
Lucy Hughes

University College London

Thesis submitted for the degree of Doctor of Philosophy
Declaration:

I, Lucy Mari Hughes, confirm that the work presented in my thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signed L. M. Hughes

.............................................
Abstract

Developmental language disorder (DLD) affects around two pupils in every UK classroom and can impact on their education and social well-being. Thus far, interventions for school-aged children with DLD have been targeted at vocabulary, grammar or narrative skills. This project developed and evaluated a new conversation-based intervention, 'Better Conversations with Children' (BCC), based on established methods used with other clinical populations.

The study employed conversation-based outcome measures, which were novel for this client group. Video-recorded data were collected from 22 typically-developing children (aged 5;02 - 8;10 years) and their main carers to provide a benchmark for the main intervention study. These findings revealed wide individual variability, but showed stability at group level for key conversation variables across two timepoints, six weeks apart.

Six children with DLD (aged 6;06 - 8;02 years) participated in BCC with their mothers. Each dyad took part in pre-therapy assessment and six conversation-focused therapy sessions. Video feedback was used to highlight facilitative and barrier strategies within their talk and to agree targets for change. Follow-up conversation and language-based measures evaluated progress in response to intervention.

Experimentally-controlled outcomes showed an increase in children's average utterance length and a statistically significant decrease in the use of barrier conversation behaviours for five dyads. Change in child-to-adult ratio of speech was achieved, in line with intervention targets. Children also showed progress on standardised assessments, including the Clinical Evaluation of Language Fundamentals. Feasibility findings provided strong support for the further development of the intervention, while conversation analysis revealed the potential for adult turns to shape the development of children's language and communication.

Larger-scale studies will be needed to establish whether these findings can be generalised to the wider population of children with language disorder. The results suggest that school-aged children can benefit from direct intervention to improve their everyday conversation.
Impact statement

There are over 10 million school-aged children in the UK, of whom around 750,000 are estimated to have developmental language disorder (DLD). As a neurodevelopmental condition, which affects people across the lifespan, DLD has significant personal, social and financial consequences for individuals, their families and wider society.

There is emerging evidence for the effectiveness of impairment-based interventions, focusing on vocabulary, narrative and grammar. Research also indicates that parent-child interaction therapy is effective for developing language in pre-school children. However, there is no equivalent interaction-based programme available for primary school-aged pupils, despite conversation being the main medium through which they learn, express themselves and build relationships with family and peers.

This study has developed and evaluated the feasibility of a new intervention, 'Better Conversations with Children' (BCC), co-designed with key stakeholders. BCC was tested in a case series study involving six children with DLD and their main carers across five mainstream schools. Data from 22 typically developing (TD) children and their parents were also collected and analysed to explore key conversational features and to provide a benchmark against which to compare the DLD group.

Findings from the case series demonstrate that BCC is feasible to deliver in a mainstream school setting and meets the needs of children with language disorder and their families. Children and parents who participated in the project benefited directly from enhanced understanding of different techniques which enable more effective conversations. The intervention produced large effects on conversation-based measures and standardised language assessments. To extend impact beyond the parent-child dyads, a set of 'top tips' were shared with teachers, learning support assistants and other key conversation partners, raising awareness of language disorder and strategies to support children's communication.

The outcomes of both the intervention and TD study are of interest to researchers specialising in language development and disorders. The PhD researcher is involved...
in clinical teaching and training at UCL and has contributed lectures and workshops on Conversation Therapy within the division of Psychology and Language Sciences.

Results of this work have been disseminated in the research community through peer reviewed publication (Hughes et al., 2022), academic conferences, seminars and invited talks, e.g., the Atypical Interaction Conference (Helsinki, 2019; Newcastle, 2022); Birmingham City University Online Research Seminar Series (2022) and UCL Conversation Analysis Research Seminar (2022).

Transfer of knowledge to Speech and Language Therapists has been achieved through a poster contribution at the Royal College of Speech and Language Therapists' Conference (2021), service level presentations (California Speech Language Hearing Association, 2019; Hillingdon Mainstream Schools, 2019) and the Centre for Speech, Language and Intervention Research Showcase event (2022). The following book chapter was also published: Hughes & Best (2023).

This project has the potential to inform future clinical practice. In contrast to traditional speech and language therapy, BCC focuses on developing parents' communication and interaction skills to provide the child with a language-rich environment. This could bring long-term, cost-effective benefits for both families and service providers.
UCL Research Paper Declaration Form
referencing the doctoral candidate’s own published work(s)

1. For a research manuscript that has already been published (if not yet published, please skip to section 2)
   a) What is the title of the manuscript?
   ‘Where does Granny live?’ The role of test questions in conversational remembering between mothers and their children with developmental language disorder.
   b) Please include a link to or doi for the work
   https://doi.org/10.1558/jircd.20235
   c) Where was the work published?
   Journal of Interactional Research in Communication Disorders
   d) Who published the work? (e.g., OUP)
   Equinox
   e) When was the work published?
   06.04.2022
   f) List the manuscript’s authors in the order they appear on the publication
   Hughes, L., Corrin, J., Newton, C., & Best, W.
   g) Was the work peer reviewed?
   Yes
   h) Have you retained the copyright?
   No
   i) Was an earlier form of the manuscript uploaded to a preprint server? (e.g., medRxiv). If ‘Yes’, please give a link or doi)
   No

   If ‘No’, please seek permission from the relevant publisher and check the box next to the below statement:
   ☒ I acknowledge permission of the publisher named under 1d to include in this thesis portions of the publication named as included in 1c.

2. For a research manuscript prepared for publication but that has not yet been published (if already published, please skip to section 3)
   a) What is the current title of the manuscript?
   Click or tap here to enter text.
b) **Has the manuscript been uploaded to a preprint server?** (e.g., medRxiv; if ‘Yes’, please give a link or doi)

Click or tap here to enter text.

c) **Where is the work intended to be published?** (e.g., journal names)

Click or tap here to enter text.

d) **List the manuscript’s authors in the intended authorship order**

Click or tap here to enter text.

e) **Stage of publication** (e.g., in submission)

3. **For multi-authored work, please give a statement of contribution covering all authors** (if single-author, please skip to section 4)

LH led the 'Better Conversations with Children' (BCC) Project, with support from her lead supervisor, WB, and secondary supervisory CN. JC provided specialist advice on the use of Conversation Analysis within the research paper and wider PhD thesis. All co-authors contributed to an aspect of study development. Data collection and transcription were carried out by LH, while JC checked the transcripts and advised on building a CA data collection, with additional checking by WB and CN. LH wrote the original draft. Editing was led by JC with input from WB and CN.

4. **In which chapter(s) of your thesis can this material be found?**

   Chapter 8: Conversation analysis of test question sequences.

5. **e-Signatures confirming that the information above is accurate** (this form should be co-signed by the supervisor/ senior author unless this is not appropriate, e.g., if the paper was a single-author work)

   **Candidate**
   L.M Hughes
   
   **Date:**
   18.06.2023

   **Supervisor/ Senior Author (where appropriate)**
   W. Best
   
   **Date**
   19.06.2023
Acknowledgements

Sincere thanks to the children, schools and carers who participated in the 'Better Conversations with Children' project. Your experience, trust and generosity have guided and motivated my PhD.

I would like to express my deepest appreciation to Professor Wendy Best, my Primary Supervisor and mentor since I began working in clinical research. Without your wisdom, patience and encouragement, I would not have embarked on this thesis, let alone completed it! Special thanks also to Dr Caroline Newton and Dr Juliette Corrin, both of whose insights have strengthened and enriched my understanding and writing. I have been lucky to have such a strong and sympathetic team alongside me throughout the ups and downs of the past few years.

I am extremely grateful to the Economic and Social Research Council for funding my MRes and PhD through the UCL, Bloomsbury and East London Doctoral Training Partnership. It has been a privilege to have time dedicated to this research and to attend conferences and events, which have helped me make connections with others who are dedicated to this fascinating field.

I have had the pleasure of being part of the 212 Ideas and 'Better Conversations' laboratory groups throughout my PhD experience. Both remotely and in person, your warmth, motivation and humour have carried me through the most challenging times and uplifted me when we have had better news to share.

To my wonderful colleagues at Moor House Research and Training Institute - you inspire me every day to keep learning and progressing, always with the goal of making life better for the amazing young people we are lucky enough to work with.

Finally, to Chris, Alex and Clara - thank you for putting up with my PhD angst and frequent disappearances upstairs to the computer. I am looking forward to seeing more of you and hope this will encourage you to pursue your own dreams in the future.
# Table of Contents

**Abstract** 3

**Impact statement** 4

**Chapter 1: Introduction** 13

**Chapter 2: Literature review** 17

2.1 Theories of language development 17

2.2 Studies of language acquisition 21

2.3 Atypical language acquisition: developmental language disorder 24

2.3.1 Theories of DLD 25

2.3.2 Genetic and environmental influences on language disorder 29

2.3.3 Evidence for the impact of DLD on conversation and interaction 32

2.4 Intervention for DLD 35

2.4.1 Example PCIT strategies 39

2.4.2 Intervention for school-aged children with DLD 44

2.5 Conversation-based therapy for adults with communication disorders 46

2.5.1 Example barrier conversation strategies 48

2.5.2 Example facilitative conversation strategies 50

2.5.3 Findings from conversation-based intervention research 51

2.6 Summary 53

**Chapter 3: Development of the intervention** 56

3.1 Context 56

3.1.1 Development context 56

3.1.2 Delivery context 57

3.2 Need for the intervention 57

3.3 Target population 58

3.4 Influence of published intervention development approaches 60

3.5 Evidence which informed the intervention development process 60

3.5.1 Evidence for working with parents to improve children's expressive and receptive language 61
3.5.2 Evidence for working on everyday conversation 62
3.5.3 Evidence for strategies facilitating language and conversation 63
3.6. Published theory, which informed the intervention development process 63
3.7. Use of components from existing interventions in the current intervention development process 65
3.8 Guiding principles, people or factors that were prioritised when making decisions during the intervention development process. 72
3.9 Stakeholder contributions to the intervention development process 72
3.10 Changes to the content and format of BCC from the start of the intervention development process 73
3.11 Changes to BCC required or likely to be required for subgroups 74
3.12 Uncertainties remaining at the end of the intervention development process 74
3.13 Template for Intervention Description and Replication (TiDier) description of the intervention 75
3.14 Reporting of the intervention in an Open Access format 75

Chapter 4: Measuring conversation 76
4.1 Selection of outcome measures 76
  4.1.1 Conversation behaviour counts 77
  4.1.2 Ratio of child-to-adult speech 81
  4.1.3 Linguistic characteristics: mean length of utterance in words 81
4.2 Feasibility and inter-rater reliability of conversation outcome measures 85

Chapter 5: Characterising the conversations of typically developing children and their parents 87
5.1 Methods 88
  5.1.1 Ethics 88
  5.1.2 Design 88
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1.3 Participants</td>
<td>89</td>
</tr>
<tr>
<td>5.1.4 Procedure</td>
<td>93</td>
</tr>
<tr>
<td>5.1.5 Data analysis</td>
<td>93</td>
</tr>
<tr>
<td><strong>5.2 Results</strong></td>
<td><strong>95</strong></td>
</tr>
<tr>
<td>5.2.1 Conversation behaviours</td>
<td>95</td>
</tr>
<tr>
<td>5.2.2 Child mean length of utterance in words (MLUw)</td>
<td>105</td>
</tr>
<tr>
<td>5.2.3 Ratio of child-to-adult speech</td>
<td>107</td>
</tr>
<tr>
<td><strong>5.3 Discussion</strong></td>
<td><strong>110</strong></td>
</tr>
<tr>
<td><strong>Chapter 6: Case series study</strong></td>
<td><strong>113</strong></td>
</tr>
<tr>
<td><strong>6.1 Methods</strong></td>
<td><strong>116</strong></td>
</tr>
<tr>
<td>6.1.1 Ethics</td>
<td>116</td>
</tr>
<tr>
<td>6.1.2 Design</td>
<td>116</td>
</tr>
<tr>
<td>6.1.3 Participants</td>
<td>118</td>
</tr>
<tr>
<td>6.1.4 Procedure</td>
<td>120</td>
</tr>
<tr>
<td>6.1.5 Intervention</td>
<td>121</td>
</tr>
<tr>
<td>6.1.6 Data analysis</td>
<td>122</td>
</tr>
<tr>
<td><strong>6.2 Results</strong></td>
<td><strong>124</strong></td>
</tr>
<tr>
<td>6.2.1 Dyad A</td>
<td>124</td>
</tr>
<tr>
<td>6.2.2 Dyad B</td>
<td>136</td>
</tr>
<tr>
<td>6.2.3 Dyad C</td>
<td>150</td>
</tr>
<tr>
<td>6.2.4 Dyad D</td>
<td>164</td>
</tr>
<tr>
<td>6.2.5 Dyad E</td>
<td>177</td>
</tr>
<tr>
<td>6.2.6 Dyad F</td>
<td>191</td>
</tr>
<tr>
<td>6.2.7 Summary of and discussion of results for case series and group</td>
<td>206</td>
</tr>
<tr>
<td><strong>Chapter 7: Feasibility of BCC</strong></td>
<td><strong>221</strong></td>
</tr>
<tr>
<td><strong>7.1 Recruitment and retention</strong></td>
<td><strong>222</strong></td>
</tr>
<tr>
<td><strong>7.2 Acceptability of the intervention (including any resulting changes in protocol as a result of parental/child feedback)</strong></td>
<td><strong>224</strong></td>
</tr>
<tr>
<td><strong>7.3 Outcome measures</strong></td>
<td><strong>228</strong></td>
</tr>
<tr>
<td>7.3.1 Inter-rater reliability.</td>
<td>228</td>
</tr>
<tr>
<td>7.3.2 Time taken to collect and analyse conversation data</td>
<td>235</td>
</tr>
</tbody>
</table>
List of appendices

**Appendix 3.1:** Template for Intervention Description and Replication (TIDieR) Checklist for 'Better Conversations with Children' (BCC). 338

**Appendix 3.2:** Blank 'Talk Time' record sheet 345

**Appendix 3.3:** Completed 'Talk Time' record sheet 346

**Appendix 3.4:** Example 'Top Tips' for talking with Child B 347

**Appendix 4.1:** Guidance notes for barrier and facilitator counts. 348

**Appendix 4.2:** Calculating MLUw in conversation guidance notes. 353

**Appendix 5.1:** Parent information sheet (for TD study) 356

**Appendix 5.2:** Child information sheet (for TD study) 363

**Appendix 5.3:** Parent consent form (for TD study) 365

**Appendix 5.4:** Child consent form (for TD study) 368

**Appendix 5.5:** Child and family history form 370

**Appendix 5.6:** Advice on making video recordings for BCC 373

**Appendix 5.7:** Raw data for TD conversation behaviour counts 374

**Appendix 5.8:** Raw data for TD mean length of utterance in words (MLUw) 375

**Appendix 5.9:** Raw data for TD child-to-adult ratio of speech scores 376

**Appendix 5.10:** Shapiro Wilk tests on the differences between T1 and T2 scores for all coded conversation behaviours 377

**Appendix 6.1:** Parent information sheet (for case series study) 378

**Appendix 6.2:** Child information sheet (for case series study) 386

**Appendix 6.3:** Parent consent form (for case series study) 388

**Appendix 6.4:** Parent views questionnaire 392

**Appendix 6.5:** Child views questionnaire 394

**Appendix 6.6:** The Language and Life Ladder 396

**Appendix 7.1:** Draft research therapy protocol 398

**Appendix 8.1:** Conversation Analysis transcription conventions 405
Chapter 1: Introduction

'If we couldn't have conversation, then people won't be friends.'

Amelia, child with DLD, aged 7 years.

Conversation is at the heart of children's language development, education and social interaction. From the early days of playing 'peekaboo' with parents to participating in classroom discussions and negotiating games in the playground, learning to initiate and maintain conversation is an essential life skill, which underpins work and leisure and can contribute to human well-being. For children with developmental language disorder (DLD), learning to converse well with others presents significant challenges, due to difficulties understanding and responding 'online' in the quick back-and-forth of natural conversation. This, in turn, can limit children's access to the rich language-learning opportunities, which gradually build linguistic and conversational competence for typically-developing (TD) children.

The role of parents in shaping their child's language learning is a complex and contested research area, with some theorists arguing that adults play a minimal role in children's first language acquisition, whilst others contend that environmental input via everyday conversation is crucial to the development of our future communicative abilities. Meanwhile, interactionist theories bring together these two approaches, emphasising the importance of both the child's innate desire to communicate and the rich linguistic experience offered by conversing with more experienced adult speakers. Linked to this viewpoint, interventions that aim to modify parent-child interaction in order to enhance children's language are among the most common form of speech and language therapy provided for pre-school children in the UK (Roulstone et al., 2012). However, up to now, there has been a lack of research investigating whether this approach can be adapted for school-aged children with DLD, in the context of their everyday conversations.

This study investigated a new intervention: 'Better Conversations with Children' (BCC), targeted at primary school children with DLD, aged 6-8 years, and their main carers. The project follows Phase I and II of the Medical Research Council guidelines
on developing and evaluating complex interventions (Craig, 2008; Skivington et al., 2021), beginning with the design and adaptation of BCC, taking into account programme theory, context and the needs of this clinical population. Conversations from typically-developing children and their parents are first characterised and later contrasted with those of mothers and their children with DLD in order to set intervention findings in context. The next stage of the study focuses on examining the response of six parent-child dyads to the research intervention to provide preliminary evidence for the effects of this conversation-based programme. Feasibility, acceptability and suitability of outcome measures are assessed to inform the future development and refinement of BCC. Finally, conversation analysis is used to explore findings in more detail and to provide further insights into the mechanisms of parent-child talk.

The next chapter describes the theoretical background to the study, along with evidence from related intervention research to inform programme development and understanding of the context for BCC.

Chapter 3 summarises the conception and design of the intervention protocol, including identification of the target population, influence of published evidence and stakeholder contributions to guide the development process.

Chapter 4 focuses on methods for measuring conversation and the rationale for selection of primary and secondary outcome measures.

Chapter 5 presents data from typically developing children and their parents to investigate key conversation variables and provide a benchmark against which to compare the DLD group.

Chapter 6 reports on the main study: a case series involving six children with DLD and their main carers. Outcomes are explored for targeted conversation facilitators and barriers, child mean length of utterance (in words) and ratio of child-to-adult speech. In addition, results from standardised assessments are reported and the views of children and parents are incorporated to reflect participants' perception of changes beyond quantitative observational measures.
Chapter 7 evaluates the feasibility of BCC with regard to recruitment and retention, acceptability of the intervention and suitability of chosen outcome measures, including inter-rater reliability.

Chapter 8 employs conversation analysis (CA) to examine a key feature of adult-child conversations: test question sequences. Insights from this qualitative investigation will be evaluated to inform the future development of BCC and the value of CA as a potential clinical tool will be considered in the context of these findings.

Finally, Chapter 9 draws together results from the study as a whole, highlighting implications for research and clinical practice, recognising limitations and identifying avenues for further investigation.
Chapter 2: Literature review

2.1 Theories of language development

Conversation is the primary and most natural context for child language acquisition (Clark, 2016). Through their everyday interactions, primarily with parents and carers, typically-developing children learn and hone the multiple skills required to communicate through language, including phonology, syntax, vocabulary and pragmatics. The complexity of this process is underlined by the distinct theoretical approaches, which aim to explicate both the child and adult's contribution to the task of language acquisition.

On the one hand, strict nativists focus on the child's innate ability to assimilate language, proposing a model of linguistic cognition whereby humans are born with specialised learning mechanisms and access to abstract linguistic concepts, which are part of a 'universal grammar' (Chomsky, 2017). Following this account, adults contribute little more than input data for children's language learning, which is facilitated by an inbuilt neural architecture, predisposing them to recognise and use the underlying structures of any given language. According to Chomsky (2010), evidence for this theory centres on the ability of pre-schoolers to generate and comprehend utterances, which they have not encountered previously, known as the 'poverty of stimulus' argument. Empirical studies, which support the nativist approach, include those involving deaf children who, being brought up by hearing parents, have developed their own grammatical language from the small number of signs and gestures they see (e.g., Goldin-Meadow, 2003). Summing up this child-focused approach, Pinker (1995, p. 29) states:

“In general, language acquisition is a stubbornly robust process. From what we can tell, there is virtually no way to prevent it from happening, short of raising a child in a barrel.”

Set against this generative view, where grammar is shaped by a set of innate, universal principles, 'learnability' theorists emphasise the complexity of the language-learning process and the importance of facilitative adult input to support children in
acquiring their native tongue. Researchers (focusing on US and Western European cultures) have identified a set of key characteristics of child-directed speech (CDS, Snow, 2012), including the use of higher pitch and exaggerated prosody (Cristia & Seidl, 2014), slower rate of speech with more frequent use of pauses, compared to adult-to-adult communication (Harley, 2017), and linguistic modifications, such as simplified grammar (Eisenbeiss, 2015). In combination, these acoustic and verbal cues are thought to facilitate children's acquisition of new words, morphology and syntactic structures by helping them to tune in and segment key features from the multi-layered and transitory stream of human speech (Hoff, 2014; Richards & Gallaway, 2012).

More recent research has focused on contextual factors, such as whether adult language input is being delivered during shared book reading, reminiscing or pretend play, as key dimensions which may contribute to the quality of the child's language exposure (Rowe & Snow, 2020). Separately, Jokihaka et al. (2022) focused on the emotional quality of dyadic interaction for 97 children with DLD and their parents. The study coded aspects such as children's enthusiasm and affection, adults' supportiveness, sensitivity or intrusiveness, as well as features of dyadic behaviour, such as mutual responsiveness. Findings suggest that synchrony and attunement between adults and children are associated with more positive language outcomes, particularly for children with receptive language difficulties. However, it is difficult to disentangle emotional connection from linguistic factors. For example, tuning into what the child is doing and talking about their actions could be classified as a linguistic, as well as an emotionally-responsive behaviour (e.g., contingent commenting; see Section 2.4.1.2, below).

Provision of this rich and engaging adult input has been described as 'language nutrition' (Head Zauche et al., 2017). These authors hold that the enhanced quality and quantity of CDS feeds the child's maturing brain, promoting their linguistic growth in a manner similar to the effects of a healthy diet on physical development. Learnability theorists point to evidence that the number of words spoken to a child in their first three years of life is predictive of their later language and literacy outcomes (e.g., Dickinson & Porche, 2011; Hoff, 2013; Weisleder & Fernald, 2013). It is widely documented that lower socio-economic status (SES) is associated with reduced
vocabulary exposure, with Hart & Risley (1995) famously identifying a thirty-million-word gap between children of low and higher SES status in the first three years of life. However, recent research has questioned the methods and conclusions of this landmark study (e.g., Sperry et al., 2018), arguing that the design lacked cultural sensitivity, as well as statistical power, focusing as it did on the differences between six disadvantaged African American families and 13 professional families, only one of whom shared the same cultural heritage. Notwithstanding, Burchinal et al. (2008) assert that the quantity of words spoken to a child can compensate for social risk factors, including low levels of parental education; indicating that early intervention to optimise a child's language learning environment can lead to improved linguistic, educational and social outcomes (e.g., Head Zauche et al., 2017; Rowe, 2008).

