:: can ~you (.) cu? the (.)
 13 Reb: m:: ptle[ts s]
 14 Hen:→ ['I CN] cut the 'top off 'you
 [aɪkən ku? ðə tɒpɒv ju:]



15 Reb: 'oh good i'dea
 16 (1.0)

RH003_0015_connect in the middle

Henry is playing with the controllers and cutting up Rebecca's character, preventing her from participating in the game. The extract begins with Rebecca redirecting Henry to begin again.

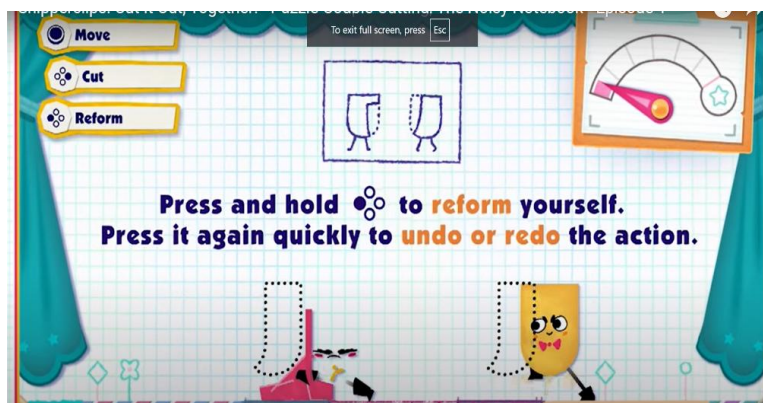


Figure 4.2: Screenshot of onscreen instructions on how to reform in "Snipperclips©". Used under fair use for educational purposes.

The sequence begins with Rebecca proposing to Henry that they begin again (line 1). There is a subsequent pause in the talk filled with a cutting sound from the game, and Henry's next turn-at-talk in line 3 is to comment on the move he has made on the screen ("I've cut you up, so now you're good"). This turn can only be understood in the context of how the game works. By cutting her character on the screen into small pieces, Rebecca can reset it to become whole again, which will be needed to restart the game (as illustrated in Figure 4.2).

Therefore, Henry's turn can be considered to align with Rebecca's proposal as a second pair part and closes this initial sequence. Rebecca's turn in line 4, beginning with "right", signals a change of topic to restart the game. Rebecca follows up this with a multipart part turn beginning with a directive, "so you stay there" (line 4), followed by an additional justification, "Because we need to try and make this shape, don't we?" (line 5). Henry responds affirmatively to her proposal "yeh" (line 6). In seeking Henry's affiliation with the tag question "don't we?", she mitigates any assertiveness of the prior directive and gets a green light to proceed as the directive giver. Prosodically, Henry displays an orientation to Rebecca's turn-holding, mid-pitch and segmental lengthening on "there" in line 4, allowing her to continue with her follow-up turn.

Rebecca's next turn in the directive sequence "and then if I" (Line 7) presents a trouble-spot in the sequence as it is incomplete. She begins with what appears to be the beginning of a conditional (such as 'if I do x, then you do y' formulation) but pauses. Her subsequent thinking token, "hm what", denotes she is unclear of how to proceed with her turn. At this point, Henry comes in, "We're gunna connect in the middle" (line 8). Despite her turn-holding design on "I::" (prolonged and without pitch movement), Rebecca's subsequent thinking token "hm wha?" creates a legitimate point for Henry to take a turn to bid for the floor in the clear.

His turn suggests a proposal for the strategy, which is interactionally helpful to the game's progress, aligning with the mutual understanding that this is a cooperative activity. It is lexico-syntactically complete, thereby creating a grammatical boundary for turn completion.

Furthermore, the turn is designed with a cluster of prosodic features projecting a complete TCU with a clear pitch accent on the second syllable of *connect* and turn-final pitch movement on the first syllable of “middle”. Here, the pitch falls to low, and there is a drop in volume. Rebecca responds without an intervening pause, “That’s it”, and a smooth transition occurs. Interestingly, there is a possible point of syntactic completion following “connect”, but Rebecca does not come in at that point as Henry’s prosodic design projects past this point.

A similar sequence occurs in lines 12-14. In line 12, Rebecca self-selects as the next speaker from her prior turn, beginning a new directive sequence. The pitch fall-rise on “so” accompanying the vowel lengthening creates a turn-holding, projecting more to come. However when she does continue, the turn is fragmented, punctuated by two micropauses following “you” and “the”. She then adds a thinking token “m” before she restarts. At this point, Henry comes in to make a proposal: “I can cut the top of you.” (line 14). Although she has not indicated turn completion, Henry comes in at an interactionally appropriate point to continue the topic in light of her discontinuation, rather than earlier in the sequence, following “so” where she used a turn-holding device. Rebecca quickly drops out of her turn, minimising the overlap and allowing Henry to complete his turn. Syntactically, the turn is similar to his turn in line 8: “We’re gunna connect in the middle”. The turn is also prosodically similar in its rhythm and overall stress pattern. It is designed to project a clear turn ending. He begins the turn loudly with an audible accent on “I” and “top” and a pitch movement on the turn-final “you” falling to low and an accompanying drop in volume (Schegloff 1998; Wells and Macfarlane 1998). Rebecca responds without a pause with an affirmative, “Oh, that’s a good idea”.

Henry’s cluster of prosodic resources converges with the syntactic design to create a complete TCU projecting an upcoming TRP to which Rebecca orients. Furthermore, he demonstrates orientation to Rebecca’s turn-completion and turn-holding practices. This extract illustrates how the children in this data successfully organise both prosodic and linguistic resources to signal turn completion, thus facilitating smooth turn transitions (Bone et al. 2014; Wells and Macfarlane 1998; Tager-Flusberg and Anderson 1991).

The following sequence, however, reveals that despite displaying a fundamental competency in turn management, problems can and do occur. The child, Andy, uses the same typical intonation pattern as in the previous extract, marking the tonic turn-finally. However, this time, a trouble spot emerges, and the adult, Katy, seeks clarification. Andy appears unable to repair his turn design to indicate a different emphasis.

Extract 2

Katy and Andy have been playing for about 20 minutes, completed one task, and are beginning a new task, the same as in the previous extract, “Shape Match”. The sequence opens with Katy seeking collaboration on a decision regarding the game strategy.

Extract 2: That Shape

1	Katy:	`righ? (1.0)	
2	Katy:	'wha? d'you'think we 'need to ['do]	
3	Andy:→		['oh]
4	Andy:→	'cu? me in(.)to tha `sh:a:pe [kʌ? mi in (.)tə ðæ? ʃ:ei:pʰ]	
5	Katy:	into `that shape	
6		(4.0)	
7	Katy:	oo	
8		(1.0)	
9	Katy:	er[:::]	
10	Andy:	[the]'bar goes `ou?. for how `close[we are]	
11	Katy:		['tha?]'wa:y
12		(1.0)	
13	Andy:→	'yeh 'cu? me(0.5) to 'make (0.2) [tha? `sha:pe] [ʃe 'kʌ? mi (0.5) tə 'meik(0.2) ðæ? ʃ:ei:pʰ]	
14	Katy:		[so a `thin]
15	Katy:	ʔh	
16		(1.0)	
17	Andy:→	you 'have to ['cu?] me 'into tha? `sh:a:pe [jɛ 'æftə 'kʌ? mi 'intə ðæ? ʃ:ei:pʰ]	
18	Katy:	[so]	
19	Katy:	`righ? lets have a `go	
20		(1.0)	

AK003_2020_that shape

The sequence begins with Katy redirecting attention to the game with “Right”, followed by a one-second pause. Katy then asks a question using the pronoun “we” (“What do you think we need to do”). Her turn is designed to seek collaboration, asking his opinion. Andy comes in as she signals a turn completion with “oh” followed by an imperative: “Cut me into that shape” (lines 3 and 4). His inclusion of this token, beginning at a point in the clear from Katy’s prior turn, prefaces his subsequent response to her question. In the second pair-part position, his “oh” is characteristic of a change of knowledge state, in this case, from recognition of not knowing what to do to knowing (Heritage 1984; Weidner 2016). He then immediately follows up with the directive. Syntactically, this is constructed as a complete sentence and, therefore, has a clear grammatical boundary marking it as a complete turn. Moreover, the cluster of prosodic

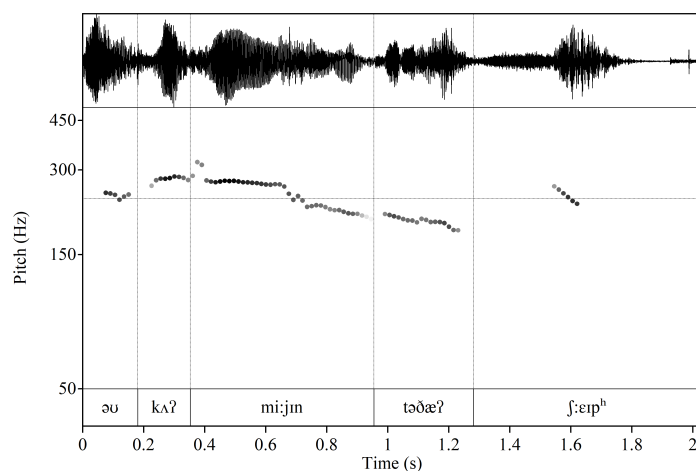


Figure 4.3: Diagram illustrating the prosodic design of "Oh cut me into that shape"

and phonetic features marks it as a complete turn (Figure 4.3)

Figure 4.3 illustrates the overall pitch contour. There is a smooth flow across the turn, with the pitch over the turn beginning in the middle of Andy's pitch range and a gradual pitch fall. There is a slight increase in intensity on the vowel [ʌ] in "cut" denoting this as a stressed item. This is followed by a relatively reduced stress on the four subsequent syllables "me into that," which is achieved through elision and coarticulatory processes, smoothing the transitions between the segments. Therefore, the turn before the Tonic, follows a smooth pattern of intonation with a clear pitch movement on the turn-final "shape".

The design of "shape" is noteworthy. The combination of prolongation on the first two segments, the initial palatal fricative [ʃ] ("sh"), and the vowel [ɛɪ], the pitch fall on the vowel and the audible plosion on the final bilabial voiceless plosive [p] mark this item as the tonic and signals a turn completion.

Structurally, this seems satisfactory as it marks stress with a broad focus and places importance on the item "shape". However, Katy's response indicates a problem. She initiated an insertion sequence in line 5, "into that shape," is marked by a stress on "that," contrasting with Andy's stress on "shape." Thus, it acts as an other-initiated repair.

Andy's emphasis on "shape" suggests that it is key information; however, as shown in Figure 4.1, multiple shapes are displayed on the screen. In her turn, Katy changes the Tonic to "that," which appears to be an attempt to clarify which shape he means.

Andy does not immediately respond, and there is an extended pause where game actions are going on. An interim exchange occurs where he comments that "The bar goes out for how close we are" (line 10) (seen in Figure 4.1). Katy produces a short turn "that way" overlapping the end of this turn where the meaning is not immediately apparent from the talk and maybe

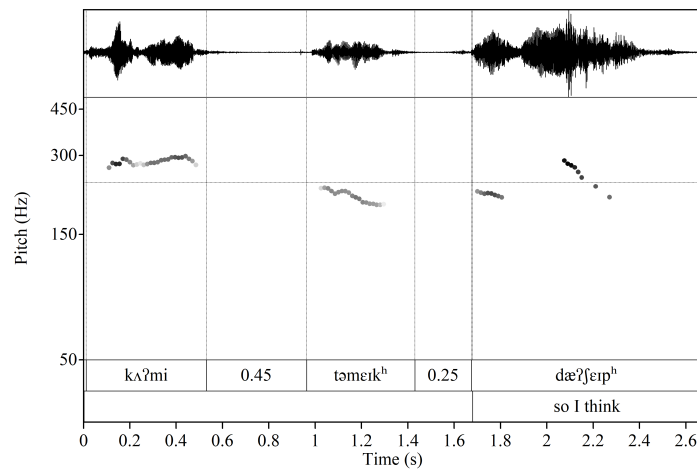


Figure 4.4: Diagram illustrating the prosodic design of "Cut me to make that shape"

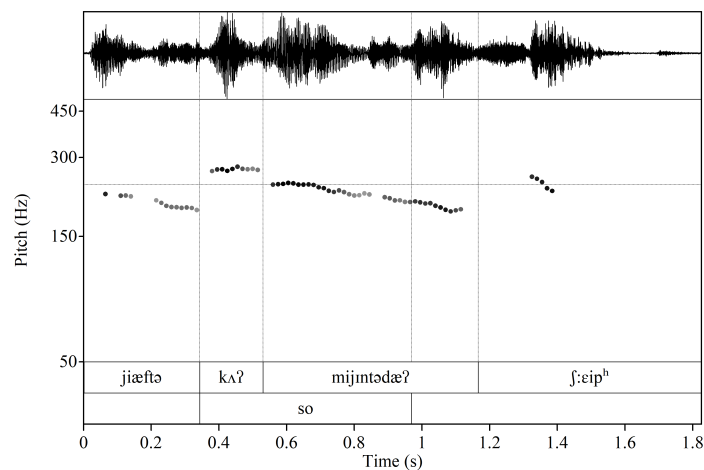


Figure 4.5: Diagram illustrating the prosodic design of "You have to cut me to make that shape".

referencing what is on the screen. Andy eventually, after a one-second pause, responds to Katy's bid for clarification, "That way?" in line 13, beginning with an affirmative "yeh" followed by a recycling of his prior turn, "Cut me to make that shape". As illustrated in Figure 4.4, despite the intra-turn pauses affecting the flow and causing an overlap in the talk with Katy coming in after "make", the overall pattern is comparable to the first turn. The turn before the Tonic is produced in the middle of Andy's pitch range with a gradual fall, with the Tonic marked on "shape" with a pitch fall.

Figure 4.5 reveals a similar turn design. He recycles his turn again in line 17, using a similar prosodic pattern with an overall even pitch contour in the mid-range with the Tonic on "shape" marked with a distinctive pitch fall.

Despite having a few problems consistently constructing a smooth and well-coordinated turn, there is evidence that Andy can deploy a cluster of prosodic and phonetic features, including prolongation, pitch movement, and intensity, to signal a tonic and turn completion. This is consistent with the typical broad focus pattern in English, with the Tonic in the turn-final position (Ladd 2008; Wells and Macfarlane 1998; Wells and Peppé 1996).

However, he does not modify this pattern in response to other-initiated repair to shift the tonic placement from a broad to narrow focus in response to Katy's other-initiated repair. This is despite her providing a model for him to imitate. This analysis also raises the question regarding Andy's ability to modify his lexico-syntactic design to clarify his point. These challenges are explored more fully in Chapter 5.

4.3 Turn competition

Episodes of overlapping speech often coincide with the players making moves which compete for the player's attention and, therefore, are therefore most often observed during directive sequences. Where the act of giving and receiving instructions is fluid between the two players, competition for the speaking floor is inevitable as the speaker attempts to get their message across in time to perform the necessary moves.

The frequency of turn-competitive overlaps collected from the data enables a detailed examination of both the prosodic and linguistic resources that the children use and an exploration of the interactional goal of turn competition. Episodes of turn-taking competition reveal children's awareness of interactional consequences and their ability to achieve specific interactional goals through linguistic and prosodic devices. To understand how they go about this, the types of overlap occurring outside the TRP at an interjacent point in the TCU were analysed in more detail. This overlap category typically signals the next speaker's intention to take the floor from the current speaker (French and Local 1983; Schegloff 1998; Wells and Macfarlane 1998). They can occur at some point after the start of the turn and before the TRP or following the end of the current speaker's prior turn when both speakers begin simultaneously.

The results are presented in terms of the following:

- 1) The purpose of the overlap
- 2) Turn design in terms of linguistic and prosodic features
- 3) Interactional consequences

The exchanges illustrate how directives serve critical functions in the game, including guiding actions, encouraging cooperation, and facilitating problem-solving. Directives also help manage each player's roles and who takes a turn at any given point in the game. Where these directives are produced in overlap, it becomes more challenging for the players to progress

in the game. Therefore, as in everyday interactions a resolution is required to reduce the length of the overlapping talk (Schegloff 1998; Sidnell 2010).

The data shows that the children in all the dyadic interactions frequently produce directives that overlap with the adult which are prosodically designed as turn-competitive.

This is observed in both the linguistic and prosodic designs of their directive and turn management. The following analyses (Extract 3 Duck, Extract 4 Move, Extract 5 Bridge shape) present the most frequently noted patterns of turn competition the children use in the game. Extract 5 demonstrates a less common occurrence where the child takes a turn in overlap before the adult indicates a TRP, but the child withdraws, allowing the adult to continue speaking. These extracts provide evidence that the children are aware of the implications of overlapping speech and can prosodically organise their talk to steal the floor from the adult.

Extract 3

John and his mother have been playing together for approximately 15 minutes. John played the game with the researcher beforehand. His mother has only briefly seen the game but does not know how to complete the tasks. They are playing "Shape Match" (as referenced in Extract 1 and Extract 2) but struggling to progress. John has been trying to explain the task to his mother, but she frequently asked for clarification, and he has not always responded. Her questions arise from either a lack of understanding of the task's purpose or John's instructions. In this sequence, an argument takes place. The overlap episode in lines 20 to 23 is the particular focus of this analysis.

Extract 3: Duck

```

1 Joh: 'mummy 'press
2 Joh: 'mummy 'jus `duck
3 Joh: `duck (.) `duck (.) [`duck ]
4 [((cutting noise on screen)) ]
5 Joh: ...huh (.)
6 Joh: ^MU:M 'that's 'NOT the `way you're su'pposed
7 TO'DO:
8 Mum: 'so wait `there:
9 Mum: [°go i°]
10 Joh: ['now ] 'I ['am ]
11 [((comp[uter turning[ noise)])]
12 Mum: [^NO:::] ]^Johnny
13 Joh: `there we are [m ]
14 Mum: [^I']m 'cu'in you 'round in
15 [ 'tha? ^sha:pe]
16 Joh: [J goes to M ]
17 [((J tries to take controller from M))]
18 Joh: [look 'I'll do it ]
19 Mum: ^NO::: `I'LL do i?
20 Joh: MUMMY h 'NOW a na och: 'I'LL t hoh
21 Mum:→ [can I can I d ]
22 [((J tries to take controller from M))]
23 Joh:→ [hh`D]UCK ]~mu:m (.) `duck ]
[dʌkʰ mʌm (.) dʌkʰ]

— ~ —

24 Mum: ñ 'I:'M 'doin i? ~fir:st
25 Mum: [let 'mummy ]
26 Joh: ['mummy can 'I] just 'do[n't its]
27 Mum: [let ] `mummy
28 have a 'go=
29 Mum: ='sit `down plea:se
30 (3.0)

```

DJ005_0612_duck

The sequence begins with John issuing repeated, increasingly loud directives formulated in the imperative (lines 1-3). In line 3, he repeats "duck" three times, each increasingly loud. As his final loud 'duck' (line 3) is issued, computer noise in the background indicates a cutting action has been made. John's subsequent sharp audible in-breath (line 5) indicates this was unexpected, with his next speaking turn confirming his dissatisfaction that this was not the correct action (line 6). Here, he begins a two-part turn directed to his mother. "Mum, that's not the way you're supposed to do". By nominating his mother in the first single TCU, he identifies her as responsible for the transgression. His follow-up TCU prosodically marks a turn completion with the Tonic marked on "do" by a pitch movement and vowel lengthening.

It is lexico-syntactically incomplete but he makes his meaning sufficiently clear as a negative assessment that she has deviated from some expected action. His lexical choice “supposed” indicates this expectation of there being a correct action which she should have made. However, it does not clarify what she should have done or more explicitly identifies that the expected action was to ‘duck’ and not ‘cut’.

Despite the lack of specifics in the lexico-syntactic design, his mother’s response in line 7 (“So wait there”) suggests she has received his turn as complaint-relevant and is prefacing a repair to her action. Her use of the discourse marker “so” acknowledges John’s prior turn and serves to bridge her directive, indicating that she needs him to wait before she makes another move. The prolonged vowel and pitch holding on “there” portends more to come. However, John does not wait, and lines 8 and 9 show a brief episode of overlapping speech as Mum starts “go i” and John simultaneously comes in with “now”. Her turn is quiet, and there is insufficient information to predict the remainder of her turn before she drops out, allowing John to continue, “Now I am”. Although he does not complete his speaking turn, the computer noise indicates that he has acted on screen, to which his mother interjects with a loud and prolonged “no” followed by a similar nomination, “Johnny” (line 12), which indicates she is in strong disagreement.

Using an idiomatic expression “there we are” (line 13), John’s next turn suggests that John assesses his prior action as now complete. However, his mother continues asserting that she needs to perform a different action: “I’m cutting you round in that shape” (line 14). At this point, John takes more assertive action, getting up from his chair and attempting to take the controller from Mum (line 17). His speaking turn (line 18), “Look, I’ll do it”, indicates that he is taking charge. Mum resists strongly with a loud: “No, I’ll do it”. John matches the raised tone with a loud and high “Mummy”, followed by a partial and discontinued turn, which appears to be an attempt to explain, culminating in a forced exhalation.

Mum’s next turn appears to begin a renewed attempt to make a move. Her turn is constructed with the modal “Can I” (line 21), suggesting she requests permission. Her false start with a repetition of “can I” is possibly due to her simultaneously moving her hands away as John leans over her to take the controller. However, her turn is intercepted by John’s loud and high “duck mum” (line 23), followed by a repeat of the directive “duck”, and she drops out of turn, orienting to his turn competition.

This turn’s combined lexico-syntactic organisation and prosodic design functions as a TCI (French and Local 1983; Kurtić et al. 2013). He emphasises action by placing the imperative before the person, creating a sense of immediacy and agency as a direct command. His repeat of the imperative in the clear adds further emphasis.

Figure 4.6 illustrates the overall prosodic design, with the beginning of the turn prefaced by

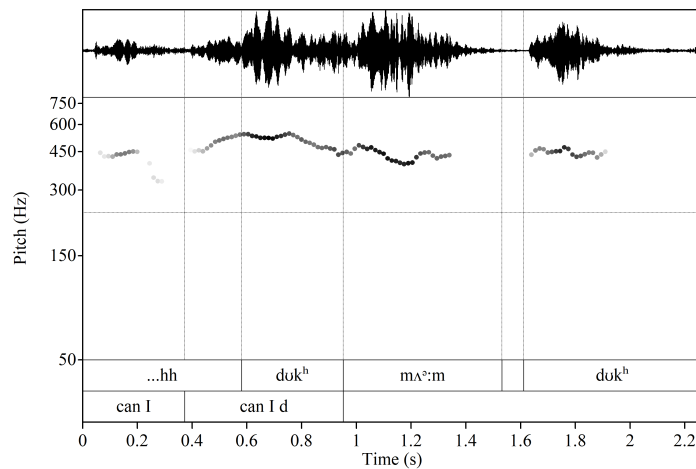


Figure 4.6: Diagram to illustrate the prosodic design of "Duck Mum duck"

an audible in-breath followed by an increase in intensity and pitch, which reduces only slightly over the two TCUs. The initial audible inhalation that overlaps with his mother's turn may serve as an articulatory setting, preparing for the heightened respiratory force necessary for the subsequent increase in intensity required to produce the interruption (Rochet-Capellan and Fuchs 2014; Snow 2007). The pitch begins above 500Hz, significantly higher than average and falls only minimally across the turns. There is no obvious pitch movement on the final "duck" signalling turn completion. There is, however, a slight fall in pitch and intensity which appears to signal turn-completion.

The phonetic realisation of "duck" also serves to mark a complete TCU. The plosion burst on the word-final velar plosive [k^h] emphasises the imperative. Furthermore, the prolonged vowel on "mum" with a slight variation in vowel position from the back [Λ] to a more central [ə] has the effect of a slight pitch rise. This also adds emphasis to the turn design. John continues with insistence by repeating the same imperative "duck", also with a plosive burst on the word-final [k^h] projecting a finality to the TCU.

The dispute continues with his mother self-selecting as next speaker once John signals turn completion "I'm doing it first" (line 24) until she finally closes it by giving an instruction unrelated to the game, reaffirming her position as the adult in charge: "Sit down, please" (line 29).

In summary, John's lexico-syntactic construction, loud and high prosody and emphatic phonetic features delivered before his mother indicated a possible TRP corresponds with a TCI design described in section 2.2.1. By discontinuing her turn, his mother shows orientation to his turn design, indicating that this turn design has successfully achieved his goal to reassert his prior directive to duck (lines 2 and 3), this time more forcefully.

A similar pattern is evident in the following extract taken from Brad playing with his mother.

Extract 4

Brad and his mother have just completed one task and have begun another. It is unclear which one they are playing as Brad, who had been playing for a while before his mother joined him, moves quickly from one task to another with minimal involvement from her. In the previous sequence, she asked what they were meant to do.

Their last game involved the characters moving cogwheels, which made the wheels spin. Given that Brad repeatedly instructs his mother to spin, this is likely part of the same series of tasks. As in the previous extract, Brad has already played the game with the researcher and is now taking the lead in instructing his mother. She is attempting to follow.

Extract 4: Move

```

1 Bra: 'so al`right 'ge? 'go'tha?`way ~over
      ['səʊ ə'raɪ? 'ge? 'gə'thæ? `weɪ ˜əʊvə]
2 Bra: you 'need to `spin
3 Bra: !you 'need to 'spin[ `mum]
4 Mum: [how ]d'you: make it`spin
5 Bra: you 'need to `spin
6 Mum: li? `tha?
7 Bra: 'jump (.)'jump out the`way
8 Mum: 'how did I
9 Bra: ↑'move
10 Mum: I can?[remem'ber      ]
11 Bra:→ [↑come on'mo:ve:]

      _____
      ───┐ ───┐
      ───┘ ───┘
      _____

12 Mum: which ones`jump[in this ]'part
13 Bra:→ [ 'MO:VE: ]

      _____
      ───┐ ───┐
      ───┘ ───┘
      _____

14 Bra: 'MO:VE `mum 'mum `mo:ve
15      (1.0)
16 Bra: 'righ 'so (.) we we 'need to ge?a `scoop

```

BJ005_1805_move

The sequence starts with Brad using discourse markers like "so alright," establishing himself as the speaker. He gives an imperative command to his mother, initially using the word "get," which he then corrects to "go." It is unclear whether this correction is a lexical adjustment (changing "get that way" to "go that way") or if he originally intended to issue a different instruction beginning with "get." He may have opted for a more immediate command. His follow-up word, "over," suggests that his mother has not fully complied with his request.

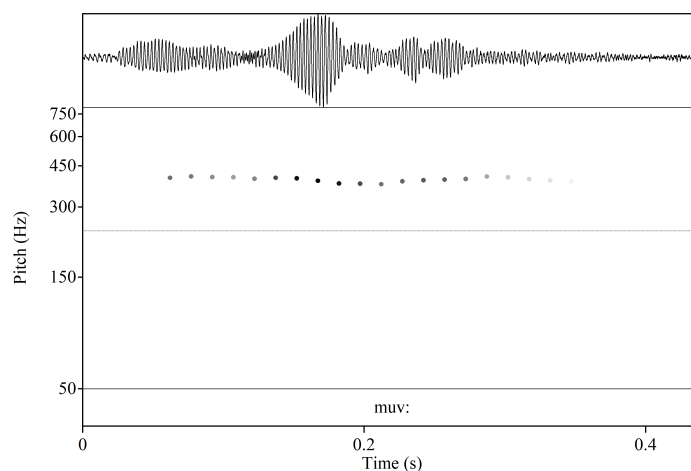


Figure 4.7: Diagram to illustrate the prosodic design of the first “move”

He then provides a more specific instruction: “You need to spin” (line 2). It’s unclear whether she is trying to make the move but is unsuccessful or if she isn’t moving at all. Brad repeats the directive, “You need to spin,” this time explicitly addressing her as “mum,” which emphasises the urgency of her action. His pitch increases with each successive turn, conveying a growing sense of urgency.

His mother’s response, “How do you make it spin?” overlaps slightly with the end of Brad’s turn. This indicates that she has understood his instruction while also justifying her non-compliance: she is unsure how to make it spin.

Despite his mother explicitly asking how to make the wheel spin in line 9, Brad continues to repeat his instructions. His imperative to “jump”, repeated and expanded to “jump out the way” in line 7, is responded to with the beginning of a repair sequence from his mother, “How did I . . .” (line 8), but she is interrupted by Brad with a high-pitched “Move”, cutting her off before she has completed her turn. She restarts with a complete justification of her problem: “I can’t remember which ones jump in this part”. Brad’s turn-incoming: “Come on, move” (line 11) occurs in overlap with his mother before she has signalled a TRP. However, she does not drop out and carries on to complete her turn. Brad comes again with “Move” (line 13) this time, although in overlap, at a legitimate TRP. He does not however, respond to her turn and instead continues to issue the same directive in line 14. Over the sequence, Brad’s prosody becomes increasingly loud and high, culminating in the two TCIs seen in lines 10 to 13. The two diagrams below illustrate the prosodic design of “move” in these two interjections.

As seen from the first Figure 4.7, the overall pitch is higher than average, but even across the turn. The intensity is lower than in Extract 3 Duck, but Brad’s speech is generally quiet. The increase in length of the final segment [v] is a departure from his typical speaking style,

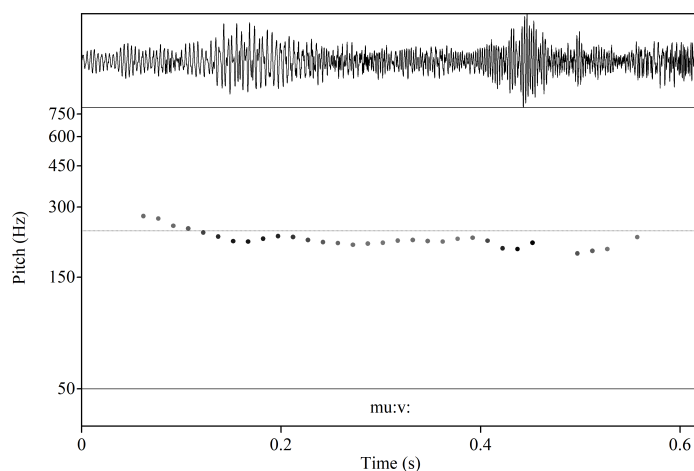


Figure 4.8: Diagram to illustrate the prosodic design of the second “move.”

where he tends to speak quickly, shortening segments and syllables (as in line 1). The effect is more emphatic than his typical speech patterns, thus marking it as a TCI.

Figure 4.8, shows a slightly different pattern of the turn repeat in line 11: the pitch is below average, but the intensity increases. A similar segmental lengthening occurs on the vowel [u] and the final consonant [v]. There is a 0.2msec increase in length in the second item from the first. The lengthening clustered with an increase in intensity increases the emphasis, upgrading the directive from the prior one.

Despite these turns being designed to be competitive, his mother does not drop out from her turn, but continues to completion. She does, however, not continue as the next speaker; instead, she allows Brad to continue as speaker in the clear. Brad’s next turn, following a one-second pause, is an acknowledgement, “Right”, followed by his next proposal, “So we need to get a scoop”, suggesting that his mother has eventually managed to comply with his directive to his satisfaction with an embodied response.

In summary, Brad’s lexico-syntactic construction (an imperative), combined with a relative increase in volume, pitch, and overall intensity overlapping with his mother’s talk, is consistent with a TCI design. As discussed in Chapter 2, Brad’s prosodic design is not as extreme as John’s design in Extract 3 Duck, but rather a relative change from his typical speech pattern. Although his mother eventually concedes the floor to Brad in this example, the episode is not without problems. The competing agendas in the game cause trouble in managing the overlapped episodes and inhibit the game’s progression.

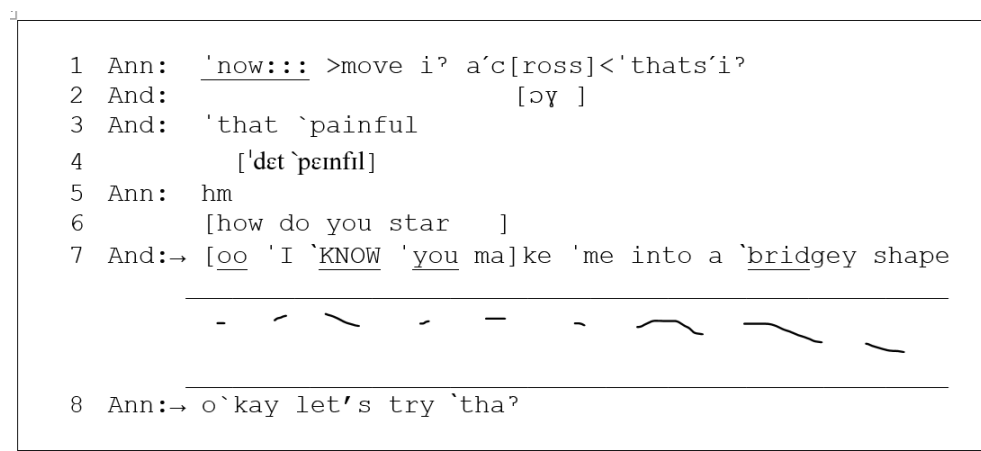
A frequent event occurs when the two players start speaking simultaneously, resulting in episodes of overlapping speech. Across all the data sets, the children’s dominance in the interaction is evident, with the adults more frequently conceding their turns at talk than the

children. Following the rules governing conversational turn-taking where a repair is needed, it is the case in this data that the most frequently occurring phenomenon is when children deploy a turn-competitive design and adults concede. This is irrespective of the place in which they appear in the turn. This is illustrated in the extract below.

Extract 5

Andy and Katy are playing "Hamster Helper" (Table 3.1). They are trying to work out how to prevent the hamster from falling down the gap in the floor. Andy is the one who works out that they have to cut one of the characters into a ramp to create a bridge.

Extract 5: Bridgey Shape



SA003_1339_bridgeyshape

Ann marks her thinking about the problem with “hm” and immediately continues with what appears to be the beginning of a question: “How do you. . .” (lines 5 and 6). However, Andy starts up simultaneously with, “Oo, I know” (line 7). Starting his turn this way, he pre-empts his proposition by signalling that he has just thought of something relevant and is eager to share information, creating an ‘aha’ moment (Weidner 2016). The linguistic formulation with the exclamatory “oo” preceding the turn adds weight to his bid for speakership rights.

Figure 4.9 shows the pitch and intensity contour of Andy’s turn: “Oo, I know”.

His utterance, which overlaps with Ann’s, is subject to some recording distortions and, hence, not precisely representative of the design. This is noted at the time point 0.2 milliseconds, where there is a gap in the pitch trace. However, it can be seen that the overall pitch is higher than average, and the volume is also consistently high, with a peak of both pitch and intensity at 0.2 milliseconds on “I”. The effect is that this sounds high-pitched and loud, to the point where Ann’s turn is barely audible. It can be seen that there is no distinctive pitch movement on “know”. This level pitch and the lack of pausing between the end of “know” and the beginning of his next TCU, “you,” suggests he is holding on to his speakership rights as the giver of

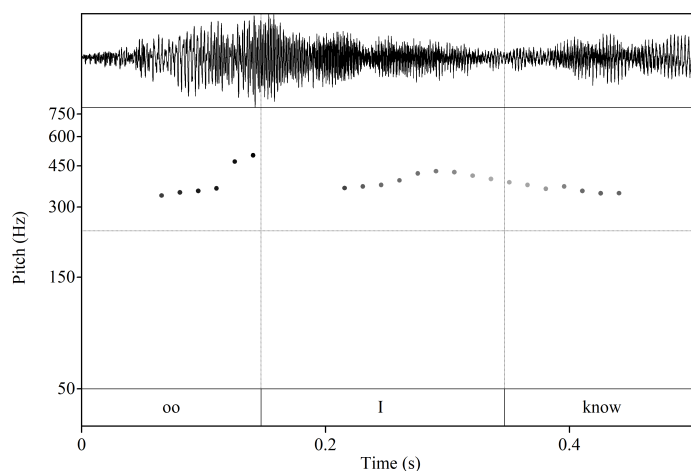


Figure 4.9: Diagram illustrating the prosodic design of “Oo I know!”.

information. Ann drops out of her turn, allowing Andy to continue to complete the turn, which is to give Ann instructions to “make me into a bridgey shape” (line 7). Ann orients to his display of knowledge and the TCI design with the agreement, “Okay, let’s try that” (line 8).

In these three extracts, the children use prosodically designed turns in overlap to compete for speakership and maintain their control of the talk. Locally, in Extract 3 Duck and Extract 4 Move, the children modify the design of their prior turns to upgrade their directives. Both are characterised by lexico-syntactically by repetition of the command and nominalisation. Prosodically, there is a relative increase in overall pitch and intensity. Features of hyperarticulation are frequent but are not consistent.

The adult treats the increased contingency projected by increased pitch and intensity with alignment, but not necessarily agreement. In Extract 5 Bridgey shape, Andy successfully introduces a new topic using the same prosodic resources (high and loud) in overlap with Ann. However, while still treated as a competitive bid, it is mitigated by his prior announcement, “Oo, I know”. Ann aligns with his topic shift and, in this instance, agrees. Andy shows competency in organising his turn to be competitive but not combative. All the children demonstrate competency in aligning lexico-syntactic constructions with prosodic and phonetic resources to compete for a turn during overlap episodes to meet their interactional goals. The role of pitch is unclear in these designs. The pitch rises observed in some of these TCIs may be caused by a significant increase in intensity, as seen in John’s design (Extract 3 Duck) (Eriksson et al. 2001), while in others, such as Extract 5 Bridgey shape, the pitch appears to be the primary resource.

In addition to understanding how these children design their turns, it is important to determine what happens when their talk is intercepted. The next section addresses this topic.



Figure 4.10: Screenshot of "Baseballin". Used under fair use for educational purposes.

4.4 Turn yielding

Thus far, the analysis has focused on the children's competency in deploying linguistic and prosodic resources in turn management. However, it is equally important to consider how the children orient themselves to the cluster of linguistic and prosodic markers used by adults in turn management. Such an investigation provides insight into the children's understanding of the interactional functions.

In the event of a bid for the floor, turn yielding helps maintain balance in the interaction, ensuring that the directive giver does not dominate. It also allows the listener to process the directive and respond appropriately. Without turn yielding, there may be no clear opportunity to seek clarification or confirm understanding, potentially leading to errors or confusion.

The following analyses present evidence that the children have some challenges in yielding their turns during overlap episodes, despite showing an orientation to a competitive turn incoming. Extract 6 Too much and Extract 7 Bending down represent the most frequently occurring event where the child continues to speak in overlap when faced with a turn-competitive bid. In the first, Tom continues his directive despite acknowledging the adult's contradiction. In the second, the adult's interjection is to clarify an action.