In support of the learnability model, formerly known as the 'Motherese' hypothesis, Goldin-Meadow & Mylander (1990) state:

"Linguistic input has an obvious impact on the child’s acquisition of language – a child who hears Swahili learns Swahili, not French or Polish." (p.323)

This observation is not at odds with the nativist view, according to which input from a specific language allows the child to set parameters of variation appropriately (e.g., whether the pronoun dropping is permitted or not; Wolfe-Quintero, 1996). Goldin-Meadow & Mylander (1990) also assert that children bring certain capabilities to the language learning process, which are not language specific, but make young learners sensitive to the features of CDS. According to these authors, such within-child skills work together with the adult's input to make language learning possible within the context of everyday social interactions. Recent research has focused on this two-way relationship, aiming to analyse how children's learning trajectories are shaped by their existing knowledge, learning and processing mechanisms, in combination with the environmental input they receive. Since development is not static, the input that children require will differ across time in response to their evolving language and related skills.

For example, usage-based theory (Tomasello, 2015) highlights how a child's learning of the structures of their language emerges from using this language within
their social environment. To do this, they rely on general cognitive skills, such as pattern finding, in order to build mental schemas of grammatical rules, based on their understanding of the functional role of words within and across utterances. Thus, as with Chomsky's model, children are able to 'go productively beyond the individual utterances they hear' (Tomasello, 2015, p. 90). However, unlike nativists, proponents of a usage-based approach acknowledge the additional crucial role of social context, including conversational partner and setting, in shaping children's language learning trajectory (Hoff, 2010).

Linked to this viewpoint, social interactionist theorists stress the importance of language input to the child, as well as the child’s reciprocal uptake of that input. Under this account, children's language development is dependent upon social interaction, which 'gates' language learning (Kuhl, 2007). The central claim of the interactionist approach is that language ability emerges out of an initial desire to communicate, while the success of this depends on whom we communicate with (Lytle & Kuhl, 2017). This proposal has been tested by studies which compare children's success in learning new words and phonemes during social interaction, versus their response to non-social contexts, e.g., television exposure. Results from both behavioural and brain response measures have demonstrated that language learning is supported by contact with human speakers, over and above video displays or audio recordings when compared under experimental conditions (Kuhl, 2011; Kuhl et al., 2003).

Taking these ideas further, constructivist theories of child language development focus on the collaborative construction of meaning by the child when interacting with adults (Kaufman, 2004). Rooted in the work of Vygotsky (1978) and Bruner and Watson (1983), constructivism holds that children's acquisition of new knowledge builds incrementally upon the foundation of previous learning. Thus, adults and children share and acquire language respectively within the 'zone of proximal development,' through ongoing problem solving with adult guidance (Vygotsky, 1978, p. 86). Meanwhile, parents and teachers employ 'scaffolding' to continually tailor and adjust the level of support they offer, in response to the child's linguistic level.
A final approach to language acquisition, which brings together aspects of both nativism and social interactionism, is the emergentist perspective (MacWhinney et al., 2022). This focuses on the detailed mechanisms at work in learning language, both from the child and adult's perspective. Emergentists argue that the organisation of the human brain supports our ability to form language associations (e.g., between phonology and verb tenses) through statistical learning - allowing children to notice and extract patterns in the input they are exposed to and helping them to understand and make predictions when engaging actively within future language interactions (Plante & Gomez, 2018). The nature and content of the linguistic input children receive may contribute to the speed and success of their learning through aspects including intensity and spacing. Our understanding of these features influences intervention design through considerations such as scheduling and dosage (Frizelle et al., 2021).

In sum, these theories converge on an account whereby language emerges and evolves through the dynamic interaction between children's rich pre-linguistic communicative and cognitive abilities, together with their experience and environmental input. Rather than being a passive recipient of the adult's superior linguistic knowledge, young learners collaborate actively with their conversation partners to shape their ongoing language trajectory. This learning process can be conceptualised as a virtuous developmental spiral, in which the child's linguistic skills - as well as the adult's input - will change and adapt to each other over time across the moment-by-moment exchanges which occur within their everyday interactions.

2.2 Studies of language acquisition

Recent studies have underlined the importance of this two-way communication between caregivers and children by identifying a mechanistic link between the number of back-and-forth conversational turns within adult-child interactions and early neurolinguistic development (Romeo, Leonard, et al., 2018; Romeo, Segaran, et al., 2018). According to these authors, greater participation in conversation with parents and carers is associated with stronger connections between language regions of the developing brain. The reported effects of adult-child turns on Broca's area pathways were independent of socio-economic status and the overall amount of
adult input. This was interpreted by Romeo and colleagues as suggesting that factors such as joint attention, adult responsiveness and temporal contiguity - all of which they claim to be associated with more balanced, to and fro interaction between speakers - exert an important influence on children's ongoing language development. However, these dimensions were not investigated individually, but were instead taken as being represented collectively within the adult-child turn counts, making it difficult to pinpoint their relative effects in shaping language growth.

Romeo et al.'s neuroscientific findings align with behavioural data, which provide evidence that early talk in interaction can be used to predict later language outcomes. Gilkerson et al. (2018) carried out all-day audio recordings of 146 infants and toddlers (aged between 2 and 47 months) once a month for six months. As for the Romeo et al. (20018a and 20018b) studies, Language Environment Analysis (LENA) software was used to calculate automatically the number of daily adult words and adult-child conversational turns (defined here as a pair of utterances - either from the adult followed by the child, or vice versa - with no more than 5 seconds pause between the two). Long-term follow-up of participants 10 years later found that counts of conversational turns at age 18-24 months were strongly correlated with child receptive and expressive language scores at school age (between 9 and 13 years old). However, this relationship was not significant for children first tested at age 2-17 months, or at age 25 months or older, suggesting that there may be a critical period during which language-rich interaction between adults and children may be particularly beneficial, though it is not clear why these effects were observed during this particular age window.

Confidence in the both the Romeo et al. (2018a and 2018b) and Gilkerson et al, (2018) results is complicated by the use of the LENA system, which uses acoustic information, rather than direct speech recognition, to estimate word and turn counts so that it can register the amount, but not the exact nature of adult input. For example, the device cannot distinguish between overheard and child-directed speech, with the latter being most robustly associated with language acquisition. Furthermore, if participants are engaged in a noisy activity, this can reduce reliability by mischaracterising language input (Romeo et al., 2018a). Notwithstanding, LENA speaker segmentation software has been reported to be between 68% and 82%
accurate in identifying the speech of adults and children up to three years old (Oller et al., 2010; Xu et al., 2014). It is unclear how well it can distinguish between the voices of older children and parents or how accurate the system is for segmenting the words of individual speakers.

Separately, Zimmerman et al. (2009) employed LENA in a cross-sectional and longitudinal study to test the relative effects of adult input (measured in words), television viewing (timed as average number of hours per day) and adult-child conversational turns on child language development. 275 children (aged 2-48 months) and their families participated in Phase 1 assessment, with 71 continuing for ongoing data collection over 18 months (Phase 2). The Preschool Language Scale, Fourth Edition (PLS-4; Zimmerman et al., 2008) was employed as a child language measure, administered at both stages of the study. Multiple regression models were used to assess the relationship between PLS scores at the start of Phase 1 and adult word count, television viewing and adult-child turns. During Phase 2, language scores were regressed on Phase 1 PLS results, as well as the three language environment variables.

Results showed significant negative effects of television viewing on child language, with each hour of daily TV exposure being associated with a corresponding decrease in PLS scores. Meanwhile, both adult word count and adult-child turns were positively associated with child language scores. However, when all three predictors were included together in the cross-sectional model, television viewing and adult word count were no longer significant, while conversational turns retained their statistical significance, which increased in magnitude.

Turning to the longitudinal data, in which Phase 1 PLS scores were controlled, television viewing was no longer a significant predictor of language development, while both adult word count and conversational turns were significantly related to follow-up PLS-4 scores. Since children's baseline language ability was controlled for in this longitudinal model, the results suggest a causal relationship between adult-child conversation and child language development. The authors propose that this is due to the increased opportunity for children to practise language within a facilitative conversation environment, with adults who engage in frequent interactions with their
children becoming more attuned to their younger conversation partner’s abilities, thereby refining their own skills in providing nutritive input and feedback within the ‘zone of proximal development’ (Vygotsky, 1978).

2.3 Atypical language acquisition: developmental language disorder

Having considered theories of language acquisition for typically-developing (TD) children, the next section considers how this process may differ for children with language disorder. Whilst the majority of children acquire language quickly and apparently effortlessly in the first 10 years of life (Hartshorne et al., 2018), some children have severe and persistent difficulties in learning and using their native language, which affect their day-to-day functioning and can impact on their social and educational outcomes (Bishop et al., 2017). For around 2.34% of children, these language difficulties are associated with an underlying bio-medical condition, such as autism spectrum disorder (ASD), learning disability, brain injury or hearing impairment. However, a further 7.58% - or two pupils in every class of 30 - start school with developmental language disorder (DLD; Norbury et al., 2016). This has been defined as: 'a lifelong condition characterised by difficulties with understanding and/or using spoken language,' for which there is no single known cause (Royal College of Speech and Language Therapists; RCSLT, 2018, p. 1). The term DLD was introduced by Bishop et al. (2017) to replace the previous diagnostic label, specific language impairment (SLI), representing a shift away from the requirement for language to present as selectively impaired, with non-verbal IQ scores no longer being implicated in the identification or treatment of language disorder\(^1\).

The nature and severity of DLD vary for each child and may change across the lifespan. Common features include difficulties with word-finding in isolation or in discourse (Best et al., 2021); phonology, including articulation and awareness of and ability to manipulate rhyme, syllables and blends of speech sounds (Ramus et al., 2013), morphology and syntax (Calder et al., 2021) and pragmatics (Andrés-Roqueta

\(^1\) Diagnostic criteria for SLI varied across studies and clinical practice, with cut-offs for nonverbal IQ ranging from <70 to <85. The International Classification of Diseases—10 (World Health Organization, 2010) defined SLI as present when a child’s language skills fell more than 2 SD below the mean, with a gap of at least 1 SD below non-verbal skills.
& Katsos, 2020; Norbury, 2014). However, individual children may also show strengths in any of these areas. Indicators of poor prognosis, which help support a clinical diagnosis of DLD, include:

- significant language problems at age 5 years or above
- poor comprehension
- several areas of language affected
- poor use of gesture
- a family history of language impairment and/or
- poor response to intervention (Bishop et al., 2017).

Beyond the immediate linguistic consequences of DLD, language difficulties are closely linked with poor academic attainment, in particular problems with literacy and numeracy (Chow & Jacobs, 2016). Up to a quarter of children with language disorder leave school without any formal qualifications (Durkin et al., 2009) and this can negatively affect their employment prospects (Conti-Ramsden et al., 2018). Since classroom and playground interaction is typically mediated through language, children with DLD can also show difficulties with peer relationships (Mok et al., 2014). This, in turn, can lead to social, emotional and/or behavioural difficulties, which may persist into adolescence and beyond (Clegg et al., 2005; Conti-Ramsden et al., 2019; Winstanley et al., 2018). A meta-analysis by Yew & O’Kearney (2013) indicated that the risk of behavioural and mental health difficulties was doubled for children with DLD. Perhaps unsurprisingly, the presence of this disorder has also been linked with lower quality of life outcomes for primary school-aged children, compared to their TD peers (Eadie et al., 2018). Taken together, these wide-ranging consequences highlight the need for greater understanding of language, in order to develop effective, theoretically-based interventions to support children and families.

### 2.3.1 Theories of DLD

Several theoretical accounts have been proposed to aid our understanding of the difficulties associated with DLD and to inform the assessment of language, as well as the development and evaluation of effective interventions. These accounts can be linked back to the nativist and constructivist theories of language acquisition,
discussed above, since they focus on either within-child or environmental factors, or a combination of both. Firstly, Rice et al. (1995) have characterised DLD (and its forerunner, SLI) as a modular linguistic difficulty, which results in an extended period during which children inconsistently realise ‘finiteness marking’; that is the use of grammatical morphemes, such as past tense ‘ed’ and third person singular ‘s’ to denote tense and agreement. Rice et al. (1995) call this the 'extended optional infinitive stage,' whereby children with language disorder over-use verb infinitives, such as 'go', 'see' and 'eat', as well as present participles, e.g., 'doing' and 'making', whilst treating grammatical markers as optional, rather than obligatory.

Importantly, Rice et al. (1995) view the language acquisition of children with DLD as following a typical developmental sequence, though at a slower rate. More recently, Rice (2020) has proposed a 'growth signalling disruption model', suggesting that faulty timing and rate mechanisms at the neuronal level are responsible for children with DLD starting to learn language later and more slowly than their peers. However, a clear criticism of this innate linguistic theory is that the approach does not account for the wide variation in presentation of DLD, including deficits beyond grammar, nor does it consider the influence of environment and social factors on children’s complex and developing language profile. Further, Rice and colleagues' modular account continues to view language impairment as a specific deficit, adhering to more traditional diagnostic criteria. This approach neglects to recognise co-morbidities, which commonly occur for children with DLD, e.g., associated attention, memory or motor problems.

One area of debate among DLD researchers is whether the disorder should be categorised into different subtypes. For example, both the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in the US and the World Health Organisation’s International Classification of Diseases (ICD-10) contain a separate category code for social (pragmatic) communication disorder, to be used for individuals who have significant difficulties in the social use of verbal and nonverbal communication, including 'difficulty in signalling topic shift and change, and difficulty in interpreting and meshing subtle verbal and nonverbal clues to the speaker’s intent' (Adams et al., 2018, p. 605). This must occur in the absence of other diagnostic features, such as restricted interests, which would be seen as characteristic of ASD (Norbury et al.,
However, participants in the Criteria and Terminology Applied to Language Impairments: Synthesising the Evidence consensus process (CATALISE-2, 2017) failed to agree on terminology for subgroups within the wider DLD classification. They noted that:

'Children's problems do not neatly segregate into subtypes, and there may be overlap between problems in speech, language and communication.' (Bishop et al., 2017, p. 1076).

This appears particularly pertinent to conversation, where difficulties with initiating or maintaining conversation with family or peers may be interpreted as relating to a specific impairment of pragmatics or social communication, but can often be rooted in wider difficulties with understanding and using spoken language. For example, Adams et al. (2018) compared the metapragmatic abilities of children diagnosed with DLD, versus social communication disorder. They found that both groups performed poorly on tasks where they were required to show awareness of pragmatic rules such as turn-taking and being polite and identify violations of these rules within filmed interactions. These findings align with those from a separate study by Norbury et al. (2014), which reported that narratives of children with DLD showed similar characteristics to those of age-matched controls with ASD. Both groups produced descriptions that lacked lexical diversity and omitted key details, compared to TD peers. This suggests that difficulties with language processing may reduce children's opportunity to learn and follow social cues from everyday conversations, due to the effort required to comprehend and participate in verbal interactions. While some children with DLD can show relative strengths in their pragmatic abilities, Brinton & Fujiki (2017) recommend that interventions for this population should go beyond an impairment-based focus on structural language to support the use of language within social interactions.

While Rice et al. (1995) focused on the linguistic basis of DLD and others have highlighted its impact on social communication, Tallal (1980) proposed an alternative account, according to which children with language disorder are impaired in their ability to process rapid speech stimuli. Known as the 'auditory processing hypothesis' (APS), this viewpoint suggests that a specific auditory deficit is at the root of
difficulties with analysing speech phonemes, which in turn compromise the child's ability to build and store accurate phonological representations. This explanation could account for both oral and written language problems. However, the APS has once again been criticised for offering too narrow a perspective upon DLD (e.g., Lorusso et al., 2014), which is not restricted to impairments in the phonological domain, but can also present as a complex condition, affecting semantics and/or pragmatic aspects of language and communication.

A further set of theories consider DLD as a wider cognitive disorder, with limited memory capacity underpinning problems with language acquisition. Gathercole & Baddeley (1990) presented evidence that children with language disorder show marked deficits in verbal short-term memory. Meanwhile, Leonard (1989) put forward the 'surface hypothesis', suggesting that grammatical difficulties in children with DLD are caused by reduced processing abilities, which are exacerbated by the low perceptual salience (surface properties) of morphemes in English and other European languages, such as Italian (Leonard et al., 1987). Thus, when the linguistic information a child is attempting to process and remember is unstressed and/or voiceless (e.g., third person or plural 's'), this is unlikely to be recognised and stored accurately within their weakened memory system, meaning that they are less likely to mark grammatical contrasts accurately within their own speech.

While Gathercole and Baddeley (1990) and Leonard (1989) have argued that problems with non-word and sentence repetition are causally related to DLD, more recent studies question the direction of this relationship. Klem et al. (2015) reported findings from a longitudinal study of 216 children aged 4-6 years, who were assessed three times across a 2-year period on measures of sentence repetition and wider language skills. The results suggest that sentence repetition is not a predictor of language growth, but rather a reflection of underlying language abilities. More recently, Montgomery et al. (2021) have further explored the association between language and memory in school-aged children with DLD, proposing a new model according to which working memory acts as a channel through which existing grammatical knowledge (stored in the long-term memory), combines with attention and pattern recognition skills to drive sentence comprehension, which is in turn reflected by sentence repetition tasks.
Linked to these cognitive theories, Ullman & Pierpont (2005) have developed the procedural deficit hypothesis (PDH), suggesting that problems with implicit learning, e.g., of rule-based grammar, phonology or motor sequences, lie at the root of both DLD and dyslexia. Meanwhile, these authors propose that declarative, explicit learning, e.g., of historical facts, remains relatively unimpaired within these clinical populations. Support for this theory has been provided by Krishnan et al. (2016), who cite evidence of micro-abnormalities in the caudate nuclei of children with language disorder, which may contribute to the specific learning difficulties experienced by this clinical group by disrupting the cortico-striatal brain circuits involved in language learning. Studies have linked this area of the brain with key aspects of language processing, such as syntactic comprehension, as well as with wider cognitive and motor function (Dominey et al., 2009). This account would help explain the frequent co-occurrence of DLD and motor difficulties, including dyspraxia. However, once again, the direction of causality is unclear. The PDH also falls short of clarifying why children with DLD commonly present with impairments in areas such as lexical retrieval, pragmatics and/or attention control.

Further neurobiological studies of DLD have reported conflicting findings, e.g., Badcock et al. (2012) identified reduced brain volume in children with DLD, compared to typically-developing peers, whereas Soriano-Mas et al. (2009) and Lee et al. (2013) found the reverse. Meanwhile many, but not all, researchers converge to suggest atypical, or low, lateralisation of language-related brain structures in children with DLD, compared to TD peers (e.g., de Guibert et al., 2011; Herbert et al., 2005; Mayes et al., 2015). Interpretation of these neuroimaging studies is complicated by the high degree of heterogeneity within DLD, the relatively small sample sizes and by the failure to control for age-related effects across different research papers (Krishnan et al., 2016).

2.3.2 Genetic and environmental influences on language disorder

All of the above theories have focused on within-child factors, which offer domain-specific or domain-general accounts of DLD. A separate body of research has set out to investigate both genetic and environmental influences on language disorder.
and development. Rice (2020) summarized five longitudinal twin studies, combining to suggest moderate to high levels of heritability for DLD, which are greater for monozygotic (identical) than for dizygotic (non-identical) twins. Separately, four distinct genes have been identified, which are consistently associated with spoken language disorders: forkhead box P2 (FOXP2; Monaco et al., 2001), contactin-associated protein-like 2 (CASPR2; Vernes et al., 2008), ATPase 2C2 (ACTP2C2; Monaco, 2004; Newbury et al., 2002) and, most recently, the c-MAF inducing protein (CMIP) genes on chromosome 16 (Newbury et al., 2009). While these studies collectively indicate genetic susceptibility factors, which may contribute to the emergence of DLD, no single source has been established which can fully explain the presentation and progress of the disorder across time. This is likely due to the heterogenous nature of DLD, as well as the complex range of factors underpinning language acquisition, including the effects of both social and environmental influences and the interaction between these and biological / genetic factors, which may affect both the child and the parent.

Norbury et al. (2016) reported a clear social gradient in cases of language disorder within their population-based prevalence study. While 34.2% of their lower SES group met the criteria for language disorder, this fell to 7.9% for the higher SES group. These findings were in the context of children in this study experiencing lower than average levels of poverty, according to their Income Deprivation Affecting Children Index (IDACI) scores. Children attending private school were also excluded from the investigation, meaning that the true disparity in DLD occurrence between wealthier and less wealthy families may be greater than reported. There was no assessment of parental language or learning profiles, which may have contributed to the association between SES and child language scores.

Several explanations have been put forward for the difference in language abilities between children from high and low SES backgrounds. Hoff (2003) examined the role of maternal input in child language acquisition, dividing her sample of 63 dyads

---

2 For a comprehensive account of environmental factors and their influence on language development, see Law et al. (2022).
into low and high SES groups. She found not only the quantity, but also the quality of adult input differed as a function of SES, with higher SES mothers producing more words and utterances, as well as more frequent instances of topic-continuing, or contingent, replies to their children. Contingent talk refers to the act of responding moment-by-moment to the child's focus of attention; using language that is both semantically and temporally connected to the child's previous utterance or non-verbal turn (Masek et al., 2021; McGillion et al., 2017; Roseberry et al., 2014).

Contingency in parental communication is strongly correlated with child language outcomes (e.g., Gilkerson et al., 2018; Hirsh-Pasek et al., 2015; Tamis-LeMonda et al., 2001). However, studies of contingent talk fail to control for adult language levels, meaning once again that it is hard to disentangle neuro-biological and genetic factors (which can be passed on from parent to child) from socio-economic features, which may in turn be related to the parent's own linguistic and educational outcomes. For example, longitudinal studies have shown that young people with DLD typically achieve lower academic and vocational qualifications than their TD peers, leading to lower levels of employment and financial earnings (Conti-Ramsden et al., 2018; Eadie et al., 2018). While SES has been shown to affect children's home language environment, it is too simplistic to suggest that this factor alone is responsible for causing or exacerbating DLD.

As Smolík and Rice (2007) state:

'Language acquisition is at the interface of environmental and genetic influences' (p. 686).

The evidence suggests that both of these factors should be considered when attempting to formulate a comprehensive account of DLD, which is best conceived of as a multi-factorial disorder, with heterogeneous features which emerge and progress across childhood and beyond. Findings from neurological, genetic and behavioural studies combine to suggest that both typical and atypical language development are shaped by internal and external factors, which are interconnected and change over time, as part of an ongoing developmental spiral (Rowland et al., 2020); squarely at odds with the nativist account. This dynamic interaction is
explored within studies which consider the impact of DLD on children's conversation and interaction, as well as the role of communication partners in supporting children's language development.