Extract 6

Tom and the researcher, Julie, are playing "Baseballin". This is an easier version of the previous task, "Bowling for Baskets". It involves catching the ball on the left side of the screen, cutting a scoop out of one of the characters to transport the ball to the right side, and then dropping it into the hoop (Figure 4.10).

Extract 6: Too Much

```

1      ((computer noise in the background))
2  Jul: there's 'no?'much of me 'left 'now:
3      (0.5)
4  Jul: huh !ss
5  Tom:→ well the `yeah then'tha?
           [wuɪðə jɛ ðə ða?]
6  Tom: >wha?you do'is< you 'jump on `top n the
7      you~crou:ch
8  Tom: h s 'jump on `top `crouch an'then'just erm (.)
9      re'pe: re'peatedly 'hit 'thee erm (.)`cu? 'bu'n
10     (4.0)
11 Jul: .hhh if you do !'too:(.)h 'TOO: `mu:ch ~though
12     you 'won be 'able 'to:
13     'press the 'button `long enough
14 Tom: `yeh 'so erm (.)
15     `oh[yeh s'jus°do`this°]
16 Jul:→ [you 'DON w]ant`too:[ much ]
17 Tom: [s'JUMP on ~top]
18     'jump on `top
19     (1.0)

```

DJ001300_toomuch

The players are engaged in a dispute about the strategy. At the point where this sequence begins, Tom has cut Julie's character into tiny pieces. She comments, "There's not much of me left now" (line 1). Tom's response (lines 5 to 9), is delayed. This is likely due to actions being made in the game. His turn is syntactically fragmented, beginning with what appears to be the onset of a justification ("Well the") followed by an explanation of how to carry out the move. The four-second pause following his explanation is filled with computer noises. Although it is not possible to see the action on the screen, Julie's next turn (lines 11-13), "If you do too much though you won't able to press the button for long enough", appears to be a comment on the implications of his suggested action. The four-second pause in the talk may be due to Tom demonstrating the move. The "it" in this case refers to the repeated cutting action, which will cut the character on the screen into small pieces, thereby creating a problem with pressing "the button for long enough" to make the move successful. She begins her turn with an in-breath. Given the repetitions and micropauses across the remainder of her turn, the breath may indicate that she is gathering her thoughts and organising what she will say (Rochet-Capellan and Fuchs 2014). There is a smooth transition to the next turn, with Tom beginning his response at the point where Julie signals turn completion. His "yeh" indicates agreement that he does not want to cut too much and issues an alternative directive: "So just do this" (line 15). Again, it is not possible to know what "this" refers to, but he may be carrying out the move on the screen

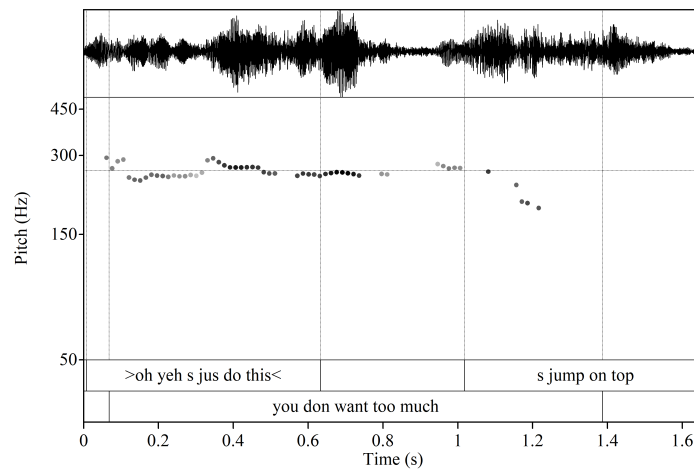


Figure 4.11: Diagram to illustrate the prosodic design of "You don't want too much".

as he speaks. Julie, however, interjects at a point of hesitation to repeat her previous warning not to cut too much: "You don't want too much" (line 16). The prosodic design is consistent with a competitive turn incoming with an increase in volume and emphatic stress on the critical message "don't".

The remainder of Tom's turn overlaps with Julie's, and he shows an orientation to her turn competition, with an accelerated speech rate and a drop in volume. However, he picks up his turn and interjects midway through Julie's turn to re-compete for the floor. Likely, he has already understood, given that her turn is a recycling of her prior turn. His incoming turn is now competitively designed with increased volume ("so jump") following his prior turn.

The turn competitive features are illustrated in Figure 4.11.

Julie's turn-incoming can be observed at approximately 0.2 seconds as Tom continues to speak. His turn is quiet and fast-paced and is difficult to decipher. Her turn can be heard above Tom's with increased intensity on "don't" and "want". Tom's voice can be heard more clearly with a new turn at 0.95 seconds, overlapping with Julie "s jump on top" with a higher pitch and intensity. While only indicative, it can be seen that both Julie and Tom use a turn-competitive prosodic design to take speakership successfully.

Tom shows orientation to turn competition by managing the resultant overlap, adjusting his speech patterns to speed up and lowering his volume. He does not, however, drop out from his turn. Instead, he continues with another turn, this time in competition. In modifying his prosody in the event of the turn-incoming, Tom demonstrates his understanding of the interactional consequences of the overlap.

In contrast, the following sequence shows what occurs when the turn incoming is not designed to be turn competitive. Simon demonstrates a lack of orientation to a turn incoming



Figure 4.12: Screenshot illustrating "Alley Oop". Used under fair use for educational purposes.

by Cath as she seeks clarification midway through his turn.

Extract 7

Simon and Cath have been playing for approximately 20 minutes. They have been engaged in a task called “Alley Oop.” As illustrated in Figure 4.12, the task is similar to “Baseballin” in the previous extract, but the hoop is higher, so one character must stand on the other to reach it.

Extract 7: Bending Down

```

1 Cat:  that's clever
2 Cat:  huhhehehahaha .hh
3 Cat:  um tip back a little bi? that's i?
4       (1.0)
5 Sim:→ 'I [need ]`YOU:(.)
6 Cat:  [righ?]
7 Cat:  ama ['bending `down]
8 Sim:  [to 'come over ] `here
9 Cat:  `o:`kay

```

SC004_2105_bendingdown

The players have just completed one move and are beginning another. The first two lines of the extract see Cath commenting on actions on the screen. Cath then instructs Simon to “Tip back a little bit” (line 3). Her immediate follow-up, “That’s it”, suggests that Simon has complied. Following a one-second pause in the talk, Simon starts with a directive in line 5: “I need you. . .”, a trouble spot emerges. The cluster of features on “you”, including increased volume, pitch fall vowel lengthening and syntactic incompleteness, suggest that Simon is not relinquishing his turn. Cath has already taken a turn as Simon partway through Simon’s speaking turn with “Right” (line 6), although she quickly drops out, avoiding an extended overlap. She attempts to retake a turn in the clear, as Simon pauses. Although Cath comes in at

a possible sanctionable point, she cannot easily take her turn without a consequential overlap. However, in this instance, Cath does not design her turn to be competitive (high and loud) (Kurtić et al. 2013) and therefore, does not trigger any repair. Her query is answered through the resolution of his turn, in that she is not to bend down but rather to “come over here” (line 8). Her acknowledgement of this directive “okay” (line 9) indicates she has understood, and the sequence closes.

Simon’s turn-holding strategy in line 5 results in an episode of overlap as Cath takes up an opportunity at the point of pause to interject. The overlap occurs as Simon continues his turn, with the same volume and pace, maintaining his right as speaker in the light of his projected turn-holding, and does not show concession to Cath’s non-competitive incoming turn. In this case, Cath has been given sufficient information to progress the game; hence, there is a lack of pursuit, and the sequence is completed. Simon legitimately continues his turn in the light of his projected turn-holding despite the interjection from Cath. Cath does not pursue her query in this instance, and the sequence progresses to completion. Simon demonstrates competency in holding and completing his turn, maintaining his speakership rights.

The child’s orientation to turn competition, of which Extract 8 in charge and Extract 9 lengthways are examples, shows how the children can successfully manage episodes of overlapping speech and respond with relevance to the incoming turn. In the first of these, the cluster of prosodic features around the adult’s incoming turn is identifiable as a competitive bid. In the second, the features are more subtle but designed to get the adult’s point across before the child can continue.

Extract 8

In this sequence, Brad is playing with his mother. They have been playing for approximately 20 minutes. To this point, Brad has been chiefly playing alone, and his mother has had little opportunity to participate.

The computer noise at the beginning of the sequence corresponds to Brad making moves in the game, and Brad’s mother can be seen watching and not participating.

Extract 8: In Charge

```

1      ((computer noise))
2 Mum:  op hehehehe
3      (3.5) ((computer noise))
4 Mum:→ 'can I TRY: ' ~some'thing
5 Bra:  `yeh
6 Mum:  'o:`kay lh
7 Bra:  `so (.) could ~YOU:: (1.0)
8 Mum:→ ['could you 'make a (.) erm (.)
9      a a `bowl shape at at 'thee:[erm] top've ~me: ]
10     [((points to screen, finger circle, looks to C))]
11 Bra:                                     [m: ]
12 Bra:  lh pt[I KNOW:[ th (.) th
13                                     [ðə (.) ðə ]
13 Mum:→      [>can I be< in !CHARGE of ~this]
14 Bra:  yeah sure

```

BJ00418838_incharge

Brad's mother laughs at something on the screen. In line 4, she asks if she can try something. Using a question form, she seeks permission to take the floor as the instruction giver. Brad agrees, and she begins her next turn, "Okay", indicating she is now taking speakership. However, she takes an audible in-breath, at which point Brad starts with his own directive (line 7) so could you". His vowel lengthening on "you", delivered in the mid-pitch range and followed by a pause, suggests he has more to say, except his mother continues with her prior turn, presumably because she has not given up her speakership yet. Beginning in line 8, her subsequent directive is formulated as a question using the conditional "Could you..". In constructing her turn in such a way, she frames her instruction as a polite request rather than a more assertive imperative form. Considering she has not had the opportunity to collaborate to this point, she likely uses this directive construction to facilitate an affiliative response (Kent 2012). Her turn, however, is fragmented and hesitant as she constructs the talk incrementally with intermittent thinking tokens "er" and "erm". Her addition of a circling hand gesture, mirroring the term "bowl-shape", suggests that the hesitancy is due to a word search as she constructs her turn. Brad's response begins with an audible in-breath. He begins his turn with increased volume, saying, "I know." Given that this child generally speaks at a low volume, the in-breath may be a postural gesture facilitating his increased volume for the upcoming turn (Rochet-Capellan and Fuchs 2014). His turn competition suggests he is attempting to regain the floor with his idea. At the point at which he begins to speak, Brad's mother starts up, causing an episode of overlap. She recycles her prior turn to take the lead in the instruction-giving. This time, she changes from a general request to "try something" to a more specific "be in charge".

Prosodically, she begins the turn with increased speed and emphasizes "charge" produced with a high pitch onset and additional length. The design suggests a bid for the speakership. Brad orients to her turn as competitive and drops out, allowing her to continue. On completing her turn, he responds affirmatively to her request with "Yeah, sure," and the sequence closes.

Thus, Brad shows an orientation to the interactional consequences of his mother's turn competition by conceding and allowing her to continue. Similarly, in Extract 9 Lengthways, Tom is seen to yield to his mother's turn-competitive incoming.

Extract 9

Tom has been leading and instructing his mother on the game, adopting a dominant role. His directives are highly assertive in design, using predominantly simple imperative command structures.

Extract 9: Lengthways

```

1 Tom:  'now stan 'there
2 Mum:  'yeah:
3       (2.0) ((computer noise))
4 Mum:  hh ((smiling))
5 Tom:→ 'kay 'you are 'now: (0.2) 'now: (.) h 'you ar? (.)
6 Tom:→ you're 'now (.) [length'ways]
7 Mum:→ [so DON w ]DON?
8       'you: ge? 'cut? 'now
9       to 'thee other 'bi? to 'make i? 'into a 'whole:
10 Tom:→ 'yeh I 'do:

```

DJ005_1420_lengthways

Tom is issuing a series of directives. In line 1, he tells his mother to "now stand there", to which she verbalises her agreement with "yeah" (line 2). The prosodic design of this design is with a low pitch and segmental lengthening, indicating that not only does she agree, but she is awaiting further instructions. He then begins what appears to be a pretext for the next instruction: "Okay, so you are now lengthways" (lines 5 and 6). His turn is fragmented, consisting of three attempts using recycled elements before reaching syntactic completion. His prosodic design of "lengthways" is with a pitch fall on the first syllable "length" and a pitch rise on the second "ways". Both are marked with stress. The absence of a turn-final pitch fall at the point indicates he has not finished speaking and has more to say. The micropause occurring just before "lengthways", which may denote an ongoing word search or syntactic organisation problem, presents an opportunity for his mother to take a turn despite his clear indication that he has not completed his turn. She comes in with a loud "so don't". Her incoming turn causes an overlap as Tom continues with his turn with "lengthways". Her recycling of "don't" again with increased volume emphasises her bid to take the floor (Kurtić et al. 2013). Despite Tom

signalling more to come with a turn-holding pitch rise, he does not continue. Instead, he allows his mother to continue her turn before acknowledging and agreeing with her proposal. In his concession, Tom demonstrates orientation to turn competition.

These analyses reveal that the children are oriented to the linguistic and prosodic features involved in bids for turn competition and can successfully manage overlap episodes when they choose to.

An essential component of turn management involves the preservation of a speaking turn to enable the seamless continuation towards completion, particularly in the context of planning challenges or lexical inaccuracies. It may also be necessary to maintain speakership over multiple turns to complete what it is they want to say. Prosody plays a vital role in achieving turn-holding. This aspect of turn management will be the focus of the subsequent analyses in this chapter.

4.5 Turn-holding devices

The illustrative directive sequences also provide opportunities to examine the practice of turn-holding, where the speaker is not ready to relinquish the floor and signal their intention to continue speaking. Turn-holding involves a range of linguistic and prosodic strategies. Grammatically incomplete sentences, conjunctions, and discourse markers, alongside phonetic and prosodic elements such as vowel-lengthening, micropauses and pitch modulation, work together to signal to the listener that the speaker is not ready to give up their turn. As illustrated in the previous extract, one strategy is to use a pitch rise on the element in the turn-final position. Analyses in this section focus in more detail on the turn-holding devices used by the children. These analyses support the argument that they exhibit problems in turn design and construction that significantly disrupt the turn flow, prompting the children to utilise various turn-holding strategies to manage their trouble spots. The subsequent chapter delves into these issues with turn design in detail. This section examines the various turn-holding strategies the children in the data used. The same directive is recycled in the extended sequence presented below Extract 10 *Make me basket*, but has different prosodic and phonetic features. In the second iteration, turn-holding devices maintain speakership over two consecutive turns. The extract illustrates how, despite his atypical linguistic and articulatory features, Andy can modify his speed to produce an “abrupt-join” (Local and Walker 2004) in two ways across two TCUs.

Extract 10

Ann and Andy have been playing together for about 15 minutes. They are attempting to complete a task related to the previous “Baseballin” game but have been unsuccessful thus far. They are almost ready to give up. Ann suggests that they play a different game.

Extract 10: Make Me Basket

1 Ann: shuwe we 'try a 'diffren? game
 2 'this one's qui?e 'har:d 'isni?
 3 (2.5)
 4 Ann: (looks to Andy)
 5 Ann: wha? d'you 'thin?
 6 (10.0) ((Computer noises of cutting actions))
 7 Ann: hehe he he lh
 8 ((looks to Andy))
 9 (5.5)
 10 Ann: o'kay 'let's play a 'difren? one
 11 ((4.0 computer noises))
 12 Ann: m I'm 'no? sure 'how you ge? 'ou? of 'here
 13 d'you 'know
 14 (4.0)
 15 And:→ 'WAI? >I 'ave an i'dea<
 16 And:→ 'make me 'BA:sket
 [mæik mi bæ:skɪt]
 17 Ann: 'ma? shall I 'make you a 'basket [a'gain]
 18 And: [˜ye:ah:]
 19 And: bu? 'DON'T (.) 'press the 'butto:n
 [bʌ dəʊntʰ (.) prɛs də bʌtʰən:]
 20 Ann: 'wha?d'you 'mea:n
 21 (0.3)
 22 And:→ 'JUS >'MAKE me a< ˜BASke?
 [dʒʌsmɛɪ'mijə bæski?]
 24 Ann:→ ˜ye:ah:
 25 (2.0) computer noise
 26 (2.0)
 27 Ann: 'that's ˜i:?
 28 (2.0)
 29 Ann: 'li::ke
 30 (2.0)
 31 Ann: 'YOU'RE 'RUNNING a'WAY:
 32 And: now GO >go go go go go go go< go[::]]
 33 Ann: [li?] ˜tha?
 34 (1.0)
 35 And: ˜yeh
 36 Ann: ˜yeh
 37 And:→ bu? >'don press the 'bu'on I 'aveni'dea<
 [bʌdɒnpri:səbʌʔənæɪjəvənæɪdiə]
 38 And:→ so(.) 'snip
 39 (2.0) ((computer noises))
 40 Ann: ˜yep
 41 (3.0)

In the first part of this sequence (lines 1 to 11), Andy does not respond to Ann's repeated bids to get an agreement to play a different game. In the video footage, Ann is seen to repeatedly look at Andy for acknowledgement, but he is focused instead on the screen. He may be ignoring her or not paying attention, but in any case, he does not respond to her presses. She then presses further by asking him if he knows how to get out of the game (lines 12 and 13). The four-second pause in the talk could indicate that Andy disagrees with her proposal to quit the game but is avoiding saying so; more likely, given the length of the pause, he is still focused on the game and ignoring her.

He self-selects as the next speaker (line 15) with a multipart turn beginning a loud imperative: "Wait", followed by a justification, "I have an idea", followed by a directive, "Make me basket" (line 16). His lexical choice of "wait" suggests that Ann is going ahead with quitting the game, and he is now halting her actions. The directive, "Make me basket", is grammatically incorrect and triggers an other-initiated repair sequence from Ann in line 17. Her initial "ma" (likely the beginning of "make") is self-repaired to "Shall I make you a basket again?" to which he replies in the affirmative, adding the directive, "But don't press the button" (line 19). Following another request for clarification by Ann (line 20), there appears to be a series of actions in the game that do not relate to the prior talk.

Ann's turn in line 33 ("like that") indicates they are back in the game, and she checks if the shape she has made is correct. Andy acknowledges this with a follow-up: "Yeh" from Ann.

Andy self-selects as the next speaker (line 37) is a recycling of a previous turn, "but don't press the button," followed by a repeat of "I have an idea". However, the prosodic design of these two turns shows a marked difference. The first "but don't press the button" is notable in the emphasis placed on "don't", with a hyper-articulated plosive release on the final [t] followed by a pause. The whole turn is loud and evenly paced. In the repeat, however, the turn is marked by an increase in speed, with the [t] in both "don't" omitted and the medial alveolar plosive [t] substituted by a glottal stop. Andy generally tends to produce voiceless plosives with aspiration (as in the first "don't") or, in this case, substitute with a glottal stop. This substitution reduces the time taken to articulate the utterance. Furthermore, there is no pause between this TCU and the next "I have an idea", also marked by increased speed. There is still no pause as he goes on to his next turn, "so,". The onset of this subsequent turn is characterised by a return to his typical pace, which is now followed by a turn-holding pause. It is only at this point that there is a change in stress pattern to issue the final directive as a one-word imperative "snip". In so doing, Andy can hold his speaking turn across three TCUs.

The extract exemplifies Andy's awareness of turn-holding strategies and turn-taking rules. He uses articulatory and prosodic variations to his turn design to maintain speakership between turns. The absence of pausing inhibits the possibility of a legitimate turn-incoming from Ann

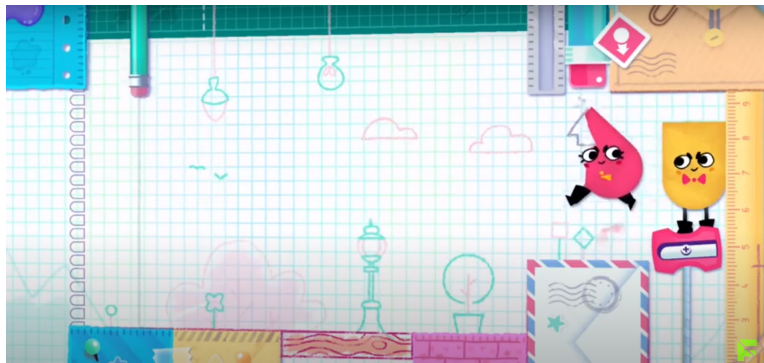


Figure 4.13: Screenshot of "Sharpen Up". Used under fair use for educational purposes.

at a point of syntactical completion ("but don't press the button"). However, this extract also emphasises a rapid change in pace and rhythm at various points, which may not be functionally irrelevant but can contribute to the overall picture of arrhythmic and uncoordinated speech.

The following extract illustrates the turn-holding devices most frequently deployed by the children within turns. The child is seen using different turn-holding devices, including prolongation and intra-turn pauses, to give him time to construct his turn incrementally without conceding the floor.

Extract 11

This extract involves Brad and the researcher, Julie. They have just completed a challenging task involving catching fireflies. They are about to start another, called "Sharpen up" (Figure 4.13).

The game's objective is to work together to manipulate the characters to jump up to release a pencil from the top of the screen and then transport the pencil across the bridge to the sharpener on the right of the screen. The strategy is to cut one of the characters to push the button to release the pencil and then cut the other character into a shape that will catch the pencil and carry it across to the sharpener.

During this game, Brad's mother is sitting in the background watching, waiting to take over as the adult player. The first turn in the sequence, is Brad's mother commenting on the play, which is not transcribed.

Extract 11: Fireflies Again

```

1      ((talking in background))
2  Jul: 'oh `NO: it's these `FIRE:flies a'°gai:n°
3      (1.0)
4  Bra: 'no its `no?
5  Jul:  oh coz[>we haven't g'<]
6  Bra:      ['oh we 'ne we ]'need to `shar:pen i?
7  Bra:→ we 'need to 'ge? (.)
8  Bra:→ so 'you:: 'you ge? `here:
9          erm 'you ge? ~here
10         s so its 'ready to catch a `pencil
11      (1.0)

```

BJ003_1429_fireflies again

Julie's exclamation, "Oh no, it's these fireflies again" (line 2), references what is happening on screen and indicates her recognition of an ensuing problem: they will have to deal with the fireflies again. Brad's emphatic rebuttal, "No, it's not" (line 4), follows a one-second pause, indicating that he is checking the voracity before he replies. Julie's next turn, by its "oh" preface, appears to be the beginning of a modification to her position in response to Brad's rebuttal as she recognises that it differs from the firefly task because "Oh cos we haven't g. . ." (line 4). Brad intercepts her as he also takes a turn (line 6) prefaced by "Oh", suggesting he has likewise recognised new information about the game. However, Brad's prosodic design is louder. The increase in volume facilitates his turn competition, and Julie drops out, allowing his idea to take precedence. The partial repeats of "we need" may indicate difficulty organising his turn in the event of the overlap. While syntactically and intonationally complete, "We need to sharpen it" (line 6) does not give enough information as he does not specify what "it" is. He follows up with what appears to be more information: "We need to get" (line 7), but discontinues his turn, and there is a micro pause before beginning his next turn. His follow-up turn is a shift from explaining to giving a directive: "You get here" (line 8). By using "so" at the beginning of the turn, despite not completing his prior turn, he can link the two turns together and switch to the new action of giving directions. Another strategy Brad uses for holding the floor involves extending the vowel sound in "you" and repeating it, giving him time to organise the rest of his turn. The rising pitch and lengthened vowel on "here" indicate that he has not finished speaking. A further turn-holding, a vocal token "erm" is present before he begins his next turn. Julie does not intercept, allowing him to continue until he finally indicates turn completion, marking a tonic with a pitch fall on the first syllable of "pencil".

The extract presents several turn-holding strategies which serve different functions for Brad. Partial and whole repetitions and vowel lengthening allow space for cognitive processing,

facilitating Brad's turn construction (Perkins 2014). Moreover, he demonstrates competency using prosodic pitch rises and vowel lengthening to signal that he has not finished speaking at turn-endings. In doing so, he signals that he is still developing his point.

One further issue to be discussed is how the children are oriented to turn-holding strategies used by the adults. The following extract is from the interaction between the researcher (Julie) and Tom.

Extract 12

They are also playing "Baseballin" (previously described Table 3.1). As a practised gamer, Tom shows impatience because Julie is not as adept at the moves as he is. He moves his character repeatedly back and forth across the screen, preventing the game from progressing. He takes control of the gameplay, and the following argument ensues.

Extract 12: Jump

```

1 Tom:  ergh o'kay y-y' 'need tur 'turn me into a 'scoop
2 Tom:  er 'I'm (.) 'probably going to be 'better at 'this:
3        (2.0) ((computer noise))
4 Jul:  well[ how oh >WAIWAIWAI?<] 'wai?'wai?
5 Tom:  [ oh rota? you cant ]
6        (1.0)
7 Jul:  [if 'you]
8 Tom:  ['o:'kay]
9 Jul:  if [you]
10 Tom:  ['ju]mp
11 Tom:  'jump (.) jump 'up
12 Jul:→ won 'tha? (.) 'hang 'on if you 'jus 'tur(.)
13        if you 'rote (.) if 'you: if 'you (.) [hm ]
14 Tom:  [ 'jus] 'jump
15 Tom:  'jus 'jump(.) 'plea:se(.) ^plea:se:(.) 'PLEA::SE::
16 Jul:→ well tHANG on
17        ah 'think I 'migh? have an 'easier way of 'doing
18        (.) a 'scoop
19        (0.3)
20 Tom:  'JU:MP or I 'cut
21 Jul:  a:ll 'righ?
22        (2.0) ((computer noise))

```

DJ002_2119_jump

Tom begins the sequence with a display of authority, saying he will be better at the proposed move than Julie (line 2). During the subsequent two-second pause, computer noise in the background suggests that Tom is going ahead with the move. Julie self-selects as the next speaker (line 4), as she starts to make what is likely an alternative proposal (how.."). Tom begins his next turn overlapping Julie. She abandons her proposal to issue a repeated series of the imperative "wait" in quick succession. Considering the ongoing computer noise in the

background, it appears that Tom has not stopped his actions in the game, and she tries to halt him. This seems successful as a bid for the floor as there is a one-second pause, after which they both start up again, with Julie beginning what appears to be the restart of her proposal for alternative action “if you” (line 7) and Tom’s “okay” (line 8) prefacing another directive. Both drop out, and Julie tries again with a repeat of “If you”. Tom interjects more competitively with his imperative “jump” (line 10). His turn competitive bid is successful this time, and Julie drops out. His repeated imperative to “jump” suggests that she is not complying, and after the third repeat, she begins a counterargument: “Won’t that..” (line 12). She does not continue with her turn point. Instead, she uses the discourse marker “Hang on”.

The video footage does not show Tom physically moving away, indicating that he is engrossed in what he is doing and is not listening to her. She seems to be trying to get his attention before continuing with her suggestion. Her subsequent turn is problematic because her multiple repeats of “if you” suggest she is formulating and clarifying her turn as she progresses. Tom holds off until her third attempt and then intercepts with an aggravated imperative, “Just jump” (line 14). The micropause allows Tom to reissue his directive more forcefully and continuously, ‘just jump,’ ending with a pleading and twice-repeated ‘please’. The final of these produced with increased loudness and length. Julie again attempts to regain the floor with “Well, hang on..”. This time, she can complete her turn and offer a proposal. This turn is followed by a 0.5-second silence, after which Tom persists with his directive to jump, this time with an ‘ultimatum: “Jump or I cut” (line 20). The prosodic design of this “Jump” is comparable with Brad’s upgraded directive in Extract 4 Move, with increased intensity and segmental lengthening. Julie orients to the upgrade, conceding with “allright” (line 21). This is designed with a prolonged low-pitch fall, indicating she is not enthusiastically agreeing (Stevanovic 2012).

The extract illustrates two key points. Julie uses a cluster of turn-holding strategies to elaborate on her turn and facilitate her turn construction using linguistic and prosodic resources. These include discourse markers, repetitions, mid-pitch, and vowel lengthening. Tom’s repeated use of turn-competitive markers suggests an awareness of the turn-taking rules and that he is not allowed to come in where he does but persists nonetheless. Tom demonstrates orientation to her intra-turn holding strategies in lines 13 and 14 by not taking a turn immediately. Also, albeit at his discretion, he orients to her use of discourse markers, “Well hang on” (line 16), allowing her to continue to turn completion. This supports the argument that the children can orient to turn-holding strategies and understand turn-taking rules but do not when their interactional goal is to get their agenda on the table. The extract also illustrates how Tom can use pausing to preface a dispreferred response to facilitate his regaining his role as the instruction-giver.

4.6 Summary

In summary, these analyses seek to provide focused insights into the children's turn management abilities, particularly during competitive interactions. The examination focuses on the prosodic and linguistic resources utilised to manage turn transitions. Three aspects are explored: first, the children's ability to signal turn completion; second, the management and treatment of turn competition; and third, their proficiency in using and orienting to turn-holding devices.

Overall, the findings demonstrate that the children can and do demonstrate competency in both their use of and orientation to the cluster of prosodic and linguistic features involved in effective turn management, albeit awkwardly at times. However, the interactional context plays a significant role in the children's communicative strategies and lexico-syntactic designs as they dominate the gameplay (Goodwin 1990; Kent 2012).

Generally, the data offers evidence of the children's competency in marking the relinquishment of their turn using a cluster of prosodic and phonetic features to mark a tonic and a turn transition place. They can be seen using pitch movement, increased intensity, and lengthening on the relevant segment to assign stress placement suitably to reflect meaning and follow conversational rules. However, problems sometimes occur when they are required to repair their turn, particularly when they are needed to organise these features to mark a different tonic. There is evidence of some inflexibility in the ability to modify their overall turn design, which can create problems for intersubjectivity.

Extracts made during directive sequences reveal a high proportion of overlap in the talk, presenting multiple opportunities to examine how the players manage these problematic episodes. Turn competition involves a complex interplay of linguistic and prosodic features. Linguistically, interruptions, overlap onset, and assertive language signal an attempt to control the conversation. Overwhelmingly, as seen in the Goodwin (1990) study, these children construct their turns using simple command structures, imperatives, and declarative language. The analyses in section 4.3 explore the children's management of overlaps during turn competition. There is clear support for the argument that these children can competently coordinate linguistic and prosodic features to signal turn competition to which the adults orient. The children use linguistic discourse markers such as "oh" and "wait" with a cluster of prosodic features such as increased volume, pitch peaks, accelerated speech rate, and intonation patterns to compete for the floor. The adults show orientation to such competitive turn-incomings by either dropping out or relinquishing their speakership rights, confirming that these children can successfully organise their turn in such a way as to achieve their interactional goal.

Furthermore, these analyses present evidence that these children are oriented to features of turn competition used by adults. However, their concession is somewhat dependent on their

interactional goal at the time. There is evidence that how the children manage their concessions can be awkward. The illustrative analyses show that, rather than being able to drop out from their turn quickly, they tend to be hesitant or modify their prosody (dropping volume, increasing speed), prolonging the episode of overlap.

A noticeable phenomenon observed in these sequences is the practice of turn-holding. This is addressed in section 4.5. Two key aspects are identified. First, the children use various prosodic and phonetic turn-holding practices to hold onto their speaking rights, both inter and intra-turn. These include keeping a mid-pitch, elongation of sounds, controlled micropauses, and increased keyword intensity. What is less apparent is a smooth flow from one turn to another. There are instances of turn-holding features analogous to “abrupt join” turns (Local and Walker 2004), where the end of the turn is speeded up to avoid a possible incoming turn. This can be seen in Andy’s data (Extract 10) over the two turns construction units, “Don’t press the button; I have an idea”. Second, the children struggle to use linguistic resources to hold their turn. There is evidence of discourse markers such as “so”, but this is rarely used as a conjunctive. The data shows these children have significant difficulty marking the connectivity between their turns using syntactic constructions such as coordination and subordination, relying instead on prosodic resources to do the work.

A key feature of their turn construction is incompleteness. The children work hard to hold their turn using a cluster of resources, including micropauses, pitch holding, and elongation of sounds and repeats, to allow them time to develop their point without conceding their turn. The adults show a definite orientation to these features, even when it is to the detriment of the game’s progression. It is also evident that the children are also aware of turn-holding strategies used by the adults. However, they frequently ignore these to maintain dominance over the interaction and can use these opportunities to regain the floor.

The children’s data all present similar patterns of turn competition, yielding and turn holding, particularly in these directive sequences, but variations exist in the range of prosodic resources used. For example, some children typically have a loud voice and fast speaking rate. In these cases, variations in volume and pitch can increase the child’s appearance of assertiveness. Others are quieter, and although they may sound less dominant, the features they use are similar.

This prevalence of challenges in turn construction across all the children significantly impacts their turn management and conversational dynamics. The following chapter analyses the children’s turn construction features in detail.

TURN DESIGN: PROGRESSION AND INTERSUBJECTIVITY

5.1 Introduction

This chapter considers questions related to how the children in the study design and coordinate their turns to create meaning. The aim is to investigate how they accomplish their interactional goals using prosodic and phonetic elements of the intonation systems. The analyses presented are specifically focused on the children's prosodic and phonetic realisations and how their timing and synchronisation affect two critical aspects of the turn: the fluidity of the turn towards completion and how meaning is conveyed by indicating new information or specific information.

The following points are discussed in the text: sequential progression, rhythm, intonation, and phonetic modifications made in segmental transitions across the child's turn. It is important to note that prosody, which includes rhythm and intonation, is achieved through the precise timing and synchronisation of articulatory movements. This temporal coordination is fundamental to maintaining sequential progressivity in speech. Effective temporal coordination ensures smooth transitions, natural rhythm, and appropriate coarticulation. For example, the nasalisation of a vowel before a nasal consonant [m] or [n], or the articulators (lips, tongue, velum) moving towards the position of the next sound while still producing the current sound resulting in a gestural overlap, all contributing to fluid and intelligible speech. Conversely, poor temporal coordination can lead to disjointed, irregular and less natural-sounding speech.

Furthermore, well-coordinated articulatory timing in gameplay facilitates intersubjectivity

in two ways: first, it allows the listener to follow and understand the flow of speech easily, and second, it allows the speaker to highlight essential or contrastive information. Both enhance clarity and comprehension.

A negative effect of poor temporal coordination is reduced coarticulation and elision. In some cases, the opposite can occur: hyperarticulation or even over-articulation. As explained in section 2.3, hyperarticulation refers to the deliberate exaggeration of speech sounds. This can involve increased duration, loud volume, more precise articulation of phonemes, and more significant pitch variation.

Freeman (2014) suggests that marking stress to convey emphasis or emotion naturally leads to hyperarticulation. However, hyperarticulatory gestures can also be used to locally contrast stressed from unstressed syllables (de Jong 1995; Wedel et al. 2018). The key characteristics of stressed syllables are the acoustic correlates, increased duration, pitch variation, and volume. It can, therefore, be assumed that the phonetic features of exaggerated articulation and these acoustic features are common mechanisms for achieving stress marking in speech.

The preliminary analysis of two key actions in the game, decision-making and directives, revealed patterns of interest around how these children accomplish their interactional ends using prosodic and linguistic resources. Both players put their choices on the table when making decisions, and the one who can make the most persuasive argument will win. During directive sequences, the goal is to convey sufficient and accurate information for the other player to contribute their part and for the game to progress. In both instances, there is a compelling need to design their talk in such a way as to be both coherent and cogent, or else they will not achieve their goal.

In this chapter, the following questions will be addressed:

- How do the children achieve sequential progressivity across a turn or turns through the articulatory transition from one sound to another and the temporal coordination of phonetic features?
- How do the children use prosodic, phonetic and linguistic resources in their turn design to achieve their interactional goals?
- What challenges do they face in designing and executing these turns, and how are they managed?
- Can the children draw on their competence in following three interactional features to accomplish their interactional ends?
 - 1) The identification of topical focus.
 - 2) The use of the Tonic ¹ placement to signal upcoming completion.

¹As described in section 2.2.1, the Tonic syllable is the one which carries the main stress or emphasis in a TCU, typically marked by pitch movement, increased volume and longer duration. It is the most prominent part of the utterance and often conveys important information or the speaker's intent.

- 3) The use of matching or contrasting tones to align with the speaker's agenda.

However, it is also illustrated that these features are variable, and errors occur frequently and randomly. The nature of these errors is analysed in detail in the context of the unfolding illustrative actions. Perhaps more importantly than the errors themselves, noting how the children manage these errors and how the adults treat them is significant for understanding how best to provide timely and appropriate treatment strategies.

Evidence reveals that these children experience difficulties in terms of sequential progressivity through the articulatory transition from one sound to another and the temporal coordination of phonetic and prosodic features (Dankovičová et al. 2004; Franich et al. 2021). These difficulties may affect their ability to effectively use prosody to convey meaning and engage in fluid interactions, but not necessarily so. Furthermore, it is argued that the children are aware of the difficulties and that their attempts to repair them can further disrupt the sequential progressivity of their turns.

Analysis of the conversational interactions during game selection and instruction-giving revealed notable patterns related to the children's stress markers. Further examination of these instances identified recurring themes in the conversations. The following analyses provide specific examples of these themes.

Section 5.2.2 first considers episodes with atypical sequential progression and transition from one segmental feature to another, affecting the overall flow, rhythm, and intonation of turns. Extract 13 *Believe* and Extract 14 *Basketball* explore the impact of hyperarticulatory features on segmental transitions across syllables. Where the problem occurs has different consequences for progressivity.

The subsequent two extracts (Extract 15 *Rubbish* and Extract 16 *Show it to you*) display the effect problems in articulatory coordination has on the intelligibility of the turn. Understanding the interactional goal is crucial in how the child manages speech difficulties. This highlights the adaptive nature of their communication strategies and the importance of context in their speech production.

Fragmentation and disjointed speech patterns are frequently present in children's talk when using complex linguistic structures, particularly in the first pair part position. This disruption affects the overall flow and rhythm and impacts the coherence and cogency of the child's turn. section 5.2.2 presents some examples (Extract 17 *Puzzles*, Extract 18 *Rotate up*, Extract 19 *Dropped an egg*, Extract 20 *Crane grab*). They illustrate how the interactional goal influences the child's ability to repair and progress to completion.

The final section 5.3 analyses the children's ability to make prosodic and phonetic modifications to convey new or essential information. These modifications are used for interactional purposes, such as marking contrast (Extract 21 *Blue fish*, Extract 22 *Pink man*) and emphasis

(Extract 23 Slowly, Extract 24 Extra hard). These analyses present the most frequently occurring typical patterns in the data. Problems, however, are also observed. The final two extracts (Extract 25, Extract 26) illustrate incidents where problems in marking narrow stress occur.

These analyses are presented as examples of the data findings, with a summary in section 5.4.

5.2 Sequential progression and its effects on flow, rhythm and intonation

The sequential progression from one sound to another often creates distinct patterns that affect the overall flow of the conversation. The sequential progression of a TCU is achieved by the predictable addition of sounds, syllables, words, and phrases. The successful completion of this task depends on precise coordination of articulatory movements (Kent 2000). Smooth, natural-sounding and crucially intelligible speech production involves the seamless flow of sounds within words and across word boundaries. Elision and coarticulation are the two fundamental processes that contribute to this fluidity.

The children in this study mainly produce intelligible, albeit at times atypical, speech patterns. However, they exhibit problems in segmental transitions through mistimed hyper-articulatory or co-articulatory gestures. The extracts in section 5.2.1 illustrate the children's variable success when synchronising and anticipating articulatory gestures within words and across boundaries.

Section 5.2.2 presents a different phenomenon frequently occurring in the children's data. Here, dysfluencies and repetitions occur across whole turns, impacting progressivity and resulting in disjointed speech patterns.

5.2.1 Sequential sound progression and temporal coordination within words and across boundaries

The three extracts presented are illustrative of types of articulatory transitional challenges with the timing and coordination of hyperarticulatory and co-articulatory gestures. In the data, these instances occur randomly in the children's talk and are often difficult to isolate. The first two illustrate how articulatory transition problems impact lexical stress patterns. The first Extract 13 is an example of articulatory transitional issues occurring within a word, and the second, Extract 14 shows transition challenges occurring at syllable boundaries. Extract 15 is an example of the impact on lexical stress patterns as the child attempts to speed up to manage a turn-competitive overlap. The final extract (Extract 16) presents a similar issue but with different consequences. Here, there is a breakdown in articulatory coordination across



Figure 5.1: Screenshot of "Shape match" to show overlap of characters. Used under fair use for educational purposes.

segments, which compromises the intelligibility of what is said, not the pattern. It reveals how John manages a breakdown in his speech production by reformulating his turn.

Extract 13

This extract occurs between Simon (child) and Cath (adult) at the beginning of their time together, where they work out how to play the game. They have chosen to play "Shape Match" (described in Extract 1 Connect in the middle). As shown in Figure 5.1, in the centre of the screen, there is a dotted outline. The objective is to work together to fill the space. This is achieved by cutting away a portion of each character and then rotating them right and left.

Extract 13: Believe

```

1 Cat:  oh:: uh uhu[ hehehahaha]huh
2 Sim:  [ ^WAI:::t      ]
3 Sim:→ I'bel::^ie::ve I know what[°to do°]
        [b°ʌt::li::°v]

        _____
        -  _  _  ~  _  _  _  _  _
        _____

4 Cat:  [ ^OH::: ] we made `green
5 Cat:  'that's `pretty
6       (1.0)
7 Sim:  m::n:: [°mbe pre°]
8 Cat   [I'm ju'OH]I'm 'stood on your `head 'now
9       (2.0)

```

SC004_00_40_believe

As the extract begins, they press the controller buttons to see what happens. They have not yet worked out what to do, but they enjoy manipulating the characters, as shown in line 1 of the extract, which begins with Cath's laughter.

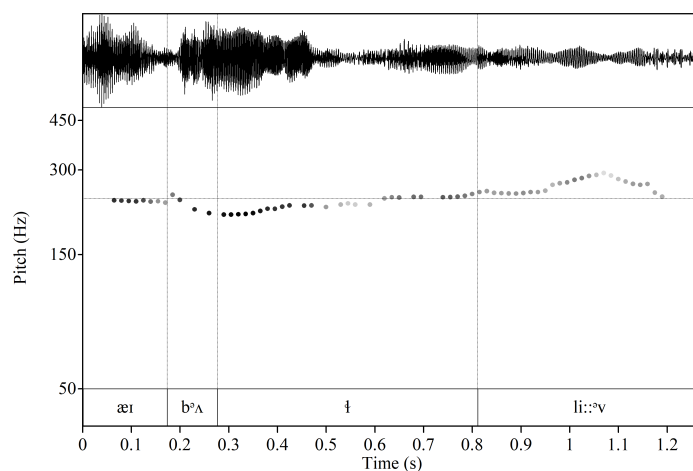


Figure 5.2: Diagram to illustrate the prosodic design of "I believe"

As Cath laughs at what is happening on the screen, Simon comes in with a loud and prolonged 'Wait' (line 2). The imperative verb form, prosodically designed with a prolonged vowel and a long and low pitch rise-fall, differs from the pitch high-fall on verb imperatives acting as a directive in the children's data as seen in Extract 12 Jump. Instead, it appears to act to get Cath's attention that he has noticed something important, and he is planning to say more. Cath treats this as a turn-competitive incoming and halts her laughter, allowing him to continue. In his follow-up turn, his realisation of the word "believe" is where trouble emerges. Although semantically relevant to project his uncertainty, the specific articulatory realisation of the word results in a momentary loss of cohesion of the turn construction.

Figure 5.2 illustrates the overall production of the word in terms of its phonetic and acoustic features.

On examination of the individual segments, the transitions, either in terms of movement between articulatory gestures or pitch changes, are less than smooth. Two troublespots are noticeable. First, the transition from voiced bilabial plosive [b] to the back vowel [ʌ]. Elements of hyperarticulation are seen in the initial [b], which has a plosive release resulting in an additional slight transitory vowel [ə] from the front-to-back articulatory placement [b^əʌ]. As this is a voiced plosive, the release is also voiced, heard as [ə] instead of the voiceless plosive release [h] as in [p^h]. The second troublespot occurs at the transition from [l] to [i]. The [l] is produced as the dark version with velarisation, so the tongue position is far back in the mouth. This [ɫ] is the prominent segment of this word worthy of description as it creates problems in achieving a smooth transition across the segmental boundaries. This is a velarised variation of the lateral approximant [l]. It is distinguished from the clear [l] (typically articulated with the tongue tip at or near the alveolar ridge behind the top teeth) by the tongue raised towards



Figure 5.3: Screenshot of "Alley Oop". Used under fair use for educational purposes.

the velum at the back of the mouth. Typically, it is acoustically less salient than its alveolar counterpart, as evident in Figure 5.2; therefore, in many dialects of English, it is more typically occurring in syllable-final positions (Barry 2000).

The lexical stress pattern for ‘believe’ would typically be produced bisyllabically with a weak syllable [bə] and strong syllable [li:v]; the syllable boundary being at the transition between [ə] and [l] with a subsequent movement towards the high front vowel [i]. Simon’s realisation of [l], being articulated with significant velarisation, causes an articulatory challenge to move the tongue from its position far back in the mouth to the front in readiness for the vowel [i]. Consequently, the segmental transition takes time to occur. The segmental lengthening (0.4 secs) may be, in part, a turn-holding strategy to facilitate the construction of the remainder of the turn. Nevertheless, the phonetic realisation of the segment presents a challenge in producing a smooth flow across the whole item.

This word shows hyperarticulatory behaviour, affecting the articulators’ ability to adjust for smooth segmental transitions. Although the additional emphasis on “believe” appears intentional in projecting that this is his opinion rather than fact, Simon’s hyperarticulated production reduces its overall integrity and intelligibility rather than highlighting it.

A similar transitional problem emerges at the syllable boundary in the following extract.

Extract 14

Ann and Andy have just completed the first task, and Andy has just chosen the second one, "Alley-Oop". This is a similar game to "Bowling for Baskets" (Table 3.1). The game’s object is to transport a baseball from where it is released from the left side to the right and drop it in the hoop (as pictured in Figure 5.3).

During the prolonged pause at the beginning of the extract, they select the game, which loads on the screen.

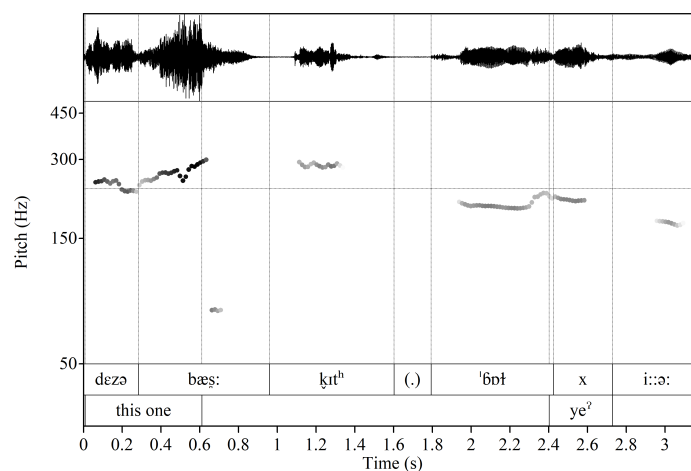


Figure 5.4: Diagram to show prosodic design of "There's a basketball here"

by a plosive burst. This is followed by the vowel [ɪ] and the final voiceless alveolar plosive [t]. Since the [t] is the last segment of the weak syllable and appears in a mid-turn position, creating a relatively weak syllable could be achieved in various ways, such as having no audible release, omission, or substitution with a glottal closure. In this instance, the plosive release is reversed. Andy produces the voiceless velar stop with some voicing, which is unproblematic. However, the voiceless alveolar stop [t] produces the syllable-final segment with a plosive burst. As a result, the emphasis on the two syllable-final segments, [s] and [t], reduces these two syllables' relative strong/weak stress patterns, rendering them perceptually more equal.

A further problem emerges at the remaining two syllable junctures. At the transition between the [t] of "basket" and the [b] of "ball" the release of the voiceless alveolar [t] disrupts smooth assimilation to the voiced bilabial [b], which is also hyperarticulated. The h in "here" also creates a troublespot in that the prolongation of the segment (0.3msecs), being voiceless, creates a potential space for Ann to come in. She does so in line 5 but drops out again in response to the brief consequential overlap as he completes the remainder of "here" with the vowel [iə].

This extract illustrates problems with the preplanning and timing of transitions between individual segments, which in turn cause problems for the listener in knowing when to take a turn. hyperarticulation involves longer voice onset times, more forceful articulatory closures, and releases for consonants, especially stops. In this case, Andy's transitioning from one consonant to another, such as in consonant clusters or syllable and word junctures, indicates challenges in smooth coordination. The lack of coordination between the segments hinders the smooth blending of the sounds, making Andy's talk less fluid, more segmented, and arrhythmic.

The third extract in this section illustrates a less frequent coordination problem that occurs

as the child increases tempo. As the child increases the rate of speech, it can result in less precise articulatory transitions. Consequently, the word structure is degraded and syllables are omitted or elided. In this extract, the child's repair strategy to coordinate his turn affects overall coherence.

Extract 15

Tom and his mother have played for around 20 minutes. They have just completed a task called "Hamster Helper". Tom has done most of the work, and his mother has followed his instructions. They are assessing the game, and his mother changes the topic to comment on her performance.

Extract 15: Rubbish

1	Mum:	'oh my 'goodness I'm 'so: 'rubbish at 'this
2	Tom:	kyhe 'you're `so 'rubbish at `everythin
3	Mum:	'OH 'that's no? 'fair:
4	Tom:→	well 'rub 'rubbish at (.)
5		y'know [>co`mu °games°<]
		[kəmiu geɪmz]
6	Mum:	['you cn 'WALK]
7		ho:me then I if 'I'm 'rubbish
8		whichm I 'cant drive y'ho:me
9	Tom:	' <u>that's</u> no? 'very 'nice
10	Mum:	^ <u>ye:ah</u>

DJ00600_05_rubbish

In line 1, Mum's assessment of herself, "I'm so rubbish at this", preceded by the exclamation "Oh my goodness". Tom begins his response with a slight laughter token followed by an agreement with an upgrade; she is not just rubbish at this game but rubbish at everything. The laughter token downplays his criticism somewhat, but his mother rejects this characterisation with "Oh, that's not fair" (line 3).

Tom responds with a modification and downgrading of his prior criticism, "Well rubbish at, you know, computer games" (line 4). His use of "Well" without being followed by a pause indicates a change of mind and revisits his previous turn to add more information. The remainder of his turn lacks cohesion. He self-repairs the next lexical item, "rubbish", restarting after the first syllable. He then pauses again, following "at" (which is not fully articulated with the final [t] replaced by a glottal stop) and inserts the filler phrase "y'know" before continuing with "computer games". The filler at this juncture is most likely used to give him time to retrieve the following word (Roberts et al. 2006). While simultaneously repairing his turn to be more specific (she is not necessarily rubbish at everything, just at computer games), he continues to proclaim that she is rubbish. At this point in his turn, Mum takes the opportunity to rebut.

“You can walk home then” (line 5).

Tom continues despite the overlap to the end of his turn. However, two specific features in his production of the remainder of the turn “computer games” indicate an orientation to her turn competition. First, he drops his volume. Second, he elides production of ‘computer’ by omitting the plosive [p] at the beginning of the second syllable and the final syllable [tə] before moving on to “games”, and the remainder of the turn is reduced to “comu games”. In so doing, the three-syllable “computer” is reduced to two. This elision does have the interactional consequence of speeding up the remainder of the turn. The subsequent elided production of “computer games” may be an attempt to rush to close his turn, withdrawing from the overlap as Mum starts speaking.

Two key points emerge from this interaction. First, Tom’s critique of his mother being rubbish prompts her to challenge him. His attempt at repairing his turn by clarifying that he only meant computer games and not everything) is ineffective as he continues to say she is rubbish, which is the source of his mother’s challenge, and at this point, she interjects. Second, her turn-incoming creates a trouble spot in that he attempts to manage it by amending his prosodic design, speeding up and reducing volume. However, because he appears to be attempting to coordinate two complex actions simultaneously, word finding and turn management, the integrity of his realisation of the phrase “computer games” is affected.

The fourth extract, taken from the play between John and his mother, shows John having trouble with syntactically and phonetically organising his turn. His mother does not understand and needs to initiate a repair.

Extract 16

John has just started playing with his mother, and they are also playing “Shape match”, (Table 3.1). John has completed this task when playing with another adult. Mum repeatedly asks John questions about what to do, and John provides less-than-coherent answers.

Extract 16: Show You It

(5.0) ((computer noise - cutting))
 1 Mum: 'did you 'manage to do 'ther:
 2 erm 'shape before John
 3 (1.0)
 4 Joh: now:
 5 Mum: 'did you 'manage to do i? 'earlier
 6 Joh: 'ye 'mum
 7 Mum: 'yeah: 'well 'ow did you 'do i?
 8 Joh:→ 'mum can I 'try some'thing

9 → the'laf'don wha? we ^do:ne
 [læfdɒn]

10 Mum: 'pardon:
 11 Joh:→ y' 'know the 'last one we ^do:ne

12 Joh:→ 'want me to 'show you 'i?

13 (0.8)
 14 Mum: ?hm 'wha? 'was i?
 15 Joh: 'I'll 'show you it 'mum
 16 Mum: [m:m:]
 17 Joh: [vt]
 18 Mum: d'you 'know ?ow to 'do i?
 19 ((computer noise - selection))
 20 Joh: al'right

TJ005_0950_show you it

Mum tries to determine whether John previously managed the task (see lines 1 and 5). She asks directly in line 7, “How did you do it?”. John sidesteps, and rather than providing a contingent response, he requests permission to make a move: “Can I try something the [læfdɒn] (last one) what we done?” (lines 8 and 9). There are several points regarding this turn. First, although the first TCU of the utterance is syntactically complete (“Can I try something?”), the second part of the turn does not make sense semantically and is syntactically inaccurate (“the [læfdɒn] (last one) what we done”). John often struggles to formulate complex subordinate clauses, as illustrated here. Second, he has trouble with the accurate production of “last one.”

His articulatory movements from the final cluster [st] of “last” and the initial /w/ of “one” are not well-coordinated. John’s articulatory movements appear to be mistimed, producing the alveolar fricative [s] as the labio-dental fricative [f] and the voiceless [t] being realised as a voiced alveolar [d]. As a result, the combination of syntactic and phonetic errors compromises the overall intelligibility and meaning of the turn, making it difficult for his mother to understand. She issues an open-class repair sequence “pardon”, to which John responds with a clarification, orienting to the other-initiated repair as a request to repair his turn construction rather than that she did not hear him, indicating an awareness that he did not make himself understood.

Here, John exhibits two problems: First, his syntactic organisation is compromised, resulting in a breakdown in intersubjectivity. Second, there is an articulatory coordination problem, which further adds to the breakdown. His strategy for repairing is to break his prior turn down into smaller, syntactically more simplistic chunks over two separate turns, thereby avoiding subordination. This time, he successfully produces the segmental sequence in the “last one” (line 11). Prosodically, these turns are now restructured into a more typical tone unit structure. His successful repair suggests his awareness of the need for intersubjectivity and that he can coordinate his speech more effectively by reducing the complexity of the turn construction.

In summary, the children in this data show challenges in managing and coordinating the transition from one segment to another, which disrupts the smooth flow and impacts the turn’s overall coherence.

5.2.2 Disjointed and fragmented turns

The analyses in this section underscore how fragmented and disjointed speech patterns significantly disrupt the continuity of the child’s turn. This discontinuity often leads to repetitions and recycling as the child attempts to repair their turn, or they may abandon it altogether. The consequences are critical for progressivity, as the child can lose the conversation thread with a breakdown in intersubjectivity. The following analyses detail the fragmentation to explain how and why these problems occur.

The data shows that the children struggle to provide coherent explanations and instructions to the adults. Despite their ability to produce syntactically complex utterances and speak fluently and coherently, all the children show intermittent dysfluency and disruptions in their speech patterns, mainly when the interactional project goal is to instruct and explain. The fragmentation in the temporal and sequential organisation of the phonetic and lexical elements comprising the projected turn often leads to episodes of self-repetition and recycling, indicating that these utterances are constructed incrementally (Perkins 2014). These analyses underscore the children’s tendency not adequately to plan their turn before execution.

This section presents four analyses representative of the types of problems seen in the data. The first two are extracts from the same child during his interaction with his mother. The first, Extract 17 Puzzles, reveals how Tom attempts to repair the disjointed and fragmented speech patterns during this multi-part turn to convey his message. This contrasts with the second, Extract 18 Rotate up, where he is pressured to clarify his meaning. Tom begins but cannot complete, and abandons his turn, reverting to an assertive directive. The third (Extract 19 Dropped an egg) and fourth (Extract 20 Crane grab) provide evidence from other children in the data, revealing how specific lexico-syntactic and phonemic errors and the resulting repairs impact the children's ability to create complete and coherent turns.

Extract 17

Tom and his mother have just started to play together. Tom has already played the game and is competent and confident in knowing what needs to be done. His mother has not seen the game before. He is in the process of demonstrating the game moves. At this point, he explains what the game is about.

Extract 17: Puzzles

- | | | | |
|----|-------|---|--|
| 1 | Tom: | <u>'cut</u> | |
| | | [kʌtʰ] | |
| 2 | Mum: | 'OH my 'goodness y' 'jus 'cu? me in ^ha::lf | |
| 3 | | 'tha? was 'mean | |
| 4 | Tom:→ | 'yeh 'yeh >'what it 'does< 'is erm lʰ | |
| | | [wɒ.ɪdʊz] | |
| 5 | → | the 'way y' sup | |
| | | [ðəweɪjəs'pʰ] | |
| 6 | → | the 'way s the 'way this game 'works | |
| | | [ðəweɪjɪs (.) ðəweɪdɪsgeɪmwɜ:kʰs] | |
| 7 | → | is >y' supposed< to solve 'PUzzles | |
| | | [ɪzjəs'pəʊs'təʊlv pʊzəlʰz] | |
| 8 | → | by erm (.) 'cutting things | |
| 9 | Mum: | o'kay:: | |
| 10 | Tom → | lʰ by 'cutting er 'objects an 'peo:'ple into | |
| 11 | → | 'diffren 'shapes so you can 'solve 'puzzles | |
| 12 | Mum: | o'kay: | |
| 13 | Tom:→ | and to: 're:form or become 'whole a'gain | |
| 14 | → | you 'press 'thee er 'ro le ar 'righ? a 'arrow key | |
| | | [ɪəʊlɛ'ʰæɪɪ'ʰæ æɪəʊ ki:] | |
| 15 | | ((computer noise - cutting)) | |

DJ005_1706_puzzles

The extract begins with Tom verbalising “cut” indicating he has cut his mother's character on screen. His mother comments on what happened, starting with the exclamation, “Oh my

goodness, that it was mean” (lines 2-3). This is a playful repartee as he shows her the game. Tom’s next turn begins with repeated “yeh yeh” (line 4). These are produced quickly and appear to act to acknowledge her prior turn while simultaneously adopting speakership rights. He then begins a project of explaining what this task requires, eventually justifying why he has cut her in half (lines 5-8). Tom repairs the beginning of his turn three times from “what it does is” (line 5) to “the way you’re supposed..” to “the way s” before finally organising a complete turn, “The way this game works is you’re supposed to solve puzzles” (line 7). He adds more information “by erm cutting things” (line 8).

His mother’s continuer “okay,” (line 9) is produced with a prolonged vowel and low pitch rise to middle pitch projecting continuation. Tom orients to this by continuing where he left off, repairing his previous turn, replacing the generic “things” with the more specific “objects and people” and adding additional information “into different shapes.” After a further continuer “okay” (line 12) from Mum, he adds extra information. He incrementally constructs a complete overview of the game over multiple turns. He orients to the design of his mother’s continuers “Okay” to provide more information with a syntactically accurate construction, “by cutting objects and people into different shapes” (lines 10 and 11). However, the explanation is not without problems in its organisation. Tom’s rate of speech is fast. This rapid speech may add to his challenges in organising and constructing a smooth turn. His two-part turn in lines 10 and 11 (“by cutting people and objects into different shapes so you can solve puzzles”) are preceded by an intake of breath and are slower in rate, which may facilitate the smoother progression to completion. Similarly, lines 13 and 14 (“and to reform or become whole again, you press the ro le ar right arrow key”), it is conceivable that the turn-holding strategies he deploys in these turns to facilitate his word finding, slow him down, thereby facilitating progression towards the eventual completion.

In summary, Tom is seen to have challenges initially in organising his turn to explain the game, resulting in self-repairs. Tom’s troubles appear to be two-fold. First, he has trouble organising the complex syntactic and lexical elements that will accurately convey his message. His first turns are rapidly produced. He manages the fragmentation by recycling and incrementally adding successive elements to progress towards completion (Perkins 2014). In subsequent turns, he slows down and takes time to repair and reformulate it adequately. Secondly, the flow of the turn is disrupted by pauses when he has trouble accessing the words he wants to use. This is particularly evident in line 14, where he has trouble with “left” and “right” (“ro le ar right a arrow”). The first repair appears to be a reorganisation of the whole turn, and the second a local lexical one. His awareness that this is not what he wants to say results in an eventual successful repair, but it takes him some time to organise it.

Considering Tom’s ability to construct complex linguistic formulations, two points emerge.

Tom shows an awareness of the need to give relevant and sufficient information but is challenged with the initial lexico-syntactic organisation of his talk. Second, difficulties in lexical retrieval create trouble spots, which he is obliged to repair but affect his talk's overall fluency and coherence. In this instance, he is supported by his mother, who allows him time to repair and complete. Her feedback is minimal, with her "okay" continuers acting as backchannels to indicate she has understood, but the prosodic design (prolonged and low) means she needs more. Tom orients to this through partial recycling, incrementally repairing and adding more information.

The following is another extract from the interaction between Tom and his mother, where similar problems with sequential organisation and progression towards turn completion are evident. In the example, Tom eventually uses a more familiar and simplistic syntactic structure to circumvent his difficulties in explaining coherently.

Extract 18

Tom and his mother have been playing "Shape Match" (as previously described) for about 15 minutes. Tom has previously completed this task with another adult, but this is the first attempt for his mother. Tom has been directing her, but on several occasions, she has mentioned that she does not understand and that they need to restart.

Extract 18: Rotate Up

1	Tom:	y-'you 'might need to 'ro'tate a bi? `up
2	Mum:	why
3	Tom:	be`cause (.) I said so [æɪzɛzəʊʔ]
4	Mum:	bu? 'wha? we're 'tryn t'a`chieve:
5	Tom:	?AH HA::H
6	Mum:	pt but 'surely if you 'go back over to the `le:ft
7		(2.0) ((M looks to T))
8	Tom:→	no y j:(.) i 'duh i? 'doesn't `matter [nəʊ jəʒəʔ (.) i'duʔ idʌzn mætə]
9	→	'just 'just ohch: jus th 'jus 'just 'rotate `up
10	→	'd-'do wha? I `say: ['jus d]
11	Mum:	[`ro ]tate `up
12	Mum:	didju 'manage to do ther: erm 'shape be`fore Tom
13		(1.0)

DJ005_1449_rotate up

Throughout the data, Tom typically gives directives using imperatives or declaratives. This extract begins with Tom using an indirect directive in the form of a suggestion using a modal verb: "You might need to rotate a bit up" (line 1). His mother questions why. Tom begins his response with a conditionally relevant "because. . . ." Followed by a micropause before adding

“I said so” (line 3), counteracting his prior construction as a suggestion and re-assigning it as a directive. Mum follows up with a further question in line 4: “But what are we trying to achieve?”. Tom’s aggravated cry prompts Mum to justify her question by presenting an alternative: “But surely if you go back to the left” (line 6). She ends her turn on a fall-rise pitch change followed by an overt look to Tom, suggesting she is anticipating a response. He responds only after a prolonged two-second pause when his mother looks at him, seeking a response. The video footage shows him looking at the screen; he may or may not be listening to her. After initially rejecting her suggestion, he appears to add a follow-up explanation (lines 8-10), “No y j” (line 8), but instead of continuing, he restarts. He begins the new version, “It duh,” which he repeats before continuing the TCU: “It doesn’t matter.” The same self-repetitions are seen in the subsequent TCU “just just.” After the first repeat, his exclamatory token “och” suggests he is becoming frustrated, but he continues repeating “just.” After multiple false starts and repeats, he eventually abandons the turn altogether. He reverts to giving a more syntactically simplistic assertive directive in line 10: “Rotate up. Just do what I say”, thereby avoiding the problem of explaining and justifying completely. His mother’s repeat of “rotate up” line 11 shows orientation to these two complete turns rather than the prior fragmented turns. In doing so, she appears to orient to Tom’s difficulty in explaining and does not pursue her questioning.

This example illustrates the types of problems with sequential progressivity the children have when designing turns requiring preplanning of complex lexico-syntactic structures. When challenged to create a contiguous and coherent explanation, Tom reverts to a more straightforward syntactic structure with a turn final Tonic “just rotate up” (line 9), circumventing the problem. He is facilitated in this by his mother, who acquiesces to his final directive rather than persisting with her initial challenges to the plan. Tom uses his authority role (he knows what to do) to manage the potential interactional consequence of his challenges in explaining and justifying coherently.

This section’s third extract illustrates how problems in the prompt coordination of the turn do not necessarily affect intersubjectivity but can affect the game’s progression.

Extract 19

Brad and the researcher (Julie) have just begun “Mockingbirds” (Figure 5.5).

The game’s object is to guide the eggs that drop from the tube at the top of the screen to the nest at the bottom by gently rotating the red and yellow characters. This task is challenging to work out initially, and progress is not being made.

for him to continue. Brad does self-select as the next speaker, but rather than continuing from where he left off, he starts with what appears to be a change in topic initiated by “so” (line 4). Julie starts speaking at the same time (line 5). Here, she comments, “Oh, we dropped an egg”, signifying that the game has faltered, with the likely consequence of them needing to start the move again. Julie’s “Oh” prefaced turn is oriented to Brad as turn competitive, and he drops out, allowing her to continue.

Brad retakes the floor and ownership of the directive giving, self-selecting as the next speaker in line 6 “Right, you move”. His subsequent turns are constructed as single directives. This time, he recycles the action to “move”, but this time in the form of a directive to Julie, changing the pronoun from “we”, suggesting a collective move to “you” as an instruction to Julie. The pitch fall and vowel lengthening on “move” suggests a turn-completion, not a turn-holding, with more information to follow. The initial problem reoccurs because there is still insufficient information for Julie to act on. Brad’s follow-on turn changes the verb to “turn” and after a micropause, he adds more information to complete the turn “to the left”, marking the Tonic on the turn-final “left”.

The one-second pause before Julie responds may be indicative that she is working out what to do, as her second-pair part does not project dispreference (Pomerantz 1984). Instead she initiates an other-initiated repair of his prior turn with a repetition of the verb “turn” before self-repairing with a change of state “Oh” (Weidner 2016; Heritage 1984), followed by a new verb “rotate”, produced with a questioning pitch fall-rise. Brad’s repeat of this item with pitch fall signals his acknowledgement and acceptance of the lexical repair (Müller 1996, p.163), and the game continues. Julie only gains the information she needs to execute the move, through an other-initiated repair once Brad’s self-repairs have been unsuccessful.

The extract shows how Brad’s delay in organising and executing a contiguous and coherent directive the first time (line 3) impacts Julie’s ability to carry out the instructions correctly at the right time. He eventually produces a cohesive turn by returning to a less complex syntactic and prosodic construction. Moreover, Brad’s prosodic turn design in terms of Tonic placement and insufficient semantic information contribute to the problems in intersubjectivity and hinder progress in the game.

These analyses illustrate how fragmented speech patterns arising from temporal disturbances and problems in turn design affect the overall turn construction. Consequently, the child has difficulty making a smooth and coherent trajectory towards completion. They also illustrate their preference for simplistic syntactic organisation and a typical tone unit pattern with a turn-final placement of the Tonic.

Although these problems can make it difficult for the adult to make an unproblematic bid for the floor or to carry out the instruction, the adults in this data adopt two strategies to avoid

interactional conflicts when the child is explaining or giving directives. First, they allow the child to proceed with their repair strategies uninterrupted until there is a clear indication of a turn end, or they can take a turn in the clear. Secondly, they initiate repair sequences when they take their turn in the clear. These strategies, whilst they can cause problems for intersubjectivity, show orientation by the adults to the children's displays of speakership rights and their ability to hold their turn until completion.

The final extract in this sequence illustrates the broad extent of this phenomenon within the data. The extract below is an instance where the child has difficulty during a sequence where the players are deciding which game to play. The commonality with the previous extracts is that the child, Henry, attempts to design a turn contingent on the prior turn using a complex syntactic structure, but a lack of contiguity causes problems. In this instance, Henry tries to recycle or latch on to Rebecca's lexico-syntactic constructions.

Extract 20

Rebecca and Henry have been playing for around 20 minutes. Henry has been sabotaging the game by cutting Rebecca's character into tiny pieces and preventing her from making any moves. Rebecca says that she wants to choose a different game. They exit the current one and go back to the home page. When the extract begins, they decide which one to do.

Extract 20: Crane Grab

```

1 Reb:  how a'bou? I 'I choose a `game 'this `time
2        (0.8) ((computer noise - selection))
3 Reb:  >shouldwe< 'do: 'tha?
4        (1.0)
5 Reb:  I-I think 'I want to 'choose (.)
6        `this[one with the'pig ]
7 Hen:  [I 'want to do `CANE] grab
           [k'hæm]
8 Reb:  the hamster
9        (2.0) ((computer noise - selection))
10 Hen:  'NO ↑NO::
11        (2.0)
12 Hen:→ pt 'I 'wanted t-d 'I 'wanted
13      → 'I 'wanted to do the `cane `crane one
14        (2.0) ((computer noise - selection))
15 Reb:  d'you 'think its 'my turn to `choose though:
16        (2.0)
17 Hen:  there 'is no `thing've
18 Reb:  coz 'you've you 'chose the `other one
19 Hen:  oo::
20 Reb:  so a 'think (.)
21        I'm gunna 'choo:se the `hamster one
22        so I'm 'gunna go `back
23 Hen:  I `chose this one
24        I-↑I've 'chosen a `special 'one .hh
25 Hen:  .h 'this 'is
           [ðɪs ɪj]
26        (0.5)
27 Reb:  >shallwe< 'do the 'hamster one `next then
28 Hen:  `yeah

```

RH004_0225_crane grab

Rebecca's first pair part at the beginning of the sequence suggests her choosing the game. Her turn, designed as an offer, "How about. . ." is designed to make her request subtly rather than directly. Henry does not respond, perhaps indicating that he is not in agreement, but he may not be listening to her equally. Rebecca persists in getting a response, following up with a more direct question culminating in a pitch rise: "Should we do that?". Henry still does respond. In lines 5 and 6, Rebecca hesitatingly suggests, "I think I want to choose this one with the pig". Her turn is organised to follow on from her bid to make the next game selection without directly saying that she will do so. Rebecca also makes a lexical error, this time identifying the picture on the screen, which she calls a pig. She self-repairs this in line 8 to "hamster". Before Rebecca has completed her turn, Henry starts up in overlap with a competitive turn- incoming.

His turn is constructed as a partial recycling of Rebecca's turn: "I want to do the cane grab" (line 7). Although not apparent until later in the sequence, "cane" represents a phonological error where the target item is "crane". Despite this, his lexico-syntactic design is organised in such a way as to make his contrast choice evident. Rebecca wants to choose the pig, Henry, the crane one.

The issue is both about what they choose and who is doing the choosing. Rebecca initially stakes her claim as to be the one to choose (line 1), to which Henry does not object. She then goes on in line 5 and 6 to stake her claim in what she wants to choose. However, at this point, Henry challenges both of her assertions: "I want to do the crane one" (line 7). It appears that neither player is willing to concede at this point. At the same time, there is a game selection on the screen, presumably the "hamster", to which Henry exclaims a loud "No No". Following a two-second pause, Henry recycles his prior turn this time in the past tense to indicate that he did not get what he wanted, "I wanted to do the crane one" (lines 12 and 13). The turn is produced higher and louder than his prior turn from line 7, which upgrades his complaint. Henry's construction of the turn is not fluent with recycling and segmental repetitions evident at the start of the turn. The micropause following [d] in "I wanted t d" followed by recycling the turn "I wanted" suggests problems in syntactic organisation. The remainder of the turn is constructed incrementally. He continues to have the same problem with the word "crane" needing to repair the cluster. Eventually, he reaches turn completion, indicated by pitch fall on the tonic "cane" and again on the repair "crane". Overall, Henry appears challenged in constructing his turn, both syntactically and phonetically.

These extracts illustrate the children's challenges in organising lexico-syntactic structures, particularly when they involve complex linguistic and phonetic formulations. The self-repair strategies indicate that these children are aware of what to say to achieve intersubjectivity but are challenged in the construction and execution of such turns.

5.3 Prosodic and phonetic modifications during contrastive and emphatic stress marking

For a speaker to highlight meaningfully important or contrastive information in their talk, they must make phonetic and acoustic modifications precisely timed with the relevant syllable or word to which they intend to draw attention. These stressed syllables are typically louder, longer and higher in pitch than the surrounding unstressed syllables (Ladd and Arvaniti 2023). The timing of this stress marking requires control and coordination of duration, volume, and precise articulation of phonemes and pitch (White 2014).

In marking contrastive stress, the placement of the Tonic must be switched from a broad

focus to a narrow one. Appropriate stress marking has interactional consequences, particularly when giving instructions, as the game's success relies on the speaker's precision and accuracy in delivering information relevant to the topical focus. When marking emphasis, however, there is a requirement to place additional stress on a particular item, increasing prominence relative to the surrounding stress pattern, as in 'This is too difficult'. The interactional implications may not be as marked as for contrastive stress in this context, but they still play an important role in the progressivity of the talk.

This section explores the children's competency in stress marking and identification of topical focus and the interactional consequences thereof. The extracts presented (Extract 21 Blue fish and Extract 22 Pink man) illustrate the children's ability to orient to and mark successfully contrastive stress and the phonetic and prosodic resources they deploy to achieve this. The following two extracts (Extract 23 Slowly and Extract 24 Extra hard) exemplify the children's competency in emphasising important information. They illustrate a key point. The children understand the importance of and can successfully indicate new, contrastive information and mark emphasis via the prosodic resources of duration, volume, and pitch changes.

However, there are times when these features are mistimed, leading to potential interactional troublespots. The types of problems which occur in the data are illustrated in Extract 25 Can you not and Extract 26 Noisy Notebook. This data shows that the children are aware of these errors as they quickly attempt to repair their turns. The data also reveals the children's competency in matching contrasting tones to align with the adult's agenda (Müller 1996).

5.3.1 Displays of competency in marking contrast and emphasis

The following analyses demonstrate the children's ability to use phonetic and prosodic changes to effectively emphasise and differentiate elements, albeit sometimes with unique characteristics. The use of contrastive stress and the identification of topical focus is particularly evidenced in directive sequences, where the clear conveyance of meaning as to who is to do what is critical to the game's success (Davidson 2010).

For the most part, the children can mark contrastive stress and topical focus using a combination of increased intensity, vowel length, and pitch change on the intended segment. Extract 21 Blue fish and Extract 22 Pink man illustrate this competency.

Extract 21

Tom and the researcher, Julie, have just completed part of a task called "Fish Splash". The task involves getting two fish out of the tank and dropping them down the tube. The red and green fish are needed as they match the icons on the wall. (Figure 5.6).

The players have been struggling with this game for some time, trying to catch all the fish rather than selected ones. Tom finally succeeds in getting the correct fish.



Figure 5.6: Screenshot of "Fish Splash". Used under fair use for educational purposes.

Extract 21: Blue Fish

1	Jul:	oh we:ll do[:ne]	
2	Tom:→	[> I]don even< 'NEE:d(.)the 'BLUE fish	
3	Jul:→	we don 'need the 'blue ~fish: hah	
4	Tom:→	we ^only 'nee:d the (.) 'gree:n n the 'red 'fish:	
5		(0.5)	
6	Tom:	ah:uh 'so: a`nnoying	

DJ003_1356_blue fish

Julie congratulates Tom, and Tom follows up with the assessment, “We don’t even need the blue fish” (line 2). Overall, his turn is high and loud. However, he successfully increases the intensity and length sufficiently to mark stress on “need” (they did not need the blue fish) and on the crucial aspect of colour, in this case, blue. Julie’s next second pair part is a repeat of his prior turn with the same stress pattern, with a slight laughter token at the end, and reinforces his first pair part. Tom’s next turn is a continuation of Julie’s turn, possibly prompted by Julie’s pitch fall-rise on her turn final “fish”, “We only need the green and the red fish”. Again, he stresses the contrastive colour elements, green and red (contrasted with blue). This extract illustrates the children’s ability to shift focus from a broad to a narrow one, moving the Tonic from the turn-final position. This example contrasts with Extract 2 That shape, where Andy did not prosodically shift focus from the turn-final position to align with Katy’s prior turn.