2.3.3 Evidence for the impact of DLD on conversation and interaction

Depending on their individual language and communication profile, DLD can impact on a child's ability to participate in conversations with family, teachers and peers (Bishop et al., 2017; Croteau et al., 2015). Studies show that children with language disorder may differ from typically-developing peers in their intelligibility (Laasonen et al., 2018), their word-finding abilities (Best et al., 2021), a tendency to provide brief or ambiguous utterances (Redmond & Redmond, 2017; Yont et al., 2002) and/or their reduced ability to initiate and respond to interaction (Liiva & Cleave, 2005). These differences, which may occur in isolation or in diverse combinations, can result in increased conversational breakdowns and instances of repair (Forrester, 2012; Yont et al., 2002).

There is also growing evidence to suggest that the interactions of children with DLD can be influenced by the skills and characteristics of their conversation partner. Hansson et al. (2000) found that children with language disorder (aged 5;01-5;11 years) contributed more equally to conversations with siblings and peers, compared to adult-child exchanges, which were asymmetrical in terms of the adult frequently asking questions and taking longer and more frequent turns. Despite this, children with DLD produced more utterances overall when talking with a parent, as well as a wider variety of vocabulary and more complete and intelligible turns.

These findings align with research on typically-developing children by Hoff (2010), who found that the mean length of utterance (MLU) of preschoolers (N=16) was lower in conversation with their mothers, compared to conversations with their older siblings, as children produced more single word responses to adult questions. However, as with the Hansson et al. (2000) study, these TD children used a richer vocabulary when communicating with their parent, suggesting that the more experienced speaker was able to model and elicit higher-level language, which may counter-balance their tendency to dominate the talk.
Separately, Bruce et al. (2012) found that children with DLD (N=9; aged between 3;09 and 5;0 years at the start of the one-year study) were more talkative and communicatively assertive during interactions with younger peers, compared to with age-matched controls. However, their conversations with older children were rated as more coherent and cohesive, meaning that the conversation partners consistently linked their contributions to each other's preceding turns, rather than responding minimally or introducing multiple new topics. Bruce et al. (2012) suggest that this is because a more competent conversational partner (CP) 'assumes more of the responsibility for the structure and flow of conversation' (p. 197), helping to scaffold the input of the child with DLD. It is unclear whether TD children show similar context effects in conversation with older and younger peers, though the authors note that higher responsiveness in one partner is associated with similarly high responsiveness scores from their CP, creating a virtuous communication circle and suggesting that this bi-directional relationship may hold for children whose language is unimpaired.

There is limited research available examining the impact of DLD on the conversations of school-aged children. Dale et al. (2014) suggest that language difficulties may become less evident in everyday interaction as children grow older, referred to as 'illusory recovery' (Dale et al., 2014; Scarborough & Dobrich, 1990). This mirrors findings by Snowling et al. (2016), who investigated language and literacy trajectories for 220 TD and language-impaired children by tracking their progress on standardised language and reading-related measures from ages 3;06 to 8;0 years. These authors identified subgroups of resolving, persisting and late-emerging language disorder, whilst noting that children in the 'resolving' group continued to show scores lower than those of their TD peers. This indicates their language could remain vulnerable as both social and educational demands increase in late primary school and beyond. However, no measures of natural conversation were included in this or similar longitudinal studies (e.g., Bishop & Edmundson, 1987; Stothard et al., 1998).

Findings from a small-scale study by Bruce & Hansson (2019) indicate that primary school pupils with DLD (identified at age 3;11 - 5;0 years and followed up at age 8;11
- 10;06 years) continue to struggle with understanding and expressing themselves during classroom dialogues with their teachers. The study compared conversations between four children with language disorder and their class teacher during structured and less structured contexts. While the adults spoke significantly more than children across both conditions, children's individual contributions varied according to their linguistic profiles. Those with predominantly expressive language difficulties produced more words per minute and higher mean length of utterance (MLU) during more open contexts (where the topic was related to their own interests), whereas children with receptive language disorder benefited from teacher scaffolding during more structured discussions, e.g., related to their school work. The authors highlight the limitations of their small-scale, exploratory analysis, which prevent generalisation of findings to the wider population of children with DLD. They also identify a need for future comparative studies, which include child participants with typically-developing language.

The Bruce & Hansson (2019) paper highlights the two-way influence of verbal interaction, with the communication skills of both participants influencing the content and dynamics of their conversations. Bonifacio et al. (2007) argue that children who are more assertive and responsive in terms of their contributions to conversation help bring about an increase in the language input from caregivers and thereby benefit from more frequent opportunities to imitate adult models, as well as to have their own utterances expanded. While children with limited language could show relative strengths in conversation, Yoder, Camarata, & Gardner (2005) argue that for many whose language is impaired, they can become caught in a vicious cycle, whereby their communication difficulties mean that they 'are less likely to elicit language-facilitating interactions from significant others,' p. 34. This is particularly problematic, since multiple studies show that children with language impairments require increased access to language-facilitating interactions, compared to their TD peers, in order to benefit from their exposure to adult language models (e.g., Fey et al., 2003).

In line with Bruce & Hansson's (2019) recommendations, several studies have compared dyadic interaction between children with language disorder and their parents, versus that of typically-developing children and their caretakers. In a Dutch
study, van Balkom et al. (2010) investigated the style and content of parent-child conversations involving 12 pre-school children with DLD and six TD controls. Participants were recorded in semi-structured play situations at two-month intervals across a period of 18 months. The results showed that DLD children produced significantly lower MLU than their TD peers. Conversely, they used significantly more non-verbal turns and experienced difficulties with turn-taking, topic initiation and topic maintenance. Alongside this, parents of DLD children were reported to use more corrections, interruptions and 'incoherent' (non-contingent) responses, while group differences between DLD and TD parents increased over time. This indicates that conversations between children with DLD and their main carers may become progressively less facilitative, as the child's language difficulties appear to disrupt the typical structure and flow of their everyday interactions.

However, these findings have been contradicted by Blackwell et al. (2014), who conducted a systematic review of studies comparing parent-child interaction (PCI) involving children aged 0;0 - 5;11 years with and without language disorder. They found limited evidence for PCI differences between the two groups, challenging the widely-held belief that the communication environments of children with language disorder differ from those of TD peers. Instead, these authors suggest that children with DLD may find it more difficult to make use of adult input and to learn from their language environment. However, the results of this review paper should be interpreted with caution, since the age range of child participants means that some of those included in the sample may have been 'late talkers' (Prelock & Hutchins, 2018), whose language went on to follow a TD trajectory. Blackwell et al. (2015) also note that research papers included in their review overwhelmingly focused on middle-class families, concluding that further research is needed to increase our understanding of PCI in relation to a wider range of language-disordered children in order to inform interventions designed to support their everyday communication.

2.4 Intervention for DLD

Given the wide range of strengths and difficulties shown by children with DLD,
intervention for this clinical group can take many different forms. Law et al. (2003) conducted a Cochrane Review of SLT interventions for children with primary speech and language disorder (now known as DLD). The authors identified a range of programmes focusing on expressive and receptive vocabulary, syntax and phonology, though no studies explicitly targeted children's conversation skills. Meanwhile, Cirrin & Gillam (2008) included one conversation-based study in their systematic review of SLT practices for children with language disorders. This single case study by Bedrosian & Willis (1987) aimed to increase topic initiation, but did not include strategies to support the child's language or wider conversational skills.

More recently, Jensen de Lopez et al. (2022) and Rinaldi et al. (2021) have carried out separate systematic reviews on the efficacy of treatment for DLD. The first of these focused on pragmatic interventions, once again targeting topic initiation and maintenance, as well as turn-taking and using appropriate non-verbal skills. The latter includes one study relating to conversational recasts (Plante et al., 2013), delivered by trained clinicians in a University clinic. None of the above studies are aimed directly at dyadic communication as it occurs in natural home or school settings. Instead, they focus on offering conversation-based strategies to the child or providing enhanced adult input with the aim of developing children's pragmatics or structural language.

Therapy programmes aimed at nursery or school aged children may target vocabulary and word-finding (Best et al., 2021; Ebbels et al., 2012; Wright et al., 2018), comprehension and production of grammar (Balthazar et al., 2020; Calder et al., 2021; Ebbels, 2014) or narrative structure (Gillam et al., 2014; Hessling & Schuele, 2020; Spencer & Petersen, 2020). Approaches vary in their emphasis on implicit versus explicit intervention techniques. In line with the procedural deficit hypothesis (Ullman & Pierpoint, 2005), some programmes aim to circumvent perceived difficulties with the procedural memory system by using explicit strategies, such as Shape Coding™, to highlight visually the rules of the grammar. Meanwhile, others favour more implicit methods, such as focused stimulation, auditory bombardment and conversational recasting (Cleave et al., 2015; Ellis Weismer et al., 2017; Plante et al., 2018), arguing that explicit learning relies upon attention and working memory, both of which can be compromised for children with DLD.
A recent survey of US speech-language pathologists found that explicit interventions are favoured by clinicians when treating school-aged children (Finestack & Satterlund, 2018), linked to emerging evidence supporting this form of instruction when working with this client group (e.g., Ebbels, 2014; Finestack & Fey, 2009). Meanwhile, implicit approaches are more likely to be employed for younger children presenting with delayed or disordered language (Ellis Weismer et al., 2017; Leonard et al., 2004; Plante et al., 2014), despite a lack of studies which compare the effects of implicit and explicit approaches. Methods of delivery are similarly varied across age and clinical groups, with many speech and language therapy (SLT) services operating a tiered approach (Ebbels et al., 2019), whereby 'universal' strategies are embedded in schools and pre-school settings to promote language-rich learning for all children, while more targeted support is offered for at-risk children, and individualised intervention is reserved for those with severe and persisting speech, language and communication needs (SLCN).

Given the impact of language disorder on children's everyday interactions and the key role carers play in supporting their child's development, many SLT approaches for pre-school children focus on training adults to interact with their language-impaired children in ways that are known to facilitate communication and progress with spoken language. For a review of parent-mediated interventions, focusing on implicit learning techniques, see Roberts et al. (2011, 2019). Among the most widely used therapy packages in the UK is the Hanen 'It Takes Two to Talk' programme (Pepper et al., 2004). This comprises 6-8 group training sessions for parents to develop knowledge and understanding of language development and supportive communication strategies, as well as three home visits by a Speech and Language Therapist. During these visits, parents are videotaped while practising strategies to support their child. These videos are reviewed by the parent and clinician to identify what is most helpful for the child, as well as to monitor progress and set ongoing therapy goals.

A comparative effectiveness study by Baxendale & Hesketh (2003) evaluated the progress of a group of 37 pre-schoolers, aged between 2;06 and 3;06 years, with identified language impairment in response to either the Hanen parent training
programme (N=19) or usual clinic therapy, which consisted of one-to-one, direct intervention with the parent observing while the therapist interacted the child (N=18). Children in both groups attended weekly 45-minute sessions for a minimum of eight and a maximum of 12 weeks. They were assessed on a range of measures at pre-therapy, six months afterwards and at follow-up 12 months after their initial testing. Participants in both groups showed significant post-treatment gains in standard scores on the Preschool Language Scales, Third Edition (PLS-3; Zimmerman et al., 1997). These were maintained at 12-month follow-up. Similarly, children in both groups increased their mean length of utterance and proportional number of utterances, compared to their parent, while mothers showed more frequent use of language modelling techniques, such as recasts, repetitions or expansion of child utterances.

Importantly, the study found that there was no statistically significant difference in progress on language scales between the Hanen and clinic groups. This was in the context of the Hanen intervention being over twice as intensive in terms of therapist time spent per child in organising and implementing this form of therapy. However, the results did suggest that children with receptive language difficulties may be more likely to benefit from intensive intervention, such as that offered by the Hanen programme. The authors acknowledged that the lack of a no-treatment control group makes it difficult to be certain that the observed gains were related to therapy alone. This is particularly the case for older children, who are likely to have started school or nursery by the time the project ended, meaning that they would be exposed to a language-rich environment, which may have enhanced their own linguistic and interactional skills.

A related intervention approach, which is commonly used with the parents of pre-school children with language difficulties, is parent-child interaction therapy (PCIT; Falkus et al., 2016). Like Hanen, PCIT employs video recordings of play sessions between adults and their children to highlight key communication strategies and support parents to reflect on their own interaction style. However, the delivery of therapy differs in that PCIT typically takes place in clinic and is condensed into 4-6 individual sessions, with no additional group training. The focus of intervention is to encourage parental communication behaviours, which have been found to be
positively related to TD language development (Pickstone et al., 2009), in order to scaffold and support child language acquisition. Falkus et al.'s (2016) study employed a within-subjects design with 18 participating parent-child dyads. Children were aged between 1;09 and 3;06 years, with identified language delay. Following four clinic-based sessions and a five-week consolidation period, during which parents continued to practise supportive communication strategies at home, significant change was reported on children's mean length of utterance, the ratio of child-to-adult speech (based on timings measured in seconds) and parents' rating of their own use of strategies. A summary of the most common PCIT targets and components of intervention (some of which overlap with Hanen and other related programmes) is provided, below. Detailed consideration of these features informed the development of the intervention investigated in this thesis (see Chapter 3).

2.4.1 Example PCIT strategies

2.4.1.1 Recasting / repeating back. Recasts are defined as 'a modified repeat' (Radford et al., 2012), whereby an adult responds to a child's previous utterance by 'reflecting it back to them with certain embellishments' (Saxton, 2003). Most commonly, this takes the form of a correction to the child's immature grammar, semantics or phonology, whilst incorporating elements of their original turn and retaining its intended meaning. However, recasts can also entail adult modification of errorless sentences in order to facilitate language acquisition (Clarke et al., 2017). This is known as a 'growth recast' (Menn, 1993) and can involve replacing or adding new elements to an utterance, for example to introduce a new grammatical construction, which the child has not yet learnt.

Recasting is closely linked to unmodified repetition of what children say, since both provide 'an endorsing receipt' in the next conversational turn (Bruinsma et al., 2020, p. 254). Falkus et al. (2016) note that this has the effect of showing the child that you are listening; confirming their verbal contribution and thereby increasing communicative confidence, while encouraging greater enjoyment of the interaction. In a study of spontaneous conversations between 41 French adult-child dyads, Clark and Bernicot (2008) found that parents sometimes used exact repetitions, combined with rising intonation, to check their understanding. At other times, they followed their
repeats with novel information, such that they fulfilled a similar function to recasts. These authors also note that repeats can carry a pragmatic purpose within conversation by helping to establish 'common ground' (Grice, 1981, p.190). This is defined as the 'presumed background information shared by participants' (Stalnaker, 2002, p. 701) and is central to social interactionist theories of language acquisition.

Numerous studies have investigated recasts and repetition in relation to adult input directed at both typically-developing and language-disordered children (e.g., Camarata et al., 1994; Conti-Ramsden et al., 1995; Fey et al., 1999). Together, these studies have shown that parents of both groups naturally recast their children's speech, though this is less frequent for children with DLD than for their TD peers. A recent systematic review by Cleave et al. (2015) found that recasts are an effective technique within grammatical interventions for DLD. However, Fey et al. (2003) argue that language disordered children require recasts at the rate of two per minute in order to benefit from their effects - double the frequency at which they occur during conversation with TD children.

Separately, Radford et al. (2012) provide further evidence that children with DLD may struggle to make use of recasts. They used conversation analysis to examine repair sequences during lessons in a specialist language resource base. Findings show that recasts containing grammatical or phonological corrections were not immediately acknowledged or acted upon by children with language disorder (e.g., through self-repair). Radford and colleagues (2012) suggest that this is due to reduced language processing skills and a tendency to focus on semantic, rather than form-based adult input. These authors recommend a more explicit approach to 'correcting' children's immature output, e.g., by recasting or repeating back an isolated word and by placing tonic stress on the repaired version. However, this runs counter to most SLT approaches, which place emphasis on 'modelling back' mature production without actively exposing the repair or interrupting the flow of conversation.

**2.4.1.2 Contingent commenting.** Contingency is 'the act of responding moment-by-moment to what the child has just done or said' (Bosanquet et al., 2016, p. 46). This adult behaviour is connected to recasting, in that it requires the parent to
tune in closely to the child's focus of attention and to respond promptly to their verbal or non-verbal initiations. For example, if the child holds up a toy car, the adult might comment: 'Oh, your toy car!' If the child went on to bang two cars together, the parent could say: 'Oh no! They crashed!' According to Falkus et al. (2016), this style of input benefits children because it gives them access to language which is both accurate and relevant to their interests and experience. Contingent commenting also decreases the pressure on the child to speak, unlike other common parental strategies, such as questioning (considered in Section 2.4.1.4, below).

Studies show that disadvantaged mothers typically engage in less contingent talk with their children than those from higher SES groups (e.g., Hoff, 2003). Meanwhile, infants whose parents frequently use this communication behaviour go on to develop larger vocabularies as toddlers (Masur et al., 2005). A recent randomised control trial (RCT) by McGillion et al. (2017) explored the use of contingent discourse with 142 11-month olds from higher and lower SES families. Caregivers were randomly allocated to either a contingent talk intervention or a control. The intervention was successful in increasing the amount this strategy was used by all caregivers and there was a short-term effect on children’s expressive vocabularies. However, the effects did not maintain for these very young children when participants were followed up at 24 months, indicating that focus on this area alone was not enough to produce lasting benefits.

While contingent commenting is a commonly used technique within PCIT programmes (e.g., Falkus et al., 2016), one potential criticism of promoting this strategy is that it may not be culturally appropriate for all client groups. For example, van Kleeck (1994) points out that while in Western cultures, it is customary for parents to follow a child’s lead, this practice may not reflect the underlying values and beliefs of all families participating in SLT intervention. Kwok et al., in preparation, investigated cross-cultural differences in PCI between UK and Hong Kong dyads (N=16; TD children aged between 4 and 8 years, with UK participants drawn from the current study). On average, UK parents used almost three times more contingent comments ($M=9.75$) compared to HK parents ($M=3.38$), while the latter used more teaching behaviours, such as recasts and gave more explanations for words and concepts. Kwok and colleagues suggest that these differences may be linked to
underlying cultural beliefs, e.g., Confucian thought (a dominant philosophical value in Chinese society), according to which parents are responsible for educating their child, and value their obedience.

Separately, Burns and Radford (2008) used Conversation Analysis (CA) to examine interactions between three Nigerian mothers and their pre-schoolers. The study identified a preference for instructional, rather than child-led talk, leading to the recommendation that SLTs should tailor their therapy and advice according to the background and interactional style of each individual dyad. The authors note that mothers who adopt a more directive style of communication, e.g., by giving instructions and explicitly praising or correcting their child, can nevertheless be supported to use more contingent language, e.g., by saying: 'Oh good boy. You broke open the bricks', rather than simply: 'good boy' (p. 16).

2.4.1.3 Giving clear explanations of words or concepts. Parents often introduce new words to their children within everyday conversation (Clark, 2018). Alongside this, they typically supplement their word offer with information that enables the child to develop their understanding, such as the semantic category, characteristic properties, sounds or actions associated with the target noun or verb. Adults may also contrast the new word's meaning with that of neighbouring items or highlight the relationship between comparable terms (Clark & Wong, 2002). According to Clark (2018), these parental explanations support children to build and organise their own internal semantic representations, which are essential for new word learning. Improving semantic knowledge is also a technique used to remediate word-finding difficulties for children with DLD (Best et al., 2020; Ebbels et al., 2012).

2.4.1.4 Use of questions. One key characteristic of parent-child interactions is the frequency of adult questions directed to the child. While questions can function to establish and maintain young children's attention (Grosse & Tomasello, 2012; Yu et al., 2019) and may encourage children to practise using language (Luo et al., 2022; Mol et al., 2008), research suggests that they can also limit the child's interactional and turn construction opportunities, e.g., by carrying an expectation of a specific response.
Test questions (TQs) account for up to a third of all requests directed at children (Siraj-Blatchford & Manni, 2008). While genuine questions call for the child to provide missing information, TQs solicit knowledge that is ‘obviously already known to the questioner’. Also referred to as ‘known answer’, or ‘exam’ questions, TQs have been widely studied within educational settings. They typically form part of a three-step question, answer, response (QAR) turn sequence. Under this structure, teachers will initiate a topic by asking a test question (Q) that invites a required answer from students (A), which in turn is given an evaluative adult response (R). This places the child in the position of having to ‘display’ their knowledge of the correct word or concept - an expectation which is likely to be particularly challenging for children with DLD. Indeed, while questions such as: ‘What’s that?’ were found to contribute positively to receptive language development for typically-developing 2-year-olds (Luo et al., 2022), this association did not hold for children with low vocabularies at this age, suggesting that children with language difficulties may find it challenging to comprehend or respond to these types of referential questions and thus, may miss out on the opportunity to hone their own immature linguistic skills. The Luo et al. (2022) paper also failed to analyse parental follow-up to children’s responses, which may have differed as a function of the child’s own correct, incorrect or imprecise answer to their originating question.

Another question type, which can be seen as particularly limiting for children’s verbal output, is forced choice questions, or ‘option-posing prompts’ (Brown et al., 2013). These require children to choose between two or more alternatives, e.g.: ‘Was it red or white?’ or ‘Do you want the apple or the orange’? This category of questioning is commonly reported within parent-child interactions (e.g., Cameron-Faulkner et al., 2003; Heather Fritzley et al., 2013; Wells, 1981). Research shows that such closed-ended questions typically elicit shorter and less accurate narratives from children about facts or events they have experienced or witnessed (e.g., Powell et al., 2014). However, younger children and children with DLD may find forced choice questions helpful in some circumstances, as a form of scaffolding which offers them semantically appropriate alternatives which they might otherwise be unable to express. Previous research has shown that it is difficult for children with DLD to respond to more open-ended enquiries (e.g., Brown et al., 2013; Fritzley et al., 2013)
because of the higher memory and cognitive load involved in processing these questions.

According to Falkus et al. (2016), reducing the overall use of questions within parent-child interaction can help encourage language development by decreasing the pressure on the child to speak about what the adult already knows. This opens up the child's potential initiation or response opportunities, allowing them to help choose and develop topics that are of interest to them. This, in turn, is likely to elicit more timely and tailored adult feedback, which is essential for ongoing language development (Gillkerson et al., 2017). However, it would not be desirable to eliminate child-directed questions entirely, since these form a fundamental part of natural conversation (Grosse & Tomasello, 2012). Furthermore, as children grow older, they typically use internalised adult models to form their own information-seeking questions, in order to build upon their emerging knowledge and understanding (Clark, 2018).

2.4.1.5 Giving the child extra time to talk. The final strategy, which is commonly promoted within parent-child interaction therapy, is that of giving the child extra time to speak. The rationale for this is that children with DLD require additional processing time to understand what others have said and to formulate their own contributions to conversation (Allen & Marshall, 2010; Falkus et al., 2016). Parents may be encouraged to achieve this goal by waiting for the child to start the talking, or by using extended pauses, e.g., leaving a gap of 2 seconds or more within or between speakers' turns (Fox Tree, 2002). According to Falkus et al. (2016), parents' adoption of these facilitative behaviours can help redress the balance of conversation between adults and their children with DLD, whilst also encouraging the child to initiate more.