Further evidence is presented in the following extract in which the child, Simon, successfully

marks contrastive stress to confirm meaning.

Extract 22

This sequence occurs at the start of Cath and Simon's time together, and they are working out what the game is doing. The two controllers, one pink and the other yellow operate the actions of the two characters in the game.

Extract 22: Pink Man

1	Cat:	oo am 'I the 'pink man
2		(1.0)
3	Sim:→	'yeah 'you're the 'pink (0.1) 'I'm the 'yellow
		
4	Cat:	'so d'we 'have to 'fit into tha? 'shape
5		do you 'think

DC004_0010_pink man

Cath's first pair part asks, "Oo, am I the pink man?" In this turn, she stresses "pink" to confirm that she controls the pink character on the screen, contrasting with the yellow. Simon's second pair part is confirmative: "Yeah, you're the pink", with a focus on "you're" (as opposed to him) and "pink" (in contrast to yellow). The item "pink" is produced with minimal pitch fall and is followed by a micropause, indicating he has not completed his turn. He makes the follow-on turn with additional contrast, "I'm the yellow", with emphasis on "I'm" and the first syllable of "yellow". Prosodically, he marks the relevant focal items ("you're" and "I'm") with an increase in intensity and minimal vowel lengthening. Lexico-syntactically, his turns are incomplete, reducing the noun phrase to the colour adjective. This also places the Tonic in both TCUs in the turn-final position. In so doing, he demonstrates his awareness of the importance of colour contrast and the redundancy of the noun. His turn's linguistic and prosodic design (emphasising the person and the colour) shows clear matching tones aligning with Cath's topical focus in her prior turn. This successful organisation of the turn closes the sequences, and Cath moves on to her next question.

As illustrated, the children can deploy prosodic and phonetic resources to create prominence on particular words relative to the overall stress pattern. By contrast, however, the following two extracts reveal atypicality, which contributes to the child's unusual-sounding speech, although it does not affect the meaning of the turn. The two sequences below present opposing features. In the first, the child exaggerates; in the second, there is insufficient prosodic emphasis, for which the child compensates by adding lexical emphasis.

Extract 23

Henry, the child in this extract, typically speaks loudly and often uses a wide and exaggerated pitch range. Here, we can see that when he marks emphasis, he does so relative to his typical speaking style through additional segmental lengthening. He and Rebecca are playing “Mockingbirds”, where they must pass eggs to each other to get them into their nests (Figure 5.5). The game is challenging, and they are finding it difficult to complete. The extract begins with Rebecca and Henry arguing about how to complete the task.

Extract 23: Slowly

1	Hen:	[((points to screen))]
2	Hen:	['s::end it on to 'me 'now]
3	Reb:	['you 'have to 'ge? 'ready though]
4	Reb:	[((points to screen))]
5	Hen:	['NOW 'come 'on]
6	Reb:	that's 'too big a 'gap
7	Hen:	[((head tilt)) 'no] its 'no?
8	Reb:	[s'y' 'have]
9	Reb:	[i? 'is]
10	Hen:→	[if 'you]['S::lowly]move 'down
11	Hen:	[((head tilt))]
12	→	I can ['S::low:ly] get i? onto[(0.5)]to 'you
13	Hen:	[((head tilt))]
14	Reb:	[y' 'sure]
15	Hen:	'YES 'come 'on (.) 'down

RH004_1414_slowly

At the beginning of the sequence, Henry gives a directive to Rebecca, “Send it to me now”. Rebecca rebuts it by saying that Henry has to get ready: “You have to get ready though” (line 3), simultaneously pointing something out on the screen. The organisation of her turn with emphasis on “you” and the inclusion of “though” indicates that she cannot carry out his instruction “now” because he needs to be ready to catch the egg. Henry persists, urging her to do it: “Now! Come on!” (line 5). Rebecca also continues to assert a problem with her compliance because “that’s too big a gap”. This appears to reference that if she carries out the move as instructed, it will fail because there is a “too big a gap”; therefore, the egg will fall through.

She then continues with what may be a justification or a suggestion, “So you have” (line 8), but Henry comes in simultaneously with a rebuttal of there being too big a gap: “No, it’s not” (line 7). His head tilts before he starts his turn, preempting his rebuttal and emphasising his turn. Rebecca continues to refute “it is” (line 9). However, Henry also continues with a justification: “If you slowly move down, I can slowly get it on to you” (lines 10 and 12). The organisation of this if/then linguistic construction turn is syntactically complete. His design of

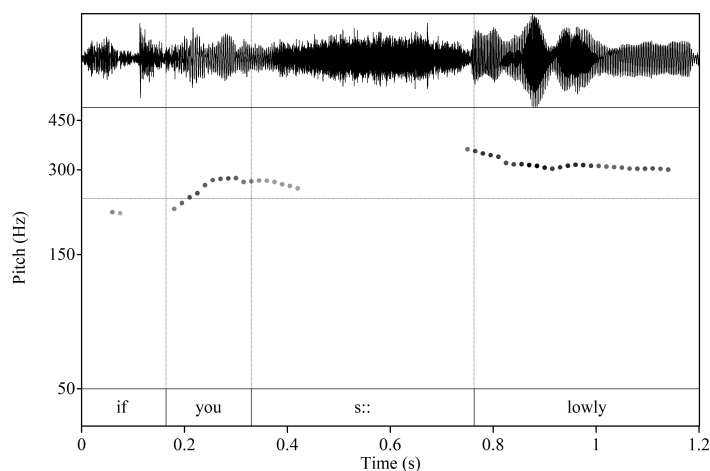


Figure 5.7: Diagram to illustrate prosodic design of ‘slowly’

this turn is such that the focus is on “slowly”.

In this case, using prosodic and phonetic resources to mark emphasis serves two purposes. A marked lengthening of the initial [s] and the vowel [əʊ] on both realisations of “slowly” emphasises these items relative to his surrounding talk. This is illustrated in Figure 5.7.

The diagram illustrates a prolonged transition from the voiced vowel in “you” to the voiceless [s]. On the spectrogram the intense turbulence on [s] can be viewed as more dense than the surrounding segments. The additional segmental lengthening without a significant pitch movement, particularly on the first “slowly”, also serves to compete for speakership in the event of the simultaneous start-up and brief episode of overlap, with Rebecca conceding the floor to Henry.

The additional exaggerated head movement accompanying these segments adds even further emphasis. Rebecca’s “y’sure” (line 14) indicates a shift from her previous disagreements to a weak agreement, to which Henry responds with an affirmative “Yes, come on! Down!” (high to low pitch fall), at which point the sequence closes and they continue with the game.

The extract illustrates how, because Henry already speaks with a fluctuating prosodic style, his marking of emphasis using additional resources (in this case, segmental lengthening and embodiment) shows an awareness of his need to work harder to make his point more noticeable.

In contrast to Henry, Brad generally speaks with a quiet voice, a fast pace, and little pitch movement. This short sequence shows that Brad’s use of prosodic resources to mark stress is relatively weak; he adds grammatical markers to make the emphasis relevant.

Extract 24

Brad and Julie have been working on a task for some time and are not progressing. Brad comments, “It’s an extra-hard game this.” Julie replies, agreeing and recommending, “It’s not

going, is it?"

Extract 24: Extra Hard

1	Ben:→	its	an	'extra	'har:d	'game	'this
				—	—	—	—
2	Jul:	'ye:ah:::	its	'no?	'going	'is	i?
				—	—	—	—

BJ002_1505_extra hard

Brad's first pair part, assessment of the game being "extra hard", justifies the previous move going wrong. Figure 5.8 illustrates the prosodic design in detail. The turn is overall low in volume. There is some pitch movement with a pitch rise on the intensifier "extra", beginning in the above-average range, peaking to above 400Hz, and dropping to mid-pitch on "hard". This pitch movement, in addition to a slight increase in intensity and lengthening of the vowel in "hard", signals the tonic. Brad's linguistic design, including his use of the referent "this" (as in "the game") and the intensifier "extra", emphasises the game's "hardness" in the absence of clear prosodic markers.

These two extracts illustrate the children's competency in marking emphasis relative to their baseline speaking styles. In Henry's case, as someone whose typical vocal pattern tends to be loud with wide pitch variations, he deploys additional length and non-vocal gestural features to mark emphasis. On the other hand, Brad, whose speech is low volume, fast-paced and has slight pitch variance, deploys pitch rise, length, and additional lexical elements to denote emphasis.

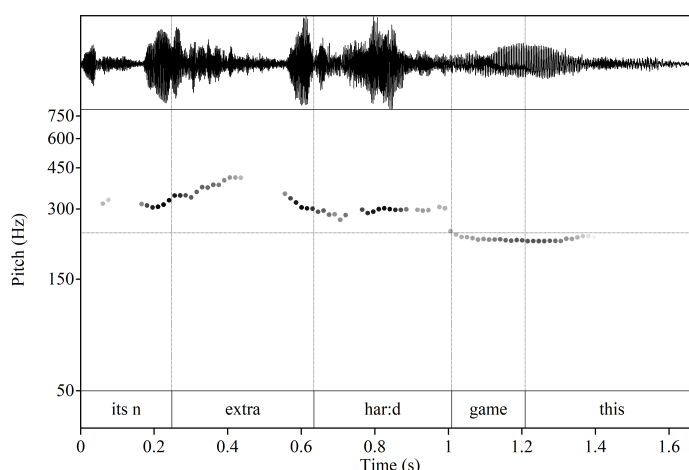


Figure 5.8: Diagram to illustrate the prosodic design of "It's an extra hard game this"

5.3.2 Management of trouble-spots when stress marking

The data also show instances of the children having problems with stress marking. Subsequent attempts to self-repair indicate that the children are aware of the error and its implications for intersubjectivity but have trouble organising and repairing their turns. The two extracts presented here illustrate the types of challenges the children display.

The following sequence illustrates how Simon, the child, effectively repairs his stress placement to emphasise the important information to convey his message. Previous analyses of this child have shown that he has problems coordinating the timing of phonetic features to transition from one segment to another. The sequence presents an example of where this mistiming affects stress placement. Simon is shown to have sufficient awareness to repair his turn to mark a different item.

Extract 25

This sequence occurs early on in Simon and Cath's interaction. They have just begun a task but are still working out the game moves and how the controls work. Neither has played the game before, but Simon is more familiar with game consoles than Cath. He has been helping her.

Extract 25: Can You Not

```

1 Cat: 'isi? 'eks for 'cut
2 Sim: y 'ye uhm 'no (.) m [((looks at C's controller))]
3                               [ (0.5) ]
4 Sim:→ for 'you 'yes
5 Cat: °yeah°
6 Sim: may I y
7 Cat: a've done i? now
8       (0.5)
9 Cat: uhhahaha
10 Cat: now [then AH:::::::::: ]
11 Sim: [cn you jus 'kill me]
12 Sim: cn you 'jus'press the 'eks 'button[ a'gen]
13 Cat: [y' wan] me to
14       'kill yer
15 Sim: ['yes:]
16 Cat: [o'kay]
17 Sim: erm cn you 'n:
18       (0.5) ((computer noise))
19 Sim:→ 'so: (.) 'I need to do 'thi:s
20       (1.0) ((computer noise - turning))
21 Sim:→ cn you 'n:o:? can 'you not 'press the 'eks 'button
22       [for 'this one]
23 Cat: [o'kay ]

```

SC006_0306_can you not



Figure 5.9: Image of "TM Switch" controllers illustrating the X button on the blue controller.

The sequence begins with Cath asking Simon about the controller: "Is X ("eks") for cut?". As shown in Figure 5.9, her blue controller has a button marked X.

Pressing this button performs a cut action to the characters on the screen. Simon's red controller also has a 'cut' button, which is not marked as X. Simon's response is initially contradictory: "y ye uhm no". The answer depends on which controller is being referred to. Simon checks by looking at Cath's controller and follows up with a more definitive "For you, yes" (line 4). X is the cut button for her controller, which contrasts with his controller. Although the turn is elided in its grammatical structure, Simon shows competency in using stress marking to align with Cath's prior turn. Stress is placed on "you" and added intensity on "yes". This highlights the two critical pieces of information in response to her question and shows the use of both topical focus ("you") and tone matching ("eks" and "yes") to show alignment.

The lexico-syntactic formulations used in this sequence use a modal as a question. There are two possible interpretations in this context: he is questioning her ability to perform the actions of giving an indirect instruction. Following his turn in line 12, Cath's insertion sequence to clarify (lines 13-14) overlaps with his projected TRP following the "button", and her subsequent acknowledgement, "okay" (line 16) suggests that she has received this turn as a directive. This receipt is possibly facilitated by his relatively reduced prominence on the realisation of "can" by reducing the vowel, thereby diverting emphasis from ability to a focus on the subsequent action. In so doing, "can you" becomes somewhat redundant.

In line 17, Simon begins another directive recycling the same grammatical and prosodic format as in his prior turns: "Can you n...". In this instance, it appears he is about to include a negative, as in "Can you not... ", but he abandons his turn before completion. The subsequent slight pause with computer noise suggests some action on the screen, and Simon pivots with a change in topic: "So, I need to do this" (line 19). The cluster of features on "this", prolonged vowel, increase in intensity and pitch change emphasises the item. Considering it is

accompanied by computer noise, the indication is that Simon is drawing attention to something he is doing on the screen. The pitch fall-rise suggests that he has not finished and has more to come.

He picks up his talk, recycling his previous turn from line 17 in lines 21 and 22 (can you no – can you not press the eks button for this one”). In the first iteration, as before, there is reduction of the vowel in “can” and emphasis on “not,” with segmental length on [n] and on the vowel [ʊ] (‘o’) and a pitch fall. However, he halts abruptly and restarts the turn. This time he emphasises “you” before continuing to complete, with the Tonic marked on “eks”: “Can you not press the eks button for this one?”. It is not possible to ascertain the intention underlying his self-repair. The repetitive pattern observed in the turn design in the sequence is notable. Nevertheless, there are indications that he possesses an awareness of the implications for intersubjectivity based on topical focus.

In either event, the overall meaning of his directive can be understood from the prior context and through his lexico-syntactic design, thus rendering the stress placement repair somewhat unnecessary. However, it does demonstrate Simon’s awareness of the importance of emphatic stress as part of his overall turn construction and his ability to modify to some degree.

Extract 26 Noisy notebook is from Henry’s data. In this sequence, problems arise regarding where to place the stress in his turn. There are multiple repairs before he completes his turn.

Extract 26

Henry and Rebecca are currently choosing their next task. To select a game on the home page, Rebecca must hover over the icon and press the button A on her controller. Henry presses the button instead and makes a mistake in selecting the game. Rebecca recognises that she has to press the button (line 6).

Extract 26: Noisy Notebook

```

1      ((Computer noise - selection))
2 Hen:  oh 'I jus ˘got i˘
        [gɒrɪ˘]
3 Reb:  [n::]
4 Hen:  [OH] ˘sorry
5      (0.5)
6 Reb:  [no its ]okay a press
7 Hen:  [˘HEY ]
8 Hen:  hey lets ˘do: this
9 Hen:  aw nonono I ˘want
10     (1.0) ((computer noises - selection))
11 Hen:→ pt I ˘want to ˘DO ˘noisy ˘no? ˘notebook
12 Hen:  hey ˘I wanna d ((computer noise - selection))
        [ʌʌnə]
13     (1.0)
14 Reb:  [its loading ]
15 Hen:  ['this was the ]˘one we jus ˘did
16 Reb:  it gunna be a difrn˘ shape
17     (2.0)
18 Hen:  ..hhh it's the ˘sa:me ˘one
19 Reb:  oh:: (.) hm

```

RH003_1453_noisy notebook

The sequence begins with a brief exchange in which the pair select a game. It is unclear what is happening from the talk, but there appears to be a problem with the correct selection. Henry's "Hey, let's do this" (line 8) marks a topic shift indicating a selection has been made. He emphasises "do" through increased volume and length and a prolonged pitch fall, denoting the Tonic.

His next turn in line 9 ("aw no no no I want"), produced with a high pitch; however, it projects more problems. It is abandoned partway through, and in the one-second pause, the computer noises indicate another selection has been made. Henry self-selects as the next speaker in line 11, picking up on his prior turn and beginning with a partial repeat, "I want to do noisy notebook". While lexically and syntactically complete and meaningful, the prosodic emphasis on "do", marking this as the Tonic in this turn, creates a potential trouble spot as it does not align with the context if his complaint is about choosing a different game than the one he wanted. The subsequent self-repair of "notebook" perhaps indicates an awareness of a trouble spot as he goes on to recycle his prior turn, this turn with a different stress pattern in line 12.

Although incomplete, he begins a shift in the focal points, reducing "want to" to "wanna d" [ʌʌnə] through vowel modification and elision of [t], marking these syllables with less

prominence. The interim pause and Rebecca's insertion, commenting, "It's loading" (line 14), suggests another game has been selected and is loading on the screen. Henry starts up simultaneously, commenting that they have just finished that game. Rebecca reassures that it will be a different shape, and the interim computer noise indicates the game has completed loading. Henry's complaining continues in line 18, where he comments that the game is "same one", to which Rebecca receives as new information, followed by a thinking token. His turn in line indicates that his focus was on the choice of game and not the 'doing' of it.

Rebecca's lack of participation in this sequence is striking. The only occasion she responds in the second-pair part is in response to Henry's lexico-syntactically and prosodically complete turn in line 15: "This was the one we just did". It is not possible to determine if she is focusing on the game selection and not listening or if she is not responding because his meaning is unclear.

Henry's marking of the Tonic in lines 11, mirrors his turn design in line 8, emphasising the action 'do'. Over several turns, Henry finally completes his turn." Although lexico-syntactically, he makes what he wants evident, and the changes in emphatic stress obscure the precise meaning. His multiple self-repairs suggest that he is aware of a need to change how he is organising his turn. Still, it is impossible to determine his original interactional target, and if completed, he did achieve his intended meaning.

The presented extracts reveal that problems with stress marking for contrasting and emphasising meaning differences occur. Still, they are more related to arbitrary difficulties in the timely and accurate deployment of prosodic and phonetic features than a lack of cognitive awareness of the meaning differences involved (Diehl et al. 2015; Franich et al. 2021; Shriberg et al. 2001).

5.4 Summary

This chapter has detailed the children's predominant intonation and speech sound patterns influencing turn progression and intersubjectivity. These analyses endeavour to understand how these children use prosodic phonetic and linguistic resources to design turns to achieve their interactional goals. The primary focus of this chapter was to explore the sequential progressions and phonetic modifications made across a turn towards its successful completion.

The chapter begins by exploring the sequential progression at the segmental level and the impact on flow, rhythm and intonation. The children's talk generally displays segmental transitions, which create a smooth flow across the turn. Features of hyperarticulation, coarticulation and elision, in addition to prosodic components such as pitch movement, vowel lengthening, and changes in loudness, allow the turns to progress to completion in ways similar to that found

in the talk of neurotypical children (Wells and Stackhouse 2016, pp144-149). However, the deployment of these resources is shown to be inconsistent. Issues with the mistiming and lack of coordination of these features result in distinctive patterns that affect the turn's overall flow. These patterns are variable and unique, impacting their turns at random points and in different ways.

The analyses provide evidence that the children display an uneven rhythm with sudden acceleration and decelerations, making it more difficult for adults to anticipate turn transitions and impacting the overall coherence of the turn. This variable rate can be attributed to challenges in coordinating articulatory gestures between segments. These challenges are exhibited in features of hyperarticulation, slowing down the rate (as in Extract 13 Believe) and elision, causing a rate increase (as in Extract 15 Rubbish).

The adverse effects of challenges in temporal coordination can be seen most clearly when the children are engaged in actions requiring complex linguistic planning and organisation. The data reveals problems in the children's turn design when coherence and cogency are critical, such as when giving instructions or explanations. The analyses presented reveal fragmented and disjointed turns, which inhibit and disrupt the sequential progression of the turn towards completion. In these actions, planning and coordinating linguistic and articulatory features when designing syntactically complex utterances present significant challenges for these children. Difficulties in phonetic integration and progression result in fragmented or disjointed speech patterns that break the continuity of the turn. It is, however, essential to note that these atypical features do not always result in problems in turn transitions or intersubjectivity. The adults tend to adjust to the differences (Kelly and Beeke 2011).

The analyses in this chapter illustrate that, for the most part, these children have no difficulty using prosodic resources to highlight the importance of contrastive information. However, two findings suggest challenges do exist. Firstly, the children rely on duration and intensity to mark stress, and there is less variation in pitch. Secondly, where stress is misplaced, the children attempt to repair it but have challenges. This finding suggests that these children know where the emphasis will be made in the turn but are challenged when required to reorganise their design to denote an alternate meaning.

The data indicates that social-cognitive difficulties in prosody functions, such as contrastive focus and emphatic stress (Peppé et al. 2011), are not immediately noticeable in these children. The differences observed in prosody are not directly related to pragmatic function (Walker 2014), are variable, and are more awkward in timing and integration than pragmatically deficient (Paul 2008). These problems are predominantly observed in the directive sequences occurring across the data. Further analyses have been conducted to determine differences in the children's turn design during different actions during another frequently occurring action: complaining.

It is postulated that more precise and cohesive speech patterns will be observed when the grammatical structures are less complex and have a canonical prosodic design. The game provides multiple instances of this during episodes of complaining. These sequences are explored in the subsequent chapter.

AFFECT: PROSODIC AND LINGUISTIC DESIGN

6.1 Introduction

This chapter continues the exploration of the prosodic and linguistic features involved in turn design. It focuses on how the children construct turns, specifically during complaint sequences. In examining the complaint recipient's responses and the subsequent management of these turns, consideration is given to achieving their interactional goals.

Chapter 4 discussed how the children's position of entitlement influences the turn design during directive sequences. The analyses in this chapter, conversely, demonstrate how they use complaints to maintain this position through avoidance and deflection of culpability rather than using more adaptive and prosocial forms of conflict resolution, such as requests for help or negotiation. More specifically, the children's ability to achieve their interactional goals as they unfold during episodes of conflict via prosodic and linguistic turn design is discussed. Similarly to those seen in directive sequences, turns in complaint sequences are also considered in terms of their overall temporal coordination and rhythm.

Initial observations of the data set highlighted frequent episodes of complaining when the game did not go according to plan. As with the directive sequences, these complaint sequences are frequently 'unbounded' in that they do not have an easily identifiable beginning and end and are often connected to prior events in the game. Furthermore, the boundaries between what might be considered a direct complaint levelled at the other participant and a third-party complaint are blurred in game playing. When immersed in the game and when tensions are heightened, a complaint can erupt suddenly. The lines between displaying frustration with

the game and the other player's skills are often blurred. The children in the data frequently construct complaints against their co-participants. However, they are equally likely to complain about the problems occurring in the game or characters in the game.

Given that the participants are manipulating the characters on screen, some 'complaints' addressed to the characters could be indirectly be targeted at the other player's skill or performance. It is also the case that those, which may be constructed as 'third-party' complaints superficially, may not in fact be complaints but rather more attempts to seek help; what [Alshammari and Haugh \(2024\)](#) term troubles-complaints.

Moreover, in the context of game-play, [Hofstetter \(2020\)](#) describes how some complaints, despite complaint-relevancy is contextualised by the recipient as 'play', and therefore non-serious. This contrasts with other lexical complaints where there is a possibility of conflicts arising and game actions being withdrawn. Hofstetter describes two non-lexical features of these complaint-sequences do not carry the consequences of other complaint designs which project non-seriousness: laughter and moans. The inclusion of these features do not carry the consequences of other complaint designs, in that the relevant response is not empathy, repair, rejection or justification.

Therefore, complaints during gameplay are complex and delicate actions which require careful consideration.

The analyses presented in this chapter represent the collected examples of direct and indirect child-initiated complaints and a significantly smaller collection of adult-initiated complaints.

The collected complaint sequences can be partitioned into two main groups:

- 1) Direct complaints: These include specific lexico-syntactic features that reference the adult individual and contain a negative assessment.
- 2) Indirect or third-party complaints: These involve an indirect referent (such as "it is" or "this is") or a reference to the game accompanied by a negative assessment.

The analyses are primarily concerned with the linguistic and prosodic resources used during these complaint sequences and the extent to which the children successfully achieve their interactional goals through their turn design.

The chapter focuses mainly on child-initiated complaints/response sequences, the most frequently occurring in the data. Section 6.2 presents evidence for the children's two most frequently occurring turn designs: direct and indirect complaints, where there is a distinct complaints-relevant prosodic design ([Ogden 2010](#)). The analyses illustrate how the lexico-semantic designs of complaints differ depending on the children's interactional goals. They also reveal how the children's use of canonical 'complaining' prosodic design increases the likelihood of these turns being treated as complaints. Moreover, evidence is presented regarding the influence of emotional affectivity on construction and coordination across the turn.

Equally important to consider, however, is how these children treat complaints made by the other player. Questions about their ability to recognise a complaint design from its linguistic and prosodic features are asked. How the children treat such complaints is relevant to exploring and understanding the role of interactional dynamics. Section 6.4 presents two adult-initiated complaint sequences, differing in their design, to examine how the children respond.

Not all complaints require reparation in the context of video game playing. Along with directives and instructions, complaints are considered part of the interconnected social phenomena embedded in this type of activity (Reeves et al. 2017). Section 6.3 examines how the children organise and design their complaints to display ‘non-seriousness’ (Hofstetter 2020; McGraw et al. 2015).

The analyses present evidence to support an argument that the children’s addition of paralinguistic contextualisation cues projects the complaint’s acceptability in the context of ‘this is play’ and, therefore, not to be taken seriously. It is demonstrated that adding these cues facilitates an affiliative response from the adults. These analyses also reveal a lack of design flexibility, with the children deploying additional prosodic features to modify or downplay complaints rather than using a more sophisticated linguistic structure.

To summarise, section 6.5 presents an overview of the analyses and the consequences for progressivity.

6.2 Child-initiated complaints: Direct and indirect

This section presents extracts of the most frequently occurring complaint sequences initiated by the children. Two distinct designs are evident: direct complaints, where the complaint is levelled at the adult, and indirect, where the child’s claimed issue is with the game. The three analyses show similar prosodic and phonetic features but different lexico-syntactic designs.

The first extract represents a frequently occurring event in the data: the child actively uses an insult or reprimand directed to the adult (Daly 2018). The linguistic design is accompanied by a cluster of prosodic and phonetic resources characterising the turn as a direct complaint. The second is representative of an indirect complaint, with blame targeted towards the game. The third combines the two with a direct lexico-syntactic and prosodic design directed towards the game.

Extract 27

Henry and Katy have been playing for a short time. They are currently engaged in a task which requires collaboration to make baskets to catch eggs (“Mockingbirds”, previously described in Table 3.1 and Extract 19 Dropped an egg). Henry has played the game before. Katy

is also familiar with the game. Henry has been trying to control the interaction by sabotaging Katy's moves.

Extract 27: Moron

```

1  Hen:  NO::
2  Kat:  ~yeah::
3        (3.0) ((computer cutting noises))
4  Kat:  !NO:::
5        (1.0) (computer cutting noises))
6  Kat:  'he:'he:
7  Kat:  [hhhhuh ((Laughter )) ]
8  Hen:  [ ((H thumps K on arm ))]
9  Hen:→ 'you !M:OR::`on
          ((leans forwards, looks at screen, smiles))

          -  ~~~~~
          (3.1) ((K leans back on chair, smiles))
10 Kat:  >shallwe 'trythis a`gen<

```

KH001_714_moron

When this extract begins, Henry is not playing the game. Instead, he is cutting Katy's character to pieces, which means she cannot make any moves to progress. Katy then engages in some tit-for-tat play with Henry, cutting him instead. During the 3-second pause in the talk, computer noises can be heard where it appears the cut fight is continuing. Katy's "No" in line 4, followed by a further pause, indicates that back-and-forth actions are occurring. Katy makes a token of voluntary laughter "he:he:" (line 6) (Lavan et al. 2016). It seems that she has won. Henry's response is an upgrade to what had to this point been a playful cutting fight and punches her on the arm. He follows up his aggression with an insult in line 9 "You moron!".

Henry directs his insult at Katy with the explicit "you" and follows this with a derogatory term to describe her. As shown in Figure 6.1 below, Henry's prosodic design is an extreme variation to his typical pattern, using higher pitch variation than his average (over 500Hz) and high intensity across the turn. The intensity is at its most significant on the first syllable of "moron". The hyper-articulation of the consonant [m] and the vowel [ɔ], including significant prolongation and increased intensity, place further emphasis on this word. There is, however, no loss of articulatory coordination between the segments, resulting in a smooth progression across the turn.

The design of Henry's turn projects outrage directed towards Katy. However, as he speaks, he does not direct his attention towards her. Instead, he leans towards the screen and smiles. This indicates a disconnect between his prosodic design and his emotional state in that Henry can actively produce a complaint-relevant turn, without any apparent high emotional arousal,

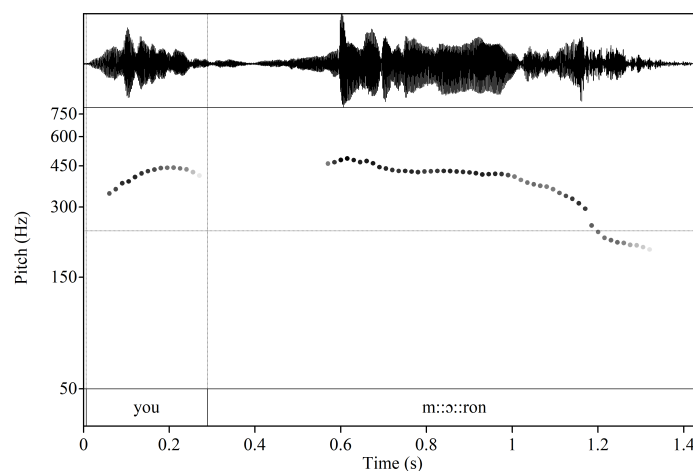


Figure 6.1: pitch and intensity for "You moron!"

but which, through the deployment of hyper-articulatory features adding emphasis to ‘moron’, project an affect stance towards Katy (Freeman 2014). Daly (2018) describes these complaints as explicitly designed to cause offence.

Following Henry’s insult, there is a 3.1-second pause, during which there is no talk. However, the video footage shows Katy’s embodied response. She leans back and smiles exaggeratedly, not accompanied by laughter. Henry, looking at the screen, does not see her reaction. She self-selects as the next speaker (line 10) with “Shall we try this again?” Thus, she closes the complaint sequence.

Daly (2018) discusses that recipients of an insult can choose to be offended, and in this case, Katy’s response suggests that she is not taking offence. In the context of a playful retaliatory exchange, this is not unsurprising. However, her disaffiliation by disengaging from the physical and verbal interaction allows her to avoid the potential for escalation and conflict (Drew and Walker 2009).

This example highlights how Henry uses an explicit lexical and prosodic design to complain to Katy directly. Although she opts not to respond verbally, her embodied response shows she has treated his turn as complaint-worthy.

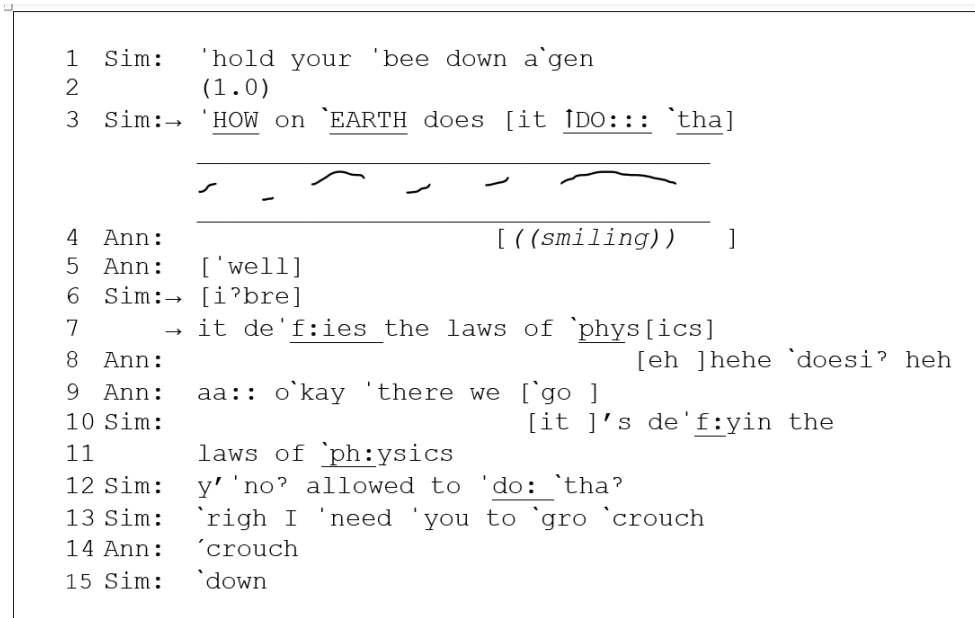
The second extract represents the most frequently occurring complaint type in this data. Here, the blame is directed towards the game.

Extract 28

In this sequence, Simon and the adult, Ann, play "Balloon Burster" table 3.1. The objective is to burst the balloons floating at the top of the screen. To achieve this goal, the players need to cut one of the characters in the game into a sharp point and manipulate the other character to use this point to burst the balloon. They played together for around 25 minutes and already

completed some tasks. This one is proving a challenge because the balloon moves around randomly and is difficult to burst. They are just beginning a new strategy. Simon, the more experienced gamer, has taken on the ‘expert’ role and is guiding Ann, who is new to the game.

Extract 28: Physics



AS003_0755_physics

The extract begins with Simon’s directive to Ann, “Hold your B down again.” In this instance, the B refers to the button on her controller. There is a one-second pause in the talk, followed by Simon beginning a complaint sequence in line 3, “How on earth does it do that?”. Despite the lack of concrete reference to what is happening on the screen, it seems likely that Simon is referring to the balloon’s propensity to drift across the screen at inconvenient points. The turn is syntactically organised as a question, using the idiomatic phrase “How on earth”, which feasibly expresses confusion regarding the balloon’s action. Moreover, the turn construction facilitates a claim that what is happening in the game is not in Simon’s control and, therefore, his inability to complete the move is not his fault.

The prosodic design of the turn likewise contributes to the claim this is a complaint-worthy event. Figure 6.2 below shows an overall increase in intensity and higher-than-average pitch variation over most of the turn with increased intensity and pitch rise on the first item “how” and “do”. The vowel lengthening on “do” further emphasises this already extreme formulation. The final pitch fall to low on “that” signals his turn ending. As in the previous extract, there is no fragmentation at segmental transitions or loss of coordination across the turn; it flows smoothly. This contrasts with other turns from Simon’s data, where he is seen to have difficulties with articulatory transitions.

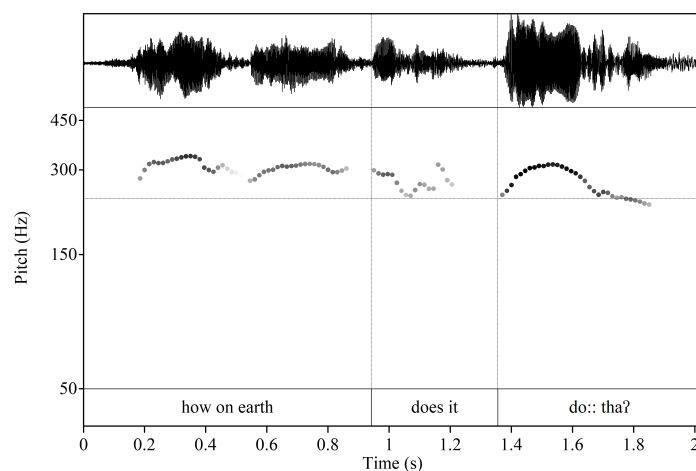


Figure 6.2: Pitch and intensity contour for "How on earth does it do that!"

Ann begins smiling midway through Simon's complaint turn. As he completes his turn, she begins to speak, "Well". However, her start-up coincides with Simon's continuation of his prior turn: "It defies the laws of physics" (line 7). In this instance, her use of "well" could preface any number of actions. Considering the structural preference for agreement (Pomerantz 1984), her turn may signal an attempt to pre-empt a transition to a new idea. It is impossible to know what was to follow as she drops out of her turn, conceding to Simon.

Her smile may indicate her amusement at his idiomatic description as she laughs more noticeably at the end of his next turn, which includes another idiomatic phrase, "defies the laws of physics". The first part of his turn begins with "It bre", (likely the onset of "breaks"). However, he discontinues and repairs this, upgrading to a more substantial term, "it defies". His repair may also be in response to the overlap and designed to assert his continuing right to speakership. Her response, 'Does it?' is relevant to his prior turn on a superficial level, taking his phraseology literally. Her response, however, is preceded by laughter, indicating that she is responding to his complaint at a humorous level.

Ann takes the next turn with "Ah, okay, there we go" (line 9). Although, again, it is not evident what she is referring to, it appears something has happened in the game which has moved things forward. Nonetheless, Simon continues complaining by recycling his prior turn, "It's defying the laws of physics", expanded on with, "You're not allowed to do that" (lines 10 to 12). Continuing this way, he appears to justify his initial complaint and extend his lingering dissatisfaction with the game. Two specific features indicate that he is foreshadowing the closure of his complaint sequence. Firstly, the sequential organisation of this negative assessment, following directly from his prior turn and with a definitive pitch fall at the turn end, gives finality to the turn. Secondly, he immediately follows up with a change of topic to issue

a directive.

In this case, Simon legitimises his inability to carry out the move by expressing the balloon's egregious nature. The design of his initial complaint turn renders it complaint-relevant. In line 5, Ann may have been about to respond to the questioning format with an explanation or offer of help. However, by continuing to direct his ire at the game and not at Ann along with the use of idiomatic language, he presents an opportunity for Ann to join in, which results in her treatment of the turn as an indirect complaint. (Alshammari and Haugh 2024; Edwards 2005). Simon successfully designs his turn to avoid culpability and gain Ann's collaboration.

The final extract is also taken from Simon's data, playing the same game, but this time with a different adult. The lexico-syntactic ("you" + descriptor) and prosodic design are analogous to Henry's complaint in Extract 27 Moron. However, it is directed towards the balloon itself. Given that the balloon will not respond, Cath, the adult, treats this as an indirect complaint.

Extract 29

As in the previous extract, Cath and Simon are challenged with the balloon-popping task, "Balloon Burster". In this scenario, they are beginning a manoeuvre again, which involves the characters jumping up to pop the balloon at the top of the screen.

Extract 29: Stupid Balloon

1 Ca: >wha if we<'both jump to'gether
2 will 'tha? be a 'bik make a 'bigger 'jump
3 Si: i?^migh? (.) 'hang `on (.)
4 'YOU `jump an then 'I kl`jump
5 Ca: shll we `go after ^three:
6 Si: `yehk
7 Ca: 'one:: 'two `three
8 (1.0)
9 Ca: ?hh
10 Si: °hh oh f?°
11 Si:→ ?ARGH YOU 'S:TUpid[(0.5)`ball:OO:n]
[ɑː::ju ʃtʃʊpɪˌ?] [bəl:u:n]

12 Ca: [huh heh hahaha]
13 Ca: 'shall we 'le 'geev it a 'second to 'f
14 Ca: 'maybe 'i? ull
15 Ca: 'maybe 'float `down a 'little bi? 'wont it
16 Ca: [°..... °]
17 Si: [it 'doesn] 'floa? [dow::n]
18 Ca: ['does i?] ~no?
19 Si: it 'just (.)
20 Ca: ..hh `righ shulwe 'do a big `jump then
21 Ca: 'one (.) 'two (.) `three
22 (0.5)

SC005_0820_stupid balloon

Cath begins with a two-part turn comprising two questions. The first is a proposal, “What if we both jump together?” followed by “a direct question, which is repaired part way through “Will that be a big- make a bigger jump?”. Simon produces a second-pair part orienting to direct question in line 3 “It might”. The lexico-syntactic and prosodic design (pitch fall-rise) suggests an uncertainty, which is followed up by an alternative plan. He self-selects as next speaker with the discourse marker “hang on”, holding his turn before continuing with a follow-up turn which is to modify Cath’s proposal of jumping together to “You jump, then I jump” (line 4). Cath’s next turn, a further proposal, “Shall we go after three?” indicates an implicit agreement with this plan. Simon, in turn, produces a clear agreement “yeh” (line 6) with a pitch fall (Stevanovic 2012). The sequence culminates in Cath counting them in “one, two, three” (line 7). This is followed by a one-second pause, in which they can be seen pressing buttons on their controllers. A mutual sigh in lines 9 and 10 from both players suggests the action was unsuccessful. Simon begins his complaint constructed as an insult directed towards the balloon in line 11: “Argh!

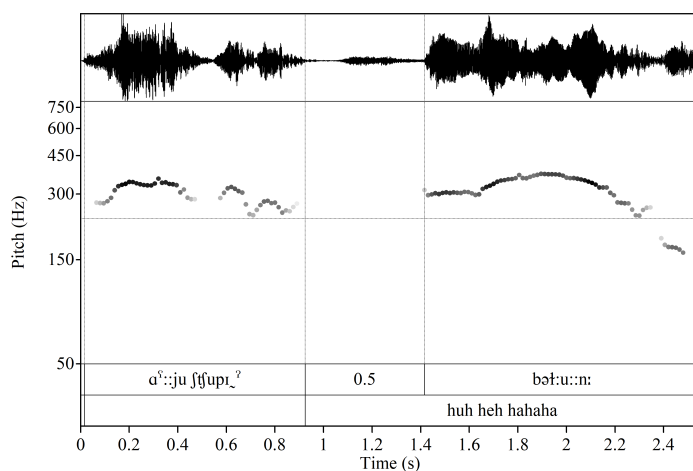


Figure 6.3: Pitch and intensity contour for "You stupid balloon!"

You stupid balloon!". His lexico-syntactic formulation characterises his turn as an insult (Daly 2018).

The prosodic features displayed in this turn are a significant change from Simon's surrounding talk and signal a change in affective state. Simon's initial "Argh" is intense and prolonged. The token is characteristic of a game response cry in reaction to a game event (Hofstetter 2020). Figure 6.3 illustrates the prosodic design of this turn, which is consistent with canonical complaint prosody.

His initial "Arghh" and the remainder of the turn are delivered with a higher global pitch and intensity than the rest of his surrounding talk. The pause mid-turn represents prolonged lip compression before releasing the initial voiced consonant [b] in "balloon". Voiced consonants are not accompanied by a release of air as in the voiceless bilabial [p], but in this case, there is plosion due to the intense lip compression prior to the realisation of the sound. There is an overall quality of tension as a display of frustration culminating in prolonging the vowel "oo" [u] of "balloon". The long pitch fall on the second syllable of "balloon" signals his turn completion. The hyper-articulatory features are comparable to those seen in the previous chapter, particularly in the extract "believe". However, they are not atypical for a canonical prosodic design in the context of a complaint.

Simon pauses midway through this turn between "stupid" and "balloon", which marks the turn completion. It is not possible to determine whether the pause is due to the intense hyper-articulation, influencing a smooth progression to the next segment or if he is unsure how to complete the turn. In the intervening gap, Cath laughs. It is conceivable that she has already determined that he is frustrated with the balloon before completion. Despite the lexico-syntactic and prosodic design of Simon's turn as being complaint-relevant and not a

laughable event, her laughter denotes her treatment of his turn as ‘laughable’ (Hofstetter 2020; Holt 2016). Because he directs his complaint towards the balloon and not Cath, she is not obligated to provide a contingent response. However, once in the clear, Cath self-selects as the next speaker to tentatively and hesitantly suggest the next move in line 13: “Shall we le give it a second to f?” In this example, Cath contextualises his complaint as ‘play’ and moves the game on. However, it later transpires that Simon is not treating this as a ‘laughable’ event and continues complaining about the balloon not behaving as expected. Once again, Simon displays frustration directed towards the game.

The previous chapter observed that Simon and other children in the data display hyper-articulatory features, which can cause issues in constructing turns. However, when it comes to making complaints, these features, combined with heightened intensity and pitch changes, align with the typical prosody of complaints. This helps make these turns more likely to be treated as complaint-relevant.

6.3 Child-initiated complaints: Modifications to turn design

The data show that the children can treat problems in the game as non-serious and characterise the events as play. How they achieve this is notably consistent across the data. The following two extracts illustrate children’s designs to achieve their interactional goals in these contexts. The first is lexico-syntactically and prosodically designed as a direct complaint analogous to Henry’s “you moron” (Extract 27). However, the additional paralinguistic features used by both players facilitate the contextualisation of the actions as part of the game experience and are not to be taken seriously. The second extract presented shows similar features. This time, the child modifies the lexico-syntactic design and the paralinguistic features.

The third extract illustrates a small number of incidents where the child uses a different design to make a complaint. Here, the child uses an assessment to register his dissatisfaction. On this occasion, the adult does not treat this as complaint-relevant.

Extract 30

Tom and his mother have been playing for almost an hour and are coming to the end of the games. His mother is improving and beginning to anticipate some of the moves. They are playing a game called “Cage Free”. The task is for the characters to collect keys stored at the top of the screen and use them to open a cage to free the birds in the cage (see Figure 6.4).

Neither of the players has played this level before, and they are still working on their technique. The strategy is for one character to release the key and the other to catch it and use it to open the cage. Tom has overseen the game strategy.

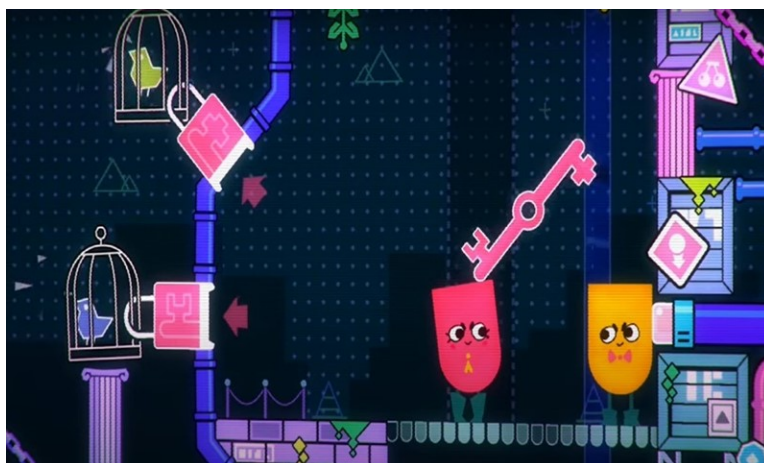


Figure 6.4: Screenshot of "Cage Free". Used under fair use for educational purposes.

Extract 30: Annoying Human Being

```

1 Tom: 'now we 'need to 'crouch
2 Tom: hoh >'kay nah o'kay<
3 Mum: ^crouch
4 Tom: ['yeah >'move'move'move < ]
5 Mum: [and 'now 'move a'long 'yeah]
6      (1.0)
7 Mum:→ [WHOA uhhuhuhuhuhuhuhuhahaha ] ..huh
8 Tom:→ ['NO 'you a'nnoying hu'man 'BE:ing]
9 Tom: [      ((smiling)) ]

```

```

10 Mum: 'sorry (.) 'try a'gain

```

DJ007_0314_annoying human being

The extract opens with Tom suggesting what they must do following a prior move. It is unclear what is happening from Tom's next turn in line 2, but it is possible that something is not quite right. His mother ignores this turn, referring to his first turn to clarify the action with a repeat of "crouch". She carries on her turn with "and now move along yeah," demonstrating an anticipation of the subsequent action. There is an episode of overlap where Tom starts up simultaneously to respond to her inserted clarification and instructs the following action to "move". The increase in speed and the repetition portray an urgency.

Following a one-second pause, Mum cries, "Whoa", followed by laughter (line 7). Although unspecified in the talk, it appears she is responding to something unexpected happening on the screen.

Simultaneously overlapping with his mother, Tom exclaims 'no' followed by an insult, "You

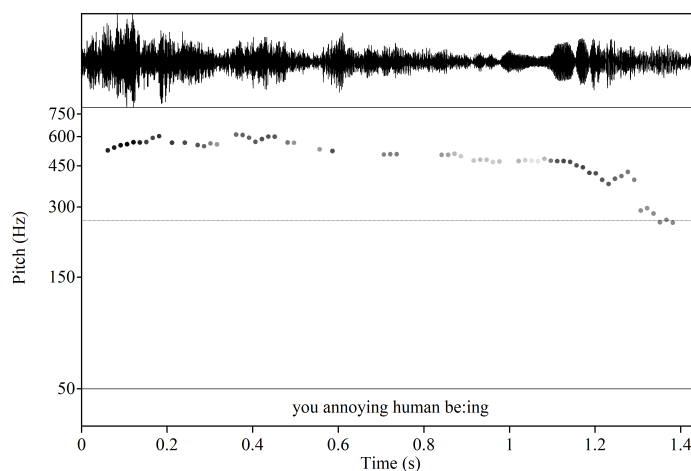


Figure 6.5: Pitch and intensity contour for "You annoying human being!"

annoying human being!" (line 8). His lexical choice of "human being" contrasts with Simon's "You stupid balloon!" and considering his mother is the only other "human being" in the room, he identifies his mother as being the source of the problem, but simultaneously depersonalises the insult. The lexico-syntactic and prosodic design of his turn is analogous to those delivered by Henry, 'You Moron!' (Extract 27) and by Simon, "You stupid balloon" (Extract 29). The prosodic design illustrated in Figure 6.5. is consistent with complaint prosody, with most of the turn produced above-average range of his pitch register, rising to over 600Hz, dropping only to mid-pitch with a pitch fall on the Tonic "being" to signal turn completion. His voice is strident and loud. Moreover, in contrast to the fragmentation and discontinuity seen in Tom's data when he gives directives or explanations (Extract 17 Puzzles, section 5.2.2), this turn is produced with an even pace and smooth segmental transitions.

Tom's mother immediately apologises, "Sorry," and offers to "try again" (line 10), thus characterising his turn as complaint-relevant.

Although Tom's formulation of the complaint might be considered belittling (Daly 2018), his accompanying embodiment, relaxed posture and smiling facilitate the characterisation of his complaint as non-serious. His mother's response, accompanied by laughter and without any withdrawal from the game, indicates she does not consider it offensive. Her apology and offer to "try again" suggests she accepts culpability without taking offence. She, thereby, closes the sequence, and the game progresses without further conflict.

In summary, Tom's complaint, an insult with a typical complaint's prosody, does not cause trouble because of the accompanying postural features by both players. Because the turn is co-constructed as 'play,' there is no withdrawal of game action (Hofstetter 2020).

Similarly, Andy's complaint in the following Extract 31 below demonstrates how paralin-

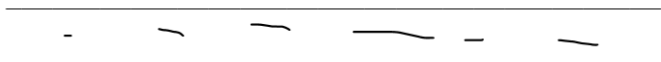
guistic features are used to downgrade the intensity.

Extract 31

Katy and Andy have been playing the game together for approximately 45 minutes. Both are proficient in it and know they need to collaborate. They are currently engaged in playing "Mockingbirds" (Table 3.1). The game involves creating 'basket' shapes out of the characters in the game and then cooperating to move the eggs between the two 'baskets' to transport the eggs from birds at the top of the screen down to nests at the bottom.

The moves are tricky to master, and the players have had several tries. The eggs are cracking each time, and they must start again. The following extract starts as Katy has just cut a basket shape out of Andy's character, which she thinks might work more effectively at transferring the egg.

Extract 31: Point

1	Kat:	ah 'don 'think our 'baskets are 'baskety e'nough
2		(2.0)
3	Kat:	'oo 'try 'tha
4		(1.5)
5	And:	'yeh gera 'bas'ket ts:: 'vla shape
		[jə ɡɛɹə bæsl'ɡɪ'tʰ s:: vlæ ʃeɪp]
6		(2.0)
7	Kat:	'm:::
8		(0.3)
9	And:→	[YOUR 'POINT 'keeps 'CRACKheing ['it]
		[jə pɔɪntʰ ki:pʂ kɹɛ:khiŋ ɪ]
		
		[((smiling))]
10	Kat:	[uh] hehuh
11	And:	'curse that 'point
		[kʰɹʌs dæ' pɔɪn]
12		am >'wan am 'ds: 'gunna get 'ridda< tha' 'point
		[æmwʌsʲ ɡɛ'ɪdðæ'pɔɪnt]
13	Kat:	'ri'o'kay:

AK003_1705_point

Katy assesses the situation, commenting that she does not think their shapes are "baskety enough" (line 1). This would account for the previous moves failing. There is no talk during the subsequent two-second pause, indicating that Andy does not respond in the second-pair part. From the next turn, where Katy self-selects as the next speaker, "Oo, try that" (line 3) it is possible that Andy's lack of verbal response is not necessarily a lack of agreement, but rather an indication that moves are being made in the game. Her turn indicate some modification has been

made. The reason for the subsequent 1.5-second pause is unclear. However, Andy's agreement in line 5, albeit after a significant pause, suggests the pause is not due to disagreement with Katy. Andy's follow up turn (line 5) is fragmented and syntactically incomplete: "Get a basket – flat shape".

As discussed in the previous chapter, section 5.2.2, Andy's speech can be fragmented and variable in speed, particularly during turns that act as directives. This turn shows problems with segmental transitions (at the segmental transition from [s] and [k] in "basket") and articulatory errors in his production of "flat" (voicing of the voiceless fricative [f]. In this case, these issues do not affect the overall intelligibility of the turn. The next pause, followed by Katy's prolonged nonverbal token 'mm' (line 7), although not explicit in the talk, suggests that they have made another move, which has not been successful.

Andy's complaint begins in line 9. In this turn, "your point" refers to Katy's character in the game, which appears to have a "point" on it that cracks the egg when it drops from the tube above. It is ambiguous as to who or what he is blaming here. It is the point that is doing the cracking. However, it is Katy's character, and she manipulates it. Therefore, arguably, the complaint could be indirectly levelled at her. His inclusion of "keeps" indicates that this has become a persistent problem.

The whole turn is delivered in a prosodic form that is both louder and higher pitched than his previous turns, indicative of a typical complaints prosody (see Figure 6.6 below). The pitch level is above his average, with slight variation across the whole turn, culminating in a pitch fall to the middle range on the second syllable of "cracking" and "it". Andy marks lexical boundaries by not using any coarticulation or elisory processes. This creates an even syllable-timed rhythm across the turn. This design contrasts with Andy's typical talk, where more erratic timing can be observed (as in Extract 10 Make me basket, section 4.3).

Although the turn does contain some hyper-articulation (for example, the final consonant plosive burst [t^h] in "point", this is a feature frequently observed in Andy's speech, and there is no indication of an emotive element, as seen in Simon's "stupid balloon" (Extract 29). Furthermore, the additional small laughter token between the first and second syllables of 'cracking' and his smile as he speaks helps characterise this turn as non-serious.

Katy responds with laughter (line 10). In doing so, she orients to his turn as something funny, but it is unclear if she treats it as complaint-relevant or even if she knows what he means. Andy's next turn in line 11 continues his complaint sequence: "Curse that point". This clarifies his stance in that he is attributing the source of the problem as "the point" and not Katy. His follow-up, "I'm gonna get rid of that point", is a further weight to this argument. As an agreement, Katy's response, "Right, okay" does not suggest a complaint-relevant response to a direct complaint.

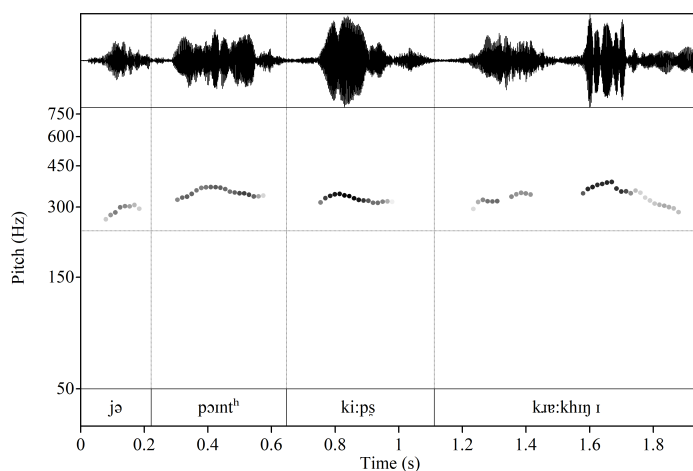


Figure 6.6: Pitch and intensity for "Your point keeps cracking it!"

Through combining two elements: an ostensible display of complaint about the “point” and humour, Andy creates a level of ambiguity designed to contextualise what could be construed as blame but instead is framed as ‘playful’ and non-serious. In this way, Andy can make a legitimate grievance about the state of play and a problem that needs to be resolved while avoiding any ‘serious’ consequences to the interaction. Katy’s response indicates that Andy has accomplished contextualising ‘play’; thus, mutual affiliation and agreement are achieved.

Two further observations can be made from this extract. First, Andy uses a linguistic and prosodic design projecting complaints-relevancy while simultaneously mitigating his design by inserting a laughter token. He uses humour to downplay rather than changing his lexico-syntactic design. Within the situational context, his design does not appear unusual or inappropriate and is not treated as problematic by Katy. It is consistent with the characterisation of this design by as ‘only joking’ (McGraw et al. 2015). The second observation is that, in using a canonical complaints design, his turn does not exhibit the features of fragmentation and temporal coordination present at other times, particularly when he gives directives, as seen in line 5 of the sequence.

Despite the profusion of children’s complaints, the adults do not always treat them as such. The following sequence illustrates this.

Extract 32

John is playing with Julie. They are just beginning a new task, “Hamster Helper” (Table 3.1). The extract begins with them figuring out what they need to do.

Extract 32: Very Difficult

```

1  Jul:      pt .hhh
2  Joh: OH:::
3  Joh: ['oh my] `goodness
4  Jul: [oof h ]
5  Joh: [ah]
6  Jul: ['wha] do we `have to `do `here:
7  Jul: s' `there's an `a:row `there:
8      'so(0.5)[er:m]
9  Joh:      [...h ]OH I `know what to `do (.)`just
10 Joh: `maybe `I `af y' `have to `turn I `thi::nk
11 Jul: `go `on
12      (0.5)
13 Jul: `yep
14      (4.0)((computer noise))
15 Jul: `m::
16 Jul: `OH::: `up a? th? `further up at the `top
17 Jul: `look (.)there's a `button up `there::
18      (2.5) ((computer noise))
19 Jul: `le? me `show you
20 Joh: `this eh
21      (1.5) ((computer noise))
22 Joh:→`this `level's very `diffuh? (.)
23      this is `very `difficul?
24      (1.5) ((computer noise))
25 Joh: bu? `ow? `ge? uh `ge? `tha? [err::]
26 Jul:      [w've] `go? to `ge?
27      the `hamster ou? `there `look
28      (2.0)
29 Joh: .hh `OH::: `poor `hamster

```

TJ001_1255_very difficult

Both players make response cries in lines 1 to 4 as they view the screen. In the subsequent turns, they try to work out possible actions. In line 6, Julie asks, "What do we need to do here?" followed up with a comment that draws attention to an arrow on the screen. She continues, "So erm", indicating she will say more. However, John interjects with a loud "Oh, I know what to do". His "oh" is loud, and Julie drops out of her turn, orienting to John's bid for the speakership and allowing him to continue. In this position, his turn is organised to display a change of state, analogous to an "aha" moment (Weidner 2016). He now, and only now, knows what to do. However, considering he follows up with a self-repaired and mitigated turn (lines 9 and 10), "Just maybe I have, you have to turn, I think", his certainty is not evident.

His choice of "just" suggests that what they have to do will be simple. However, he changes to "maybe", suggesting a degree of uncertainty. Furthermore, he swaps pronouns from "I" to

“you”, creating ambiguity about who does what. Finally, he adds another mitigation to his suggestion, with the “I think” tag completing his turn. In the data, John frequently uses tags such as “I think” or “actually” to signal turn completion. Interactionally, he predominantly uses “I think” at the end of directives aimed at Julie, an unfamiliar adult. His other partner in the game is his mother, and he does not use this construction with her. It is likely that, in this extract, John uses this tag to mitigate being the one telling an unfamiliar adult what to do. In so doing, he demonstrates awareness of social norms.

Julie encourages him to continue with “go on” (line 11). The 0.5-second pause, followed by Julie’s continuer “yep” and a further four-second pause, indicates that moves are being made on the screen which is not talked about. Following this extended pause in the talk, Julie’s “mm” (line 14) indicates something is wrong. She then goes on with a multi-part turn beginning with a new knowledge receipt “oh” (Heritage 1984; Weidner 2016) which draws John’s attention to a button at the top of the screen, “Oh there up at the - further up at the top. Look! There’s a button up there” (lines 16- 17). Typically, the task requires pressing to start the action in this game, which is important information. John does not respond, and Julie directs his attention again with an offer to show, “Let me show you” (line 19). It seems clear that, up to this point, John is floundering in understanding what to do. Julie tries to point out important information, but he does not respond.

At this juncture, John begins his complaint sequence. He self-selects as the next speaker with an incomplete turn, “this eh,” (line 20). There is a prolonged 1.5-second pause during which computer noises can be heard, but what is happening is not evident. In lines 22 and 23, he starts again, “This is very difficult”. He does not fully complete the word “difficult”. Instead, he repairs the whole turn with an upgrade, “this is very difficult”. There is no significant change in pitch or intensity to his usual talk. This negative assessment is not responded to. Instead, there is continued computer noise, indicating they are still engaged in moves. John self-selects as the next speaker, but his turn is incoherent, consisting of part-words and repetitions, culminating in a growling expression of aggravation “err::” (line 25). This disjointed and fragmented turn upgrades his verbal expression of ongoing difficulty emanating from his prior turn. At this point, Julie comes in, overlapping with his growl, with a declarative statement of what needs to be done and draws John’s attention to where he needs to be on the screen: “We’ve got to get the hamster out there, look!” (lines 26- 27).

In this example, John’s initial complaint is not responded to. The lack of complaint-relevant prosody across the turn and unspecified linguistic formulation (it is unclear what is difficult) reduce the likelihood of the complaint being treated as such. It is only following his subsequent affective display of frustration that Julie orients to the problem he has expressed.

This indirect complaint design involving assessments (Ogden 2010) is comparatively infre-

quent in the data but does exist as a phenomenon. It is more often observed in the adult's talk. In considering how social acts are accomplished, it is also necessary to consider how children are oriented to complainants. Adult-initiated complaint design and their response types are addressed in the next section.

6.4 Adult-initiated complaints

The general observation in the data is that the adults tend to complain predominantly about problems with complying with instructions or executing the moves. Their complaints tend to be organised as assessments, as in the previous extract: Extract 32 Very difficult. The extract below is typical of these types of complaints seen in the data.

Extract 33

Tom and his mother have been playing for about an hour. Because Tom has already completed several games very quickly, they are playing at an advanced level. His mother, the less experienced of the two, followed Tom's lead. The game they have selected is called "Gene Machine". Figure 6.7 shows the screen.

The aim is to fit the cell patterns on the right and turn the screw on the left to lift the platform to the right spot to fit the "gene" into the right place. Tom and his mother are trying to make sense of the screen and work out what needs to be done. Tom has been trying to explain it to his mother.



Figure 6.7: Screenshot of "Gene Machine". Used under fair use for educational purposes.

Extract 33: Too Hard

```

1 Mum:→ oh::: my >'goodnessthis< too: 'har:d
2      (0.8) ((computer noise))
3 Tom: .hh no its not
4 Tom: y-y youre 'jus (.) 'no? be:ing
5      (0.5)
6 Tom: .hh you're 'no? >'using your full< 'brain ex'tent
7      (0.5)

```

DJ007_1505_too hard

The complaint sequence presented is designed to negatively assess the game as complicated and too difficult for Tom's mother to do: "Oh my goodness, this is too hard" (line 1). Her complaint is constructed as the idiomatic phrase "Oh my goodness" preceding the negative assessment. The degree of difficulty is marked by her inclusion of the intensifier "too". Her use of "this" references the game, directing her dissatisfaction towards the third party in this context. With a turn-final pitch fall and prolonged vowel in "har:d", the prosodic design projects a finality and does not seek a response (Ogden 2010). There is an absence of canonical complaints prosody. Instead, the emotive quality is conveyed through her use of "Oh my goodness". The nature of her complaint is expressed in the lexico-syntactic design ("This is too hard").

There is a 0.8-second pause in the talk, followed by Tom's self-selection as the next speaker. A pause of this length is the maximum by which an individual prefaces a dispreferred response (Pomerantz 1984). He then goes on to verbally produce a disagreement, "No, it is not" (line 3), preceded by an audible intake of breath. He delivers the turn with stress marking on the items "no" and "not". His turn is not taken in competition, suggesting that the in-breath may be a way to facilitate the organisation of his talk prior to his dispreferred response (Rochet-Capellan and Fuchs 2014).

He follows on with a clarification (line 4). This subsequent turn is disjointed and fragmented, and he takes time to repair and reorganise it until he can construct a complete turn: "You're not using your full brain extent". In refuting her negative assessment, Tom treats her turn as complaint-relevant, but his response concerns the surface-level meaning (Mum assesses the game as too hard; he argues it is not). He does not orient to the emotive feature of her turn, characterised by her inclusion of the expression "Oh my goodness". However, neither does he offer any help. Instead, he makes a counter-argument, critiquing her ability.

The following sequence contains a complaint raised by the adult, which differs in its design regarding its sequential and linguistic organisation. The laughter tokens accompanying it downplay its seriousness.

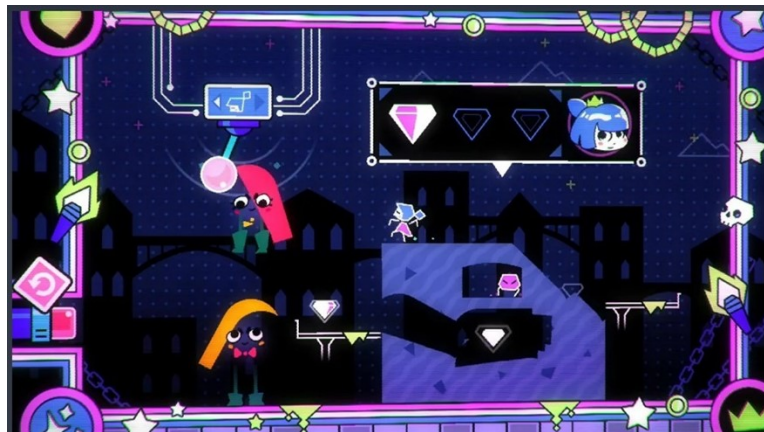


Figure 6.8: Screenshot of "Princess PowerUp". Used under fair use for educational purposes.

Extract 34

In the extract below, Brad and his mother have played for about 45 minutes. Brad had also played for an hour before this. They are both tired. Before this sequence, they agreed to play one more game called “Princess PowerUp” (Figure 6.8). This is a difficult task involving collecting gems. The aim of the task is not immediately apparent, and the solution takes some creative thinking.

Throughout his time playing with his mother, Brad has been in control of the play, and his mother has been valiantly trying to keep up with his directives. She has had little opportunity to share in the game. They are not progressing in this task, and Brad is getting frustrated. He is continuing to issue directives to his mother.

Extract 34: Confused

```

1 Bra: a'riɣh lets 're:stɑr?
      [ɑɪæ lɛts i:stɔʔ]
2      (4.0) ((computer noise))
3 Bra: 'kay 'go to the 'l:left ɒbi?
      [kɛ gəʊ tɔði: l:left ɒiʔ]
4      (2.0) ((computer noise))
5 Bra: hh
6      (2.0) ((computer noise ))
7 Bra: I 'know >'you maybe 'should geʔa< 'switch
      [æi nəʊ ju meɪbʃʊgeʔə swɪʔtʃ]
8      (1.0)
9 Mum:→ 'well 'I'm nɔʔ 'really 'playing 'properly=
10 Mum:→ =y're 'telling me 'what to 'do uhah
11      (1.0)
12 Mum:→ and I'm 'feeling 'rather 'confused
13 Bra: °sor:ry:he°
14 Mum: he

```

BJ006_0530_confused

The extract begins with Brad suggesting they restart. This seems to refer to the restart of the previous manoeuvre, as the 4-second pause is filled with computer noises, indicating that moves are being made in the game. Brad's next turn (line 3) is prefaced with “Kay (okay)”, indicating that whatever has occurred on the screen is now set up for a restart (Bangerter et al. 2024), and he transitions to a directive “go to the left a bit”. The subsequent pauses in the talk, filled with computer noises, indicate they are making moves, and the game progresses. In line 7, Brad begins an insertion sequence, suggesting that his mother should get a Switch: “I know, you maybe should get a Switch”. The reason for making this suggestion is unclear. It could be that he is attempting to influence her to buy the console because he likes it or that if she had a Switch, she would be able to practice and improve.

Following his first pair part, the one-second pause before his mother responds prefates a dispreferred response (Pomerantz 1984). Beginning her turn with “well” suggests that she is organising her turn to prioritise her perspective over his (Heritage 2011). Her response does not directly address the topic of getting a Switch. Instead, she uses her turn to begin a complaint sequence: “Well, I’m not really playing properly” (line 9). Her lexical choice of “*properly*” indicates a claim that she is not playing the game correctly and adds a further explanation: “You’re telling me what to do” (line 10). Her switch of pronouns from “I” to “you” redirects the focus to Brad. Her choice of the verb “tell” alludes to a lack of agency on her part. Her volume is low, and she completes her turn with a slight laughter token, downplaying her complaint and projecting a non-confrontational stance. There is a one-second pause where there is no talk. In

the light of no response from Brad, she self-selects as the next speaker with a follow-up turn, “and I’m feeling rather confused”. This additional information now associates his “telling” as the cause of her playing properly. This multipart turn may be designed to justify his mother’s not playing well (because she does not understand his directives and not because she needs more practice). Equally, it could be an opportunity to express her dissatisfaction with his instruction-giving. In either event, the linguistic and prosodic design characterise her talk as complaint-relevant. The first two turns, “Well, I’m not playing properly” and “You’re telling me what to do,” indicate that she is complaining about the state of affairs. She associates her confusion with “not playing properly” because he is telling her what to do. However, she mitigates the complaint by including “rather” and ending her turn on a pitch rise. These features suggest a muted affectivity.

Brad responds this time with “sorry” (line 13) followed by a token of laughter. The design of his apology suggests that he is treating her turn as complaint-relevant. However, it mirrors the non-serious design of his mother’s prior turn and, thereby, claims that the negative situation she presents is, in fact, acceptable (McGraw et al. 2015). His mother closes the sequence with a further small laughter token.

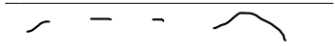
Brad’s mother designs her complaint sequence to avoid overt disagreement and potential confrontation. Brad only shows orientation to her grievance when it is made explicit in her talk. Her mitigated design prompts Brad to treat a negative situation (she has not been able to play properly because he is telling her what to do) as acceptable and, in doing so, inhibits adequate redress (McGraw et al. 2015).

The final extract in this section is a rare example of the adult using a canonical complaints prosody overlying their turn, to which the child responds with a justification indicating he has received the turn as being complaint-relevant.

Extract 35

Rebecca and Henry have been playing for almost an hour. Rebecca is attempting to direct a coordinated move, and Henry has been teasing Rebecca by consistently cutting her character until it disappears, thus thwarting her attempts to progress the game. Rebecca continues to direct the move but is smiling and not taking his sabotage seriously.

Extract 35: Cut Me Up

1	Reb:	'count to 'ten (.) slowly
2		(3.0) ((computer noise))
3	Hen:	# <u>o::ne:</u> # whoo [hoo] [w~:D:]
4	Reb:	[`yeh] 'keep 'coun'in
5		(0.8) ((computer noise))
6	Reb:	'keep 'coun'in
7		(0.5) ((computer noise))
8	Reb:→	YOU 'CU? ME ^U::P [Λ::p ^h]
		
9		(2.5) ((computer noise))
10	Hen:	I'm 'just 'tryn to 'cu? ^this (.)
11		the (.) #`blueprint#
12	Reb:	'righ 'you stay 'there then an 'I cu? 'you
13		(2.0) ((computer noise))

RH003_2148_cut me up

At the beginning of this extract, Rebecca asks Henry to count to ten slowly before he moves, and doing so will allow her time to make her move before he interrupts.

After a pause, Henry complies and begins counting with exaggerated slowness. He counts 'one' with prolonged articulation and a creaky voice. He stops after "one" and makes an exclamatory token "woohoo", which appears to respond to something happening on the screen. Rebecca prompts him to keep counting in line 4 with a continuer and directive: "Yeh, keep counting!" After a pause in which noise from the computer suggests moves are being made, she repeats her previous directive. Following a further 0.5-second pause in the talk, during which the game continues, she announces loudly, "You've cut me up" (line 8). Syntactically, her turn is constructed as a declarative statement, directly referencing Henry with the pronoun "you" as having done something to her. Semantically, using the phrasal verb "cut up" rather than 'cut' signifies an increased intensity to the cutting action; Henry has cut her character into small pieces, thereby inflicting damage as he has done previously in the game. The prosodic design is distinct from the surrounding talk, with a pitch and intensity well above her average level, with a pitch rise to 700Hz, completing her turn with a high and prolonged pitch and intensity falling from high to mid-pitch on the turn-final "up" (Figure 6.9).

The turn-final element "up" is marked with a prolonged vowel [u]. In a word-final position, particularly at a turn ends, voiceless plosives such as [p] are typically produced without plosion, unlike in word-initial positions. The plosive burst on the final [p^h] in "up" adds emphatic stress

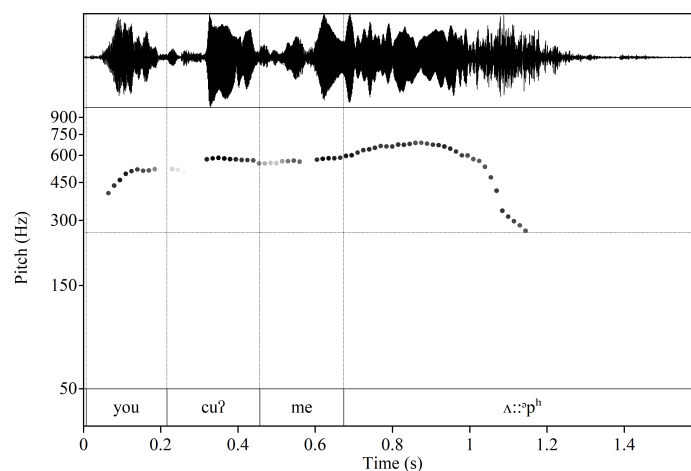


Figure 6.9: Pitch and intensity contour for "You cut me up!"

to her turn. The prosodic characteristics of this turn signal are consistent with a canonical complaints prosody. Coupled with the linguistic formulation, this turn is designed as a direct complaint.

There is a two-second pause following her turn before Henry responds. Computer noise during the pause in the talk indicates some action is still going on. Therefore, it is not possible to know if he has made reparations on screen or is ignoring her. Henry self-selects as the next speaker, "I'm just trying to cut this – the blueprint" (lines 10 and 11). This appears to be a justification for his continued cutting. This time, he is cutting something he calls the "blueprint" (and not Rebecca). Including the discourse marker "just" in "just trying to" facilitates the minimisation of his previously subversive actions (Tagliamonte 2005).

Rebecca's switch from a neutral tone to a complaining one is an upgrade. She has previously tried delaying him through counting, but now she conveys dissatisfaction. This overt complaint design increases the likelihood of Henry treating her turn as a complaint, effecting some change in his behaviour (Mauchand and Pell 2021). Although delayed, his justification response treats her turn as a complaint. Henry is oriented to this type of complaint design despite his reluctance to accept culpability for his actions.

These analyses, along with those presented in section 6.2 illustrate how these children can use contextually complaint-relevant designs and orient to complaints raised by the adults, provided they are explicit.

6.5 Summary

The analyses presented offer insights into the children's ability to deploy linguistic and prosodic devices during complaint sequences. Furthermore, they seek to understand how they orient to emotive gestures made by the adults. The data reveals distinctive patterns in the children's complaints, both in the linguistic and prosodic design. The children frequently complain loudly, blaming their co-players or the game to avoid culpability and taking responsibility. Their complaints are predominantly over one TCU with single clause constructions, as exemplified in Extract 31 *Your point*. Moreover, including idiomatic phrases and descriptions suggest an immaturity in linguistic design (Goodwin 1990).

Two designs can be distinguished according to their distinctive lexico-semantic features in the children's talk. These are comparable to the X and A complaint designs proposed by (Ogden 2010) and are shown to be treated as such by the adult partner. In this context, they both serve similar interactional goals: avoiding blame and culpability and maintaining the power dynamics.