2.4.2 Intervention for school-aged children with DLD

Whereas PCIT is the most widely-used intervention for pre-school children with speech, language and communication needs, it is rarely employed once children reach school age (Roulstone et al., 2012). Instead, interventions for primary pupils tend to focus on structural language skills and are typically delivered by teaching
assistants, or other educational staff (Ebbels et al., 2019). One exception to this is a study by Allen & Marshall (2010), which investigated the effectiveness of PCIT for children aged 8-10 years with expressive language disorder. Sixteen children with DLD and their parents took part in the research and were randomly assigned to either an intervention or delayed treatment (control) group. Research therapy took place once a week for four weeks, with pre- and post-therapy assessment and follow-up after a six-week consolidation period. Outcomes were assessed through video analysis, focusing on the following measures: child verbal initiations, verbal and non-verbal responses, mean length of utterance and proportion of child-to-parent utterances.

The results showed children in the treated group improved on three out of the five target parameters: verbal initiation, MLU and proportion of child to adult speech. These results appear promising. However, the study failed to include any standardised language measures, making it difficult to determine whether change was achieved in children's underlying language skills, over and above progress which would be expected from natural maturation. Furthermore, children continued to receive other language intervention during the project, including one-to-one and direct therapy, which complicates interpretation of the findings.

Despite children in the study being in Key Stage 2 (school years 3-6), Allen & Marshall followed the example of early years PCIT in focusing on play-based situations, which may not reflect participants' day-to-day encounters with family, peers and adults outside the home (Croteau et al., 2015). In addition, the research therapy focused solely on the role of parents and carers in tailoring their input in order to promote language development; pupils were not offered strategies to support their own expressive or receptive language, or to modify their turns in conversation. This represented a mismatch with the study's primary outcome measures, which focused on changes to children's, rather than adults' communication. Salmenlinna and Laakso (2020) argue that using self-help techniques, such as asking for clarification or repetition when they haven't understood their conversation partner (other-initiated repair) is 'an essential skill for children with language comprehension problems' (p. 895). Previous studies indicate that children with DLD use such strategies less frequently than TD children, which
may have consequences for their education and social participation (Brinton & Fujiki, 1982; Shepherd, 2012), offering scope to target this skill within interventions that focus on language in interaction.

Croteau et al. (2015, p. 30) state that conversation situations ‘are not sufficiently examined in speech and language interventions for children’. Limited studies exist which explore the benefits of training carers of children who use augmentative and alternative communication in supportive conversation strategies (e.g., Kent-Walsh et al., 2015), and these typically involve young people with a diagnosis of ASD or learning disability. Moreover, Tegler et al. (2019) report that clinicians seldom use this type of instruction within their day-to-day practice, citing ‘environmental factors’ as a barrier to implementation.

2.5 Conversation-based therapy for adults with communication disorders

In contrast to the lack of conversation-based intervention for children with DLD, conversation therapy is a well-established method, which is used to address communication difficulties for adults with acquired language disorders, e.g., stroke-related aphasia (Simmons-Mackie et al., 2016), cognitive communication disorder (Togher et al., 2022) and language-led dementia (Volkmer et al., 2023). Whilst treatment approaches vary widely in their focus and delivery, researchers have identified a set of common underlying principles and methods, which cross clinical groups (O’Rourke et al., 2018). These adult-focused programmes fall under the umbrella term ‘communication partner training’ (CPT) and are defined as ‘planned intervention that is explicitly designed to enhance conversational abilities’ (Simmons-Mackie, 2008, p. 253).

Among the most widely adopted CPT courses is ‘Better Conversations with Aphasia’ (BCA; Best et al., 2016), a manualised intervention programme, which can be accessed online at: https://extend.ucl.ac.uk. BCA was originally conceived for clients with conversational difficulties arising from agrammatism but has since been adapted for wider use with other forms of aphasia, including Primary Progressive Aphasia (PPA; Volkmer et al., 2023). The intervention draws upon Kolb and Kolb’s (2009) adult learning model as its theoretical basis, following four discrete stages, from
concrete experience (or re-experience, e.g., watching conversations on video), to reflection, thinking and finally action. A detailed explanation of how Kolb & Kolb’s theory can be applied to BCA is provided by Beckley et al. (2013, p. 221 - 222).

The programme is also informed by the principles of Conversation Analysis (CA), a qualitative research method, which focuses on examining video or audio-recorded data to identify patterns within naturally-occurring talk. CA is an inductive approach, which addresses how conversational turns are designed and ordered, as well as how participants understand and respond to each other within their everyday interactions (Sacks, 2010; Scheglof, 2007). Importantly, turns are seen in context, with each conversational act being conditional on its predecessor and influencing successively how the next speaker will respond. CA has been used to underpin the design and delivery of a range of interventions across Speech and Language Therapy and other areas of healthcare (Barnes, 2019; Wilkinson, 2014). Like PCIT, this form of ‘interventionist’, or applied, CA relies on viewing selected clips from pre-therapy recordings to encourage participants’ active reflection on their individual communication style, as well as repeated practice of new strategies, both during clinic sessions at home.

A key distinction between BCA and other CA and interaction-based approaches is that the programme includes working directly with people with aphasia (PWA) as well as their communication partner (CP). Prior to therapy, the dyad is asked to record themselves conversing as they would typically at home. The delivering SLT then views the videos in preparation for each session, identifying potential barriers, or trouble in the talk, as well as behaviours which appear to facilitate conversation, e.g., times when the participants resolve any difficulties and/or appear to be enjoying the interaction. These instances are highlighted and discussed within therapy, using video clips to aid reflection and understanding. The PWA and CP are then supported to set goals collaboratively with the therapist, based on what the clients themselves identify as important or problematic within their talk.

BCA typically takes place once a week for eight weeks, with each session lasting around 1.5 hours. To maximise access to the programme and to ensure that conversation takes place in its most natural setting, therapy is delivered within
participants' homes. The overall aim of the programme is to 'change behaviours known to influence the flow of conversations when a speaker has aphasia' (Best et al., 2016, p. 2). This involves first raising the dyad's awareness of how conversation works, such as the aim of turns, how these can be impacted by communication disorder and how misunderstandings can be repaired. Both participants then typically target a reduction in behaviours that act as barriers to communication, as well as an increase in facilitative strategies. Time is set aside both within and between sessions for them to practise their chosen targets within conversation. A summary of example barriers and then facilitators, which have been identified and worked on during BCA intervention, is provided, below:

2.5.1 Example barrier conversation strategies

2.5.1.1 Test questions. Just as parents asking children 'known answer' questions can limit interactional opportunities for the younger speaker, so Beeke et al. (2013) have argued that test questions can act as a barrier to the flow of everyday conversation for people with aphasia and may produce negative social and emotional consequences. According to these authors, test questions arise when the CP already knows the answer to their query and is ‘testing’ PWA, either to encourage them to talk, and/or to keep the conversation going. An example TQ would be: ‘Tell me the names of your sisters’, often followed up by the CP cueing production of a specific name or content word, e.g.: ‘One begins with K-’. According to these authors, TQs can cause a ‘threat to face’ by placing pressure on PWA to produce a specific noun or noun phrase, which may prove elusive despite extensive word search attempts (Burch et al., 2002; Goffman, 1972). Lock et al., (2001) further found that this type of failed word search, prompted by a test question, is often followed by a “correct production sequence”; a series of turns designed to prompt the semantic or phonological target, which the PWA is struggling to produce.

In such sequences, CPs may actively withhold information in order to elicit a specific response from the person with communication difficulties, which may not be forthcoming. Aaltonen & Laakso (2011) have explicitly likened this process to school-based activities, referring to such breakdowns in communication as 'exam halts' (p. 115).
2.5.1.2 PWA using minimal or single word turns. Turning to the barrier behaviours identified for PWA participating in the BCA study, Beeke et al. (2013) describe how people with agrammatism frequently use minimal, or single word turns, which highlight their identity as 'a linguistically impaired interactant with minimal resource to take a turn at talk' (p. 799). Within the aphasia literature, a minimal turn is defined as one which:

'does not contribute meaningfully to the conversation, and serves only to hand the conversation back to the other speaker' (Herbert et al., 2013, p. 9).

Typically, minimal turns are composed of tokens, such as 'mmm', 'oh' and 'OK', or a combination of these. While single words differ from minimal turns, in that they contain lexical information, they are grouped together here as they are also a sign of reduced participation by the PWA in conversation. Both minimal and single word turns occur frequently in response to test questions initiated by the non-impaired CP (Beeke et al., 2013).

2.5.1.3 PWA giving up when stuck on a word. A second PWA barrier, which was identified within the BCA study, involved instances where the PWA abandoned, or failed to complete a turn - often in response to word-finding difficulties. For example, Beckley et al. (2013) described how one participant ('Giles') sought to give up trying to get his message across following an unresolved repair sequence with his wife. The trouble source centred around his difficulty in retrieving a proper noun (Jonathan Ross), which is a common problem within conversation for adults and children with language disorder (Best et al., 2021; Herbert et al., 2003). Prior to therapy, Giles's tendency was to repeat the same indistinct words and gestures multiple times, before surrendering his turn in frustration when his wife could not understand. Instead, he was encouraged to try 'saying it another way' (see Facilitators, below), for example by using a key word, such as 'television' to clearly signal the context for his comments.

While 'giving up when stuck' was identified as a barrier to conversation for this individual dyad, it should be noted that pursuing a specific word across lengthy repair
sequences may not always be a desirable strategy. Depending on the context, participants may instead agree to carry on with the conversation to avoid diverting their communicative resources, as in 'correct production sequences' (Lock et al., 2001). Alternatively, these authors suggest that CPs may offer candidate words to try to 'guess' the PWA's meaning. However, this was not a strategy specifically targeted within the BCA study.

2.5.2 Example facilitative conversation strategies

2.5.2.1 CP uses minimal or passing turns. Whereas using frequent single word and minimal turns was identified as a barrier for PWA participating in the BCA study, this same behaviour was chosen as a target facilitator for several CPs. The rationale for this was that using utterances, such as 'mm hm', 'right', or 'uh huh', rather than adding new information, may prompt the PWA to elaborate or continue with their prior talk (Clark & Schaefer, 1989; Sacks et al., 1974). The advice for CPs to increase their use of minimal (sometimes known as 'passing') turns also appears within the Supporting Partners of People With Aphasia in Relationships and Conversation programme (SPPARC; Lock et al., 2001), upon which BCA is partly based. According to the SPPARC manual, partners should aim to 'look interested and expectant as you take this type of turn' (p. 32). They are also encouraged to leave an extended pause afterwards, to allow the PWA time to formulate their next utterance or non-verbal contribution.

2.5.2.2 PWA uses word finding strategies (e.g., circumlocution, gesture or acting out). These related strategies offer an alternative to the previously discussed barrier of 'giving up when stuck on a word'. Participants within the BCA study were encouraged to use multi-modal turns (e.g., mime, gesture, facial expression and marked prosody) in order to help get their message across within everyday conversation. Where appropriate, some participants also employed drawing and writing as an additional communication resource. Beeke et al. (2013) describe how one PWA, 'Graham' was able to construct turns which, despite his chronic agrammatism, allowed him to convey his opinions and engage actively in conversation - including challenging the views of his unimpaired partner. By using these facilitators, Graham was able to circumvent his significant word-finding
difficulties and participate equally with his CP in guiding the topic and flow of the conversation.

It is important to acknowledge that the use of gesture and other physical movement can be problematic for some adults and children with communication disorder - particularly if this co-occurs with dyspraxia (Raymer, 2007; Sinani et al., 2011), as their actions may not be accurate or easily interpretable. However, multiple studies have highlighted the role of non-verbal communication not only in enhancing and extending the information that is being communicated, but also in facilitating lexical retrieval by providing an alternative route to the lexicon. For example, Clough and Duff (2020) highlight the positive effects of gesture on learning and memory for adults with neurogenic conditions, including aphasia. Separately, Goldin-Meadow and Alibali (2013) argue that gesture can support and shape cognition by reducing working memory load for both children and adults with and without communication disorders. When word retrieval fails, multi-modal turns can also be used to help compensate and repair communication breakdowns (Pierce et al., 2019). However, Caute et al. (2021) identify the need for simpler and more reliable tools to code and evaluate gesture, in order to increase understanding of how this can be used facilitatively within SLT intervention.

2.5.3 Findings from conversation-based intervention research

For all of the above barriers and facilitators, the exact nature of how turns are designed and organised between PWAs and CPs was explored in detail from the perspectives of the participants themselves during BCA therapy. Individual and group findings from the BCA research programme combine to suggest that therapy results are influenced by the underlying language and cognitive profiles of PWAs, as well as the communication style of CPs. Best et al. (2016) reported that there was no significant change, with a small effect size, in frequency of targeted facilitators between pre and post therapy for the group of eight people with chronic agrammatic aphasia and their CPs. However, two of the eight dyads did show a significant increase in their use of chosen facilitators, while another showed a significant decrease in facilitative behaviours. The remaining five dyads showed no significant change in facilitators following the intervention. In contrast, there was a significant
decrease, with a medium effect size, in the number of barrier conversation behaviours for the group. This represented a reduction in barriers to less than a third of the frequency which occurred before therapy. Five of the eight dyads showed a significant reduction in targeted barriers following BCA, suggesting that change in this direction may be easier to produce than an increase in the use of facilitative communication strategies.

One issue which is acknowledged in the Best et al. (2016) paper is the difficulty of obtaining satisfactory inter-rater reliability (IRR) when measuring conversational outcomes. IRR refers to:

> 'the degree of agreement between two or more coders who make independent ratings about the features of a set of subjects' (Hallgren, 2012, p. 23).

Reaching satisfactory agreement is essential to establishing reliable outcome measures, but as Best et al. (2016) point out, this is complicated by the inherent variability of natural conversation samples (Perkins et al., 1999). For example, some behaviours which were coded during the study were present for all participating dyads, while others were specific to one dyad only. Similarly, these behaviours varied in their frequency across conversation samples. An evaluation of IRR was included within the Best et al. (2016) analysis and found percentage agreement of 69% between student raters for targeted facilitators (SD = 21). For barriers, IRR was lower at 64% (SD = 27). Although there is no formally recognized acceptable level of agreement for novel conversation-based measures, 80% agreement is typically used as the gold standard for IRR (McHugh, 2012). However, a lower cut-off point of 70% has been proposed as acceptable for new instruments involving observational coding from videos (Haidet et al., 2009). Further research will be needed to determine what is a realistic and meaningful level of IRR for conversation-based outcome measures, especially when designing novel interventions where these are the primary means of assessing change.

In order to explore individual therapy goals and outcomes in more detail, Beckley et al. (2013) and Beeke et al. (2013, 2014, 2015a, 2015b) employed both quantitative and qualitative methodology to analyse strategy use in pre- and post-therapy
conversations collected during the BCA study. For example, Beeke et al. (2015a) analysed strategy choice and change in conversation for two couples who participated in the research intervention. The study found that successful adoption of strategies by PWAs is related to underlying language profiles; the participant with more severe aphasia showed no change in targeted facilitators (writing, gesture and keyword use) following BCA, while the participant with less impaired spoken and written language showed a significant increase in his use of writing, mime and key words post-intervention. Meanwhile, use of test questions decreased significantly for both CPs, while facilitators remained unchanged.

Qualitative analysis of each dyads’ conversations, using CA, revealed the limitations on PWA turns occasioned by TQ sequences, leading Beeke and colleagues (2015a) to suggest that insight into these negative effects (gained through watching pre-therapy videos with the therapists) may have motivated CPs to stop engaging in this behaviour. This proposal is supported by Johnson et al. (2017, 2021) who carried out research into behaviour change mechanisms in conversation therapy. For further details, see Chapter 3, Section 3.6. These results have implications for the design of future interventions, aimed at improving the conversations of other clinical populations with speech, language or communication disorders.

2.6 Summary

This literature review has drawn together evidence from the fields of both developmental and acquired communication disorders research, aiming to summarise and appraise relevant papers and provide a context for the current research. Multiple robust studies identify parent-child interaction as a key mechanism in supporting child language acquisition in the early years. However, there is less data available to inform our understanding of how language and conversation skills continue to develop once children reach school age.

While the majority of language intervention for pre-schoolers focuses on PCIT and Hanen, there is a lack of interaction-based programmes for pupils of primary age and beyond, with conversation being identified as a neglected area within paediatric SLT research (Croteau et al., 2015). Conversely, Communication Partner Training is a
well-established approach, with a growing evidence base, for enhancing the everyday conversations of adults with acquired communication disorders and their regular talk partners. However, there is limited work comparing the conversations of adults or children with communication disorders to those of unimpaired populations.

Having identified a gap in the literature and current SLT practice for conversation-based research involving school-age children, this study aimed to:

1) co-design with key stakeholders a new treatment protocol for a named intervention to effect change in children’s everyday conversation and structural language skills, based on published theory and interventions used successfully with other clinical populations.

2) characterise the conversations of typically-developing primary school children and their parents with respect to key variables which are targeted within the research intervention to provide a context for the main intervention study.

3) investigate the response of six children with DLD and their main carers to the research intervention programme.

4) evaluate the feasibility of using this approach, including recruitment and retention, acceptability of the intervention, IRR and suitability of chosen outcome measures.

5) explore how dyadic turn sequences shape development of children's language and communication skills through fine-grained Conversation Analysis, in order to inform future clinical development of the intervention.

The Medical Research Council (Craig, 2008; Skivington et al., 2021) provides detailed guidance on the development, evaluation and implementation of complex interventions to improve health. Four key phases have been identified to guide and frame the research process: i) development or identification of the intervention; ii) assessing feasibility, acceptability and study design in order to make decisions about progression to next stage of evaluation; iii) assessing an intervention using the most
This thesis describes Phase i) and ii) work to develop a conversation-based programme, 'Better Conversations with Children' (BCC), and assess whether the intervention has the potential to proceed to further development. Individual outcomes will also be evaluated as part of an experimentally controlled case series study to inform understanding of the mechanisms of change. Findings from a group of DLD children and their parents will be compared with those of a typically-developing comparison group to set these results in context. Both quantitative and qualitative methods will be employed to analyse conversation data in order to provide insights which may guide the future refinement of BCC.
Chapter 3: Development of the intervention

The following chapter describes the early-stage development of the 'Better Conversations with Children' (BCC) intervention, including how theory, clinical expertise and participant involvement informed the creation and refinement of the research therapy programme. The 'GUIDance for rEporting intervention Development studies in health research' (GUIDED; Duncan et al., 2020), a 14-item framework, will be drawn upon to describe systematically each aspect and stage of BCC's development:

3.1 Context

The idea of developing BCC was first conceived whilst the PhD researcher and her lead supervisor were working together on the Word Retrieval and Development Project (WoRD; Best et al., 2021), an intervention study focusing on lexical therapy for children with DLD. Children and parents involved in the WoRD intervention frequently reported their difficulties with understanding each other in conversation, whilst children expressed their frustration at not being able to get their message across at home and at school:

'It can be quite annoying at home, because my sister speaks over me. At school, I get really angry, because I forget and can’t tell the answer... People say things instead of me.' (Best et al., 2017, p. 708).

This experience echoed that of children and families living with DLD whom the PhD researcher has worked with extensively in clinical practice across health centres, pre-school language units, mainstream and special schools.

3.1.1 Development context

A clinical advisory group was established, consisting of two specialist SLTs who work with this population, as well as an SLT researcher, who co-developed the 'Better Conversations with Aphasia' (BCA) training programme, alongside the PhD researcher and her lead supervisors. The team was led by the PhD researcher who
is a Highly Specialist SLT, experienced in working with this clinical population. Members of her wider advisory group had experience of living with DLD, the design of intervention and assessment, behaviour change theory, clinical linguistics and conversation analysis, all of which influenced decisions on the content and structure of the intervention.

### 3.1.2 Delivery context

The intervention was designed for primary school aged children with DLD and their parents, to be delivered in schools and/or at home by qualified SLTs. Development took place during a period of consultation by the Royal College of Speech and Language Therapists (RCSLT) with clinicians, patients and carers to identify priorities for new DLD research. This ongoing consultation informed the content and form of the BCC programme, which aligns with the final priorities agreed by the professional body (RCSLT; Bishop & Norbury, 2021), e.g.:

- Outcomes for individuals with DLD across settings (e.g., language provision, mainstream school) in relation to curriculum access, language development and social skills.
- Specific characteristics of evidence-based DLD interventions which facilitate progress towards the goals of an individual with DLD.
- Effective interventions targeting receptive language for individuals with DLD.
- Effective ways of teaching self-help strategies to children and young people with DLD.

### 3.2 Need for the intervention

Research shows that DLD affects around two children in every Year 1 classroom, around half of whom will experience difficulties into secondary age and beyond (Botting et al., 2001; Norbury et al., 2016; Stothard et al., 1998). Problems with spoken and written language can lead to poor academic attainment, mental illness and increased risk of offending (Bryan et al., 2007). Therefore, it was decided to
develop an intervention to improve children’s language and conversation skills in order to support their social and educational outcomes and enhance their well-being.

Given the intractability and potential consequences of DLD, timely and effective intervention is crucial. To date, most evidence-based programmes focus on pre-school and reception aged children (e.g., Fricke et al., 2017), indicating a gap in the literature for school-aged children with persisting language disorder. In addition, the focus of prior language therapy research has been at the single word and sentence level (see Chapter 2, Section 2.4; Law et al., 2017), despite conversation being the primary context for communication and the main medium through which children build social relationships.

Most speech and language interventions for school-aged children at Key Stage 1 and beyond focus on training education staff to support children’s oral language (Roulestone et al., 2012). However, there is limited evidence for the effectiveness of these TA-led programmes (Dimova et al., 2021; Thurston et al., 2016). Meanwhile, the value of parental participation in children’s speech and language therapy is well established in the early years literature (Roberts & Kaiser, 2011; Roberts et al., 2019). However, parent-mediated interventions for school-aged children remain an understudied area. It was hypothesised that caregiver involvement in treatment would be associated with positive gains for primary school pupils.

Therefore, we identified the need for an intervention to address these recognised gaps in the literature and clinical practice by working with parents and primary-aged pupils, using a conversation-based approach which is grounded in established methods used with other clinical populations.

3.3 Target population

The target population was primary aged children of 6-8 years diagnosed with or presenting with DLD and their parents. We planned focus on this age group because language difficulties that are still evident at five years and over are likely to persist (Bishop et al., 2017). Furthermore, from Key Stage 1 (school years 1 and 2),
the language demands in the classroom increase and DLD may be more clearly distinguished from other diagnoses, such as sensory or behavioural problems. Full inclusion criteria for the current BCC study were:

- Child presents with difficulty producing or understanding language that affects everyday functioning, as reported by parents and school and confirmed by formal language testing, e.g., scaled score of 7 or below on two or more Clinical Evaluation of Language Fundamentals (CELF-5; Wiig et al., 2017) core language subtests; identified as having a clinical language difficulty on the Children’s Communication Checklist (CCC-2; Bishop, 2003).
- Aged between six and eight years (persisting language difficulties at this age are suggestive of poor prognosis).
- Having English as a main language (i.e., exposed to English at home and/or in an English-speaking nursery since the age of three).
- No other significant developmental diagnosis, e.g., ASD, behavioural or emotional difficulties, which may affect the child’s participation in BCC.
- Non-verbal skills task at or above the low average range (as indexed by a percentile score ≥ 8 on the Pattern Construction task from the British Ability Scales, Third Edition (BAS-3; Elliott & Smith, 2011). This was to ensure that the child had adequate meta-cognitive skills to be able to reflect on their own communication through guided video-based discussion.
- Difficulty with conversation as reported by parents and captured in assessment of a videoed conversation (examples of difficulty include frequent misunderstandings and/or conversations where the ratio of child-to-adult speech is markedly low).

Because most existing interventions for school-aged children in the UK focus on training education staff to support classroom communication (Roulstone et al., 2012), a gap was identified for an intervention targeting children with DLD and their parents. This aligns with the Special Educational Needs and Disability (SEND) Code of Practice (Department for Education, 2015), which places emphasis on empowering families to support their child’s learning and development, acknowledging the rights of parents to participate in decision-making and reviewing their child's progress. The
approach also reflects the RCSLT's (2021) priority of promoting self-help strategies for young people with DLD.

3.4 Influence of published intervention development approaches

BCC is a complex intervention, requiring multiple components, since it targets a range of behaviours for both adult and child participants. Specialist expertise and skills are required by those delivering the intervention and there is a level of flexibility permitted when tailoring therapy for individual dyads (see Skivington et al., 2021). The project design process, therefore, followed key recommendations from the Medical Research Council (MRC)'s guidance for developing and evaluating complex interventions, which was in place at the start of this PhD (Craig et al., 2006). This included: a) identifying the existing evidence on interventions to support language and conversation for children and adults with communication disorder by conducting a detailed literature review; b) ensuring that the research has a 'coherent theoretical basis' (p. 4) by working with supervisors and a clinical advisory group to discuss evidence in the context of expert knowledge and wider theory; c) consulting with behaviour change experts to identify hypothesised mechanisms of action underpinning programme theory; d) evaluating intervention feasibility and acceptability, as well as assessing the efficacy of BCC for a small group of participants, by collecting quantitative outcome measures, alongside questionnaire data. As suggested by Skivington et al. (2021), these steps did not follow a linear sequence. Rather, progress in each area was informed iteratively by other strands of the research across the project's course.

3.5 Evidence which informed the intervention development process

This relates to Step a) of the MRC guidance (Craig et al., 2006).

The MRC guidance for complex intervention development recommends reviewing existing published evidence to inform development of a new intervention. The

---

3 Mechanisms of action are defined by Michie et al. (2021) as 'the processes through which a behaviour change technique affects behaviour'. Mechanisms of change refer to 'the theory-driven reason that change occurs in therapy, or the how or why of therapeutic change' (Petrik & Cronin, p.284).
following evidence from related work with other populations with communication disabilities, both younger and older, informed the development of the BCC programme.

3.5.1 Evidence for working with parents to improve children's expressive and receptive language

Several key studies provide empirical support for training parents of children with language DLD to use language support strategies. Roberts and Kaiser (2011) conducted a systematic review and meta-analysis of parent-implemented interventions for children aged between 18 and 60 months with primary and secondary language impairments. The results showed large and significant effects for children's expressive language (Hedges g = 0.61), compared to untreated controls. Gains for receptive language were moderate and also significant (g = 0.35). However, the analysis included studies focusing on children with ASD, Down syndrome and other learning difficulties, as well as DLD. It is also important to note that the Roberts et al. (2011) review includes studies with a high number of intervention sessions (up to 36 hours), which may not be realistic within routine clinical practice.

More recently, Roberts et al. (2019) published an updated review, examining the association between parent training and language outcomes for children aged 6 years or younger with, or at risk for, a range of communication impairments. Once again, large and significant effects were reported for children with DLD (g = 0.83 for expressive and g = 0.92 for receptive language). Children in this diagnostic group also had the strongest social communication outcomes (g = 0.37), compared to at-risk participants, those with ASD or other language and learning impairments.

While studies by Boyle et al. (2010) and Heidlage et al. (2020) both suggest that difficulties with receptive language may be more difficult to remediate than aspects of expressive language, two scoping reviews by Tarvainen et al. (2020, 2021) conclude that modifying a child’s environment (e.g., by training parents and teachers to use facilitative communication strategies) is the most effective form of intervention for both pre-school and school aged children with language comprehension difficulties.
The results from all of the above studies combine to suggest that interaction-based therapy has the potential to improve both children’s expressive and receptive language, with the latter being identified by the RCSLT (2021) as a priority for language intervention.

3.5.2 Evidence for working on everyday conversation

There is no equivalent review available evaluating the effects of conversation-based therapy for school-aged children and very limited literature exists (see previous chapter, Section 2.4). However, at the other end of the lifespan, there is growing evidence for the use of communication partner training (CPT) to support the everyday conversations of adults with acquired communication difficulties, such as aphasia, and the family, friends and caregivers, with whom they interact regularly.

Simmons-Mackie et al. (2016, 2010) conducted two separate systematic reviews, covering a total of 56 studies. Each concluded that CPT is effective in increasing partner skill in facilitating the communication of people with aphasia, however there was insufficient evidence to determine whether this type of intervention is suitable for people with acute aphasia. Furthermore, Cruice et al. (2018) conducted a follow-up review of the papers included in the above systematic studies. These authors found that the majority of reported interventions were insufficiently specified to enable replication, while key ingredients, or mechanisms of change, were rarely stated. Furthermore, there was no consensus on optimal dosage or timing of delivery post-stroke.

As for the DLD literature, most available evidence consists of descriptive case studies, or pre-post designs. Within these studies, a series of papers by Beckley et al. (2013) and Beeke et al. (2011, 2014, 2015) provide evidence that significant change in communication behaviours is possible for adults with aphasia and their CPs following an eight-week manualised programme, ‘Better Conversations with Aphasia’ (BCA). More recently, Volkmer et al. (2023) have reported positive results from an RCT involving an adaptation of BCA for people with primary progressive aphasia. Together, these findings from different populations with acquired communication disorders suggest there is potential for a conversation-based
3.5.3 Evidence for strategies facilitating language and conversation

Turning to the specific strategies that are used to promote children's language and conversation within BCC, evidence for the effectiveness of recasting, contingent commenting and other facilitative adult behaviours is summarised in the previous chapter (e.g., Cleave et al., 2015; Masek et al., 2021; Falkus et al., 2016). There is also evidence that people with aphasia can support, or hinder their own conversations by using specific facilitators, or barrier strategies (Beeke et al., 2013). These findings underpinned the decision for BCC to target both child and parent behaviours within conversation, rather than focusing solely on adult strategies to support their child's language and conversation development.

3.6. Published theory, which informed the intervention development process

This relates to Steps b) and c) of the MRC guidance (Craig et al., 2006)

Though no single published theory acted as a unitary driver for the development of the intervention, the following models of language and social interaction helped guide the design, reflecting the multifactorial nature of communication development and disorders. The design of BCC was informed by the social interactionist and constructivist theories of language acquisition, because these emphasise the two-way interaction between children's emerging linguistic skills and parents' ability to scaffold and respond to these, rather than focusing only on the child (nativism) or adult (learnability theory). This dynamic view of language acquisition, for which there is growing evidence (e.g., Romeo et al., 2018a; 2018b) underpinned the decision to focus on both child and adult behaviours as targets for the new intervention.

In addition, behaviour change theory (Michie et al., 2009) was used to help identify specific techniques and hypothesised mechanisms of change for the BCC programme. In consultation with experts from UCL's Centre for Behaviour Change, the Human Behaviour Change Project's Theory and Techniques Tool was used to
map behaviour change techniques onto mechanisms of action in order to inform the development of BCC programme theory: (https://theoryandtechniquetool.humanbehaviourchange.org/tool).

Insights also were drawn from previous work by Johnson et al. (2021, 2017), who applied the COM-B Model of Behaviour (Michie et al., 2011) to investigate mechanisms of change following the BCA programme. Under this model, individual behaviour is conceptualised as a product of three necessary conditions: the capability to carry out the behaviour (including necessary knowledge and skills), the opportunity and motivation to do so (including social, environmental and psychological factors). Seven key mechanisms were identified as activating change in speakers' conversational style following BCA, including increased awareness of their own behaviour (through video reflection) and replacing barriers with facilitators (Johnson et al., 2016). These findings informed the content and focus of the BCC programme.

Alongside these theoretical approaches, linked to language and behaviour change, BCC draws upon systems theory (Hawe et al., 2009), which takes into account the context or setting in which the intervention is delivered and how these interact. For example, BCC was designed in accordance with RCSLT clinical guidelines (Taylor-Goh, 2005), including key principles such as: 'Work in partnership with colleagues both within and outside of the profession in the best interests of service users.' Professional conduct and client confidentiality were maintained according to the Health and Care Professions Council standards of proficiency (HCPC, 2014). Consideration of children's family history and dynamics also helped tailor several aspects of BCC delivery, e.g., adapting written materials to support parents who may themselves have a language or learning difficulty and scheduling sessions at the beginning or end of the school day, or during weekends and holidays, to fit around work and childcare commitments.

Finally, BCC was influenced by the principles of applied Conversation Analysis, which focuses on how conversational turns are designed and organised within naturally-occurring talk from the perspectives of the participants themselves. CA considers conversation as collaboratively produced, while language is seen primarily
as a tool for social interaction. This viewpoint underpinned the development of BCC, which focused on everyday parent-child interactions as experienced by the child and carer.

A logic model is presented in Figure 3.1, below, to illustrate activities and resources, hypothesised mechanisms of change, outcomes and impact for BCC, based on the theory which informed all stages of the intervention process.

3.7. Use of components from existing interventions in the current intervention development process

BCC is based upon principles and methods from both parent-child interaction therapy (PCIT, Falkus et al., 2016) and the Better Conversations with Aphasia programme (BCA, Beeke et al. 2013), which is freely available at: https://extend.ucl.ac.uk. Decisions on which specific components were used or adapted from these previous interventions were made by the PhD student, with support from her clinical and wider advisory groups. For example, the agreement to include six face-to-face sessions was based on the preference of parents and children, with reference to usual clinical practice in the NHS, whereby children on SLT caseloads typically receive a block of 6-8 therapy sessions per term. Separately, it was agreed that BCC therapy sessions would be shorter than those typically offered for adult CPT, due to the constraints of school timetabling and limits on children's attention control. A full list of BCC components, which were adopted or adapted from existing interventions, is provided in Table 3.1, below:
**Figure 3.1: Development of the intervention logic model.**

<table>
<thead>
<tr>
<th>Activities and resources</th>
<th>Hypothesised mechanisms of change</th>
<th>Outcomes / impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bespoke questionnaires on child and family background, including previous SLT contact, any other medical or developmental difficulties, languages spoken and current conversation strengths and needs (adult and child).</td>
<td>• SLT knowledge and awareness of child and family history, as well as current language and conversation skills.</td>
<td>• Information used to help the SLT tailor intervention to individual dyad in order to maximise participant outcomes.</td>
</tr>
<tr>
<td>• Formal assessment of child's receptive and expressive language skills.</td>
<td>• SLT understanding of environmental context and resources; aspects of a person's situation or environment that discourage or encourage certain conversation behaviours.</td>
<td></td>
</tr>
<tr>
<td>• 3 x pre-therapy videos of child and parent recorded at home during the 6 weeks prior to intervention.</td>
<td>• Indication of child and parents' attitudes towards language and conversation.</td>
<td></td>
</tr>
<tr>
<td>• Introduction to conversation and language development, including raising awareness and understanding of DLD.</td>
<td>• Parent and child's knowledge and understanding of how conversation works in typical development and with DLD.</td>
<td></td>
</tr>
<tr>
<td>• Spoken information supported by pictures and handouts, tailored to individual dyad.</td>
<td>• Participants’ beliefs about child’s capability / motivation.</td>
<td></td>
</tr>
<tr>
<td>• Feedback from parents and children about their own experience and views relating to the impact of language difficulties in conversation.</td>
<td>• Child’s self-image, e.g., conception and evaluation of themselves, including characteristics, qualities and skills.</td>
<td></td>
</tr>
<tr>
<td>• Watching selected clips from dyad's pre-therapy conversations.</td>
<td>• Knowledge and understanding of how own conversation works (parent and child).</td>
<td></td>
</tr>
<tr>
<td>• Using these to guide discussion around key facilitators / barriers to their communication.</td>
<td>• Beliefs about capabilities.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Optimism about therapy outcomes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Beliefs about consequences of a behaviour, e.g., participants encouraged to reflect on ‘what happened next in the conversation’ during clips.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Observations and reflections used to inform adult and child goal-setting.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Increased understanding of existing skills, as well as areas for development, can lead to improved communicative confidence.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Focus on instances where things are working well, as well as solutions for conversation</td>
<td></td>
</tr>
<tr>
<td><strong>Participants are supported by the SLT to select their own goals for change (e.g., to increase chosen facilitators and decrease barriers).</strong></td>
<td><strong>Intention; a conscious desire for the parent or child to increase or decrease a behaviour.</strong>&lt;br&gt;<strong>Mental representations of outcomes, or end states, that an individual wants to achieve.</strong>&lt;br&gt;<strong>Motivation; impetus that gives purpose or direction to behaviour.</strong></td>
<td><strong>Setting own goals makes therapy meaningful for participants and highlights their own agency in supporting their everyday conversations.</strong>&lt;br&gt;<strong>Identifying existing behaviours to work on makes goals more specific, realistic and achievable, thereby increasing the likelihood that these will be met.</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Practising strategies during therapy sessions and regular 'Talk Time' at home.</strong></td>
<td><strong>Skill; an ability or proficiency acquired through practice.</strong>&lt;br&gt;<strong>Feedback (from SLT and participants).</strong></td>
<td><strong>Over time, skill is refined and becomes more natural / automatic.</strong>&lt;br&gt;<strong>Positive feedback helps reinforce the desired behaviour, while suggestions can be made to help modify a behaviour if this is not yet achieving the desired effect.</strong></td>
</tr>
<tr>
<td><strong>Reviewing progress / behaviour goals.</strong></td>
<td><strong>Feedback processes (participant self-reflection and clinician support).</strong></td>
<td><strong>Renewed motivation / confidence in communication skills.</strong>&lt;br&gt;<strong>Problem solving of areas where new behaviours have been hard to implement.</strong></td>
</tr>
<tr>
<td><strong>Creation of individualised 'Top Tips for Talking with Child X' poster during final session, to be shared with school and wider family / friends.</strong></td>
<td><strong>Child's environmental context and resources.</strong>&lt;br&gt;<strong>Social influences.</strong></td>
<td>Child's wider communication environment is enhanced to enable them to have 'Better Conversations' with significant people, beyond the parent-child dyad.</td>
</tr>
<tr>
<td><strong>Dissemination of project findings to schools and SLTs serving this population.</strong></td>
<td><strong>Wider knowledge and understanding of conversation therapy for children with DLD.</strong>&lt;br&gt;<strong>Beliefs about the benefits of working on everyday conversation / understanding of likely outcomes.</strong></td>
<td>BCC to be implemented more widely, following further development of the intervention protocol and training of other SLTs.</td>
</tr>
</tbody>
</table>
Table 3.1: Components from PCIT and BCA which were adopted or adapted for BCC

<table>
<thead>
<tr>
<th>Therapy component</th>
<th>PCIT</th>
<th>BCA</th>
<th>BCC adoption / adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sessions</td>
<td>4</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Length of sessions</td>
<td>Approximately one hour.</td>
<td>1.5 hours.</td>
<td>45 minutes (equivalent to one school period).</td>
</tr>
<tr>
<td>Participants</td>
<td>Parents and pre-schoolers.</td>
<td>Adults with aphasia and CP.</td>
<td>School-aged children with DLD and their main carers.</td>
</tr>
<tr>
<td>Intervention delivered by</td>
<td>Qualified SLT, specialising in Early Years paediatrics.</td>
<td>Qualified SLT, specialising in acquired disorders.</td>
<td>Qualified SLT, specialising in paediatrics.</td>
</tr>
<tr>
<td>Use of video</td>
<td>One video recording made in clinic during first PCIT session, to support identification of target strategies. A second video is made in Week 10 (following therapy and consolidation period) to review progress and agree next steps. Further, 5-minute videos are made during therapy sessions to check on progress towards aims.</td>
<td>A total of 18 conversation samples recorded over the course of research therapy (eight pre-intervention, two during and eight post). All videos were made in participants' homes.</td>
<td>Three pre-therapy recordings made by participants at home, to support identification of targets. A further home video was made immediately after BCC and a final one was recorded at follow-up, 6 weeks later. Additionally, participants were encouraged to record further videos during therapy to reflect on progress towards aims. This sometimes included recordings made during therapy sessions.</td>
</tr>
<tr>
<td>Interaction context</td>
<td>Play-based.</td>
<td>Natural conversation.</td>
<td>Natural conversation (but may incorporate games or activities to 'get the conversation started').</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Therapy aims</td>
<td>To improve the interactions between children with delayed language development and their parents/carers in order to promote child language development.</td>
<td>To change the conversational behaviours of the speaker with aphasia as well as the conversation partner in order to maximise the PWA's turn construction abilities and increase mutual understanding between the dyad.</td>
<td>To adapt the conversation behaviours of both children with DLD and their main carers in order to enhance their everyday conversations and support the child's language development.</td>
</tr>
<tr>
<td>Strategies focused upon</td>
<td>Parents only</td>
<td>PWA and CP</td>
<td>Children and parents</td>
</tr>
<tr>
<td>Choice of strategies informed by</td>
<td>Child language acquisition evidence and theory.</td>
<td>Conversation Analytic studies and knowledge about aphasia and its consequences.</td>
<td>Child language acquisition evidence and theory and CA studies; knowledge about DLD and its consequences.</td>
</tr>
<tr>
<td>Selection of strategies</td>
<td>Facilitators only, chosen collaboratively by parent and SLT.</td>
<td>Barriers and facilitators, chosen collaboratively by CP, PWA and SLT.</td>
<td>Barriers and facilitators, chosen collaboratively by parent, child and SLT.</td>
</tr>
<tr>
<td>Methods to support strategy choice</td>
<td>Parent and therapist watch pre-therapy video together. SLT highlights positive strategies used by the parent and introduces a rating scale, highlighting benefits / rationale for each strategy.</td>
<td>SLT provides information on how conversation works and the impact of aphasia, supported by aphasia-friendly handouts. He/she then presents short video clips to illustrate</td>
<td>SLT provides information on how conversation works and the impact of DLD, supported by child-friendly handouts. Participants and SLT repeatedly view clips from pre-</td>
</tr>
</tbody>
</table>
This scale is used by parents to rate themselves and they are then encouraged to choose a strategy they rated as using 'never' or 'sometimes' to try using more of at home.

Patterns within the dyad's own talk. Participants are encouraged to reflect on their own communication and choose from a selection of strategies, suggested by the SLT.

Therapy videos and discuss patterns in their talk. Child and parent each select barriers and facilitators to work on, following choices / suggestions from SLT.

<p>| Methods used during therapy sessions to support strategy implementation | Regular recordings of parent playing with child during clinic sessions. Parent and therapist watch the video together to see if targets have been achieved / maintained. If so: - any changes in the child are highlighted - adaptations to the main aim are discussed. If the aim has proved hard to achieve, find out why and then address it together. Revisit why the aim was chosen in the first place. Useful phrases for guiding parent's self-reflection: - What would be the benefit of...? - What else could you do? - What effect does that have on the child? | Each session introduces a theme to develop participants' understanding of conversation, e.g., Session 2 focuses on the concept of repair, using aphasia-friendly handouts to support discussion of a) problems in conversation and b) what happens when things go wrong? c) three steps involved in repair. Ask dyad to pick things that happen to them. SLT supports this reflection by playing carefully-selected clips from the dyads' own conversations to illustrate points and reinforce their learning. Practice conversations / role plays during sessions and discussion of these. | Following BCA, each session introduces key information on conversation and language development, supported by child-friendly handouts or PowerPoint slides. Games and activities are incorporated to maximise children's engagement, e.g., playing the 'Microphone game' to practise turn-taking strategies. Video clips made before, or during, therapy are used to illustrate themes relating to the dyad's own communication. Practice conversations and role play are also included to support implementation of strategies, along with discussion / problem-solving. |</p>
<table>
<thead>
<tr>
<th>Home practice</th>
<th>Parents asked to practise chosen strategies 3-5 times a week during 'special time'.</th>
<th>Dyad asked to video 'practice conversations' at home between sessions.</th>
<th>Parents and children asked to practise strategies 3-5 times a week during 'Talk Time'.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflecting on home practice</td>
<td>Parents asked to comment on their use of 'special time' and any changes they have observed in child's communication during subsequent therapy sessions.</td>
<td>Dyad asked to reflect on home strategy use, either by filling in written handouts, or by recording their thoughts.</td>
<td>Dyads asked to complete 'Talk Time record sheet', detailing their target / activity and comments on how this went, to be discussed during therapy.</td>
</tr>
<tr>
<td>Outcome measurement</td>
<td>Parent rating scale, based on first and follow-up videos; child mean length of utterance; ratio of child-to-adult speech.</td>
<td>Pre- and post-therapy videos analysed to explore changes in: (i) conversation facilitators and (ii) conversation barriers.</td>
<td>Pre- and post-therapy videos analysed to explore changes in: (i) conversation facilitators (ii) conversation barriers (iii) child mean length of utterance and (iv) child:adult ratio of speech. In addition, standardised child language measures were administered before and after BCC.</td>
</tr>
<tr>
<td>Participant views</td>
<td>Published studies on parent and clinicians' views of PCIT, (e.g., Davies et al., 2017; Klatte et al., 2019).</td>
<td>Views of PWA and CPs on BCA intervention, outcome and perceived mechanisms of action (Johnson et al., 2017; 2021)</td>
<td>Views collected from children and parents pre- and post-therapy on children's language, conversation and related skills.</td>
</tr>
</tbody>
</table>
3.8 Guiding principles, people or factors that were prioritised when making decisions during the intervention development process.

The Royal College of Speech and Language Therapists' Clinical Guidance for therapists working with DLD (Taylor-Goh, 2017) states that SLT intervention aims to:

- Develop the language abilities of children with developmental language disorder to their maximum potential.
- Teach strategies to the child and those around the child to reduce the impact of their difficulties on communication and their access to education and social activities.

In addition, the guidance defines the role of SLTs as including:

- Supporting parents and
- Facilitating communication in functional settings.

Following these principles, we adapted components from existing interventions which involved both children and their parents or carers, focusing on developing child language by teaching supportive communication strategies, which could be used within their everyday conversations at home.

3.9 Stakeholder contributions to the intervention development process

Initial ideas for BCC took shape following conversations with participants from the WoRD Project. Comments from children in the study motivated the focus on everyday conversation (e.g., 'If we can't have conversation, then people won't be friends'). Separately, parents expressed a need for more advice and strategies to help them to support their children's communication at home.