The referents and syntactic organisation used in most complaint sequences in the data leave no doubt about where the children are directing their complaints. However, this is not always so. There are instances in which the children do not effectively organise their talk to be treated as complaint-relevant, as seen in John's data as "very difficult."

An important point to note is that the fragmentation and disjointed constructions observed during directive sequences are conspicuously absent from these turns. They are all constructed as fluent turns, with few self-repairs or restarts. Two key features, which could be construed as problematic in other actions, are, in fact, helpful in the construction of these complaint types. First, the preference for single-clause structures and including idiomatic and pejorative language reduces linguistic complexity and therefore, fewer self-repairs are necessary. The second feature relates to the prosodic design. These complaints are delivered at points of heightened arousal (Selting 2010). The typical features of an emotive state include increased pitch, intensity, hyper-articulation and segmental lengthening (Ogden 2010). This data reveals that, when issuing their complaints, the children frequently exhibit these features. In contrast to other hyperarticulatory features seen in different contexts which can contribute to fragmentation (as discussed in Chapter 5, Extract 13 *Believe* and Extract 14 *Basketball*), in these sequences, they facilitate the emotive expression commensurate with the child's arousal state. In other words, the children are adequately able to express their frustration when they need to.

Moreover, they can use the same design to engage in repartee with mockery or joking. They continue to use similar lexico-syntactic design and prosodic features associated with heightened arousal. However, they also include laughter tokens or smiling facial expressions. Given that

this is a dynamic game, their partner does not treat this design as inappropriate. However, children's abilities can be limited when they want to make a linguistically-driven complaint.

In the comparatively few occasions of adult-initiated complaints, it is shown that the children do treat them as such, but only if the complaint is made explicit, either in the talk, as in the case of Extract 34 Confused or in the prosodic design, illustrated in "You cut me up" (Extract 35). Therefore, in gameplay, these children demonstrate competency in organising their talk to raise a complaint and design it to be received as contextually relevant.

CHAPTER 7

DISCUSSION

7.1 Introduction

This chapter examines the key findings from the data analyses and how they achieve the study's aims and objectives. It discusses their implications and relationship to the existing research.

The study explored how CWASD utilise and orient to prosodic design in goal-oriented interactions with adults using an applied CA approach. It examined the interactional tools of overlapping speech, pauses, and stress marking. Key questions included identifying the specific prosodic features involved, their impact on maintaining mutual understanding, and how participants effectively navigate these tools in four areas of communication: managing conversational turns, marking boundaries, using focus to clarify meanings and expressing and recognising affect signalling. Moreover, the study aimed to uncover how prosodic design shaped the roles of participants in interactions and how this knowledge could inform the development of educational and therapeutic programmes for CWASD.

Overall, the findings indicate that the CWASD in this study demonstrated ill-formed, but not necessarily ill-used prosody. They generally display competency and resourcefulness in using prosody for interactional purposes and demonstrate orientation to prosodic design in the speech of their interactional partners. However, atypical and variable prosodic form was found in all the children, which appears primarily related to challenges in coordinating phonetic and linguistic complexity.

The chapter details and discusses the evidence for the following key findings.

Turn management (section 7.2):

The CWASD in this study understand and display competency in the relevance of prosody in turn management. They can use and orient to prosodically driven turn-endings to facilitate a smooth transition of speaking turns or to maintain their speakership rights between turns. However, atypical prosodic realisations can be observed at TRPs and at points where modification or repair to the tone unit is required.

Overlapping talk frequently appears in the data. This often happens when players are making moves that compete for their attention, particularly during directive sequences. When the exchange of instructions between the two players flows seamlessly, overlapping conversation becomes inevitable. However, the implied rules for conversational turn-taking suggest that only one speaker should talk at a time. When there is overlap, a resolution is needed to minimise violations of this rule. This is also true in cooperative gameplay, as it is difficult to progress in the game if players are talking over each other. A key finding in this data is that the children initiated the overwhelming majority of these overlap episodes and took the form of turn-competitive incomings (TCIs) designed to steal the conversational floor from the adult (French and Local 1983; Kurtić et al. 2013). The children show competency in prosodically designing their turn, which their adult partner treats as a competitive bid to take a turn. In contrast, the data reveals that although the children demonstrate an orientation to TCIs initiated by the adults, the overlaps can be prolonged as they struggle to fully relinquish the floor.

A crucial aspect of effective turn management in conversation is enabling the speaker to complete their message without interruption. This involves both allowing the speaker the time needed to express their thoughts fully and ensuring that listeners remain attentive, facilitating a smoother exchange of ideas. By doing so, the conversation can maintain its flow and foster intersubjectivity. However, constructing a complete turn can be subject to problems, such as grammatical or lexical errors or delays in knowing what to say next, all of which require repair. Moreover, there are times when a speaker may want to keep on speaking over multiple turns. Ensuring the other interactant does not interrupt requires the speaker to deploy turn-holding strategies, which are predominantly prosodically driven.

The children demonstrate competency in using prosodic and phonetic features to hold their turn within a TCU and across multiple turns. However, problems are noted in timing and coordination. They also demonstrate an understanding of and an orientation to these same features when used by the adults.

Information boundary marking (section 7.3):

CWASD in this study can deploy prosodic and phonetic resources to mark information boundaries and create meaningful units of speech and patterns of rhythm and relative prominence. However, an unexpected finding from the data reveals that implementing and coordinating prosodic and phonetic characteristics to establish a consistent and recognisable pattern of relat-

ive stress across a speaking turn can exhibit variability and disrupt the rhythm. The length and complexity of the linguistic structures, both phonetically and lexico-syntactically, increases the likelihood of disruptions occurring within the flow of communication.

Focus (section 7.4):

The CWASD orient to and successfully deploy prosodic resources, including intensity and segmental lengthening, to mark contrastive and important information in a speaking turn. These children display competency in modifying parts of their speaking turn to mark prominence relative to their unique speaking style to highlight important information. However, significantly, they display challenges in modifying turns to shift focus from a broad to a narrow one.

Affect and social signalling (section 7.5):

Complaining occurs often in the game. When something goes wrong, the children show their frustration by blaming the adult or the game, consistent with their adopted role as the ‘expert’. The majority of these child-initiated complaints exhibit a canonical lexico-syntactic and prosodic design, which the adults treat as complaint-relevant. In essence, they produce complaints that sound like complaints and do this often. It is also found that, even when they are joking or ‘pretending’ to be outraged, they continue to use similar designs but mitigate their complaint by adding laughter tokens or smiling. Furthermore, when adults make complaints, the children often do not treat them as complaint relevant unless they are made explicit in the lexico-syntactic or prosodic design.

One question raised early on is the role of adults in co-constructing meaning during gameplay. As outlined in Chapter 2 (section 2.7.2), studies indicate that an adult’s role and the social context are crucial in shaping the progression of interactions. Collaboration is essential; without it, one player may become redundant or overly dependent on the other, potentially leading to conflict over authority. Section 7.6 explores how dyads navigate these interactions and what the data reveal about CWASD interactions more generally.

The final section of this chapter (section 7.7) offers an overall summary and conclusion of the findings articulated throughout the chapter.

7.2 Turn management

Effective management of conversational turns is fundamental to successful interactional dynamics. As outlined in Chapter 2, this skill, which is influenced by prosodic elements, is typically acquired in early infancy, and is further honed as children mature physiologically and linguistically, through engagement with an increasing range of conversation partners (Casillas 2014; Kallay et al. 2022; Kuhl 2004; Snow 2007). Given that CWA are often found to experience difficulties with turn-taking (Heeman et al. 2010; Lee and Staggs 2021), it is pertinent

to identify which prosodic features CWASD employ and respond to during conversational exchanges. This understanding may help determine whether prosody is fundamentally related to their challenges.

The findings discussed in this section relate to questions regarding the children's competency in deploying prosodic resources to manage their turns-at-talk during their interactions.

Specifically, the analyses investigated the exchange of speaking turns, including overlapping talk, to offer insight into how the conversational partners monitor their ongoing interaction in real time to achieve their interactional goals.

To this end, the following questions were addressed:

- How do the children achieve and manage turn transitions by deploying prosodic features?
- How do they achieve and manage bids for turn competition?
- How do they signal and orient to an intention to continue speaking and holding the turn?

Evidence shows these children have primarily acquired the skill of projecting a turn-ending using prosodic resources and successfully orienting to the adult's signalling of TRPs. They prefer turn-final and can be challenged when required to modify the tone unit to shift the Tonic from a turn-final position.

Turn competition, where the two players vie for the floor, often leads to intercepts or overlapping speech by both participants. The data reveals these overlaps occur frequently during gameplay episodes and can occur at any point in the speaker's turn. The prosodic design of most of these from the children is turn competitive and, therefore, requires some resolution if the speakers are applying the implicit rules of conversational turn-taking (French and Local 1983; Kurtić et al. 2013; Schegloff 1998). Very few instances exist where the child intercepts using a non-competitive prosodic design.

The data show that the children deploy linguistic and prosodic resources to gain speakership. It is also proposed that these children can recognise and interpret bids for turn competition, although their resolution strategies to yield the floor can prolong the overlap episode.

A significant finding highlights the challenges these children face in developing their arguments and organising their talk in a way that allows them to articulate their points clearly and coherently. This is particularly apparent during complex lexico-syntactic constructions. The linguistic problems necessitate using various prosodic turn-holding strategies and intra-turn signalling to indicate to the other participant, that they have not yet completed their turn. They, likewise, orient to prosodic turn-holding practices by their co-participants. Moreover, while this data reveals that these children use prosodic turn-holding practices to maintain speakership between TCUs, these practices can be realised atypically.

7.2.1 Turn management: TCUs and TRPs

A key finding from the data in directive sequences is that the children display competency in orientation to and marking a tonic and projection of a TRP to signal turn completion. The adults in the interaction are oriented to these projections, and turn transitions predominantly occur smoothly from one speaker to another.

Across a TCU, the children display a typical pattern of a cluster of prosodic resources of increased intensity, segmental lengthening and a distinct pitch movement to mark a Tonic syllable. The children prefer marking the tonic in the turn final position over a longer stretch of talk with a clear head and Tonic. The head is characteristically produced with an even pitch in the mid-range. The Tonic can be distinguished from other stressed syllables in the TCU, demonstrating their ability to mark interactionally appropriate relative stress clustering prosodic resources aligned with a relevant lexical item. TRPs following the Tonic are typically projected by low intensity, pitch fall, and segmental, predominantly vowel lengthening.

The findings suggest that these children understand the rules governing interactional turn-taking and can effectively utilise prosodic elements to indicate to the listener that they are yielding their turn. Interactional developmental studies propose that this skill is acquired at the earliest stages of language acquisition and honed through the child's early years (Casillas et al. 2016; Wells and Stackhouse 2016). The data from this study suggest that these CWASD have acquired competency in using prosodic resources to manage turns. However, their preference for turn-final Tonic placement can create problems for intersubjectivity. This is discussed in more detail in the findings on Section 7.4 on Focus. This finding challenges Peppe et al.'s study (2007) using the PEPS-C, who found a preference for non-turn final placement of the Tonic.

The difference in the findings could be attributed to the context in which they occur. The PEPS-C relies on controlled variables, where patterns are repeated over several trials, and on the tester's judgement regarding the accuracy of the prosodic form. Although the revised version also includes a semi-structured conversation sample, it is arguable that the question-answer format, which is designed to produce consistent and replicable results, reinforces the pattern recognition tendencies in CWASD (Crespi 2021). It does not allow for exploration of prosody used in spontaneous, unique and unpredictable interactions, where the talk is adapted and responded to dynamically. In the context of gameplay, these children predominantly use a turn-final Tonic placement. This is not surprising, given that the majority of their lexico-syntactic constructions take the form of declaratives or imperatives in broad focus.

However, where the coherence of the turn requires a change in the prosodic design of the tone unit to mark a different Tonic, (as in Extract 2 *That shape*), these adjustments may not occur. It is possible that CWASD may not be able to dynamically update the motor patterns to

apply focus in an alternative location in the turn. This is suggested in Diehl et al.'s study 2015. Using the PEPS-C, their findings indicate that CWASD can update to new patterns, but this update occurs only after multiple trials following the new model. In conversation, this delay could be problematic.

One explanation for the finding may be rooted in CWA's preference for predictable and repeatable patterns. Crespi (2021) proposes that CWA show enhanced pattern seeking, with high attentional focus on specific patterns. Moreover, CWA maintain prior learned patterns and have difficulties modifying and adapting to new patterns. Perseveration and inflexibility, classified under Repetitive and Restricted Behaviours (RRBs) in autism can be found in any or all cognitive and motor domains and can inhibit new learning (American Psychiatric Association, 2013). Yirmiya and Sigman (1991) suggest that CWASD are less likely to show significant impairment in RRBs. However, considering the acquisition of prosody in infants is dependent on the recognition of, and imitation of prosodic patterns (Snow 2007; Wells and Stackhouse 2016), it is possible to ascribe the specific prosodic patterns observed in this data to features inherent in autism.

Previous studies have also indicated that CWASD prioritise lexico-syntax over prosody (Ploog et al. 2009; Terzi et al. 2016). The reasons for this are unclear. It is possible that they are aware of their prosodic errors and, therefore, prioritise what they say over how they say it to mitigate any potential misunderstandings. An alternative explanation, alluded to by Diehl et al. (2015) may be that there is a timing delay in processing an updated prosodic design, which prevents them from promptly instigating a repair within the flow of conversation.

It is also possible that issues related to the motor control and coordination of articulatory gestures may also be a contributory factor. The review of the literature by Murat et al. (2022) suggests that, in the few studies conducted on temporal coordination abilities in autism, there is a reduced performance in audiomotor synchrony in autistic individuals that may impact their ability to precisely coordinate and execute clusters of prosodic features onto the lexicosyntactic framework. As discussed in more detail in section 7.3.2, all the children exhibit unusual prosodic and phonetic realisations. These include variations in segmental lengthening, erratic pitch fluctuations, and an inconsistent speech rate, all of which are highly variable. These features may affect the listener's perception of stress placement. In other words, the child may lack sufficient motor control to emphasise the intended stress location competently.

The data collection methodology employed in this study precluded the use of detailed acoustic analyses of the features examined, particularly at transitional points where overlapping speech may occur. Nonetheless, given the presence of atypical features identified in this study and others, it would be beneficial for future research to explore these aspects in greater depth.

It is possible that, in CWASD, the combination of reduced social interaction and possible

developmental motor coordination challenges (Talkar et al. 2020) contribute to CWASD's atypical prosodic realisations.

The children in this data also show orientation to the Tonic and projected TRPs. There are instances of extended pauses following adult-projected TRPs. These can be observed to fulfil two purposes. First, in some instances, the pause precedes a dispreferred response and is interactionally relevant (Pomerantz 1984). Second, the game interferes with the talk as the play unfolds moment by moment. There are instances where the child does not respond to the adult's prior turn. During these pauses, computer noises can be heard, indicating that moves are being made in the game. Although inconclusive, it could be that the children's attention at these points is on the game and not on the talk, and they are playing with the game separately from the adult. The resultant pauses are not due to a lack of orientation to the projected TRP but a lack of general engagement with the prior talk (Heeman et al. 2010). However, evidence from the third-pair part responses in the sequences reveals that pauses in children's second-pair part position may be conditionally relevant in that the game moves are in response to the first-pair part but do not require a verbal response. In these cases, there is an interplay between the different forms of actions by the players which combine talk and gestures (Reeves et al. 2017).

The evidence from this data supports findings by Werhle et al. (2023) in their investigation of adults with autism. There was no clear evidence for protracted turn transition gaps being related to a lack of orientation to prosodic turn-taking cues, as indicated by Heeman et al. (2010) and Ochi et al. (2019). This data demonstrates that these children use interactionally-relevant pauses at turn endings and TRPs. Where there is a protracted pausing, there is a strong possibility that game actions are responsible, with their attention diverted from talking to doing.

7.2.2 Turn competition

This study investigated prosodic realisations at and around a point of overlap. The data contain many overlapping episodes initiated by both participants, reflecting the dynamic and fluid nature of the interaction.

A general finding from this analysis revealed that the children initiate many more incoming turns than the adults. Most of these are prosodically designed to project turn competition, resulting in overlapping episodes, which the adults receive as turn competitive, and who manage the overlap by dropping out from their turn. There is little to no clear evidence for the use of turn-incoming designs used by the children that project non-competition, such as continuers or acknowledgements.

The adult turn-incomings, on the other hand, are markedly fewer in number. Where they are prosodically designed as turn-competitive, the children treat them as such, and concede to

the adult, but managing the episode can be inefficient. Rather than dropping out from the turn, they tend to continue to turn completion but reduce volume and increase rate.

Turn competition in neurotypical adult speakers involves a complex interplay of linguistic and prosodic features (Casillas 2014; French and Local 1983; Kurtić et al. 2013). The evidence from this data revealed that TCIs can occur at any point in the current speaker's turn and can be prosodically consistent with a neurotypical speaker. Overwhelmingly, these children design their turns to issue directives using simple command structures, imperatives, and declarative language, often overlapping with the adults' turn. They frequently use linguistic discourse markers such as "oh" and "wait" to preface their turn-incoming. These TCIs are typically high-pitched, loud, with segmental lengthening. This design is effective in gaining speakership, with the adults dropping out. Once they have taken the floor, there is room for them to continue their talk, which can be more fragmented and disjointed.

CA refrains from making assumptions about a speaker's intentions, instead concentrating on how the conversational partner responds to the preceding turn (Sidnell 2010). Consequently, it remains challenging to ascertain the extent to which children's turn design is influenced by the necessities of gameplay and performing actions quickly and how much is attributable to their fulfilment of the interactional role as 'expert' in gaming. The data support the validity of both interpretations, indicating that these children use TCIs for interactionally relevant purposes.

The children in this study demonstrate an understanding of the rule governing conversational turn-taking of one speaker at a time. They show this understanding by either dropping out of their turn or modifying their prosody (speaking more quickly and more quietly) to accommodate the adult speaker. However, it was also found that their resolution strategies can be inefficient, prolonging the overlap of the talk. More specifically, they primarily resolve the overlap episode by lowering their pitch and volume while increasing their speaking rate through phonetic adjustments as they approach the end of their turn. The interactional consequence is that the episode of overlap can be prolonged as neither speaker drops out and often results in the adult self-repairing or recycling their turn to hold speakership. This differs from the adult management of these TCIs, where the time in overlap is minimised by the adult quickly dropping out from their turn.

These analyses also present evidence that these children are oriented to features of turn-incomings used by adults that are not designed to be competitive. Brief turn-incomings can occur at micropause points in the turn where the adult attempts to take a turn but has no legitimate space to do so. In these circumstances, the child typically does not yield to the floor, and the adult quickly drops out. Therefore, the children are oriented to turn competition specifically where there is a prosodic change to the surrounding talk, typically increased intensity on the tonic or an accelerated speech rate at the turn onset.

It is the case that the children also manage TCIs by dropping out from their turn, ceding the floor to the TCI. However, if we consider what happens in the third pair part, they often seek to regain the floor at the earliest opportunistic moment in these instances. It is plausible that such disengagement facilitates a reformulation of their turn. The child's concession somewhat depends on what is happening in the game at any given moment. The data shows evidence of the children having difficulties quickly modifying their turns, which may be a contributing factor here. These episodes are collected during directive sequences where either player is the instructor at any given time. The game requires a dynamic and fluid interchange of roles to progress to completion. This data suggests these children are aware of the interactional ramifications of overlapping talk in this context, but are less adept at managing these episodes than the adults.

Turn competition from a prosodic perspective has not previously been investigated in CWASD, largely because it is difficult to capture in the natural conversations of this cohort. This research, albeit limited in scope, provides valuable insights into the interactional resources deployed by CWASD in this context. It shows that these children successfully and frequently deploy prosodic resources to attain interactional control. The design of these turns is consistent with anecdotal reports from parents and educators of CWASD dominating conversations. From this data, the children in the role of 'expert' can deploy prosodic resources to create and manage TCIs, but they are less adept in managing the organisation and timing of their incomings than the adults.

7.2.3 Turn holding: intraturn

The data shows that the children use and orient to various prosodic and phonetic turn-holding practices designed to project to their coparticipant that they have not completed their turn. These include maintaining a level pitch, segmental elongation, micropauses, and increased keyword intensity. Moreover, the children successfully deploy linguistic resources to support them in turn-holding. They also deploy filled pauses, using thinking tokens such as "erm" to avoid a potential incoming turn.

These are consistent with Perkins' (2014) findings. He suggests that CWASD construct their turns incrementally, building on previous elements or recycling prior turns as a basis for new turns. These resources also facilitate self-repairs in the event of word searches or phoneme or lexical errors, strategies observed in other speakers with language impairments (Helasvuo et al. 2004). Peristeri et al. (2024) conducted a small-scale study examining pauses in narrative production among eleven Greek-speaking CWASD with an average age of 13;03 years, compared to an age-matched control group of typically-developing peers. The findings revealed a greater frequency of ungrammatical pauses in the storytelling of the CWA group,

which the authors attribute to uncertainty encountered during narrative production, particularly when utilising syntactically complex structures. This study also shows that CWASD encounter challenges when constructing novel and syntactically complex structures. However, they can and do adopt prosodically driven resources to facilitate their progression towards turn completion and minimise potential disruptions.

7.2.4 Turn holding: interturn

The data from this study reveal that the children use and are oriented to prosodic practices when joining TCUs. The children use the same prosodic resources to extend turns past a TRP to extend a TCU. Three prosodic features are prevalent at these projection points: segmental lengthening with an accompanying level or fall-rise pitch tone and a subsequent pause (Walker 2017a; Wells and Local 2009; Wells and Macfarlane 1998). However, these can be subject to atypical realisations.

A notable finding from the data shows that these children have significant difficulty marking the connectivity between their turns using syntactic constructions such as coordination and subordination, relying instead on prosodic resources to do the work. Evidence suggests that they are aware of this difficulty in that they will repair unsuccessful complex constructions by reducing them to simpler linguistic constructions. The deployment of ‘more to come’ prosody between TCUs to maintain their turn-taking rights enables the children to issue a series of directives while simultaneously engaging in their game activities. These moments, often characterised by lengthy pauses before the child resumes speaking, can pose challenges for the adults involved. Although there is usually an initial orientation to the display of more to talk to come, the prolonged pause creates an opportunity for adults to step in and take their turn. This can lead to potential trouble spots, such as overlapping speech or difficulties establishing intersubjectivity, halting the game’s progression. Therefore, not only are the components of a TCU built up incrementally, but the sequences of TCUs may evolve similarly. This may stem from challenges in utilising complex linguistic structures or broader issues related to planning and sequencing in conversation.

This finding aligns with Peristori et al.’s (2024) findings that the CWASD in their study used less syntactically complex structures in their narratives, thus creating more phrasal boundaries, which would typically be marked with pausing. In the present study, it is suggested that these children manage this reduced complexity using prosodic turn-holding resources to maintain their role as ‘narrator’ or ‘instructor’. This suggests that these children are aware of the interactional significance of maintaining their speakership. However, it also highlights a question regarding their ability to coordinate successfully and time these resources at critical junctures (Wiklund 2016).

A somewhat unexpected finding reveals that the children use prosodic and phonetic resources analogous to ‘abrupt joins’ (Local and Walker 2004), where the end of one TCU is speeded up using elision and segmental substitution to divert a possible incoming turn at that point. The initial segment of the adjoined turn is louder and longer than in non-adjoined turns. The result is the absence of any pause, signalling a yielding of the turn and averting any potential incoming turn. The overall pitch and intensity contour still follow a recognisable rhythm, suggesting the awareness of a potential TRP. However, these abrupt joins can be erratic in pace, resulting in a breakdown in the integrity of the overall intelligibility.

The data generally finds that problems are associated with prosodic coordination and articulatory control in and around the point of TRPs, whether to signal turn completion, turn holding, or turn yielding. The increased speed and loss of accuracy at these points raise an interesting question about the children’s ability to maintain breath control and articulatory coordination over a longer speaking turn.

7.3 Informational boundary marking

The children in this data demonstrate awareness and competency in marking lexical and information boundaries using prosodic resources. However, a notable finding highlights problems with phonetic and segmental transitions, which can affect the overall progression towards turn completion and create problems for intersubjectivity.

7.3.1 Information boundaries: lexical and phrasal marking

The children’s talk generally displays segmental transitions, which create a smooth flow across a TCU. Features of hyperarticulation, coarticulation, and elision, in addition to prosodic components such as pitch movement, vowel lengthening, and changes in loudness, allow the turns to progress to completion in ways similar to those found in the talk of neurotypical children (Wells and Stackhouse 2016, p.200) and aligns with intonation patterns associated with English.

The children modify their phonetic realisations to create a relative pattern of syllable prominence across the turn, similar to that of a neurotypical speaker (Arvaniti 2020; Ladd 2008), using elision, vowel reduction, and glottal substitution processes to create ‘weak’ syllables. Coarticulatory processes may also be used, but there is insufficient evidence from this data to confirm this. Moreover, the children demonstrate a stress pattern consistent with English lexical stress rules using the same prosodic resources. This data shows that these children can utilise prosodic resources to mark appropriate lexical and phrasal boundaries to create meaningful units of speech. This skill is acquired early in language development. Wells and Stackhouse (2016) note that this skill has a maturational element, dependent on physiological and motor

development, as well as influences from an expanding lexicon. These children can accurately produce a rhythmical pattern of stress over a single TCU, but as discussed later in this chapter (section 7.3.2) they have problems when it comes to creating more complex lexico-syntactic turns.

The evidence concerning the ability of CWASD to perceive lexical stress is somewhat contradictory and indeterminate (Eigsti et al. 2012; Järvinen-Pasley et al. 2008a). This study aligns with prior research indicating that CWASD do not have a problem with the perception of lexical stress (Diehl et al. 2015; Grossman et al. 2010; Lyons et al. 2014; Peppé et al. 2006). This data suggests that CWASD have few problems coordinating prosodic resources to mark stress for grammatical purposes.

However, evidence from this data suggests that problems with articulatory control may impact the timing of these resources to precisely coincide with the relevant syllable placement (Extract 13 Believe and Extract 14 Basketball, section 5.2.2). In these instances, the relative prominence of the syllables can be affected.

In gameplay, these errors cause minimal problems to the overall intersubjectivity, where what is being talked about can be understood from interactions and what is occurring on screen. There is less of a necessity for adults to pay attention to prosodic cues to disambiguate meaning. It is also the case that the adults overlook these minor differences, provided they do not specifically impact the overall meaning (Kelly and Beeke 2011; Shriberg et al. 2001). This is in contrast to a controlled ‘test’ environment, where with fewer contextual cues and highly repetitive sequences, these issues will likely be more noticeable (Samuelsson 2009).

The findings related to prosodic form and the impact on marking information are now discussed in the next section.

7.3.2 Information Boundaries: Issues of timing and coordination

A significant and unforeseen finding from the data reveals that implementing prosodic and phonetic characteristics to establish a consistent and recognisable pattern of relative stress across a speaking turn can exhibit variability.

As with any individual, these children possess a unique speaking style. Individual variations in speech rate, volume levels, and overall pitch movement are present. However, these differences alone can significantly impact the interaction. For instance, Andy has a typically rapid speech rate, sometimes affecting his intelligibility. Brad, on the other hand, is a very quiet speaker with minimal pitch variation. This, too, has implications for intelligibility. This study places less emphasis on these individual differences and more on how they utilise resources for interactional purposes.

However, over and above their unique style, issues with the mistiming and lack of coordination of these features result in distinctive patterns that affect the turn's overall flow. These patterns are variable and unique to the individual, impacting their turns at random points and in different ways.

The analyses provide evidence that all the children exhibit an uneven rhythm characterised by sudden accelerations and decelerations, pauses and prolongations, which makes it more difficult for adults to anticipate turn transitions and affects the overall coherence of the turn. This unevenness is irregular and may be attributed to difficulties coordinating articulatory gestures between segments. These difficulties manifest in features of hyper-articulation, where the rate slows down (as observed in Extract 13 Believe) and elision, which causes a rate increase (as seen in Extract 15).

In both instances, the faltering articulatory transitional movements disrupt the overall progression towards turn completion and rhythm. The additional time required to make these problematic segmental transitions is adjusted later in the turn as the children attempt to uphold the rhythm (Arvaniti 2020). In so doing, they demonstrate an awareness of the need to maintain the rhythm, however, the compensatory repairs made to the tempo of the turn add to the impression of unevenness. These difficulties in segmental transition appear to be peculiar to the child and situated at the phonetic level.

The adverse effects of challenges in temporal coordination on turn construction can be seen most clearly when the children are engaged in actions requiring complex linguistic planning and organisation. The data reveals problems in the children's turn design when coherence and cogency are critical, such as when giving instructions or explanations. The analyses presented reveal fragmented and disjointed turns, which inhibit and disrupt the sequential progression of the turn towards completion. In these actions, planning and coordinating linguistic and articulatory features when designing syntactically complex utterances present significant challenges for these children. Difficulties in phonetic integration and progression result in fragmented or disjointed speech patterns that break the continuity of the turn. It is, however, essential to note that these atypical features do not always result in problems in turn transitions or intersubjectivity. The adults in this data tend to adjust to the differences, without overt repairing of prosodic design (Kelly and Beeke 2011). This implies that the design is sufficiently functional not to impact meaning, but intersubjectivity can be impacted depending on the position of the problem in the turn. As previously noted, this is not unexpected as a dynamic game context, as the focus will be more on what is said rather than how.

Some researchers have also highlighted deviancy in prosodic form as unrelated to function but affecting fluidity in turn (Peppé et al. 2007; Shriberg et al. 2001; Wiklund 2016). The findings from this study support this perspective and propose that any apparent misplacement of

stress may be due to articulatory and phonetic coordination problems. This aligns with previous research, which suggests that CWASD are more likely to have dysfluent or inappropriate phrasing, mainly when there is an increase in syntactic complexity and, therefore, cognitive load (Fosnot and Jun 1999; Peppé et al. 2007; Peristeri et al. 2024; Thurber and Tager-Flusberg 1993).

These studies, however, focus on the frequency and placement of pauses. Although highly salient and easily measurable, they do not include the impact of other phonetic and prosodic features on overall continuity. Wiklund (2016) points out that even minor excursions can affect the overall fluency of the turns. Therefore, it is necessary to consider a cluster of prosodic and phonetic features in and around the trouble source to ascertain the nature of the underlying problem. Some researchers (Franich et al. 2021; Talkar et al. 2020) indicate that the issue may pertain to the temporal motor coordination of phonetic and articulatory features. Nonetheless, it is important to recognise that any causal relationship between temporal coordination and prosody remains far from established.

7.4 Focus: Marking importance

Mastering emphatic and contrastive stress is essential for effective communication in English. These narrow focus stress patterns add depth and nuance to spoken language, allowing speakers to convey their intended meaning with greater precision and impact and avoid ambiguity. This section presents and discusses three principal findings related to focus marking. The first presents evidence that CWASD can orient to and use prosodic resources at appropriate points in the speaking turn to denote contrastive information. Second, a noteworthy and unexpected finding is that the children do not readily modify the fundamental tone unit pattern, to shift the Tonic from a broad focus to a narrow focus. The third finding discusses evidence that CWASD display linguistic and paralinguistic resourcefulness in highlighting important information relative to their speaking style.

7.4.1 Narrow focus: marking contrast

The principal finding is that these CWASD typically adjust their marking of relative prominence over and above the pattern in the tone unit to highlight novel or important details, demonstrating the ability to shift tonic placement from a broad-focused, turn-final position to a narrow focus. The adults orient to these cues, ensuring a shared understanding is maintained. This finding concurs with other studies, particularly Diehl et al. (2008), who found no difficulties marking contrastive stress.

The data suggests that these children rely on relative changes in segmental duration and intensity to mark stress, and there is less variation in pitch. This finding aligns with Nadig and Shaw's (2015) study of preadolescent CWASD, which indicates that CWASD rely on less-mature durational cues exhibited by neuro-typical younger children. Some studies examining contrastive stress rely on perceptual salience to determine the ability to mark contrastive stress (Baltaxe 1984; Peppé et al. 2007). However, there is some evidence from this study that perceptual salience may be misleading. As discussed in Chapter 2, the realisation of prominence marking relies more on the ability to de-emphasise non-stressed syllables and the accurate timing of articulatory and phonetic features. As we have seen in this study, these children can sometimes have challenges with articulatory coordination, which can impact the listener's perception of prosodic form. It is feasible that a less-than-fully mature motor control system in CWASD may impact the accuracy and saliency of prominence marking.

Although not fully clear, these children appear to be able to manipulate the Tonic more efficiently at the beginning of a sequence, where there are no pre-established turn constructions. This data also provides evidence of some stress marking that triggers self-repairs or other-initiated repairs, indicating potentially misplaced stress. Although infrequent, there are notable instances where trouble spots can emerge when there is a shift in focus. They predominantly appear to arise following a sequence of prior turns where the stress marking is in broad focus and subsequently shifts to a narrow one.

In these circumstances, the adults appear to accommodate errors and atypical prosodic features unless the meaning is not apparent in the talk (as is the case of Extract 2 *That shape*). The children's repair strategies evidence their awareness of the problem. The problem appears to be located, therefore, not in the ability to recognise the interactional significance of discriminating a narrow focus from a broad one but in the capacity to execute such a shift in a timely manner. One potential explanation for this difficulty may be associated with learning styles. It has been posited that CWA tend to internalise fixed patterns and may struggle to adapt these patterns in response to unexpected contingencies. In Diehl et al.'s study (2015) CWASD formed clear suppositions of syntax based on prosodic patterns over several trials but had difficulties updating their interpretation when the prosody changed. Therefore, it is feasible that in tasks requiring repetition, CWASD may show difficulties unrelated to prosodic function and have more to do with the inherent preference for patterns in autism. This tendency could challenge their self-repair strategies, as they may not be able to reformulate their prosodic design quickly enough to modify the meaning of the syntax.

7.4.2 Highlighting importance

Across all the children's data, there are consistent displays of competency in highlighting importance. This is achieved by deploying prosodic features marking prominence relative to the child's unique speaking style.

For example, Brad's speech is characterised by minimal variations in pitch and volume. This contrasts with Henry, whose speech is typically loud and has wide-pitch excursions. Both demonstrate interactional resourcefulness in modifying their designs to achieve relative prominence on the items they emphasise. The primary resource deployed is segmental lengthening. For example, Brad (Extract 24 Extra hard) cannot readily modify intensity and, therefore, adds a linguistic intensifier to do the work. As for Henry, he deploys additional head movements and notably prolonged segments to distinguish from his typical range (Extract 23 Slowly). The suggestion is that the children know the interactional importance of stress marking and use the resources available to them to achieve intersubjectivity.

In summary, the data suggests that social-cognitive deficits in the prosodic functions of contrastive focus and emphatic stress are not readily apparent in these children. As discussed in Chapter 2, the literature on this topic is inconsistent. The findings of this study indicate that any apparent errors in focus marking made by the children do not directly correlate with pragmatic function (Walker 2014). Instead, these differences are variable and typically present as difficulties in updating motor patterns, leading to the mistiming and accurate integration of prosodic features rather than specific pragmatic deficiencies. This is consistent with previous studies, which have similarly raised the point that misplaced stress is due to a lack of coordination of the features influencing form (Diehl and Paul 2009; Nadig and Shaw 2015; Peppé et al. 2006).

7.5 Affective and social signalling

In this data, the children frequently display their emotions. The question for this study is what prosodic features can be identified in and around the point of heightened arousal and how they achieve social signalling. Collections made of complaint sequences, reveal the following.

These CWASD integrate overt and canonical prosodic forms with their lexico-syntactic structures to project complaint relevancy. All the children in the data frequently deploy the facilitative effects of a canonical prosodic design to their complaints delivered at points of heightened arousal (Mauchand and Pell 2021; Selting 2010). These features include increased pitch, intensity, hyper-articulation and segmental lengthening. The prosodic design of these complaints is comparable to those described as A-complaints by Ogden (2010). This complaints-relevant prosodic form is also a typical feature of an emotive state (Hofstetter 2020;

[Mauchand and Pell 2021](#)). In other words, the children can adequately express their frustration when needed.

Notable in these complaint sequences is the absence of fragmentation with few self-repairs and instances of recycling. Two key features could be helpful in the construction of these complaint types. First, the preference for single-clause structures and including idiomatic and pejorative language reduces the linguistic complexity, and therefore, less planning is involved. Novel sentences require a high level of complexity and coordination. In contrast, these single-clause constructions require less processing, and automatic idiomatic phrases tend to be stored as whole units that can be retrieved more readily ([Cutler 2005](#)).

Furthermore, the increased intensity and accompanying hyperarticulation required to create a canonical complaints prosody could facilitate a longer time to transition from one segment to another. Any disruptions to rhythm and flow are less apparent to the listener than in the child's natural speaking prosody and could legitimately project an affective state, such as frustration. In the data, this increase in fluency is also seen when the child is making a TCI. Interestingly, a similar design of a single TCU and an increase in pitch and intensity is observed in both situations. There is no discernible difference between the pitch and intensity. There is, however, evidence of hyperarticulation and segmental lengthening in the complaints prosodic design, which is not present in the TCIs.

An interesting finding was observed in instances where the children had lowered arousal states. The children appear to struggle to produce 'minor' complaints without using a rigid formulation combining heightened prosodic design and a complaint-relevant lexico-syntactic structure. This can be seen in Extract 32 Very difficult (section 6.3). They are less variable in their lexico-syntactic structure, relying on prosodic resources to do the work of complaint-relevance. They can be seen to employ prosodic resources to make their point, frequently recycling their turn louder and with increased stress marking rather than modifying what they say.

This lack of flexibility can also be seen in the reverse when they want to downplay or soften their complaints. This data shows that when the children engage in repartee with gentle mockery or joking, they continue to use similar lexico-syntactic design and prosodic features associated with heightened arousal. However, they also include laughter tokens or smiling facial expressions. Given that this is a dynamic game, their partner does not treat this design as inappropriate and most often orient to the laughter tokens than the complaint design. This is understandable given that the game is meant to be fun.

Overall, the children can be seen to deploy the prosodic resources associated with heightened arousal to issue their complaints. In specific contexts, this design can be successful. However, their lexico-syntactic and prosodic designs are somewhat inflexible, and the children show

limited capacity to modify them. The impact is that there is little opportunity for their co-participant to engage in an extended interaction and resolve any potential conflicts. This inflexibility is inherent in autism. However, it does not imply that they are unable to modify structurally rigid linguistic and prosodic designs for distinct interactional purposes (Local and Wootton 1995; Muskett et al. 2010).