Subsequently, the clinical advisory group was set up, comprising specialist clinicians and researchers, and contributed to decision-making around the design of the intervention and how to operationalise BCC. The PhD researcher produced a first draft of the intervention protocol, following a review of the literature and completion of the online BCA programme. The clinical advisory group then met to
review each aspect of the draft. The views of group members were recorded and, where feasible, amendments were made to reflect this feedback. Where change was not possible, this was fed back to the group, with an explanation of why these changes were not made. For example, it was suggested that the number of therapy sessions could be reduced from six to four in order to increase treatment efficiency. However, the project team felt this would not allow sufficient time to introduce key information about language and conversation, to identify individual child and parent strategies and allow space for both supported practice and self-reflection on the impact of changes to communication.

Within the current PhD study, stakeholder feedback was also sought as part of a case series and feasibility study (see Chapters 6 and 7). This included questionnaires to gain insight into children and parents' experience of participating in the research therapy. These data will be used to further refine the therapy protocol ahead of wider implementation of BCC.

### 3.10 Changes to the content and format of BCC from the start of the intervention development process

See Appendix 3.1 for details of session content and materials. After two parent-child dyads had completed the research intervention, the PhD researcher met with her clinical advisory group to reflect on barriers and facilitators to therapy delivery. Based on this discussion, together with feedback from the first participants, minor pragmatic changes were made to the therapy protocol. For example, Session 5 was modified to include more games and role play activities to help maximise children's engagement. A greater emphasis was placed on using verbal and non-verbal prompts to encourage the child to use their chosen strategies (e.g., a word or a picture, which was personally selected, to remind them of their target). Finally, the discussion of conversational topic in Session 4 was made more interactive by encouraging dyads to bring in family photographs or favourite magazines as topic starters for practice conversations.
These changes were minor and did not affect the underlying theory, structure or focus of the intervention. There was no further change to the content of session plans, therapy materials or delivery context.

### 3.11 Changes to BCC required or likely to be required for subgroups

BCC is designed to be flexible in that it focuses on bespoke therapy targets, which are selected by participants from a choice offered by the clinician, depending on their own communication strengths and needs. Individual adaptations can be made to the delivery of aspects of the intervention, e.g., including images and characters that align with the child's personal interests when preparing therapy materials.

Many children with DLD have co-occurring difficulties with auditory memory and/or attention. Additional visual support can be used to help reinforce key concepts and remind children to use their chosen strategies. It may also be appropriate to incorporate movement breaks / more games and activities in order to promote more active participation for children whose difficulties include attention control. For parents / carers with literacy difficulties, written handouts can be replaced with verbal information and/or plain English materials. Tailoring to the individual dyad was an inherent part of the intervention (see Figure 3.1 and Appendix 3.1). It is likely that the principles and methods of BCC could be adapted for use with children of different ages and with a wider range of developmental disorders, however this has not yet been investigated.

### 3.12 Uncertainties remaining at the end of the intervention development process

After concluding the initial phase of BCC development, we were able to describe the rationale and theoretical basis for the intervention in detail and to list the materials and tasks required to deliver the intervention. The next stage of development - the case series and feasibility study - will provide further information about the response of individual dyads, as well as aspects such as the acceptability of the intervention.
3.13 Template for Intervention Description and Replication (TiDier) description of the intervention

A detailed description of the intervention, presented according to the TiDier checklist, is provided in Appendix 3.1. This framework is designed to support transparent reporting of intervention components and replicability (Hoffmann et al., 2014).

3.14 Reporting of the intervention in an Open Access format

Work is currently underway to write up details of the intervention development for publication in an open access journal. On completion of the PhD, details of BCC will be made freely accessible within the researcher's final funder report. In addition, details of the study will be added to the already established 'Better Conversations Lab' website, which can be found at:
https://www.ucl.ac.uk/pals/research/language-and-cognition/language-and-cognition-research/better-conversations-lab
Chapter 4: Measuring conversation

Assessing the impact and effectiveness of an intervention is a core requisite of clinical research and practice (RCSLT, 2017). However, there is currently no consensus regarding which outcome measures are most appropriate for evaluating conversation-based therapy or discourse (Croteau et al., 2018; Pritchard et al., 2018). This is partly due to the complex nature of conversation itself. As Croteau et al. (2018) state:

‘Conversation is a complex research object, multidimensional and sequential’

(p. 248).

Previous research has employed a range of techniques and measures to capture different aspects of conversation and narrative samples, from linguistic characteristics, such as mean length of utterance, clausal density and lexical diversity (Potratz et al., 2022), to non-verbal attributes (e.g., gesture, body motion, facial expression and eye gaze; Hadley et al., 2022), as well as interactive and pragmatic features (e.g., Beeke, 2012). While clinical trialists typically recommend identifying one primary outcome measure prior to a study (Andrade, 2015), Saldert et al. (2018) argue that for a complex intervention, such as BCC, it is more appropriate to use multiple measures in order to highlight different levels and perspectives, which may be influenced by therapy.

4.1 Selection of outcome measures

When selecting assessment tools, it is important to ensure that measures are valid, reliable and sensitive enough to capture change within the target population. Validity refers to the accuracy of a measure (whether the results truly represent what they are purported to assess) and is closely related to sensitivity, or responsiveness, since it depends on there being a clear relationship between the intervention and the instrument that is designed to evaluate its effects. Reliability refers to the consistency of a measure and whether the results can be reproduced under the same experimental conditions across different occasions and/or with different experimenters or raters. Assessment methods which use natural conversation as a
source for analysis are widely seen as having high ecological validity, given their focus on the interaction of individuals in their everyday contexts. They have, however, been criticised for their lack of reliability, due to the variability inherent in unconstrained conversation, compared to formal assessments, which can be administered in a standardised way across multiple participants and time points (Perkins et al., 1999).

One key consideration when measuring therapy outcomes is whether to include proximal or distal tasks to capture the key targets of intervention. As Saldert et al. (2018) suggest, change is typically easier to demonstrate if the chosen assessments measure outcomes that are more closely aligned to the specific goals and activities which are focused on in therapy. However, the ultimate aim of an intervention may be more distal (e.g., relating to quality of life or social participation), therefore it can be important to include measures which can capture the wider impact of an intervention beyond the immediate therapy goals. The following measures were chosen to evaluate BCC, with justification for each assessment and methodological details summarised, below.

4.1.1 Conversation behaviour counts

For the BCC intervention, the main targets for change were individual conversation behaviours, which were identified by participants as either facilitators or barriers to their own communication. Following Best et al. (2016) and Croteau et al. (2018), frequency counts of targeted behaviours before and after therapy were selected as a primary and proximal outcome measure to evaluate progress towards therapy goals. According to Saldert et al. (2018), the validity of behaviour counts is dependent on the reliability of the chosen measure, which in turn depends on how well each specific behaviour is defined. Therefore, clear operational definitions, along with examples, were provided to pre-registration Speech and Language Therapy students, who acted as independent coders for both typically-developing and DLD group conversations, collected during the PhD project (see Table 4.1, below). The training and familiarisation process for student raters is described in Section 4.1.1.1.
### Table 4.1: 'Better Conversations with Children' coding system for counting conversation behaviours in context

<table>
<thead>
<tr>
<th>Code</th>
<th>Conversation Behaviour</th>
<th>Example</th>
<th>Notes</th>
</tr>
</thead>
</table>
| A1   | Recasting / repeating back | Child: Make my skin a lot more pinker.  
Parent: A lot more pink.  
Child: Also, we needed a few ‘-ing’ words  
Parent: So, words that end in ‘-ing’. | Defined as parents expanding/deleting/modifying/repeating child’s utterance but maintaining its meaning. Utterances must contain at least one content word from the child’s prior turn. |
| A2   | Contingent commenting | Child: I have Summer in my class.  
Parent: Yeah, and Summer is Tess and Max's daughter.  
And they've had a new baby called Arthur.  
Child: And I was like... freezing.  
Parent: Yeah, so we had to go back inside. | Coded when parents talked about the object or action of the child’s attentional focus (Landry et al., 2006). Utterances followed the child’s lead and provided nutritive input as a step up to child’s previous utterances. |
| A3   | Giving clear explanations of words or concepts | 'It's a cube you're meant to turn. And get all the colours on the same side.' [Rubik's cube]. | |
| A4   | Test questions | 'Where does Granny live?'  
'What's your baby sister called?' | Coded when parents asked a question that they already knew the answer to, in order to 'test' the child's knowledge. |
| A5   | Forced choice questions | 'Do you want the cookies or the milk?'  
'Did you do your tests in little groups, or did you do them in the big... your normal classroom?' | Questions that limited child’s responses to two definitive options. |
| A6   | Adult minimal turns | 'Mmn', 'Right', 'OK' | Coded when turns were passed back to the conversation partner without contributing meaningfully to the conversation (Herbert et al., 2013). |
| A7   | Extended pauses | Pauses of 2 seconds or longer within or between speaker turns (based on Fox Tree, 2002, and our own observations of BCC data. |

1 Commands or evaluations on the child’s previous utterance such as ‘very good’, and comments eliciting yes/no responses from the child were excluded from this category.  
2 Test questions are distinguished from yes/no questions as the child had to produce at least one content word in the next turn. Where the status of a maternal turn as a test question is not immediately obvious from the content, subsequent turns are considered to inform coding in context, e.g., an evaluative receipt, such as 'That's right', or prompting to produce a specific target are both indicative of TQs.
<table>
<thead>
<tr>
<th>Code</th>
<th>Conversation Behaviour</th>
<th>Example</th>
<th>Notes</th>
</tr>
</thead>
</table>
| C1   | Asking for clarification or repetition | 'Huh?'  
     |                        | 'Yeah, but what's that?' | |
| C2   | Saying things another way when stuck | 'A game where you take some bones ((gesturing pinching something and picking it up)) out a man ((gesturing shape of man)), a toy man.' [Operation] | This refers to circumlocution, as opposed to using non-verbal ways to communicate meaning (see C3, below). |
| C3   | Using gestures or acting out to help communicate | See example above. Also: 'And I want some presents ((gestures shape)) what how big the door is ((points to door))'. | |
| C4   | Non-verbal emblems | Nodding, head shake or shrugging to replace a word in response to a parental turn. | |
| C5   | Giving up when stuck on a word | 'It doesn't matter'.  
     |                        | 'I forgot'. | |
| C6   | Child minimal turns | 'Mmn', 'Oh', 'Er'. | Coded when turns were passed back to the conversation partner without contributing meaningfully to the conversation (Herbert et al., 2013). |
| C7   | Child single word turns | Can include 'yes' or 'no' if in answer to a question. | Differs from minimal turns, as must include a content word. |
4.1.1.1 **Training of student raters.** The student raters completed a training period on coding and scoring transcripts, directed by the PhD researcher. This consisted of fifteen 90-minute sessions, which included instruction on each behaviour code (as well as conversation measures, e.g., MLUw and ratio of child-to-adult speech; see sections 4.1.2 and 4.1.3, below). The sessions included group and individual practice coding five video-recorded conversations (a total of 25 minutes of data) and further home practice with three additional conversation samples (totalling 15 minutes duration). Codes were compared with those assigned separately by the PhD researcher. Where disagreements occurred, these were discussed with students, referring back to the literature and guidance notes to help resolve conflicts and arrive at a consensus. Amendments were made based on these discussions.

Any outstanding issues were considered in detail by the PhD researcher and her supervisory team, who reviewed raw data and transcripts to examine utterances within their wider conversational context, cross-referencing with examples from other dyads and conversation samples. Once final agreement was reached, this was fed back to students and reflected in updated project guidance notes. When inter-rater agreement of >75% was achieved, which was deemed as a ‘satisfactory’ level of agreement for naturally occurring language interactions (Rubie-Davies et al., 2010), the student researchers independently scored remaining samples using the agreed coding system and additional guidance notes developed over the course of the BCC project (See Appendix 4.1).

One criticism of using frequency counts as an outcome measure for conversation-based intervention is the ‘wariness of quantification’ that underlies interaction-based research approaches, such as Conversation Analysis (Hutchby, 2008; Saldert et al., 2018; Schegloff, 1993). The concern arises from the view that conversational turns are built for and from preceding sequential context whilst also feeding into subsequent talk. To address this, turns within BCC were always considered in the context of prior and succeeding utterances in order to increase validity of conversational behaviour counts. For example, the classification of a parental recast was determined by the adult using at least one content word (or meaningful gesture) from the child's previous turn. Similarly, where test questions were not immediately distinguishable from 'genuine questions' by their content (e.g., it was unclear whether
'What did you have for breakfast?' was a known-answer query for the adult), they were identified by considering the Mother's follow-up turn(s). Hence, turns coded as test questions were often followed by an evaluative receipt, e.g., 'that's right', or by cueing the production of a specific name or content word, e.g., 'It starts with a b-'. Further details on individual codes and definitions are included in the methods sections of Chapters 5 and 6, respectively.

4.1.2 Ratio of child-to-adult speech

Since a core aim of BCC was to modify adult-child interaction, it was necessary to identify an additional proximal measure, which would reflect change in interactional patterns between the dyad. One such tool, which has been used previously in the PCIT literature, is the ratio of child-to-adult speech (Falkus et al., 2018). This is calculated by timing the total length of child, then adult utterances, separately whilst excluding non-verbal turns, such as nodding, and vocalizations, e.g., ‘mm’. The total time that a child spoke in seconds is then divided by the time the parent spoke. A score close to 1 indicates that the conversation was evenly balanced. A low ratio indicates a less talkative child, or a parent dominating the conversation, while a higher score signifies that the child is leading the talk, with longer or more frequent utterances. See Table 4.2, below, for an example ratio calculation.

Table 4.2: Calculation of ratio of child-to-adult speech for TD Dyad 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Time child spoke (in seconds)</th>
<th>Time adult spoke (in seconds)</th>
<th>Ratio of child:adult speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td>109.5</td>
<td>76.5</td>
<td>1.44</td>
</tr>
<tr>
<td>Time 2</td>
<td>98.5</td>
<td>94</td>
<td>1.05</td>
</tr>
</tbody>
</table>

4.1.3 Linguistic characteristics: mean length of utterance in words

BCC aimed to produce change in children's structural language skills, as a secondary effect of their enhanced everyday conversations. Therefore, mean length of utterance was included as an additional outcome measure to determine whether
children's linguistic productivity increased following the intervention. Most studies of younger children calculate MLU in morphemes (e.g., Baxendale & Hesketh, 2003; Falkus et al., 2016). However, for children over 4 years, MLU in words (MLUw) is more commonly used (Potratz et al., 2022). A pattern of gradual increase with age has been reported by Rice et al. (2010) and Potratz et al. (2022), as well as in normative data from the Expression, Reception, and Recall of Narrative Instrument (ERRNI; Bishop, 2004). While MLUw is seen by clinicians as a robust measure of children's language development, some authors have questioned its ability to capture syntactic complexity in school-aged children. Frizelle et al. (2018) argue that utterance length can be reduced when children increase their use of complex constructions, e.g., subordinate clauses. Nevertheless, these same authors report a strong positive correlation between MLUw and clausal density, a widely-employed measure of syntactic complexity (Frizelle et al., 2018; Nippold et al., 2005).

Children's MLUw were calculated following guidelines from the Expression, Reception and Recall of Narrative Instrument (ERRNI; Bishop 2004), in combination with agreed conventions adapted to conversation data (see Appendix 4.2). Child utterances were segmented from each conversation. An utterance was classified as a main clause with a principal verb and any dependent clauses. Co-ordinated clauses (joined by conjunctions, such as 'and' or 'but) were divided into separate utterances, unless the pronoun was omitted in the second part, such that the utterance could not form a complete sentence on its own. For example: 'She grabbed her towel, packed her bag and went to the beach' would be kept together as a single utterance. Contractions, such as 'isn't' were separated into two words by inserting a space. False starts, self-corrections or immediate repetitions were excluded. Total number of words per utterance was calculated using Microsoft Word count, then divided by the total number of utterances to generate the average number of words per utterance (see Table 4.3, below, for example calculation).
Table 4.3: Calculation of Child MLUw for TD Dyad 2, Video 1

<table>
<thead>
<tr>
<th>No.</th>
<th>Utterance</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Eat a couple of her meat.</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>And look!</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Should I show you him?</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>Yeah.</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>A cat.</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>And fish.</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>Tropical one.</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>And also a cat and the chicks.</td>
<td>7</td>
</tr>
<tr>
<td>9.</td>
<td>The chicks have to stay in their house because there 's a bird flu going on.</td>
<td>16</td>
</tr>
<tr>
<td>10.</td>
<td>And we do n't wanna catch it.</td>
<td>7</td>
</tr>
<tr>
<td>11.</td>
<td>No.</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>'Cause they ’re always in their house and ca n’t run around looking for stuff.</td>
<td>15</td>
</tr>
<tr>
<td>13.</td>
<td>Yeah.</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>No.</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>So today for school dinners it was Christmas dinner day</td>
<td>10</td>
</tr>
<tr>
<td>16.</td>
<td>And we got crackers</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>If you ’re sitting next to a friend you can crack it next to them.</td>
<td>15</td>
</tr>
<tr>
<td>18.</td>
<td>And also Miss Ray was sitting on our table.</td>
<td>9</td>
</tr>
<tr>
<td>19.</td>
<td>And Mr Miller is sitting on our table.</td>
<td>8</td>
</tr>
<tr>
<td>20.</td>
<td>And that ’s our two teachers in our class.</td>
<td>9</td>
</tr>
<tr>
<td>21.</td>
<td>'Cause they wanted school dinners</td>
<td>5</td>
</tr>
<tr>
<td>22.</td>
<td>Yeah but the thing is they did n’t have a white plate like we do.</td>
<td>15</td>
</tr>
<tr>
<td>23.</td>
<td>We do n’t usually have a white plate.</td>
<td>8</td>
</tr>
<tr>
<td>24.</td>
<td>They had the usual plastic plates .</td>
<td>6</td>
</tr>
<tr>
<td>25.</td>
<td>But Mr Miller had a baby fork.</td>
<td>7</td>
</tr>
<tr>
<td>26.</td>
<td>No but when Maddie was having her pudding there was also another big baby fork.</td>
<td>15</td>
</tr>
<tr>
<td>27.</td>
<td>And Maddie took it so she could have it also for her pudding.</td>
<td>13</td>
</tr>
<tr>
<td>28.</td>
<td>So that means Mr Miller had blue baby fork.</td>
<td>9</td>
</tr>
<tr>
<td>29.</td>
<td>And Maddie had an orange fork.</td>
<td>6</td>
</tr>
<tr>
<td>30.</td>
<td>Yeah well I did n’t really see Miss Ray because I only saw Mr Miller.</td>
<td>15</td>
</tr>
<tr>
<td>31.</td>
<td>Aggie.</td>
<td>1</td>
</tr>
<tr>
<td>32.</td>
<td>Yeah but I lost my cracker.</td>
<td>6</td>
</tr>
<tr>
<td>33.</td>
<td>But Miss Taylor gave me another one.</td>
<td>7</td>
</tr>
</tbody>
</table>
34. It was supposed to be green but Miss Taylor got me a red one. 14
35. And inside of the cracker I got a car and a green hat. 13
36. And here it is. 4
37. It’s quite scrunched up. 5
38. ‘Cause it was in my pocket all the time 9
39. Yes 1
40. I do n’t know 4
41. I ’m gonna save it for another Christmas dinner. 9
42. Yeah. 1
43. Yeah. 1
44. Well I ’m gonna get Mummy something Christmassy. 8
45. But Mummy ’s over here so I ca n’t tell her it right now. 14
46. Lenny does n’t know what I ’m saying. 8
47. So I ’m gonna get Lenny some special treats 9
48. Tabby ’s getting Lenny, which is my sister. 8
49. And also I ’m gonna give Monty some more Dreamies. 10
50. ‘Cause Monty loves Dreamies 4
51. And I do n’t know where the Dreamies have gone 10
52. Daddy and Tabby 3

**Total: 52**

| Total: 372 |
| MLUw: 7.15 |

Whilst MLUw can be seen as a proximal measure, since it is calculated from natural conversations recorded prior to and following therapy, more distal language measures were also employed for children in the intervention study to determine whether change was achieved more widely on children's receptive and expressive language. A full list of standardised measures, which were administered pre- and post-therapy, is included in Chapter 6, Figure 6.1.
4.2 Feasibility and inter-rater reliability of conversation outcome measures

Since the use of the above conversation-based outcome measures was novel for this research context and population, an investigation of both feasibility and inter-rater reliability was carried out within this PhD study to determine whether behaviour counts, MLUw and ratio of child-to-adult speech are appropriate instruments for evaluating the effectiveness of BCC intervention. Feasibility includes aspects such as time taken to collect and analyse conversation data, while inter-rater reliability (IRR) reflects whether independent raters are able to employ these measures in the same way, and achieve similar results, indexing the objectivity of research findings (Hallgren, 2012). Full methodological details and results of this investigation can be found in Chapter 7, section 7.3.1.

4.3 Conversation analysis

In order to provide a richer understanding of aspects of conversation not captured by behaviour counts or traditional linguistic and functional measures, qualitative methods, such as conversation analysis, have been applied to the study of outcomes from CPT programmes, such as 'Better Conversations with Aphasia' (Beckley et al., 2013; Beeke et al., 2014, 2015). CA can examine a collection of instances of a conversational behaviour to identify underlying details of design and organisation; in this sense, it back tests validity by asking whether a set of data forms an aggregate of the same type of instance. In the same way, CA can evaluate how the participants themselves orient to such instances. Whereas frequency counts act as an outcome measure for conversational behaviour change over time, CA captures change in immediately following turns, evidencing how opportunity arises for the child’s language to advance.

Although the insights offered by CA are potentially informative and ecologically valid, the technique is time-consuming, which limits the number of conversation samples that can be transcribed and analysed within or across studies. Researchers have questioned the feasibility of its use in clinical research (e.g., Croteau et al., 2018). However, Barnes and Bloch (2019) argue that empirical data on the fine details of communication behaviour is crucial for developing novel speech and language
therapy interventions, as well as diagnostic resources. Since BCC is in the early stages of the design and implementation, a small-scale CA study will be carried out within this PhD to investigate the practicality and usefulness of applying CA to a selected theme, or pattern, from our intervention data. Findings from this analysis will be combined with assessment results in order to deepen our understanding of interactions between parents and their children with DLD, as well as to inform the future development of the BCC programme.

The next chapter will provide context for the main intervention study by presenting the method and results from a preliminary investigation, characterising the conversations of typically-developing children with their parents.
Chapter 5: Characterising the conversations of typically developing children and their parents

There is limited research investigating variables arising in everyday conversations involving young school-age children with and without language disorder. This study aimed to explore key conversational features between typically-developing (TD) children and their parents to investigate variability, or stability, across two occasions six weeks apart and to provide a benchmark against which to compare the children with DLD (see Chapter 6). In addition, the TD data were analysed to explore developmental trajectories and to establish whether children's age is significantly associated with performance on core conversation measures.

The central research questions (RQs), which guided this analysis were:

*RQ1: Do key child and adult conversational behaviours and measures remain stable across a 6-week time period?*

Based on evidence from child and adult studies of natural conversation (e.g., Best et al., 2016; Brinton et al., 1988; Dorval et al., 1984; Fujiki et al., 1990; Perkins et al., 2010), it is expected that there will be significant within-participant variation across Time 1 and Time 2 samples for child and adult conversation counts, child MLUw and ratio of child-to-adult speech.