The data shows comparatively few adult-initiated complaints. Most adult complaining arises in response to a directive they cannot perform. In these sequences, as second-pair parts or as insertion sequences, the children rarely demonstrate alignment, and when they do, it is often an embodied response, as in the child taking hold of the controller. In these circumstances, one could speculate that the children are not showing orientation to the adult's turn because they are disinterested in or unaware of the adult's needs. This would fit with the theoretical framework of a reduced social cognitive domain (Tager-Flusberg and Anderson 1991). This may be so; however, it may also be the consequence of attentional and coordination challenges. Research has shown that CWASD struggle to quickly switch between cognitive skills, such as listening and doing (Diehl and Paul 2009; Duncan et al. 2019), have challenges knowing what to pay attention to (Järvinen-Pasley et al. 2008b). When playing a game, there are multiple points to which the child needs to attend simultaneously; they need to pay attention to what is happening on the screen, work out what they need to do, what the other player needs to do, project forwards in terms of the consequences of these actions and then communicate this to the other player (Mondada 2011). There are enormous cognitive complexities involved which need to coincide. How the children manage these exchanges by avoiding extended communicative interchanges could be a functional way to achieve their goals (completing the game with or without the adult's help) with the least amount of cognitive effort.

Where there is an adult-initiated complaint sequence, it becomes clear that children do treat them as complaint-relevant when the complaint is explicit in the talk, as in Extract 34 *Rather confused* or in the prosodic design, as in Extract 35 *Cut me up* (section 6.4). Notably, the participants are still playing in both extracts but not actively engaged in a coordinated move. As a result, the pressure to plan and organise within time constraints is reduced, potentially allowing cognitive space to respond to the adult's complaint. Järvinen-Pasley et al. (2008a) suggest that an overly-focused sensitivity to pitch may also contribute to CWASD's responses, in that where there are overt and complex perceptual stimuli, linguistic and prosodic, it is more difficult for them to attend to both simultaneously. Therefore, reduced linguistic complexity and increased prosodic salience are easier for CWASD to process. Where the lexico-syntactic structure and prosodic design are less explicitly complaint-relevant, as in Extract 33 *Too hard* (section 6.4), the children's responses suggest that they may have more trouble in treating these as complaint-relevant. This data shows that these children have trouble using and responding to variations

in either the lexico-syntactic or prosodic designs of complaints. This may reflect challenges in attentional focus where they may have selective attention to either prosody or linguistic content and struggle to effectively combine the two domains at speed (Järvinen-Pasley and Heaton 2007; Ploog et al. 2009).

7.6 Interactional dynamics in gameplay: the role of the adult

All adult participants were aware that the project focused on the conversations of CWASD and that the game was meant to be fun. The children were eager to participate, and all adults, regardless of their relationship to the child, allowed them to take control, sometimes overtly acknowledging them as the ‘expert’ or through implicit concessions. This allocation of roles significantly influenced the interactional dynamics and linguistic choices of both players.

The data reveal that children initiate more directives, often expressed using declarative and imperative forms. In response, the adults typically comply verbally or through their actions, unless they lack the necessary knowledge or understanding to carry out the instruction. In such cases, adults avoid a dispreferred or non-compliant response by initiating an insertion sequence that highlights the obstacles requiring resolution before compliance can occur. The data indicate that children generally do not orient to these obstacles until they observe the problem emerging on the screen or until the issue is made explicit in the conversation.

The children can become frustrated by these delays. This is most frequently evident in the children’s recycling and repetition of their positions, as well as the use of upgraded prosodic designs, characterised by increased loudness and pitch. The result is extended sequences of conflict over multiple turns (as in Extract 3 Duck and Extract 4 Move). The data show that adults actively work to avoid conflict, either by tentatively making a move even when they are unsure what to do (Extract 2 That shape), inhibiting responses in response to a complaint (Extract 27 Moron) or not intervening while the child is organising their talk (Extract 19 Dropped an egg). Moreover, the adults proactively facilitate the interactions, overlooking potential trouble spots or unusual constructions, wherever possible, to maintain the progression of the talk.

A possible explanation for the breakdown is that children expect a response fitting their role as ‘experts’, following a familiar pattern of initiation, response, and feedback. They do not anticipate hurdles unless explicitly pointed out by the adults or through mishaps visible on screen. When trying to assist the adults, they often struggle to provide coherent and sufficient information, leading to fragmented and dysfluent speech. To manage these difficulties, they resort to simpler language or break their accounts into smaller units. This aligns with studies showing that while CWASD can take perspectives, their communication is hindered by limitations in lexico-syntactic organisation, resulting in ongoing self-repair, fragmentation, and

incoherence (Henderson 2019; Wiklund and Laakso 2019; Wiklund 2016).

The data from all the dyads consistently show that adults must work to take control of the directive-giving process, often requiring them to make explicit requests (Extract 8 In charge). Sometimes, conflict arises (Extract 3 Duck). Out of context, it may appear that these children are dominating and occasionally socially inappropriate, especially when interacting with unfamiliar adults. However, it is also feasible that they are simply following the implicit social contract among the participants, where they are "in charge" (Kent 2012; Maynard and Turowetz 2017a).

A further consideration relates to their preference for prior patterns (Crespi 2021), which could extend to difficulty in moving between communicative actions, such as from giving directives to receiving them or to giving accounts or explanations. Given that the objective is to complete the task, these children may be adopting social actions which, for them, are the most expedient way of getting the task done, rather than engaging in more cognitively and linguistically demanding ones.

Notably, in this data, there is little repetitive talk, but when this does occur, they are treated as interactionally relevant (e.g. Extract 4 Move) due to the position in the sequence and prosodic design. As discussed in section 7.2.3 intraturn segmental or whole-word repetitions are used effectively by children as a means to hold their turns, creating space for them to reorganise and reconstruct their lexico-syntactic structures.

This data indicates, therefore, that in this gameplay context, these children do not engage in perseverative or repetitive talk, which could be construed as 'dysfunctional'. They do, however, show limitations in their ability to use complex lexico-syntactic structures flexibly. They are seen to manage this by reverting to simpler lexico-syntactic constructions or formulaic phrases. Section 2.7 discusses how repetitive and perseverative talk is a diagnostically relevant feature in CWA. The findings presented here align with those of others, which illustrate how CWA modify and adapt 'gestalt' or formulaic phrases to make them interactionally relevant (Korkiakangas et al. 2012; Muskett et al. 2010; Stribling and Rae 2009). In doing so, they demonstrate an awareness of social dynamics and a degree of resourcefulness in utilising the means available to them to participate in interactions.

7.7 Summary

In essence, the data indicates that the CWASD in this study demonstrate ill-formed, but not necessarily ill-used prosody. Regarding turn management, evidence suggests that the children in question have primarily developed the ability to signal the conclusion of a turn by utilising prosodic resources and can effectively orient to their co-participant's projection of TRPs. However, some atypical features are present to which the adults accommodate and do not

impact intersubjectivity. These tend to be located at variable segmental transition points and TRPs. Challenges are also observed when there is a need to adjust the tonic placement away from the broad focus turn-final position.

The data indicate that these children can employ both linguistic and prosodic resources to achieve their interactional objectives, particularly to compete and hold speakership. Additionally, they are posited to recognise and interpret instances of turn competition.

A significant finding highlights the difficulties these children experience in developing their arguments and structuring their contributions to facilitate clear and coherent articulation of their points. This process necessitates implementing various prosodic turn-holding strategies and intra-turn signalling to convey to the interlocutor that they have not yet completed their turn. Similarly, they align with the prosodic turn-holding practices exhibited by their co-participants. While the data demonstrate that these children employ prosodic turn-holding strategies to maintain their turn between TCUs, the execution of these practices may occur in atypical forms.

Regarding boundary marking, these children predominantly display smooth segmental transitions and patterns of relative stress to create meaningful units of talk, creating a smooth rhythm and flow across a speaking turn consistent with English intonation patterns. They utilise prosodic and phonetic resources to mark lexical and phrase boundaries. However, problems with articulatory coordination and timing can create episodic and variable difficulties across segmental transition boundaries, disrupting the flow of speech.

The data also reveals an increased frequency in fragmented and disjointed turns, particularly in lexico-syntactically complex constructions. These dysfluencies inhibit and disrupt the sequential progression of the turn towards completion. These turns can significantly affect intersubjectivity. The children in this data demonstrate awareness of the issues, deploying prosodic strategies to hold their turn to allow them time to repair or reorganise their talk to construct less linguistically complex turns.

In this data, the general finding is that these CWASD can successfully mark contrast in a turn using prosodic resources primarily of intensity and segmental lengthening. However, they display challenges in shifting the Tonic marked in prior turns in a broad focus to a narrow one. This appears primarily due to challenges in modifying designs and updating prosodic patterns quickly. These children demonstrate awareness and resourcefulness in their prosodic design to highlight important information.

Analyses of complaint sequences reveal that these children integrate overt and canonical prosodic forms with their lexico-syntactic structures to project the relevance of complaints. The heightened emotional arousal accompanying the complaint amplifies the prosodic design to achieve effective social signalling and increases the complaint's relevance.

However, these CWASD do not demonstrate a mature ability to construct a complaint-

relevant turn with suppressed or lowered emotional arousal. They mitigate complaints using laughter rather than modifying the turn construction. Moreover, they are more attuned to overt complaint-relevant designs used by their co-participants. However, they are less sensitive to those formatted with low emotional arousal or lexico-syntactically constructed complaints (Ogden 2010). Interestingly, these complaint sequences' heightened arousal state and accompanying prosodic design facilitate fluency in these children. This perhaps arises from the fact that these turns are less linguistically complex and the features that impede segmental transition, such as hyperarticulation, are contextually relevant.

In this data, as with other interactional studies (Kelly and Beeke 2011; Muskett et al. 2010; Rae and Ramey 2020; Rendle-Short 2014; Stribling and Rae 2009), the adults play a key role in guiding interactions with children, inhibiting certain responses and overlooking errors and missteps. Children recognise their roles but face two main challenges: difficulty in shifting between different roles and limitations in constructing complex language structures quickly.

CONCLUSION

This chapter summarises the work presented in this thesis and discusses its significance and implications. It outlines how the research has met the aims and objectives stated in the introduction. Additionally, it highlights the contribution to existing literature and its relevance to clinical practice. Finally, the chapter addresses the study's limitations and offers suggestions for future directions and potential applications.

8.1 Summary of the research

As outlined in the introduction, the impetus for initiating this project arose from the challenges I have faced in my clinical practice in delivering effective Speech and Language Therapy for CWASD. The difficulties related to prosodic impairment and its significant influence on these children's capacity to engage successfully and establish meaningful relationships are of particular concern. This area remains inadequately researched and poorly understood, which complicates the progression towards an evidence-informed approach to intervention, which is also meaningful to these children.

As [Peppé \(2009b\)](#) points out, the challenges in addressing prosodic impairment can be attributed to its elusive nature, which stems from the lack of consensus regarding terminology and scope. Furthermore, the absence of a direct correlation between prosodic form and function complicates the issue ([Walker 2014](#)). The heterogeneous characteristics of autism, combined with the variability among individuals facing these challenges, can result in clinicians, including myself, avoiding or neglecting the discussion of prosodic impairment altogether. This avoidance

is regrettable, as the select group of professionals who have engaged in assessing and remedying prosodic impairment in autism have demonstrated a commendable degree of success. It is the efforts of these pioneers that I aim to build upon in the present study.

This study aimed to understand how six preadolescent CWASD, aged 8 to 12 years, orient to and use prosodic design during a goal-oriented interaction with an adult and the adult's role in maintaining intersubjectivity through their orientation to and use of prosody. The investigation used a CA-based approach to explore their interactions during a motivating, goal-oriented task: a cooperative, interactive video game.

The literature has identified possible prosodically driven communicative actions that may be problematic for this cohort. These include turn management, information boundary marking, focus and affect. Therefore, this study explored these to determine how the children use and orient to three interactional devices: overlapping speech, pauses, and stress marking in each of these communicative actions. Further questions were asked regarding how the participants' roles and actions in the game are constructed and interpreted through prosodic design and how the children's orientation and use of prosody in the context of computer game-playing can inform education and therapy programmes for this cohort.

Key findings from this research show that CWASD demonstrate competency in turn management skills by signalling turn completion, turn competition, and turn holding using a cluster of prosodic resources aligned with lexico-syntactic structures. They also demonstrate orientation to these features in the adult's talk. However, there are discrepancies with evidence for problems associated with the timing and coordination of phonetic and articulatory features. They show a preference for turn-final Tonic placement and difficulties in updating their turn designs to reflect a difference in meaning.

The study indicates that CWASD utilise a combination of prosodic and articulatory resources to signal stress for disambiguation and to delineate information boundaries. They recognise the necessity of marking emphasis and will employ appropriate prosodic and lexical devices to accomplish their interactional objectives. However, evidence suggests that these children exhibit a certain degree of inflexibility in their design strategies, do not easily modify their prosodic patterns.

Furthermore, problems associated with articulatory and phonetic coordination and timing are evident in the children's talk at segmental transition points. This impacts the progressivity across their turns, and the resultant speeding up or slowing down the speech rate affects the overall rhythm and timing of the turns. Moreover, these coordination issues impact the children's ability to mark patterns of relatively strong and weak lexical stress effectively. These challenges are individual and appear random.

They are, however, particularly apparent during the construction of novel and complex

lexico-syntactic structures. Lexico-syntactic difficulties further accentuate the problem. Consequently, these turns are often fragmented and disjointed and inhibit a smooth progression across the turn. In this data, the children appear aware of the issues and use prosodic resources associated with turn-holding to facilitate self-repair.

The adults in the data, on their part, rarely initiate repairs to the children's prosodic atypicalities unless there is a loss of intersubjectivity. They accommodate the child's speaking style and do not draw attention to any differences in form.

The prosodic design associated with an affective state was investigated during complaint sequences. The evidence indicates that these children could design complaints both lexico-syntactically and prosodically to be complaint-relevant. Although they exhibit an inflexibility and immaturity in their design, the increase in intensity as a consequence of heightened emotional arousal facilitated a smooth flow across the turn with clear articulation turns not seen in directive sequences.

The children in this data demonstrate orientation to complaint-relevant turns initiated by the adults. However, there is also a suggestion that they have some problems in coordinating their attention to consider both content and prosodic form.

Overall, the findings are that the children in this data utilise the phonetic and articulatory resources available to them to achieve their interactional goals. However, timing, coordination issues, and linguistic competency limitations sometimes result in ill-formed prosody. Evidence suggests that these children are aware of these challenges to some degree. However, the lack of specific feedback prevents modifications or updates to their turn construction.

The data also revealed that these children utilise specific turn constructions, allowing them to avoid complex linguistic structures when possible. In essence, these children demonstrate challenges in phonetic, articulatory, and lexico-syntactic constructions, which impact their choices in making themselves understood.

8.2 Implications: the impact on interactional research into autism

The game establishes a unique context that contrasts with traditional assessments and typical interactions. Interactions progress sequentially towards a conclusion (Sterponi 2004), rather than through disconnected questions and answers (Maynard and Turowetz 2017b). In this setting, meaning is co-constructed turn by turn, allowing for more creative and variable turn constructions. The game's visual feedback makes interactions impactful, particularly important for children with CWASD, as it links talk to immediate experiences. Any troublespots can be corrected through restarting and repeating game actions. This encourages persistence (Bottema-Beutel et al. 2022; Chen et al. 2019). Three aspects of the game interactions support

the children's communicative success. First, there is a high predictability of linguistic content. Second, there is minimal pressure to initiate a social conversation. Third, there is an adult co-player scaffolding and supporting the children's talk to progress in a sequential manner.

In this context, children can showcase their strengths and skill, which is all too rare for many CWA (Kelly et al. 2018). The data from this study emphasise three key factors that facilitate successful communication in CWASD: First, a supportive coparticipant helps repair and scaffold communicative actions (Bottema-Beutel et al. 2014; Heller and Kern 2021). Second, interactions must be situated in action (Sterponi 2004). Lastly, engaging and predictable experiences allow the child to demonstrate competency (Muskett et al. 2010; Stribling and Rae 2009).

However, although these children display unique interactional skills that might go unnoticed in different contexts and do not show the often ascribed autism-related 'dysfunctions', they do face challenges. Although they show awareness of interactional dynamics and the needs of the listener (Henderson 2019; Maynard and Turowetz 2017b) and utilise all available interactional resources, they struggle when required to use words to convey meaning (Kelly et al. 2018). In other words, they know what they need to do, but they lack sufficient linguistic resources at the moment to be fully successful in constructing meaning. This affects intersubjectivity, leading to a reliance on adults to overlook errors and make concessions.

The findings challenge the current psycholinguistic frameworks used to accurately evaluate competence in CWASD and the tools for planning interventions. However, they also present a challenge to time and resource-constrained clinicians by emphasising the importance of facilitating CWASD with sufficient linguistic expediency needed to navigate social interactions, particularly as these become more complex over time and with maturation. We must strive to avoid the temptation to fall back on familiar deficit-driven tools and seek alternative methods for evaluating social communication in context.

8.3 Clinical implications

A question is raised about how these children's orientation and use of prosody in the context of computer game-playing could inform education and therapy programmes for this cohort. As an autism advocate and a person with autism, Professor Stephen Shore is often quoted as saying, "If you have met one person with autism, you have met one person with autism". The children in this study are all unique in their characteristics and abilities. However, it is also clear that they each have challenges related to prosodic form, predominantly in the timing and coordination of prosodic and phonetic features. These challenges impact their interaction abilities to varying degrees. The challenge for clinicians is that so much remains to be understood about these

prosodic impairments. This study has highlighted two key areas of clinical importance.

First, speech production CWASD is not extensively considered, particularly in those with mild impairments. Given the variability inherent in neurodiversity and additional developmental conditions such as dyspraxia and Developmental Language Disorders (DLD), it is reasonable to infer that parallel challenges related to speech production (specifically regarding rhythm and timing) may also be prevalent within this population. Due to the limited scope of this study, it is not feasible to draw broad generalisations. Nonetheless, further research focused on evaluating the motor coordination skills of children with developmental conditions would be highly advantageous. Moreover, it would be prudent to investigate the potential application of established intervention strategies for addressing motor coordination difficulties similar to those employed for motor speech disorders to determine their efficacy for this group.

A second area highlighted in this study is the challenges all the children display when using complex lexico-syntactic structures to create explanations and multipart turns. These challenges have consequences for the overall flow and rhythm and, ultimately, the coherence of what is being said. Nevertheless, the children demonstrate their resourcefulness in deploying management strategies in these instances. From my clinical experiences, this finding resonates with some of the comments made by CWASD, indicating that they know what they want to say in their mind but do not know how to say it.

This study does not allow us to determine the underlying nature of linguistic challenges. However, there is some indication of lexical access difficulties and constraints in constructing complex coordinated and subordinated clause structures. In line with other studies ([Diehl et al. 2015](#); [Muskett et al. 2010](#); [Wells and Local 1993](#)), this research suggests that these children use rigid and repetitive communication patterns, both lexico-syntactic and prosodic. It may be that these children are challenged to update these patterns quickly and accurately, or it may be that they have not acquired the necessary linguistic competencies.

To determine the most effective ways to support CWASD, it is necessary to focus on two key areas. First, as clinicians, we must consider how we evaluate language in CWASD. Second, it is necessary to consider the language environment the child is exposed to. It is important to recognise that, despite these children demonstrating competence in mainstream educational settings and attaining a level of language proficiency that may not be deemed problematic, it cannot be assumed that they will subsequently develop more sophisticated linguistic skills. Furthermore, it is crucial to consider that they may not be sufficiently equipped or proficient to utilise their linguistic competencies in dynamic and multidimensional interactions. Therefore, clinicians must consider the value of deficit-driven, standardised language assessments in determining intervention strategies for CWASD. This study advocates for understanding the prosodic features used as resourceful communication strategies and building on skills rather

than focusing on deficits (Korkiakangas et al. 2012; Muskett and Body 2013; Sterponi and Shankey 2014; Stribling et al. 2009).

As this study suggests, by the time children acquire competence in the structural linguistics of spoken language, they have already mastered the fundamentals of paralinguistics. They can respond to a wide range of paralinguistic and prosodic skills to achieve mutual understanding and convey meaning (Wells and Stackhouse 2016, pp200-203). However, for CWASD, the acquisition of social communication is subject to many complex social and cultural influences. For example, reduced social experiences and opportunities to interact in varied contexts can result in gaps in their abilities to use contextually-relevant interactional styles (Durrleman et al. 2015; Kloth et al. 1998; Lewis et al. 2007; Tager-Flusberg and Anderson 1991). This restricted range of actions can have different implications for performance. For CWASD, a repetitive interaction style with a distinct prosodic pattern is advantageous to learning but can also reinforce repetitive behaviours and inhibit flexibility (Korkiakangas et al. 2012; Samuelsson 2009).

This study has highlighted how motivation is a primary factor when using language for social purposes. It demonstrates that CWASD will communicate freely when jointly engaging in motivational tasks. Therefore, it is likely that embedding Speech and Language Therapy targets within a motivational goal-oriented task such as the one utilised in this study could prove highly productive. Supporting these children in developing confidence in using more sophisticated linguistic structures during these activities may reduce the likelihood of reverting to old patterns and lower incoherence and cogency in turn constructions. It is possible that avoiding a tendency towards rigid patterns of interactions, such as the use of imperatives and declaratives to give instruction and question-and-answer formats typical in educational and therapeutic settings, may equip these children with a broader set of resources to deploy when needed.

One major obstacle for these children is the value judgment people make based on how someone sounds. In this study, adults focus on what the child is saying rather than how they are saying it, allowing any unusual or atypical speech patterns to go unaddressed. This is not surprising. In a conversation, adult speakers tend to focus on the content of what is being said, unless there is a loss of intersubjectivity. From a contingency perspective, the strategies adopted by the adults are highly supportive in that they allow the child time to self-repair and continue to completion. In terms of prosody, however, this dynamic could be a disadvantage.

In this study, the evidence suggests that they either may not have the skills to make effective repairs or are unaware of what they need to modify. For CWASD, it may be necessary to make explicit what is implicitly known to others for change to occur. This is challenging for clinicians until more is known about the nature of problem and the mechanisms used to compensate for

difficulties (Hargrove et al. 2009).

8.4 Implications for service provision

CWASD are often unable to access Speech and Language Therapy because, from a competency perspective, they do not show sufficient deficit to access what are long-acknowledged stretched services (Pring et al. 2012). Many intervention strategies are pre-prescribed and programme-based, targeting isolated skills.

There is limited evidence that these are effective, particularly concerning treating prosodic impairments (see review in (Hargrove et al. 2009)). Access to focused, individualised Speech and Language Therapy interventions for CWASD is limited. There are two key issues: limited access to services in the UK (Parkin et al. 2016) and clinical confidence in evaluating and treating prosodic impairments (Peppé 2009b).

One significant advantage of this study is that the children were highly motivated to engage with the adults for extended periods and did not show any task fatigue, which may result from the typically observed fatigue and loss of engagement during other academic task-based activities (Arnold et al. 2023). The advantage of interactive game-based learning (GBL) in supporting intervention strategies for CWA cannot be underestimated. Considering the motivational and attentional benefits of its recreational use, judicious and targeted use of GBL to facilitate the acquisition of prosodic skills could be highly productive (Chen et al. 2019; Durkin 2010). Moreover, this medium has a practical advantage. Parents and educators frequently comment that practising functional communication skills at school or home is difficult because the children are not interested in engaging or do not see the benefit.

It may be challenging to persuade service providers of the efficacy of an individualised and interactive therapeutic approach focusing on an area of language that is not yet thoroughly understood, such as prosody. Few have presented case studies that illustrate the positive outcomes of their interventions (Bellon-Harn et al. 2007; Diehl and Paul 2009). More research is needed on targeted interventions.

The task involves a shift in perspective and recognition that addressing prosody more directly could have a widespread impact on clinical outcomes for this cohort. How could this be achieved? Collaboration with technology companies to devise tailor-made interventions is one possibility. However, this will require significant resources, both financially and in time.

8.5 Limitation and directions for future research

This section explores the limitations of this study and suggests potential areas for further research to address unanswered questions from this thesis.

A significant challenge in autism research is heterogeneity. It is exceedingly complicated to recruit a representative sample when such diversity exists. As with many others, the data collected in this study is small-scale. The design of this study has enabled a comprehensive collection of data considering the small number of participants involved. It has revealed trends in the prosodic abilities of all child participants. However, it must be recognised that this research has also highlighted diversity. Several key limitations have been identified in the study. Firstly, the CWASD participants are all male, while the adult participants are female, leaving unclear the potential impact of gender differences on the data findings. Secondly, there is a lack of comparative analysis with neurotypical children, which restricts understanding the results in a broader context. Additionally, the study does not provide insights into how these children engage with peers under similar conditions. Finally, there is a constraint in information availability to interpret the findings from a developmental perspective.

8.5.1 Impact of gender imbalance

It must be acknowledged that a gender imbalance exists among the participants in this study, as all the child participants are male, while all the adult participants are female. This was not intentional, as the study was open to both males and females. However, recruiting participants for this study has been affected by certain constraints. These are outlined in this section.

Research consistently shows that autism disproportionately affects males, with a prevalence ratio of approximately 4:1 compared to females ([de Giambattista et al. 2021](#)). Despite recent research focusing on autism in females, there continues to be a higher prevalence of autism diagnoses in males compared to females, particularly among those without additional intellectual disabilities ([D'Mello et al. 2022](#)). It is more likely, therefore, that a greater number of males will be willing to participate in research studies than females. The additional criteria of no additional difficulties further limit the potential candidates who are willing and able to participate in such a study.

However, as [Knutsen et al. \(2024\)](#) suggest, challenges in diagnosing girls with autism remain unresolved, and the differences between genders are still unclear. Researchers often rely on standardised diagnostic measures as a criterion for participation. However, as interactional studies, such as the one presented in this thesis, demonstrate, these can be flawed ([Korkiakangas et al. 2016](#); [Maynard and Turowetz 2017b](#)) and less sensitive to more subtle autistic presentations. Differences in how autism manifests may exist between males and females. According

to [de Giambattista et al. \(2021\)](#), girls are less likely to be perceived as having an unusual tone of voice or to speak in an overly precise and pedantic manner. Additionally, instances of motor coordination difficulties and RRBs seem to be fewer in girls ([Knutsen et al. 2019](#); [Supekar and Menon 2015](#)).

Observations from my own clinical experience show that similarities in communication can be observed in both boys and girls with autism. However, these similarities tend to be more evident in younger girls or those who exhibit more severe autistic traits. However, as [Knutsen et al. \(2019\)](#) point out, this may be partly due to these girls being more adept at inhibiting or camouflaging specific characteristics, making detection in interactions more difficult. The lack of understanding of the female autism phenotype increases challenges in detection and diagnosis, making it more difficult to recommend effective intervention strategies. If future research aims to achieve a more gender-balanced conclusion, it is the responsibility of researchers to consider alternative recruitment criteria that do not exclude females.

From a clinician's perspective, it is currently the case that more boys will present with prosodic 'impairments' than girls. The coordination difficulties and prosodic differences seen in the boys are often less apparent in girls. As this study was focused on prosody, understanding how these difficulties manifest, irrespective of gender, is therefore relevant. However, it is acknowledged that the study may unintentionally promote gender-biased conclusions and therefore, reinforce an incomplete model of autism that skews male.

Considering that only boys participated in this study, it is challenging to predict whether the results would have been different if girls had also been included. [Goodwin \(1990\)](#) suggests that females tend to use more conciliatory and polite directive forms and may be more likely to use proposals to initiate directive sequences ([Bottema-Beutel et al. 2022](#)). They are also more likely to acquire these skills at a younger age. Consequently, there may be differences in the way girls approach and manage the gameplay. However, these potential differences do not undermine the overall findings of this study, which demonstrate that CWASD exhibit interactional prosodic competencies that are not easily identified in other contexts.

The original project plan included assessing differences in interactions between trained and untrained adults when engaging with individuals displaying atypical behaviours. As of 3rd November 2023, the Health and Care Professions Council's (HCPC) diversity data reports that 95% of Speech and Language Therapy registrants are female. Consequently, potential recruitment candidates for this part of the project would probably be female. Although the search for non-trained adult participants did not exclude males, only females volunteered. Additional participation limitations arose due to COVID-19 restrictions (see section 3.3). This was unfortunate, as a more gender-balanced dataset would have been preferable. However, there is no evidence to suggest that, when interacting with CWA, the interactive styles of male

adults consistently differ from those of females (Muskett et al. 2010; Rae and Ramey 2020).

When examining the effects of gender imbalances on research, two key factors stand out. First, we are still far from fully understanding how autism affects language and communication in both males and females. As discussed in Chapter 2.7, this pertains to how we assess communication in autism. A good starting point would be to move away from our reliance on cognitive-based assessments and instead focus more on an individual interactional approach.

A higher proportion of adults willing to participate in this study were female. As a result, there may be an unintended consequence of reinforcing gender bias towards female adult support. This study underscores the importance of exposing CWA to various communication styles and engaging them in diverse interactions with different individuals. Understanding the differences in interaction styles is vital for the support of these children to be effective. Researchers need to encourage greater male participation in such studies.

8.5.2 Methodology issues associated with data collection

Apart from concerns about creating a more gender-representative data set, another issue arises from excluding normative data that would serve as a baseline for typically developing peers. The decision not to gather background diagnostic and therapeutic details regarding speech, language, and communication was made initially for ethical reasons, as this information might be viewed as unnecessarily intrusive for prospective families. Moreover, since the project depended on situated interactional data, the usefulness of such normative information is questionable (see section 2.7).

That said, the original project plan did include some normative data to be collected during the orientation session by the researcher using the ERRNI assessment (Expressive and Receptive Recall of Narrative) (Bishop 2004). The initial data collection involved an orientation session, during which this task was included. The aim of this session was primarily to familiarise the children with the setting and equipment. However, gathering information on their use of linguistic structures during a narrative would have helped to compare their performance with the dynamic, time-constrained interactions (Volden et al. 2017).

However, COVID-19 restrictions during the second round of data collection created specific challenges for this part of the process. Firstly, the limitations caused by these restrictions necessitated avoiding close contact with participants during in-person data collection. A two-metre distance rule was still enforced. Conducting a picture-based assessment, such as the ERRNI, under these conditions would have been difficult. Secondly, in the second round of data collection, there were still restrictions on the number of contacts between individuals. Therefore, I participated in the game as the second adult.

By including the normative data collection, the two roles of assessor and co-player might have interfered with the child's interactions with me. Therefore, since the aim of the study was to analyse interactions in context, a decision was made to prioritise the game interactions as the primary data and to minimise my involvement with the children as much as possible.

The study aimed to understand how prosody is used in interaction rather than to analyse specific acoustic features. Because it was not conducted in an acoustically controlled environment, a perceptual analysis focused on what is functionally audible to the listener, with the additional information extracted from PRAAT (Boersma and Weenik 2001) used as validity checks where appropriate. The orientation session could have helped establish individual acoustic ranges, which may have improved the accuracy of the analyses. Audio clips of uninterrupted talk from the orientation sessions might have been used to determine the maximum pitch range and median pitch. However, in the absence of data from all participants, default settings in PRAAT were applied, with an approximate median value, and individual adjustments were made where the pitch range extended beyond the average. It is unlikely that having individual baseline data would have significantly affected the overall analyses, especially considering that the children's age range included some older participants who might have been experiencing early physical changes related to puberty. Therefore, any individual baseline information collected on pitch median and pitch range may not have been entirely reliable.

8.6 Future directions

The researcher conducting this study, although an experienced clinician, is not autistic. As such, there are no insights from autistic individuals to inform the design or direction of this study. Moreover, there has been no opportunity to share the findings with autistic individuals, including those in research, to discuss the dissemination or future directions. Although the initial motivation arose from discussions with young people with autism on what they find difficult about conversations, this lack of inclusion of autistic individuals in the design and delivery of the project is an oversight that any further work would need to address. This research aims to raise awareness by sharing findings. Social media and web-based platforms offer valuable opportunities to effectively and inexpensively engage a larger audience of autistic people. Utilising these channels could significantly enhance efforts to reach a broader population while simultaneously refining subsequent more targeted investigations.

Kelly et al. (2018) conducted a series of semi-structured interviews with adolescents with autism to gain their perspective on their social communication skills. These interviews clearly show that a recurring issue for these children was in the components of communication: knowing what to say and how to say it. Addressing these challenges and providing them with

the skills they need directly through targeted interventions would significantly help reduce the anxiety these individuals often experience. However, more specific information is needed to discover the nature of the apparent limitations. Rather than assuming that the issue is located in the pragmatic language domain, there is a need to explore the structural linguistic abilities of this cohort in more specific detail.

A CA approach was chosen to explore prosody in interaction, and this approach has benefits. Only by analysing talk-in-interaction sequentially can insights be gained into what each turn-at-talk is doing. This is important as it avoids the learning effect observed in more task-based designs.

CWASDs have been shown to understand the interactional consequences of prosody and can effectively use a range of features for communicative functions. This study, which aligns with others (Shriberg et al. 2001; Wiklund 2016), suggests that these children have prosodic realisations that are not necessarily ill-used but can be ill-formed. The findings indicate potential challenges with articulatory and phonetic coordination and timing. Additional research is warranted to investigate the speech-motor coordination skills of CWASDs to ascertain whether this represents a consistent characteristic of their speech and what can be done to help.

8.7 Contribution of this study

This research makes a significant contribution by exploring a previously under-investigated area. It offers valuable insights into the discourse of a difficult-to-access cohort whose tendency to avoid interaction frequently hinders research. Specifically, this work provides a detailed examination of their prosodic communication patterns. Findings related to challenges such as articulatory timing and coordination corroborate an emerging area of investigation in autism and indicate promising directions for new intervention strategies.

Furthermore, it robustly contributes to the growing body of research focused on understanding the characteristics of autism as communication strategies and competencies rather than viewing them as deficiencies (Korkiakangas et al. 2012; Maynard and Turowetz 2017b; Muskett et al. 2010; Sterponi and Shankey 2014; Stribling and Rae 2009; Wiklund and Määttä 2021).

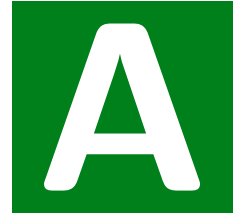
8.8 Summary

This thesis has reported on an applied conversation analytic study of the interactions between six CWASDs and an adult during an interactive goal-oriented computer game. The project explored the prosodic devices used during specific action sequences, particularly directives and

complaints, to manage turns, mark information boundaries, create focus, and display affect. The purpose was to provide insight into the prosodic abilities of CWASD and offer recommendations for future interventions.

This research adds to the existing body of literature positing that the prosody observed in CWASD is characterised as ill-formed rather than necessarily ill-used. It underscores a resourcefulness in utilising their skills to navigate conversations and establish intersubjectivity. A key finding highlights challenges in the timing and articulatory coordination of prosodic and phonetic features, contributing to an atypical prosodic form. Moreover, lexico-syntactic challenges in the creation of novel and complex linguistic structures create dysfluencies and fragmentation, which affect the overall flow and rhythm of speech.

This thesis presents new insights into the prosodic competencies and challenges of CWASD and identifies potential areas for further research. For these children to engage in successful interactions, this study highlights the critical role that the conversation partner plays and the situational context within which the interaction occurs. It illustrates the advantages of employing an interactive, goal-oriented task to examine CWASD's interactions and enhance motivation.



RECRUITMENT PROCESS 1 DOCUMENTS

A.1 Adult Volunteer Information Sheet



Volunteer Information Sheet

Date:

Project Title: Prosody and pragmatics: understanding and improving the 'turns-at-talk' between school-aged children with High Functioning Autism and adults

Dear Volunteer

Hello. Please let me introduce myself.

My name is Julie Anstey.

I am an experienced Speech and Language Therapist and a doctoral research student at the University of Sheffield.

I am writing to you to ask for some help.

I want to carry out a project to find out what happens in the conversations of school-aged children with High Functioning Autism/Asperger's Syndrome when they are talking to adults. I am also interested in finding out what happens when a child talks to someone who has had training in speech and language therapy.

I would like to invite you to take part in this project. Before you decide whether or not you would like to go ahead, let me take this opportunity to explain what the study is all about and what will happen.

Thank you so much for taking the time to read this information. Please do feel free to contact me either by telephone or email at any time for more information or to ask any questions. My contact details are at the end of this sheet.

Here are a few frequently asked questions.

Why have I been chosen?

You have been chosen because you may meet the criteria for this study.

These are either

- you have specific training to university level in speech, language and communication disorders and in the techniques used in communication with children with speech, language and communication needs
- OR
- you have not studied to university level in speech, language and communication disorders

You also

- have English as your first and main language
- have no hearing difficulties
- have no identified neurological difficulties

Do I have to take part?

No, you don't. Taking part in this study is entirely voluntary.

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form and complete a very short questionnaire.

You can still withdraw at any time without any negative consequences. You do not have to give a reason. If you wish to withdraw from the research, please contact me. My details are at the end of this information sheet.

What will happen?

The study will involve each adult spending between 8 and 16 sessions of 30-45 minutes in length in a designated location (this is between Leeds and York).

Adult Volunteer Information Sheet



Volunteer Information Sheet

Date:

The session will involve spending some time chatting to the child involved and playing a suitable (PEGI 3 rated), pre-determined interactive computer game.

I will be there in the sessions. I will ask you and the child to wear lapel microphones so that I can hear the recordings more clearly.

The parent or carer may also be there, but they will be asked to remain quiet during the sessions

You will also have the chance to learn the game beforehand and ask any questions.

The game is very easy to play and there are several activities within the game that you and the child will be able to choose. You can swap activities or stop at any time.

All the sessions will be very relaxed and at any time you and the child will be able to stop or take a break. You and the child will not be forced to do anything.

These sessions will be video-recorded and I will be transcribing everything that happens in these recordings.

What happens then?

The conversations between you and the children will form the basis of the study. I will transcribe and analyse these conversations.

I will be asking you for permission to use the recordings for the purpose of this research and, possibly for future approved research projects and for teaching purposes. You can decide what you want the information to be used for. All information will be stored securely and anonymously.

If, at any point, you decide you don't want to take part, all information will be destroyed.

What should I do if I want to take part?

Each adult in the project will need to meet either of the following criteria:

- has English as their first and main language
- has no hearing difficulties
- has no identified neurological difficulties

AND

- has specific training to university level in speech, language and communication disorders and in the techniques used in communication with children with speech, language and communication needs

OR

- has not studied to university level in speech, language and communication disorders

If you contact me expressing your interest in the study, I will send you a consent form and a brief questionnaire which asks for some background information. Please can you return these to the address below. I have included a stamped self-addressed envelope.

If you prefer, we can go through the forms together and I am happy to answer any questions you might have.

If you agree to participate, I will be in contact to arrange the sessions. I will try to arrange these at your convenience. Please be aware that I will need to coordinate these sessions with our volunteer families and so they may be at the weekend, in the evenings or in school holidays if these are more convenient. Please let me know if travel is a problem.

My contact details are at the end of this information sheet.

What are the possible disadvantages or risks to taking part?

There are no direct risks or disadvantages.



Volunteer Information Sheet

Date:

There may be some inconvenience in terms of travel.

The children may be anxious initially. Every opportunity will be made available to you and the children to feel comfortable during the sessions.

I am a Speech and Language Therapist who is very experienced in working with children with all levels of Autism. I will be present in all the sessions and will be able to spot signs of anxiety or distress in the child.

You will have the opportunity to see the computer game beforehand and practise if you need to.

It is important to be aware that the needs of the child are paramount. This means that we need to ensure that you have a current and valid DBS certificate before the sessions begin. Your status and personal details will also need to be confirmed with your institution/employer. This will be done via email.

In the highly unlikely event of any concerns that may arise during the activities that puts the children at any risk, the research team reserves the right to inform your institution/employer.

Are there any benefits from taking part?

There are no direct benefits from taking part. However, the information we gain from the study will help towards our ability to assess and understand of the problems in social communication in children with autism and potentially improve our intervention strategies.

How will the recorded media be used?

The audio and video recordings will be watched and listened to by me and my supervisors. I will transcribe (type up) what has been said, which will allow me to analyse the conversations. Real names, places and any other identifying details will be changed.

The audio and video recordings of you and children's activities made during this research will be used only for analysis and for illustration in my final thesis, conference presentations, academic publications and lectures. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. These recordings will be edited so that faces are less recognisable.

Will our taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. You will not be able to be identified in any reports or publications unless you have given your explicit consent for this. If you agree to us sharing the information you provide with other researchers, then your personal details will not be included.

How will my data be stored?

All the information you provide and the data collected will be stored on a secure, password protected computer at the University of Sheffield and on a secure, password protected laptop in an unidentifiable, anonymised form (i.e. using a key code) for the duration of the project. This will include audio and video recordings and scanned paper documents. The transcribed data will have all names changed. The original paper documents will be stored in a locked filing cabinet and destroyed at the end of the project.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

I can provide you with a copy of this document if you like.



Volunteer Information Sheet

Date:

What will happen to the data collected, and the results of the research project?

The results from this research project will be presented in my doctoral research project by September 2022. Just let me know if you would like a copy of the final project. Data collected during the course of the project may be used in later research projects and publications. You will not be identified in any report or publication. If you agree to this, then the edited video data will be held in a secure data repository.

Due to the nature of this research it is very likely that other researchers may find the data collected to be useful in answering future research questions. We will ask for your explicit consent for the data to be shared in this way.

If not, that's absolutely fine and the data will be destroyed 10 years following the end of my project. If you decide to withdraw from the project, then all the information stored on you will be destroyed.

Who is organising and funding the research?

This project is self-funded by the lead researcher, Julie Anstey.

Who is the Data Controller?

The Data Controller is the organisation who is responsible for looking after your data and using it properly. The University of Sheffield will act as the Data Controller for this study. Myself, as the lead researcher and my supervisors will be the only ones who have access to the original unedited recordings. It may be that edited data will be useful to other researchers with ethical approval. If this is the case, we will ask your permission for the data to be used for this purpose.

Who has ethically reviewed the project?

This project has been ethically approved via The Department of Human Communication Sciences Research Ethics Review Panel within the University of Sheffield.

What if something goes wrong and I wish to complain about the research?

If you have any problems or questions at any time regarding the project you can contact me, the lead researcher, or my supervisor in the first instance. Our contact details are below

If you are not satisfied that your concerns have been dealt with, and want to speak to someone not involved in the project then you can contact:

The Head of the Division of Human Communication Sciences:

Dr Judy Clegg

Health Sciences School

Division of Human Communication Sciences

The University of Sheffield

362 Mushroom Lane

Sheffield

S10 2TS

Telephone: (0114) 2222444

If you feel that the University has not dealt correctly with your personal data you can complain to the Information Commissioner's Office through this link (<https://ico.org.uk/make-a-complaint/>)

Information about how to raise a complaint can be found in the University's Privacy Notice: <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.



Volunteer Information Sheet

Date:

Contact for further information

If you would like further information, please contact me below. If I am unavailable, please contact my supervisor

Julie Anstey

Email: hcp07jfa@sheffield.ac.uk

Address:

Department of Human Communication Sciences

University of Sheffield

362 Mushroom Lane

S10 2TS

Tel: 07920041892

Dr Traci Walker

Email: traci.walker@sheffield.ac.uk

Address:

Department of Human Communication Sciences

University of Sheffield

362 Mushroom Lane

S10 2TS

Thank you so much for taking the time to read this and for your interest in taking part in the project.

A.2 Adult Questionnaire

Adult Questionnaire

Name		
Contact email	Mobile	
First and main language spoken		
How would you describe your speech in terms of its accent? The following options may help you to decide Standard English (no specific accent/Received Pronunciation) Northern English West Midlands Welsh Scottish Irish North East (Geordie) South East London (Cockney) Liverpoolian Other country (e.g. American, Asian, French etc). Please describe. Other. Please describe		
University course/current employment details		
What experience if any, do you have with children or young people with speech, language or communication difficulties		
I have a current DBS certificate:	Yes	No
Please can you circle the following yes/no responses:		
Do you have any known hearing difficulties?	Yes	No
Do you have any known motor coordination difficulties?	Yes	No

A.3 Adult Volunteer Consent Form



Adult Participant Consent Form

Project Title: Prosody and pragmatics: an investigation into the 'turns-at-talk' between school-aged children with High Functioning Autism/Asperger's Syndrome and adults

Before you complete this consent form, it is important that you have read and understood the project information sheet, so that you are fully aware of what your participation in the project will mean.

Please tick the appropriate boxes	Yes	No
Taking Part in the Project		
I have read and understood the project information sheet dated DD/MM/2019 or the project has been fully explained to me.	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I agree to take part in the project. I understand that taking part in the project will include... 1. a video recording will be made during a session with a child participant and myself and that the researcher will be present in all sessions. 2. I will be playing a computer game with the child during these sessions 3. There will be at least 8 children and therefore at least 8 30 minute sessions	☐	☐
I understand that my participation is voluntary and that I can withdraw from the study at any time ; I do not have to give any reasons for why I no longer want to take part and there will be no consequences if I choose to withdraw.	☐	☐
I understand that my participation is subject to DBS clearance and that my personal details will be validated by my institution/employer	☐	☐
I understand that I have a duty of care to the children participating in the project and that the researcher reserves the right to raise concerns regarding my conduct with my Institution/employer.	☐	☐
How my information will be used during and after the project		
I understand my personal details such as name, phone number, address, email address etc. will not be revealed to people outside the project.	☐	☐
I understand that my name will not be linked with the research materials, and I will not be identified in the report or other material that result from the research.	☐	☐
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I understand and agree that other authorised researchers may use the data collected in publications, reports, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I give permission for the data collected and transcribed to be used for future research and learning by authorised academics and students.	☐	☐
I give permission for the data collected and transcribed to be used for teaching purposes such as presentations at conferences, lectures and data analysis sessions with other authorised academics and students.		
I give permission for anonymized video clips to be used for future research and learning by authorised academics and students.	☐	☐
I give permission for anonymized video clips to be used for teaching purposes such as presentations at conferences, lectures and data analysis sessions with other authorised academics and students.		

Adult Volunteer Consent Form



Adult Participant Consent Form

So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.	☐	☐
I understand that a copy of this consent form will be held in the research data file	☐	☐

Name of participant:
[Printed]

Signature:

Date:

Name of researcher:
[Printed]

Signature:

Date:

Project contact details for further information:

Lead researcher:

Julie Anstey
Email: hcp07ifa@sheffield.ac.uk
Address:
Department of Human Communication Sciences
University of Sheffield
362 Mushroom Lane
S10 2TS

Project supervisor:

Dr Traci Walker
Email: traci.walker@sheffield.ac.uk
Address:
Department of Human Communication Sciences
University of Sheffield
362 Mushroom Lane
S10 2TS

If you want to speak to someone not involved in the project
then you can contact:

The Head of the Department of Human Communication
Sciences:
Professor Patricia Cowell
Department of Human Communication Sciences
University of Sheffield
362 Mushroom Lane
Sheffield S10 2TS
Email: p.e.cowell@sheffield.ac.uk
Phone: 0114 222 2426

A.4 Child Assent Form



Hello. My name is Julie.



I am doing some work to find out how children talk.



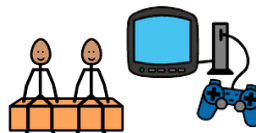
I would like you to help me.



3



I would like you to come and visit me 3 times at the place where I work.



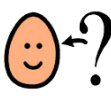
I would like to listen to you talking while you are playing a fun computer game with a grown up.



This is what will happen...

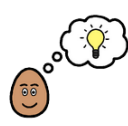
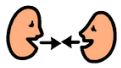
1
Visit 1

- 
- 
1. Meet me and see where we are.

- 
- 
2. Look at some pictures and answer some questions

2
Visit 2

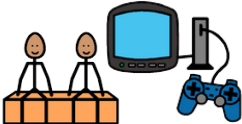
- 
1. Play a computer game with one of my friends

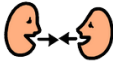
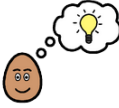
I will need to video record you so that I can remember what you have said

3

Visit 3



1. Play a computer game with my other friend



I will need to video record you so that I can remember what you have said

Name:		D.O.B:	
		Please tick	
   Yes, I do want to do these activities			
   No, I do not want to do these activities			

A.5 Child Questionnaire

Child Questionnaire

GENERAL INFORMATION		
Child's Name:		
Age:		Date Form Completed:
Name of Parent(s)/Carer(s):		
Mobile No:		Email Address:
Date and details of diagnosis		
Please can you respond to the following		
Any history of hearing difficulties	YES	NO
If yes, please can you give details		
Any visual difficulties	YES	NO
If yes, please can you give details		
Any other known medical conditions	YES	NO
If yes, please can you give details		
• Are you able to travel?	YES	NO
If no, please can you give details		

Child questionnaire

A.6 Parent Information Sheet



Parent/Carer Information Sheet

Date:

Project Title: Prosody and pragmatics: understanding and improving the 'turns-at-talk' between school-aged children with High Functioning Autism and adults

Dear Parent/Carer

Hello. My name is Julie Anstey. Please let me introduce myself.

I am an experienced Speech and Language Therapist and a doctoral research student at the University of Sheffield.

I am writing to you to ask for some help.

I want to carry out a project to find out what happens in the conversations of school-aged children with High Functioning Autism/Asperger's Syndrome. I am also interested in finding out what happens when a child talks to someone who has had training in speech and language therapy.

I would like to invite your child to take part in this project. But as you are your child's responsible adult, I would in the first instance, like to ask your permission. Before you decide whether or not you would like to go ahead, let me take this opportunity to explain what the study is all about and what will happen.

Thank you so much for taking the time to read this information. Please do feel free to contact me either by telephone or email at any time to ask any questions or for more information. My contact details are at the end of this sheet.

Here are a few frequently asked questions.

Why has my child been chosen?

Your child has been chosen because they may meet the criteria for this study
These are

1. they have a diagnosis of Autism Spectrum Disorder/Asperger's Syndrome
2. they have no other known difficulties
3. they are aged between 8 and 12 years
4. they only speak English

Does my child have to take part?

No, they don't. Taking part in this study is entirely voluntary.

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form and complete a very short questionnaire.

You can still withdraw at any time without any negative consequences. You do not have to give a reason. If you wish to withdraw from the research, please contact

Julie Anstey hcp07jfa@sheffield.ac.uk

What will happen?

You and your child will be asked to attend three sessions at my workplace in Boston Spa.

The first session is an opportunity for you and your child to meet me and to get to know their way around. During this session I will ask your child to do a task.

This task is to tell or retell a story using some pictures to help.

This will be video and audio recorded. I will ask your child to wear a lapel microphone to help me hear the recording more clearly. After the session I will watch the video and write down everything your child has said, so that I can make an evaluation of their language skills.

Parent Information Sheet



Parent/Carer Information Sheet

Date:

This session will last about one hour.

The next two sessions will be in the same place. I will be there with one of the adult volunteers. Your child will be invited to play a suitable (PEGI 3 rated) computer game with this adult. The game is very easy to play and there are several activities within the game that your child will be able to choose. Your child will have a chance to take a look at it beforehand. They can stop or switch activities within the game at any time.

All the sessions will be very relaxed and at any time your child will be able to stop or take a break. Your child will not be forced to do anything.

These sessions will be video- recorded and I will be transcribing everything that happens in these recordings.

What happens then?

The two conversations with your child and the volunteer adults will be video recorded. This information will be the basis of the study. I will transcribe and analyse these conversations.

I will be asking you for permission to use the recordings for the purpose of this research and, possibly for future approved research projects and for teaching purposes. You can decide what you want the information to be used for. All information will be stored securely and anonymously.

If, at any point, you don't want to take part, all information will be destroyed.

What should I do if I want my child to take part?

If you would like your child to take part, can you complete the attached expression of interest form which asks for some background information. Please can you return this to your child's school or to the address below. I have also included a stamped self-addressed envelope, if you prefer to send the information directly to me.

If you do decide to take part, you can keep this information sheet and you will be asked to sign a consent form. We will go through the forms together and I will answer any questions you might have. I have also an assent form for your child to complete with some easily understandable information about the project. If you would like me to explain this in person to your child, then please do let me know and I can arrange for this.

If you agree, I will be in contact to arrange the sessions. I will try to arrange these at your convenience. I am happy to for them to be at the weekend, in the evenings or in school holidays if these are more convenient. Please be aware that I will need to coordinate these sessions with our volunteer adults. If during school hours is more convenient to you, I will agree with the school to ensure there are no problems arising from taking your child out of school. Please let me know if travel is a problem.

What are the possible disadvantages or risks to taking part?

There are no direct risks or disadvantages. This study does not and will not interfere with any other assessment or intervention that might be taking place throughout the course of the project.

I am aware that your child may be anxious. Every opportunity will be made available to your child to feel comfortable before the sessions take place.

I am a Speech and Language Therapist who is very experienced in working with children with all levels of Autism. I will be present in all the sessions and am able to spot signs of anxiety or distress in your child

All the adults participating in the study will have current DBS checks.



Parent/Carer Information Sheet

Date:

Are there any benefits from taking part?

There are no direct benefits from taking part. However, the information we gain from the study will help towards our ability to assess and understand of the problems in social communication in children with autism and potentially improve our intervention strategies.

How will the recorded media be used?

The audio and video recordings will be watched and listened to by me and my supervisor. I will transcribe (type up) what has been said and this will allow me to analyse the conversations. All names, places and other identifying details will be changed.

These audio and video recordings will only be used for analysis and illustration in my final thesis and any conference presentations, academic publications and lectures. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. These recordings will be edited using computer software so that faces are less recognisable.

Will our taking part in this project be kept confidential?

All the information that we collect about your child during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. Your child will not be able to be identified in any reports or publications unless you have given your explicit consent for this. If you agree to us sharing the information you provide with other researchers, then neither you nor your child's personal details will be included.

How will my data be stored?

All the information you provide and the data collected will be stored on a secure, password protected computer at the University of Sheffield and on a secure, password protected laptop in an unidentifiable form i.e. anonymised form (i.e. using a key code) for the duration of the project. This will include audio and video recordings and scanned paper documents. The transcribed data will have all names changed. The original paper documents will be stored in a locked filing cabinet and destroyed at the end of the project.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

I can provide you with a copy of this document if you like.

What will happen to the data collected, and the results of the research project?

The results from this research project will be presented in my doctoral research project by September 2022. Just let me know if you would like a copy of the final project. Data collected during the course of the project may be used in later research projects and publications. Your child will not be identified in any report or publication. If you agree to this, then the edited video data will be held in a secure data repository.

Due to the nature of this research it is very likely that other researchers may find the data collected to be useful in answering future research questions. We will ask for your explicit consent for the data to be shared in this way.

If not, that's absolutely fine and the data will be destroyed 10 years following the end of my project.

If you decide to withdraw from the project, then all the information stored on your child will be destroyed.

Who is organising and funding the research?

This project is self-funded by the lead researcher, Julie Anstey.

Parent Information Sheet



Parent/Carer Information Sheet

Date:

Who is the Data Controller?

The Data Controller is the organisation who is responsible for looking after you and your child's data and using it properly. The University of Sheffield will act as the Data Controller for this study. Myself, as the lead researcher and my supervisors will be the only ones who have access to the original unedited recordings. It may be that edited data will be useful to other researchers with ethical approval. If this is the case, we will ask your permission for the data to be used for this purpose.

Who has ethically reviewed the project?

This project has been ethically approved via The Department of Human Communication Sciences Research Ethics Review Panel within the University of Sheffield.

What if something goes wrong and I wish to complain about the research?

If you have any problems or questions at any time regarding the project you can contact me, the lead researcher, or my supervisor in the first instance. Our contact details are below

If you are not satisfied that your concerns have been dealt with, and want to speak to someone not involved in the project then you can contact:

The Head of the Department of Human Communication Sciences:

Professor Patricia Cowell

Department of Human Communication Sciences

University of Sheffield

362 Mushroom Lane

Sheffield S10 2TS

Email: p.e.cowell@sheffield.ac.uk

Phone: 0114 222 2426

If you feel that the University has not dealt correctly with your personal data you can complain to the Information Commissioner's Office through this link (<https://ico.org.uk/make-a-complaint/>)

Information about how to raise a complaint can be found in the University's Privacy Notice: <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

Contact for further information

If you would like further information, please contact me below. If I am unavailable, please contact my supervisor

Julie Anstey

Email: hcp07ifa@sheffield.ac.uk

Address:

Department of Human Communication Sciences

University of Sheffield

362 Mushroom Lane

S10 2TS

Tel: 07920041892

Dr Traci Walker

Email: traci.walker@sheffield.ac.uk

Address:

Department of Human Communication Sciences

University of Sheffield

362 Mushroom Lane

S10 2TS

Thank you so much for taking the time to read this and for your interest in taking part in the project.



Parent/Carer Information Sheet

Date:

A.7 Parent Consent Form



Child Participant Consent Form

Before you complete this consent form, it is important that you have read and understood the project information sheet, so that you are fully aware of what your and your child's participation in the project will mean

Please tick the appropriate boxes	Yes	No
Taking Part in the Project		
I have read and understood the project information sheet dated DD/MM/YYYY or the project has been fully explained to me.	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I agree for my child to take part in the project. I understand that taking part in the project will include... - an initial session with myself and my child as an introduction. An audio recording will be made which will later be deleted. - a video recording will be made during two further sessions with my child and a volunteer adult and that the researcher will be present in all sessions. - My child will be playing a computer game during these sessions I understand that a video recording will be made during two sessions with my child and a volunteer adult and that the researcher will be present in all sessions.	☐	☐
I understand that my child's taking part is voluntary and that I can withdraw from the study at any time; I do not have to give any reasons for why I no longer want to take part and there will be no consequences if I choose to withdraw.	☐	☐
How my information will be used during and after the project		
I understand my or my child's personal details such as name, phone number, address, email address etc. will not be revealed to people outside the project.	☐	☐
I understand that my child's name will not be linked with the research materials, and my child will not be identified in the report or other material that result from the research.	☐	☐
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I understand and agree that other authorised researchers may use the data collected in publications, reports, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I give permission for the data collected and transcribed to be used for future research and learning by authorised academics and students.	☐	☐
I give permission for the data collected and transcribed to be used for teaching purposes such as presentations at conferences, lectures and data analysis sessions with other authorised academics and students.	☐	☐
I give permission for anonymised video clips to be used for future research and learning by authorised academics and students.	☐	☐
I give permission for anonymised video clips to be used for to be used for teaching purposes such as presentations at conferences, lectures and data analysis sessions with other authorised academics and students.	☐	☐
So that the information you provide can be used legally by the researchers		

Parent Consent Form



Child Participant Consent Form

I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.	☐	☐
I understand that a copy of this consent form will be held in the research data file		

Name of participant: [Printed]	Signature:	Date:
Name of researcher: [Printed]	Signature:	Date:

RECRUITMENT PROCESS 2 DOCUMENTS

B.1 Covid Parent Information Sheet



Parent/Carer Information Sheet

Date:

Project Title: Prosody and pragmatics: understanding and improving the 'turns-at-talk' between school-aged children with High Functioning Autism and adults

Dear Parent/Carer

Hello. My name is Julie Anstey. Please let me introduce myself.

I am an experienced Speech and Language Therapist and a doctoral research student at the University of Sheffield.

I am writing to you to ask for some help.

I want to carry out a project to find out what happens in the conversations of school-aged children with High Functioning Autism/Asperger's Syndrome. I am also interested in finding out what happens when a child talks to someone who has had training in speech and language therapy.

I would like to invite your child to take part in this project. But as you are your child's responsible adult, I would in the first instance, like to ask your permission. Before you decide whether or not you would like to go ahead, let me take this opportunity to explain what the study is all about and what will happen.

Thank you so much for taking the time to read this information. Please do feel free to contact me either by telephone or email at any time to ask any questions or for more information. My contact details are at the end of this sheet.

Here are a few frequently asked questions.

Why has my child been chosen?

Your child has been chosen because they may meet the criteria for this study
These are

1. they have a diagnosis of Autism Spectrum Disorder/Asperger's Syndrome
2. they have no other known difficulties
3. they are aged between **7 and 14 years old**
4. they only speak English

Does my child have to take part?

No, they don't. Taking part in this study is entirely voluntary.

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form and complete a very short questionnaire.

You can still withdraw at any time without any negative consequences. You do not have to give a reason. If you wish to withdraw from the research, please contact

Julie Anstey hcp07jfa@sheffield.ac.uk

What will happen?

You or an adult family member of the same household and your child will be asked to attend a session at my workplace, The Talking House, Grange Park, Wetherby, LS23 5DY. The session will last around two hours. There will be some time at the beginning to chat and ask questions.

Your child will be invited to play a suitable (PEGI 3 rated) video game with me using an Nintendo 'Switch'. The game is called 'Snipperclips'. -

- The game is very easy to play and there are several activities within the game that your child will be able to choose. Your child will have a chance to take a look at it beforehand. They can stop or switch activities within the game at any time.



Parent/Carer Information Sheet

Date:

There will be a short break in the middle of the session and then you or the adult accompanying your child will be invited to play the game with your child.

All the sessions will be very relaxed and at any time your child will be able to stop or take a break. Your child will not be forced to do anything.

These sessions will be video **and** audiorecorded and I will be transcribing everything that happens in these recordings.

What happens then?

- **The information from the recordings** will be the basis of the study. I will transcribe and analyse these conversations.

I will be asking you for permission to use the recordings for the purpose of this research and, possibly for future approved research projects and for teaching purposes. You can decide what you want the information to be used for. All information will be stored securely and anonymously.

If, at any point, you don't want to take part, all information will be destroyed.

What should I do if I want my child to take part?

If you would like your child to take part, can you complete the attached expression of interest form which asks for some background information. Please can you return this to your child's school or to the address below. I have also included a stamped self-addressed envelope, if you prefer to send the information directly to me.

If you do decide to take part, you can keep this information sheet and you will be asked to sign a consent form. We will go through the forms together and I will answer any questions you might have. I have also an assent form for your child to complete with some easily understandable information about the project. If you would like me to explain this in person to your child, then please do let me know and I can arrange for this.

If you agree, I will be in contact to arrange the session-. I will try to arrange **this** at your convenience. I am happy to for them to be at the weekend, in the evenings or in school holidays if **this** more convenient.-If during school hours is more convenient to you, I will agree with the school to ensure there are no problems arising from taking your child out of school. Please let me know if travel is a problem.

What are the possible disadvantages or risks to taking part?

There are no direct risks or disadvantages. This study does not and will not interfere with any other assessment or intervention that might be taking place throughout the course of the project.

I am aware that your child may be anxious. Every opportunity will be made available to your child to feel comfortable before the sessions take place.

I am a Speech and Language Therapist who is very experienced in working with children with all levels of Autism. I will be present in all the sessions and am able to spot signs of anxiety or distress in your child

-.

My workplace has a full COVID 19 risk assessment and is following current Government guidelines for social distancing and ensuring safety. I have attached this for your information. Neither you nor your child will have any contact with anyone other than myself, Julie Anstey, during the session.

Are there any benefits from taking part?

There are no direct benefits from taking part. However, the information we gain from the study will help towards our ability to assess and understand of the problems in social communication in children with autism and potentially improve our intervention strategies.



Parent/Carer Information Sheet

Date:

How will the recorded media be used?

The audio and video recordings will be watched and listened to by me and my supervisor. I will transcribe (type up) what has been said and this will allow me to analyse the conversations. All names, places and other identifying details will be changed.

These audio and video recordings will only be used for analysis and illustration in my final thesis and any conference presentations, academic publications and lectures. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. These recordings will be edited using computer software so that faces are less recognisable.

Will our taking part in this project be kept confidential?

All the information that we collect about your child during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. Your child will not be able to be identified in any reports or publications unless you have given your explicit consent for this. If you agree to us sharing the information you provide with other researchers, then neither your nor your child's personal details will be included.

How will my data be stored?

All the information you provide and the data collected will be stored on a secure, password protected computer at the University of Sheffield and on a secure, password protected laptop in an unidentifiable form i.e. anonymised form (i.e. using a key code) for the duration of the project. This will include audio and video recordings and scanned paper documents. The transcribed data will have all names changed. The original paper documents will be stored in a locked filing cabinet and destroyed at the end of the project.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

I can provide you with a copy of this document if you like.

What will happen to the data collected, and the results of the research project?

The results from this research project will be presented in my doctoral research project by September 2022. Just let me know if you would like a copy of the final project. Data collected during the course of the project may be used in later research projects and publications. Your child will not be identified in any report or publication. If you agree to this, then the edited video data will be held in a secure data repository.

Due to the nature of this research it is very likely that other researchers may find the data collected to be useful in answering future research questions. We will ask for your explicit consent for the data to be shared in this way.

If not, that's absolutely fine and the data will be destroyed 10 years following the end of my project.

If you decide to withdraw from the project, then all the information stored on your child will be destroyed.

Who is organising and funding the research?

This project is self-funded by the lead researcher, Julie Anstey.

Who is the Data Controller?

Covid Parent Information Sheet



Parent/Carer Information Sheet

Date:

The Data Controller is the organisation who is responsible for looking after you and your child's data and using it properly. The University of Sheffield will act as the Data Controller for this study. Myself, as the lead researcher and my supervisors will be the only ones who have access to the original unedited recordings. It may be that edited data will be useful to other researchers with ethical approval. If this is the case, we will ask your permission for the data to be used for this purpose.

Who has ethically reviewed the project?

This project has been ethically approved via The Department of Human Communication Sciences Research Ethics Review Panel within the University of Sheffield.

What if something goes wrong and I wish to complain about the research?

If you have any problems or questions at any time regarding the project you can contact me, the lead researcher, or my supervisor in the first instance. Our contact details are below

If you are not satisfied that your concerns have been dealt with, and want to speak to someone not involved in the project then you can contact:

The Head of the Department of Human Communication Sciences:
Professor Patricia Cowell
Department of Human Communication Sciences
University of Sheffield
362 Mushroom Lane
Sheffield S10 2TS
Email: p.e.cowell@sheffield.ac.uk
Phone: 0114 222 2426

If you feel that the University has not dealt correctly with your personal data you can complain to the Information Commissioner's Office through this link (<https://ico.org.uk/make-a-complaint/>)

Information about how to raise a complaint can be found in the University's Privacy Notice: <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

Contact for further information

If you would like further information, please contact me below. If I am unavailable, please contact my supervisor

Julie Anstey
Email: hcp07jfa@sheffield.ac.uk
Address:
Department of Human Communication Sciences
University of Sheffield
362 Mushroom Lane
S10 2TS
Tel: 07920041892

Dr Traci Walker
Email: traci.walker@sheffield.ac.uk
Address:
Department of Human Communication Sciences
University of Sheffield
362 Mushroom Lane
S10 2TS

Thank you so much for taking the time to read this and for your interest in taking part in the project.



Parent/Carer Information Sheet

Date:

B.2 Covid Parent Consent Form



Child Consent Form

**Project Title: Prosody and pragmatics: understanding and improving the 'turns-at-talk'
between school-aged children with high functioning autism and adults**

Before you complete this consent form, it is important that you have read and understood the project information sheet, so that you are fully aware of what your and your child's participation in the project will mean

Please tick the appropriate boxes	Yes	No
Taking Part in the Project		
I have read and understood the updated project information sheet dated DD/MM/YYYY or the project update has been fully explained to me.	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I agree for my child to take part in the -the project. I understand that taking part - will involve... - -	☐	☐
A two-hour visit to The Talking House, Grange Park, Wetherby LS23 5DE by my child and either myself or an adult family member of the same household		
My child will play a computer game with the lead researcher and me		
The sessions will be video and audio-recorded by the lead researcher, Julie Anstey.		
I have seen, read and agreed to The Talking House risk assessment	☐	☐
I understand that my child's taking part is voluntary and that I can withdraw from the study at any time; I do not have to give any reasons for why I no longer want to take part and there will be no consequences if I choose to withdraw.	☐	☐
How my information will be used during and after the project		
I understand my or my child's personal details such as name, phone number, address, email address etc. will not be revealed to people outside the project.	☐	☐
I understand that my child's name will not be linked with the research materials, and my child will not be identified in the report or other material that result from the research.	☐	☐
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I understand and agree that other authorised researchers may use the data collected in publications, reports, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I give permission for the data collected and transcribed to be used for future research and learning by authorised academics and students.	☐	☐
I give permission for the data collected and transcribed to be used for teaching purposes such as presentations at conferences, lectures and data analysis sessions with other authorised academics and students.	☐	☐
I give permission for anonymised video clips to be used for future research and learning by authorised academics and students.	☐	☐

Covid Parent Consent Form



Child Consent Form

I give permission for anonymised video clips to be used for to be used for teaching purposes such as presentations at conferences, lectures and data analysis sessions with other authorised academics and students.	☐	☐
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.	☐	☐
I understand that a copy of this consent form will be held in the research data file		

Name of participant:
[Printed]

Signature:

Date:

Name of researcher:
[Printed]

Signature:

Date:

Project contact details for further information:

Lead Researcher: Julie Anstey

Project supervisor: Dr Traci Walker

Email: hcp07jfa@sheffield.ac.uk

Email: traci.walker@sheffield.ac.uk

Address:

Address:

Health Sciences School
Division of Human Communication Sciences
The University of Sheffield
362 Mushroom Lane
Sheffield
S10 2TS

Health Sciences School
Division of Human Communication Sciences
The University of Sheffield
362 Mushroom Lane
Sheffield
S10 2TS

Tel: 07920041892

If you would like to speak to someone in the University not directly involved in the project, then please contact

The Head of the Division of Human Communication Sciences:

Dr Judy Clegg

Health Sciences School

Division of Human Communication Sciences

The University of Sheffield

362 Mushroom Lane

Sheffield

S10 2TS

Telephone: (0114) 2222444

Thank you very much for your participation in the project



Child Consent Form



Adult Participant Consent Form

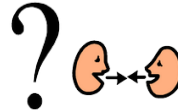


Parent/Carer Consent Form

B.3 Covid Child Assent Form with Symbols



Hello. My name is Julie.



I am doing some work to find out how people talk to each other.



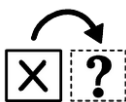
I would like you to help me.



I would like you **and a family member** to come and visit me at the place where I work.



I would like to play a fun computer game with **you**.



This is what will happen...

1. Meet me and see where we are.



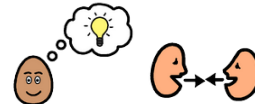
2. Play a computer game with me.



3. Have a short break.



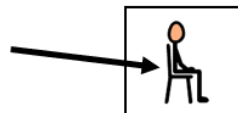
4. Play the game with the family member who has come with you.



I will need to video record you so that I can remember what you have said.



Because of Covid19 there are some things we need to do to stay safe. I might be wearing a visor. Here is what I will look like.



There will be an area marked out to show where we can sit. It will look like this. We both need to stay in our areas.



You and your family member will need to wash your hands when you arrive and I will need to wipe all the things we use to make sure everything is clean.

Please fill in the box below. This will tell me whether you are happy to take part or not.

Name:		D.O.B:	
		Please tick	
  Yes, I do want to do these activities			
  No, I do not want to do these activities			

B.4 Covid Child Assent Form without Symbols



Hello. My name is Julie.

I am doing some work to find out how people talk to each other.

I would like you to help me.

I would like you **and a family member** to come and visit me at the place where I work.

I would like to play a fun computer game with **you**.

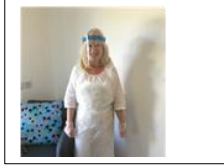
This is what will happen...

1. Meet me and see where we are.
2. Play a computer game with me.
3. Have a short break.
4. Play the game with the family member who has come with you.

I will need to video record you so that I can remember what you have said.

Because of Covid19 there are some things we need to do to stay safe. I might be wearing a visor. Here is what I will look like.

Covid Child Assent Form without Symbols



There will be an area marked out to show where we can sit. It will look like this.
We both need to stay in our areas.



You and your family member will need to wash your hands when you arrive and
I will need to wipe all the things we use to make sure everything is clean.

Please fill in the box below. This will tell me whether you are happy to take part
or not.

Name:	D.O.B:
	Please tick
Yes, I do want to do these activities	
No, I do not want to do these activities	

TRANSCRIPTION CONVENTIONS

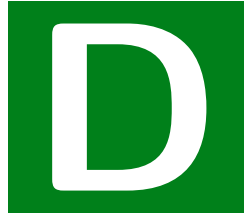
Stressed Syllable	High Onset	Fall	Rise	Fall-rise	Rise-fall	Mid-pitch
'yes	↑yes	`yes	´yes	ˇyes	^yes	ˉyes

Table C.1: Tone Diacritics

Symbol	Definition and Use
[yeah] [okay]	Overlapping talk
=	End of one TCU and beginning of next begin with no gap/pause between (sometimes a slight overlap if there is speaker change). Can also be used when TCU continues on new line of transcript.
(.)	Brief interval, usually between 0.08 and 0.2 seconds
(1.4)	Time (in absolute seconds) between end of a word and beginning of next. Alternative method: “one-one-thousand-two-one-thousand...”: 0.2, 0.5, 0.7, 1.0 seconds, etc.
Word Wo:rd	Underlining indicates emphasis. Placement indicates which syllable(s) are emphasised. Placement within word may also indicate timing/direction of pitch movement (later underlining may indicate location of pitch movement)
wo::rd	Colon indicates prolonged vowel or consonant. One or two colons common, three or more colons only in extreme cases
↑word ↓word	Marked shift in pitch, up (↑) or down (↓). Double arrows can be used with extreme pitch shifts
WORD	Upper case indicates syllables or words louder than surrounding speech by same speaker
°word°	Degree sign indicates syllables or words distinctly quieter than surrounding speech by the same speaker
<word	Pre-positioned left carat indicates a hurried start of a word, typically at TCU beginning
word-	A dash indicates a cut-off. In phonetic terms this is typically a glottal stop
>word<	Right/left carats indicate increased speaking rate (speeding up)
<word>	Left/right carats indicate decreased speaking rate (slowing down)
.hhh	Inbreath. Three letter indicate ‘normal’ duration. Longer and shorter inbreaths indicated with fewer or more letters
hhh whhord	Outbreath. Three letters indicate ‘normal’ duration. Longer or shorter outbreaths indicated with fewer or more letters. Can also indicate aspiration/breathiness if within a word (not laughter)
w(h)ord	Indicates abrupt spurts of breathiness, as in laughing while talking
£word£	Pound sign indicates smiley voice, or suppressed laughter
#word#	Hash sign indicates creaky voice
~word~	Tilde sign indicates shaky voice (as in crying)
(word)	Parentheses indicate uncertain word; no plausible candidate if empty
(())	Double parentheses contain analyst comments or descriptions

Table C.2: Transcription Conventions

APPENDIX



AI DECLARATION

1. Acknowledge

I acknowledge the use of Grammarly and Gemini (Google drive) for the following purposes:

to generate materials for background research and self-study in the drafting of this assessment.

to generate materials that were included within my final assessment in modified form.

2. Describe

Please provide a short summary of how you used generative AI in your assignment. You may wish to include the following information:

- What prompts did you use?
- What outputs did you generate?
- How did you use/adapt/develop the outputs?

3. Summary:

Grammarly was used as a spelling and Grammar checker. Gemini was used in writing for definitions and thinking prompts. The prompts were considered in the drafting of the document. All chapters drafts have been constructed, revised and edited.

4. Evidence

Please provide evidence of the outputs that you generated by copying and pasting below or by providing a screenshot.

Generative AI system: Gemini

Prompt: What would be included in a thesis acknowledgement?

Output:

When crafting a thesis acknowledgement, it's about expressing sincere gratitude to those who supported your academic journey. Here's a breakdown of what to include and exclude, along with an example:

What to Include:

- **Academic Support:**
 - Supervisors and advisors: Express gratitude for their guidance, expertise, and feedback.
 - Committee members: Acknowledge their valuable contributions and insights.
 - Funding sources: If applicable, thank institutions or organizations that provided financial support.
 - Colleagues and peers: Recognize their contributions to discussions, collaborations, and moral support.
 - Technical or research assistants: If applicable, thank those who provided essential assistance.
 - Libraries, or other institutional support.
- **Personal Support:**
 - Family and friends: Express appreciation for their emotional support, encouragement, and patience.
 - Anyone who provided significant personal support during your studies.

What to Exclude:

- **Excessive detail:** Keep it concise and focused on expressing gratitude. Avoid lengthy narratives or irrelevant information.
- **Complaints or negativity:** Refrain from expressing grievances or criticizing anyone involved in your research.
- **Inappropriate humor:** Maintain a professional and respectful tone.
- **Overly personal details:** While personal acknowledgments are appropriate, avoid sharing overly intimate or private information.
- **Information that could compromise peoples privacy.**

Example:

"I. I am also deeply grateful to the members of my committee, Dr. [Committee Member's Name] and Professor [Committee Member's Name], for their constructive criticism and valuable suggestions.

5. Declaration

I confirm that no content created by generative AI technologies has been presented as my own work.

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