*RQ2: Is there a statistically significant correlation between children's age and the aforementioned conversation behaviours and measures?*

Most of the variables included in this study are novel for this participant group and it is expected that there will be considerable variability across each child age band. However, a pattern of gradual increase with age has been reported for children's MLUw in conversation by Rice et al. (2010), Potratz et al. (2022) and Bishop (2004), as well as for related connected speech measures, such as clausal density (Frizelle et al., 2018; Nippold et al., 2005). Therefore, it is expected that there will be a significant correlation between children's age and the key conversation behaviours and measures under investigation in this chapter.
5.1 Methods

5.1.1 Ethics

This study was granted ethical approval by the University College London Research Ethics Committee (approval number 2981/003). Parents and children were provided with an information sheet, adapted to their language level, detailing the purpose and structure of the study (see Appendices 5.1 and 5.2). It was explained that participation was voluntary, and that they had the right to withdraw at any time. Parents and children signed individual consent forms (see Appendices 5.3 and 5.4) and parents completed a child and family history form (see Appendix 5.5).

Conversations were video-recorded at home by parents on their own phone or tablet devices, so that they could decide when it was appropriate for the child to take part. The parents were given options for how they would prefer the video recordings to be used. Where they consented only to research participation in the current study, these videos will be permanently deleted no later than September 2023. Videos where additional consent has been granted for use in teaching and/or presentations are being stored securely on an encrypted hard drive and will only be used for the agreed purposes. Participants were offered a certificate and a £10 Amazon voucher as an incentive for participation.

5.1.2 Design

The study employed a within-subjects design. Data were collected at two time points six weeks apart, to replicate the time-period between pre- and post-therapy measures used for children accessing the BCC intervention (see Chapter 6). Wilcoxon signed rank tests were used to compare the first and second time point for the typically developing group, to determine whether key variables were stable across time. This information will be considered when analysing baseline and outcome measures for children with DLD taking part in the research intervention.

The dependent variables were: frequency of parental and child conversation behaviours counted in context (See Table 4.1, p. 78), child mean length of utterance
in words (MLUw) and ratio of child-to-adult speech. The independent variable was the time when conversations were recorded (before and after an interval of six weeks).

5.1.3 Participants

Forty-three parent-child dyads provided their informed consent to participate in the project. All participants were recruited using convenience sampling, through direct contact or advertisement via closed groups on social media (Facebook, WhatsApp). To be eligible for inclusion, children were aged between 4;00 and 8;11 years, had no identified difficulties with language or social skills, or other significant difficulties that may affect their language or learning, such as ASD or Attention Deficit Hyperactivity Disorder (ADHD), as reported by their parents. They also needed a General Communication Composite (GCC) score above 55 and a Social Interaction Deviance Composite (SIDC) score above -15 on the Children’s Communication Checklist (CCC-2; Bishop, 2003), completed by the primary caregiver.

Following administration of the CCC-2, one child was excluded from the project due to him scoring below 55 on the GCC. Another was withdrawn due to his mother’s significant concerns about his communication and peer interaction, despite him scoring within normal limits on this standardised assessment. Five of the remaining dyads dropped out after filming the first recording, with two stating that the child did not wish to be seen on video. For the analysis, the TD age range was narrowed to age 5-8 years, excluding two dyads with children under the age of five. This was to reflect the average chronological age of 7;02 for the DLD group (range: 6;06 - 8;02 years), together with their mean age equivalent language scores of 5;05 years on the Clinical Evaluation of Language Fundamentals Fifth Edition (CELF-5; Wiig et al., 2017). Seven additional TD dyads were excluded as the child was part of a sibling group, to ensure that the same parent was not analysed in duplicate. A further five dyads were excluded as the adult was a father or a grandmother. All of the DLD dyads were made up of mothers and their children, while fathers have been evidenced to show different patterns of conversation behaviours in parent-child interaction (Conti-Ramsden et al., 1995; John et al., 2013; Tomasello et al., 1990).
Twenty-two mother-child dyads remained in the study. Figure 5.1, below, illustrates the numbers of participants who were approached and/or assessed for eligibility, those who completed one or more video recordings and those whose results were analysed in the study.

Table 5.1, below, shows demographic characteristics for each pair. Children's ages ranged from 5;02 - 8;10 years ($M = 6;09$ years; $SD = 11.93$ months). The group consisted of 11 boys and 11 girls. Twenty dyads were monolingual English-speaking, while one family was bilingual in French and English but their recorded conversations took place entirely in English. The remaining mother spoke Bulgarian, as well as English, but used only English when speaking with her child. Participants were recruited from a range of geographical areas across southern England, with all children attending mainstream primary schools.

5.1.3.1 Child language levels. All children had typically developing language. The CCC-2 (Bishop, 2003), was completed by parents either orally with the student researcher via phone or independently in writing and returned to the student researchers, who collected the data, via email. Parents rated the frequency of communicative behaviours to generate composite scores. Table 5.1 shows the results for each child. All children scored above 55 on the General Communication Composite (GCC) and above -15 on the Social Interaction Deviance Composite (SIDC), which indicated no ASD or known language disorders in the sample.
Figure 5.1: Recruitment flow diagram for TD participants (adapted from Eldridge et al., 2016).

Invited
Dyads who responded to initial invitation to participate through closed social media groups (n=43)

Screened
Parents who completed the CCC-2 on behalf of their children (n=43)

Completed Video 1
Parents and children who filmed and sent their first video recording (n=41)

Completed Video 2
Parents and children who filmed and sent their second video recording (n=36)

Age range narrowed for analysis
Number of children aged 5 years and over (n=34)

Sibling groups excluded
Number of children unique parent-child dyads (n=27)

Excluded (n=2)
- Children aged < 5 years

Excluded (n=7)
- One of each sibling pair excluded to avoid duplicate analysis of the same parent

Carer groups narrowed
Number of mother-child dyads (n=22)

Excluded (n=5)
- Dyad included a grandmother (n=1)
- Dyad included a father (n=4)

Final analysis
Dyads whose data was included in the final analysis (n=22)
Table 5.1: Demographic and Language Characteristics of TD Parent-Child Dyads, ordered by recruitment to the study.

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Child gender</th>
<th>Child age</th>
<th>Age in months</th>
<th>Location</th>
<th>Language background</th>
<th>Child GCC</th>
<th>Percentile</th>
<th>SIDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>5;07</td>
<td>67</td>
<td>Kent</td>
<td>Monolingual English</td>
<td>80</td>
<td>47</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>6;05</td>
<td>77</td>
<td>Kent</td>
<td>Monolingual English</td>
<td>58</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>5;09</td>
<td>69</td>
<td>North London</td>
<td>Monolingual English</td>
<td>78</td>
<td>45</td>
<td>-4</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>6;11</td>
<td>83</td>
<td>Kent</td>
<td>Monolingual English</td>
<td>66</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>7;0</td>
<td>84</td>
<td>Kent</td>
<td>Bilingual (English and French)</td>
<td>67</td>
<td>25</td>
<td>-2</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>5;01</td>
<td>61</td>
<td>North London</td>
<td>American family. Child speaks British English. Learning Hebrew.</td>
<td>115</td>
<td>&gt;95</td>
<td>-4</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>6;03</td>
<td>75</td>
<td>Kent</td>
<td>Monolingual English</td>
<td>93</td>
<td>72</td>
<td>-1</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>5;06</td>
<td>66</td>
<td>Kent</td>
<td>Monolingual English - parent speaks Bulgarian, but not spoken with child</td>
<td>66</td>
<td>24</td>
<td>13</td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>6;10</td>
<td>82</td>
<td>Gloucestershire</td>
<td>Monolingual English</td>
<td>95</td>
<td>77</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>6;0</td>
<td>72</td>
<td>Gloucestershire</td>
<td>Monolingual English</td>
<td>66</td>
<td>24</td>
<td>-3</td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>5;02</td>
<td>62</td>
<td>Hertfordshire</td>
<td>Monolingual English</td>
<td>72</td>
<td>33</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>M</td>
<td>5;03</td>
<td>63</td>
<td>Hertfordshire</td>
<td>Monolingual English</td>
<td>69</td>
<td>28</td>
<td>-1</td>
</tr>
<tr>
<td>13</td>
<td>F</td>
<td>7;04</td>
<td>88</td>
<td>Middlesex</td>
<td>Monolingual English</td>
<td>58</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>M</td>
<td>6;07</td>
<td>79</td>
<td>Hertfordshire</td>
<td>Monolingual English</td>
<td>73</td>
<td>36</td>
<td>-14</td>
</tr>
<tr>
<td>15</td>
<td>F</td>
<td>7;05</td>
<td>89</td>
<td>South London</td>
<td>Monolingual English</td>
<td>87</td>
<td>60</td>
<td>-6</td>
</tr>
<tr>
<td>16</td>
<td>F</td>
<td>6;09</td>
<td>81</td>
<td>Hertfordshire</td>
<td>Monolingual English</td>
<td>82</td>
<td>50</td>
<td>7</td>
</tr>
<tr>
<td>17</td>
<td>M</td>
<td>7;0</td>
<td>84</td>
<td>Gloucestershire</td>
<td>Monolingual English</td>
<td>80</td>
<td>47</td>
<td>-6</td>
</tr>
<tr>
<td>18</td>
<td>M</td>
<td>6;01</td>
<td>73</td>
<td>Hertfordshire</td>
<td>Monolingual English</td>
<td>65</td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>19</td>
<td>M</td>
<td>7;10</td>
<td>94</td>
<td>Surrey</td>
<td>Monolingual English</td>
<td>102</td>
<td>89</td>
<td>7</td>
</tr>
<tr>
<td>20</td>
<td>M</td>
<td>8;02</td>
<td>98</td>
<td>Surrey</td>
<td>Monolingual English</td>
<td>81</td>
<td>49</td>
<td>-11</td>
</tr>
<tr>
<td>21</td>
<td>M</td>
<td>7;0</td>
<td>84</td>
<td>Surrey</td>
<td>Monolingual English</td>
<td>71</td>
<td>32</td>
<td>-1</td>
</tr>
<tr>
<td>22</td>
<td>F</td>
<td>8;10</td>
<td>106</td>
<td>Surrey</td>
<td>Monolingual English</td>
<td>95</td>
<td>77</td>
<td>2</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>6;07</td>
<td>78.95</td>
<td></td>
<td></td>
<td>78.14</td>
<td>42.29</td>
<td>0.45</td>
</tr>
<tr>
<td>S.D.</td>
<td></td>
<td>11.92</td>
<td></td>
<td></td>
<td></td>
<td>14.76</td>
<td>22.06</td>
<td>7.03</td>
</tr>
</tbody>
</table>

Mean: 6;07 ± 11.92

S.D.: 14.76 ± 22.06 ± 7.03
5.1.4 Procedure

Once initial screening was completed, dyads were asked to record an initial 5-10-minute conversation in their own time, discussing an everyday topic, such as weekend plans. Parents were sent instructions on how to produce a recording, including advice on minimising background noise and how to ensure both participants were visible on camera (See Appendix 5.6). The videos were transferred through encrypted messaging services (Whatsapp or Signal) and stored on an encrypted hard drive. A second conversation was recorded and sent six weeks after the first recording, in line with the six-week BCC therapy period for DLD children and their carers.

The central five minutes of all TD conversations were transcribed (to control for length of recording) by pre-registration Speech and Language Therapy students, who were completing projects relating to this PhD. Children and adults’ speech was transcribed verbatim, while also recording aspects of non-verbal behaviour and vocalisations using conventions agreed by the researchers within the BCC project. The student researchers then completed a training period on coding and scoring transcripts, directed by the PhD researcher. Details of this and the coding system for counting conversation behaviours in context are provided in Chapter 4, Table 4.1, p. 73. Behaviour codes were selected based on common facilitators and barriers for conversation, identified in the literature and from DLD dyads participating in BCC intervention (See Chapters 2 and 6). Videos were analysed through repeated observation of the recordings with the accompanying transcript. The agreed set of conversation behaviours were coded and counted in context. After the conversational behaviours were coded, the frequencies of each behaviour were calculated for each dyad. Then, the videos were replayed and the utterances were segmented and timed to calculate child MLUw and ratio of child-to-adult speech.

5.1.5 Data analysis

After the conversational behaviours and measures were coded and analysed, data were subsequently inputted into SPSS Statistics Software Version 27 for analysis. Wilcoxon signed-rank tests were first carried out to investigate the stability of
conversational features within dyads across six weeks. Effect sizes for differences in T1 and T2 medians were calculated according to Pallant (2007, p. 225), by dividing the z value (standardised test statistic) by the square root of the number of observations (22). Subsequently, Spearman's rank-order correlation coefficients were computed to establish whether there was a significant relationship between children's age in months and each of the conversation variables. In order to reduce the effects of multiple comparisons, a Benjamini and Hochberg (1995) correction was used at a false discovery rate (FDR) of 15%.
5.2 Results

Three main conversational features were investigated across the 22 TD dyads: the frequencies of 14 conversation behaviours (seven adult-led and seven child-led); children’s mean length of utterance in words (MLUw) and ratio of child-to-adult speech. Raw data for all of these counts is provided in Appendices 5.7 - 5.9.

Descriptive statistics were first explored to summarise the characteristics of the data set, including measures of central tendency and variability. All data points were included for analysis, due to the small number of children in each chronological age band and the expected natural variation in conversation behaviours and measures. Qualitative examples are provided from conversation samples to illustrate patterns that emerge from the quantitative findings.

5.2.1 Conversation behaviours

5.2.1.1 Descriptive statistics. Figure 5.2, below, shows the frequency of all conversational behaviours at Time 1 and Time 2 (recorded six weeks apart) across the TD group. The central box plots indicate wide inter-quartile ranges (IQRs) across the dataset, while the whiskers underline this variability, representing one standard deviation above or below the median for each behaviour. Data points which are marked outside the main box and whisker plots represent outliers for each variable; circles indicate cases which lie above the third quartile, plus 1.5 times the IQR, or which fall below the first quartile, minus 1.5 times the IQR. Asterisks connote 'extreme outliers', which lie above the third quartile plus three times the IQR, or below the first quartile, minus three times the IQR. Outliers were found at one or more timepoint for all behaviours, except for C7. All data were included in our study since it was an exploratory analysis with a relatively low number of participants.
Figure 5.2: Frequencies of conversational behaviours at Time 1 and Time 2 across TD dyads

<table>
<thead>
<tr>
<th>Conversation behaviours</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recasting / repeating back</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contingent commenting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giving clear explanations of words or concepts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forced choice questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult minimal turns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pauses of 2 seconds or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asking for clarification or repetition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saying things another way when stuck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using gestures or acting out to help communicate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-verbal emblems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giving up when stuck on a word</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child minimal turns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child single word turns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.2, below, shows means, standard deviations and medians for each conversation behaviour at T1 and T2:

**Table 5.2:** Group means, standard deviations and medians for each feature at each timepoint. Time 1 = T1; Time 2 = T2 (six weeks apart)

<table>
<thead>
<tr>
<th>Conversation behaviour</th>
<th>M</th>
<th>S.D.</th>
<th>Mdn</th>
<th>T1</th>
<th>T2</th>
<th>T1</th>
<th>T2</th>
<th>T1</th>
<th>T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Recasting / repeating back</td>
<td>6.32</td>
<td>5.59</td>
<td>5.89</td>
<td>4.15</td>
<td>4.5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2: Contingent commenting</td>
<td>9.41</td>
<td>10.5</td>
<td>8.08</td>
<td>6.16</td>
<td>7</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3: Giving clear explanations of words or concepts</td>
<td>0.59</td>
<td>0.36</td>
<td>1.14</td>
<td>0.79</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4: Test questions</td>
<td>6.27</td>
<td>6.77</td>
<td>5.53</td>
<td>7.06</td>
<td>4.5</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A5: Forced choice questions</td>
<td>0.95</td>
<td>0.91</td>
<td>1.81</td>
<td>0.92</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6: Adult minimal turns</td>
<td>6.05</td>
<td>6.91</td>
<td>5.21</td>
<td>4.71</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A7: Extended pauses</td>
<td>4.77</td>
<td>4.64</td>
<td>4.55</td>
<td>3.53</td>
<td>3.5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1: Asking for clarification or repetition</td>
<td>0.36</td>
<td>0.77</td>
<td>0.58</td>
<td>0.97</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2: Saying things another way when stuck</td>
<td>0.27</td>
<td>0.32</td>
<td>0.63</td>
<td>0.57</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3: Using gestures or acting out to help communicate</td>
<td>3.64</td>
<td>4.86</td>
<td>6.04</td>
<td>5.82</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4: Non-verbal emblems</td>
<td>3.18</td>
<td>2.86</td>
<td>3.54</td>
<td>2.96</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5: Giving up when stuck on a word</td>
<td>0</td>
<td>0.09</td>
<td>0</td>
<td>0.29</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6: Child minimal turns</td>
<td>3.36</td>
<td>3.91</td>
<td>5.21</td>
<td>4.34</td>
<td>1.5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C7: Child single word turns</td>
<td>9.73</td>
<td>7.64</td>
<td>4.81</td>
<td>4.24</td>
<td>9.5</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Contingent commenting was the most frequently used adult conversation behaviour and demonstrated the widest range (T1 = 39; T2 = 25), with the same mother (from Dyad 19) producing the highest number of comments within each five-minute conversation. See Example 1, below. Parental recasts / repeats were also prevalent and showed a wide spread of frequencies, particularly at Time 1 (range at T1 = 25; T2 = 16). Once again, a single case (Dyad 12) was the greatest outlier on both occasions, producing 25 examples of this behaviour at Time 1 and 17 at Time 2. Samples from this dyad's conversations are displayed in Examples 2a and 2b, below.

5.2.1.2 Qualitative examples of conversation behaviours.

Example 1: Contingent commenting (A2) by Mother (M) from Dyad 19, T1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.</td>
<td>M</td>
<td>It's not that many weeks until the Summer holidays, though.</td>
<td>A2</td>
</tr>
<tr>
<td>40.</td>
<td>C</td>
<td>No, it’s about three.</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>M</td>
<td>It’s a little bit more than that.</td>
<td>A2</td>
</tr>
<tr>
<td>42.</td>
<td>C</td>
<td>Awh w-</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>M</td>
<td>It’s the summer holidays and then almost immediately it’s my birthday. (3s)</td>
<td>A2</td>
</tr>
<tr>
<td>44.</td>
<td>C</td>
<td>But well…it was my birthday.</td>
<td>A7</td>
</tr>
<tr>
<td>45.</td>
<td>M</td>
<td>Well yes ((laughs))</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>C</td>
<td>Aand the cards are still not up.</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>M</td>
<td>Oh, we didn’t put them back, sorry that is my fault. I think they're in your little school basket.</td>
<td>A2 x 2</td>
</tr>
</tbody>
</table>

5.2.1.3 Intra- and inter-dyad variability.
Example 2: Multiple recasts / repeats (A1) by Mother from Dyad 12, T1

a)

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>M</td>
<td>No, that was yesterday (gestures). What day is it tomorrow? (gestures)</td>
<td>A4</td>
</tr>
<tr>
<td>14</td>
<td>C</td>
<td>Monday</td>
<td>C7</td>
</tr>
<tr>
<td>15</td>
<td>M</td>
<td>It's Monday tomorrow yeah. And what are you gonna do tomorrow?</td>
<td>A1, A4</td>
</tr>
<tr>
<td>16</td>
<td>C</td>
<td>We're going to go to school</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>M</td>
<td>You're gonna go to school. Yeah back to school isn't it tomorrow</td>
<td>A1, A2</td>
</tr>
</tbody>
</table>

b)

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>C</td>
<td>And William</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>M</td>
<td>William. Is he your friend?</td>
<td>A1</td>
</tr>
<tr>
<td>54</td>
<td>C</td>
<td>Er, kind of</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>M</td>
<td>Kind of, sometimes he's your friend. What about-</td>
<td>A1, A2</td>
</tr>
<tr>
<td>56</td>
<td>C</td>
<td>'Cause he makes magic tricks</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>M</td>
<td>He does magic tricks, wow. What kind of magic tricks does he do?</td>
<td>A1</td>
</tr>
</tbody>
</table>

Meanwhile, the use of gestures or acting out to help communicate meaning was the most variable child behaviour across both timepoints (T1 = 24; T2 = 26). Child 11, who was the second youngest TD participant (aged 5;02) made the most use of this non-verbal communication at Time 1 (24 occasions) and Time 2 (26). See Example 3, below. Child minimal turns also showed a wide variation (T1 = 24; T2 = 15). These were employed most frequently by Child 12, whose mother also used the highest number of recasts / repeats (child minimal turns at T1 = 24, T2 = 15) See Example 2, above.
**Example 3**: Frequent gestures / acting (C3) out by Child 11, T2:

*Talking about the new role play area that is being created at school.*

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>C</td>
<td>(1.5) But before we put the grey bit there <em>(gestures putting on table)</em>, erm you move all the things <em>(gestures hands apart)</em> out of the way, put it there <em>(gestures putting down)</em> put them back where they were so it’s, so it’s lapping each other <em>(gestures hands on top of each other)</em></td>
<td>C3 x 4</td>
</tr>
<tr>
<td>22</td>
<td>M</td>
<td>Mm</td>
<td>A6</td>
</tr>
<tr>
<td>23</td>
<td>C</td>
<td>Erm and and same with the big gra- this bit <em>[gestures large area on table]</em></td>
<td>C3</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>(nods)</td>
<td>A6</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>same with that and, but the gra-and the grass isn’t like that <em>(gestures hands uPWArds)</em> it’s like that <em>(gestures hands flat on table)</em> so we glue it up to the wall like that <em>(gestures hands uPWArds)</em></td>
<td>C3 x 3</td>
</tr>
<tr>
<td>24</td>
<td>M</td>
<td>Mm</td>
<td>A6</td>
</tr>
<tr>
<td>25</td>
<td>C</td>
<td>Imagine my fingers were the point of the grass like that <em>(gestures fingers spread apart)</em></td>
<td>C3</td>
</tr>
<tr>
<td>26</td>
<td>M</td>
<td>Mm</td>
<td>A6</td>
</tr>
</tbody>
</table>

Elsewhere in the dataset, test questions were the second most frequent adult conversation behaviour (range at T1 = 16; T2 = 26). Once again, the mother from Dyad 12 employed this behaviour most frequently (T1 = 14, T2 = 26), as illustrated in Example 4, below. The most common child behaviour was single word turns (range at T1 = 19; T2 = 15). There were no individual outliers for this conversation feature.

**Example 4**: Adult test questions (A4) and child minimal turns (C6) from Dyad 12, T2

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>M</td>
<td>Liana’s the new girl in your class, isn’t she?</td>
<td>A2*</td>
</tr>
<tr>
<td>22</td>
<td>C</td>
<td>Mmhm</td>
<td>C6</td>
</tr>
<tr>
<td>23</td>
<td>M</td>
<td>When did she start?</td>
<td>A4</td>
</tr>
<tr>
<td>24</td>
<td>C</td>
<td>Erm <em>(gestures pondering)</em> (5)</td>
<td>C6, A7</td>
</tr>
<tr>
<td>25</td>
<td>M</td>
<td>When did she start?</td>
<td>A4</td>
</tr>
<tr>
<td>26</td>
<td>C</td>
<td>Mmhm</td>
<td>C6</td>
</tr>
<tr>
<td>27</td>
<td>M</td>
<td>Last week?</td>
<td>A4</td>
</tr>
<tr>
<td>28</td>
<td>C</td>
<td>J-</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>M</td>
<td>Or was it longer than that?</td>
<td>A4</td>
</tr>
<tr>
<td>30</td>
<td>C</td>
<td>Last week</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>M</td>
<td>Last week?</td>
<td>A1</td>
</tr>
<tr>
<td>32</td>
<td>C</td>
<td>Mmhm</td>
<td>C6</td>
</tr>
<tr>
<td>33</td>
<td>M</td>
<td>I think it’s a couple of weeks ago, wasn’t it?</td>
<td>A2*</td>
</tr>
</tbody>
</table>

*Contingent comments with tag questions are classed as A2, though framed as questions*
Turning to the least common conversation behaviours within the TD dataset, there were few examples of adults giving clear explanations of words or concepts (A3) or asking forced choice questions (A5), with the mean frequency for these behaviours falling below 1 at each timepoint. Similarly for the following three child behaviours: asking for clarification or repetition (C1), saying things another way when stuck (C2) and giving up when stuck on a word (C5), fewer than one instance of these behaviours were observed on average at both T1 and T2.

All of the above categories showed a floor effect and thus, this data was abnormally distributed. This was confirmed by the results of Shapiro-Wilk tests conducted on the paired difference scores for all behaviours between T1 and T2, though all other child and adult behaviours had a normal distribution. See Appendix 5.10.

5.2.1.3 Comparison of T1 and T2 conversation behaviours. Since normality assumptions were not met for the full range of conversation behaviours and the sample size was <30, results from Time 1 and Time 2 were compared using non-parametric Wilcoxon signed-rank tests. See Table 5.3, below:

**Table 5.3:** Wilcoxon signed-rank tests (2-tailed) to compare T1 and T2 frequency for all conversation behaviours.

<table>
<thead>
<tr>
<th>Conversation behaviour</th>
<th>z</th>
<th>p</th>
<th>Corrected p</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Recasting / repeating back</td>
<td>-0.599</td>
<td>0.549</td>
<td>0.764</td>
<td>-0.128</td>
</tr>
<tr>
<td>A2: Contingent commenting</td>
<td>0.888</td>
<td>0.375</td>
<td>0.733</td>
<td>0.189</td>
</tr>
<tr>
<td>A3: Giving clear explanations of words or concepts</td>
<td>-1.155</td>
<td>0.248</td>
<td>0.642</td>
<td>-0.246</td>
</tr>
<tr>
<td>A4: Test questions</td>
<td>0.524</td>
<td>0.600</td>
<td>0.764</td>
<td>0.112</td>
</tr>
<tr>
<td>A5: Forced choice questions</td>
<td>0.207</td>
<td>0.836</td>
<td>0.836</td>
<td>0.044</td>
</tr>
<tr>
<td>A6: Adult minimal turns</td>
<td>1.092</td>
<td>0.275</td>
<td>0.642</td>
<td>0.233</td>
</tr>
<tr>
<td>A7: Extended pauses</td>
<td>-0.238</td>
<td>0.812</td>
<td>0.836</td>
<td>-0.051</td>
</tr>
</tbody>
</table>
The results show that there were no significant differences detected between Time 1 and Time 2 for any of the conversation behaviours either at the original, unadjusted \( p \) value of 0.05, or at the corrected \( p \) levels. This indicates that these variables remained stable for the group across the 6-week period between the two video recordings, despite some instances of individual variability. Effect sizes for all adult behaviour comparisons were small, with child behaviours showing either a small or medium magnitude of difference between T1 and T2 results, suggesting more variation in child behaviours and that a significant effect may have been detected for some child behaviours if a larger sample size had been recruited.

### 5.2.1.4 Relationship between children's age and frequency of child and adult conversation behaviours.

Given the relative stability of all conversation behaviours across the two timepoints, mean values for each behaviour were calculated in order to explore whether there was a statistically-significant correlation between children's age in months and any of the coded behaviours. The mean uses every value in the dataset and is widely seen as the best measure of central tendency (Manikandan, 2011). Two-tailed tests were employed for the majority of correlations, since the investigation was exploratory. Where predictions could be made based on the existing literature, one-tailed tests were used.
Contrary to the hypothesis presented at the start of this chapter (RQ2), there was no significant correlation between children's age and frequency counts for any of the coded conversation behaviours (see Table 5.4, below). However, there was a trend for a decrease in parental test questions directed to children as they got older: $r_s = -0.359, p = 0.051, N = 22$ (1-tailed); see Figure 5.3, below. This supported previous findings (e.g., Yu et al., 2019), indicating that parents may modify their questioning style as children's language abilities increase and they become more able to answer open-ended, information-seeking questions.

Table 5.4: Spearman's rank-order correlation coefficients to assess the relationship between children's age and frequency of child and adult conversation behaviours. *Positive $r_s$ values indicate that instances of the behaviour increase as children get older, while negative $r_s$ values signal a decrease in behaviour frequency with age.*

<table>
<thead>
<tr>
<th>Conversation behaviour</th>
<th>$r_s$</th>
<th>$p$</th>
<th>1 or 2-tailed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Recasting / repeating back</td>
<td>-0.371</td>
<td>0.089</td>
<td>2-tailed</td>
</tr>
<tr>
<td>A2: Contingent commenting</td>
<td>-0.135</td>
<td>0.55</td>
<td>2-tailed</td>
</tr>
<tr>
<td>A3: Giving clear explanations of words or concepts</td>
<td>0.162</td>
<td>0.471</td>
<td>2-tailed</td>
</tr>
<tr>
<td>A4: Test questions</td>
<td>0.359</td>
<td>0.051</td>
<td>1-tailed</td>
</tr>
<tr>
<td>A5: Forced choice questions</td>
<td>-0.178</td>
<td>0.213</td>
<td>1-tailed</td>
</tr>
<tr>
<td>A6: Adult minimal turns</td>
<td>0.182</td>
<td>0.418</td>
<td>2-tailed</td>
</tr>
<tr>
<td>A7: Extended pauses</td>
<td>-0.125</td>
<td>0.581</td>
<td>2-tailed</td>
</tr>
<tr>
<td>C1: Asking for clarification or repetition</td>
<td>-0.124</td>
<td>0.582</td>
<td>2-tailed</td>
</tr>
<tr>
<td>C2: Saying things another way when stuck</td>
<td>-0.089</td>
<td>0.695</td>
<td>2-tailed</td>
</tr>
<tr>
<td>C3: Using gestures or acting out to help communicate</td>
<td>-0.095</td>
<td>0.674</td>
<td>2-tailed</td>
</tr>
<tr>
<td>C4: Non-verbal emblems</td>
<td>-0.006</td>
<td>0.98</td>
<td>2-tailed</td>
</tr>
<tr>
<td>C5: Giving up when stuck on a word</td>
<td>0.274</td>
<td>0.216</td>
<td>2-tailed</td>
</tr>
<tr>
<td>C6: Child minimal turns</td>
<td>0.019</td>
<td>0.932</td>
<td>2-tailed</td>
</tr>
<tr>
<td>C7: Child single word turns</td>
<td>-0.35</td>
<td>0.055</td>
<td>1-tailed</td>
</tr>
</tbody>
</table>

*Based on the presence or absence of literature on which to form a directional hypothesis.
Figure 5.3: Child age in months, plotted against frequency of adult test questions (A4).

Separately, children's use of single word turns decreased with age. This trend fell just short of statistical significance: $r = -0.35$, $p = 0.055$, $N = 22$ (1-tailed); see Figure 5.4, below. These findings align with previous research on children's MLUw, which indicates that children typically use longer and more complex utterances as they get older (e.g., Rice et al., 2010).

Figure 5.4: Child age in months, plotted against frequency of single word turns (C7)
5.2.2 Child mean length of utterance in words (MLUw)

5.2.2.1 Descriptive statistics. Figure 5.5, below, shows group MLUw at Time 1 and Time 2. Overlapping error bars indicate stability across time, with no significant outliers.

![Box plot showing MLUw at Time 1 and Time 2](image)

**Figure 5.5:** Child MLUw at Time 1 and Time 2

Table 5.5, below, shows group means, standard deviations and medians for MLUw at each timepoint:

<table>
<thead>
<tr>
<th></th>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.94</td>
<td>5.05</td>
</tr>
<tr>
<td>SD</td>
<td>1.35</td>
<td>1.14</td>
</tr>
<tr>
<td>Median</td>
<td>4.95</td>
<td>4.96</td>
</tr>
</tbody>
</table>

MLUw ranged from 2.3 - 6.2 at Time 1 and from 2.69 - 6.36 at Time 2 for the TD sample, whose ages spanned from 61 - 106 months (5;01 - 8;10 years). This compares to Rice et al. (2010)'s findings of average MLUw between 4.38 and 5.08 for 445 language samples from typically-developing children in the same age range (M = 4.73, S.D. = 0.25)
Figure 5.6, below, illustrates the MLUw scores obtained by Rice and colleagues (2010), compared to those for the current study.

5.2.2.2 Comparison of T1 and T2 MLUw scores. Wilcoxon signed-rank tests were carried out to compare T1 and T2 MLUw scores from the current study. On average, these were slightly higher at T2. This difference was not statistically significant and showed a minimal effect size ($z = 0.341, p = 0.733, 2$-tailed, $r = 0.073$).

5.2.2.3 Relationship between child age in months and MLUw

Mean values for MLUw were calculated across time points in order to explore whether there was a correlation between children’s age in months and this widely-used conversation measure (see Figure 5.7, below). A one-tailed test was employed, since it was predicted that children's MLUw would increase with age, in line with findings by Rice et al. (2010).
The scatterplot shows an overall positive relationship between children's age in months and MLUw. However, this was not statistically significant as there was considerable individual variation within the sample, so we are unable to reject the null hypothesis: \( r_s = 0.326, p = 0.069, N = 22 \) (1-tailed).

### 5.2.3 Ratio of child-to-adult speech

#### 5.2.3.1 Descriptive statistics.

Figure 5.8, below, shows group ratio of child-to-adult speech across timepoints.
The box plots show a larger inter-quartile range at Time 1, compared to Time 2, though the overall range was greater at the second timepoint (T1 range = 3.65; T2 = 3.72). There was one clear outlier at T1, with the child from Dyad 8 speaking four times more than his mother during their five-minute conversation. At Time 2, Child 11 spoke 4.12 times more than the adult, while Child 21 spoke 2.3 times more.

Table 5.6, below, displays group means, standard deviations and medians for the ratio of child-to-adult speech and both timepoints.

**Table 5.6: Ratio of child-to-adult speech at T1 and T2**

<table>
<thead>
<tr>
<th></th>
<th>Time 1</th>
<th></th>
<th>Time 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time child spoke*</td>
<td>Time adult spoke*</td>
<td>Ratio</td>
<td>Time child spoke*</td>
</tr>
<tr>
<td>Mean</td>
<td>117.32</td>
<td>102.17</td>
<td>1.42</td>
<td>114.88</td>
</tr>
<tr>
<td>S.D.</td>
<td>45.42</td>
<td>38.60</td>
<td>0.94</td>
<td>42.46</td>
</tr>
<tr>
<td>Median</td>
<td>108.75</td>
<td>96.38</td>
<td>1.38</td>
<td>108.00</td>
</tr>
</tbody>
</table>

*Measured in seconds

On average, children within the TD sample spoke more than their mothers. However, there were several examples of less talkative children, with Child 19 speaking only 0.3 times as much as his mother at T1, while Child 7 had a ratio of 0.32 at the same timepoint and Child 10 spoke 0.4 times as much as the adult at Time 2.
5.2.3.2 Comparison of T1 and T2 ratio scores. Wilcoxon signed-rank tests were carried out to compare T1 and T2 ratio scores. On average, these were lower at T2. However, like all previous conversation behaviours and measures, this difference was not statistically significant (z = -1.088, p = 0.277, 2-tailed, r = -0.232).

5.2.3.3 Relationship between children's age and child:adult ratio of speech. Mean values for ratio of child-to-adult speech were calculated across time points in order to explore whether there was a statistically-significant correlation between children's age in months and this final conversation measure. A one-tailed test was used, since it was predicted that child ratio would increase with age, in line with findings by Forrester (2013) and Gilkerson et al. (2017).

![Figure 5.9: Child age in months plotted against average child:adult ratio of speech.](image)

Child-to-adult ratio of speech fell as children got older (see Figure 5.9, above). This was contrary to the prediction that children's relative contribution to conversation would increase with maturity, reflecting their enhanced language and conversation skills: \( r_s = -0.193, p = 0.195, N = 22 \) (1-tailed). The direction of change was influenced by Child 11 (aged 62 months; 5;02 years) and Child 8 (aged 66 months; 5;06 years), who were the most talkative in the sample across the two timepoints and were also among the youngest TD participants. Meanwhile, Child 22 (aged 106 months; 8;10 years) and Child 19 (aged 94 months; 7;10 years) were among the eldest and least talkative child participants.
5.3 Discussion

Overall, the results from this study show that there is wide individual variation in the use of both child and adult conversation behaviours across the sample of children aged 5;01 - 8;10 years and their mothers. This may be due to factors including child and adult personality or differing parenting beliefs around the underlying roles and purpose of conversation (Kwok et al., in preparation). However, analysis at the group level indicated overall stability in the frequency of these behaviours across two recorded timepoints (6-weeks apart). This was also the case for both MLUw and child-to-adult ratio of speech. This is an important finding. While the figures mask within-dyad differences in the frequency of behaviours and conversation measures between the two recordings, there was no consistent pattern in the direction of change, meaning that the overall group results remained balanced across timepoints. This indicates that there are no obvious practice effects related to familiarity with videoing, also suggesting that repeated sampling of conversations across multiple timepoints would be optimal for ensuring that true patterns are being observed.

No significant relationship was identified between children's age and any of the behaviours or measures under investigation. This was linked to the large within-group variability and suggests that children's conversation skills develop at different paces across time, while adults tailor their input to match the child's individual stage and style of communication, rather than their chronological age. Identified trends, such as parents using fewer test questions and children reducing single word turns as they got older, may have reached statistical significance had we recruited a larger sample. Alternatively, it may be that age boundaries for language and conversation milestones become wider once children reach school age, as compared to the 'critical period' of language acquisition, which takes place in the pre-school years (Hurford, 1991; Newport et al., 2001.; Snow & Hoefnagel-Höhle, 1978).

MLUw findings from this study mirrored those of Rice et al. (2010), with group mean MLUw of 5.0 across timepoints, compared to a mean of 4.7 for the same age group within the Rice paper. This indicates that children's natural conversations with their
parents do not differ markedly on this language measure, compared to MLUw in structured conversations with a researcher. As for the Rice study and more recent work by Potratz et al. (2022), group MLUw rose with age. However, this relationship was non-significant within the current TD sample. Individual data is not available to measure the strength of association between children's age and their MLUw scores in the Rice et al. (2010) or Potratz et al. (2022) papers. However, Potratz et al. (2022) report a significant difference between the MLUw of children aged eight years, versus a five-year-old comparison group. It was not possible to replicate this comparison within the current study, since there were only two children recruited in the eight-year-old age band. A larger sample may have supported these results, adding to existing evidence that MLUw can be treated as a robust language measure, not only for pre-school children but also those of primary school age.

The final conversation measure, ratio of child-to-adult speech, showed an overall decrease with age, though once again this effect did not reach statistical significance. Furthermore, the direction of change was contrary to previous research with pre-school participants, which found that children contributed more to conversation as they got older (Forrester, 2020; Gilkerson et al., 2018; Hirsh-Pasek et al., 2015). It may be that once children reach a certain threshold of language and conversational competence, parents treat them as more equal participants; affording them similar time and 'rights' to speak as they would an adult conversation partner, rather than giving them extra time and space to speak, as they may with more linguistically immature speakers. Given the wide variety of children's structural language development (as represented by the MLUw data), this may not relate directly to chronological age. This will be investigated further in the following chapter (Chapter 6) in relation to children with DLD and their main carers.

Overall, our results show that there is no 'one size fits all' approach to children's language and conversation development, with individual differences occurring across all of our conversation behaviours and measures. Some children were more talkative, whilst for other dyads, it was parents who dominated the conversation. Adults employed a range of communication features when interacting with their children, with some using a high proportion of test questions, whilst others used more comments or minimal turns. Children showed less variation overall, but differed
widely on their use of single word turns, with some showing a greater or lesser preference for using gestures or non-verbal emblems. Overall, these results point to the need for an individualised approach when designing interventions aimed at training parents and children in the refinement of conversation skills to support language development. The next chapter will present the method and results for a case series study, examining the effects of the 'Better Conversations with Children' intervention for six children with DLD and their main carers.
The overall aim of this PhD was to develop and evaluate a new conversation-based intervention for school-aged children with DLD, which incorporates principles and techniques from both PCIT and conversation-based therapy. Within this chapter, the following research questions will be addressed in relation to the six mother-child dyads who participated in the main intervention study. Questions RQ1a) to RQ1d) relate to predicted change in proximal conversational measures as a result of BCC, while the remaining questions pertain to more distal outcomes.

1a) Does the number of targeted facilitators used by children and parents in conversation increase after intervention?

It is predicted that there will be a significant increase in the overall number of targeted facilitators used by parents and children during their post-therapy conversations, compared to pre-therapy. Though group level analysis did not provide evidence of significant change in facilitator use following the related BCA programme, positive change was achieved for 2/8 dyads, indicating that there is potential for this to occur following a related conversation-based therapy programme. Furthermore, multiple studies of parent-mediated interventions have shown positive change in adults’ use of language support strategies when interacting with pre-school children with language impairments (Roberts & Kaiser, 2011; Roberts et al., 2019). BCC will provide regular opportunities for practising targeted communication behaviours both during and outside of sessions to encourage and embed the desired behaviour change (Aarts & Dijksterhuis, 2000).

1b) Does the use of targeted communication barriers decrease following the intervention?

It is predicted that there will be a significant reduction in the use of identified barriers following the BCC programme. This is in line with the results for BCA (Best et al. 2016). Subsequent analysis of the mechanisms of change for BCA using behaviour change theory (Johnson et al., 2017) concluded that reducing communicative barriers relies on ‘changing speakers’ beliefs about how the
behaviour functions in conversation' (p.385). This is a key component of BCC, which also aims to encourage children and carers to replace less helpful behaviours with an alternative facilitative strategy, e.g., parents commenting rather than questioning.

1c) Does children's mean length of utterance in words (MLUw) increase following the intervention?

It is predicted that children who participate in BCC will increase their MLUw in conversation. MLU in both words and morphemes is seen as a robust measure of children's language acquisition and has been used to capture change following parent-led therapy for younger children with language delays (Falkus et al., 2016; Baxendale & Hesketh, 2003). As children in the BCC study are given opportunities to take part in facilitative conversations with their carer, they will be encouraged to practise their developing language, with the aim of increasing the length and quality of their utterances.

1d) Does the ratio of child-to-adult speech change after intervention?

It is predicted that there will be a difference in the ratio of child-to-adult speech following BCC. Depending on the nature of the dyad's pre-therapy communication style, this change may occur in either direction, e.g., a talkative parent may be encouraged to leave more time for children to contribute within conversation, whereas a child who is prone to holding the conversational floor and wandering off topic may require more input from their carer to support their language and help keep things on track. PCIT studies with younger children and their carers have consistently reported an increase in total length of child utterances, compared to parental speech. However, the aims of BCC may differ - particularly in cases where a child's main difficulty relates to their receptive, rather than expressive, language.

For each of the above research questions, analysis will entail consideration of individual dyads' scores in isolation and in relation to TD data in order to set the case series findings in context.
2) Do children’s standardised language scores change following the intervention?

BCC is designed to enhance children's ongoing language development by promoting use of supportive communication strategies. While the literature suggests that change on standardised scores is unlikely following a short-term intervention involving school-aged children with DLD (Ebbels et al., 2019), previous PCIT studies (e.g., Baxendale & Hesketh, 2003; Roberts & Kaiser, 2011) have reported significant change in standardised measures of pre-schoolers' receptive and expressive language. Therefore, there is potential that positive change will be observed on standardised language assessments following BCC.

3) What changes may be reported by children and parents following BCC?

Across intervention research, there is an increasing focus on capturing the views of participants to ensure that therapy outcomes are meaningful beyond the quantitative changes that may be observed using traditional assessment measures (Owen et al., 2004; Roulstone et al., 2015). This study will incorporate self-report questionnaires for both children and parents to supplement observational tools and to evaluate the feelings and attitudes of children and adults in relation to therapy targets (see Section 6.1.4.3, below).

The lack of direct connection between the content of therapy and these more distal outcome measures makes it difficult to be confident that any change in views is due to the intervention, rather than other life factors, such as the child's schooling and/or the influence of family and peers. Another potential issue with both self- and other-report is that an increase in knowledge and understanding of communication disorder may affect participants' perceptions in a negative way (e.g., Rautakoski et al., 2008; Saldert et al., 2013). Nevertheless, the ultimate goal of BCC was to enhance children’s everyday interactions and it is anticipated that participants will perceive positive change in this area, related to individual therapy goals.
6.1 Methods

6.1.1 Ethics

As for the previous TD investigation, this study was granted ethical approval by the University College Research Ethics Committee (approval number 2981/003). Parents and children were provided with separate information sheets (see Appendices 6.1 and 6.2), detailing the purpose and structure of the research. It was explained that participation was voluntary, and that they had the right to withdraw at any time. Both the parents and children signed consent forms adapted to their level (see Appendices 6.3 and 5.4) and parents completed a child and family history form (see Appendix 5.5). Conversations were video recorded at home by parents on their own phone or tablet devices, so that they could decide when it was appropriate for the child to take part. The parents were given options for how they would prefer the video recordings to be used. Where they consented only to research participation in the current study, these videos will be permanently deleted no later than September 2023. Videos where additional consent has been granted for use in teaching and/or presentations are being stored securely on an encrypted hard drive and will only be used for the agreed purposes. Participants were not offered any financial incentive for participation.

6.1.2 Design

The study was framed as an experimental case series, with multiple conversations recorded and assessments completed pre- and post-intervention. See Figure 6.1, below, for phases of the study and assessment details.
Assessment details: CELF-5 (Clinical Evaluation of Language Fundamentals; Wiig et al., 2017), ACE (Assessment of Comprehension and Expression; Adams, 2001), ERRNI (Expression, Reception and Recall of Narrative Instrument; Bishop, 2004), BPVS-3 (British Vocabulary Picture Scale, (Dunn & Dunn, 2009), CCC-2 (Children's Communication Checklist; Bishop, 2003), Digit Span (CELF-4; Semel et al., 2006).

Screening entailed a video of conversation, recorded by the dyad, and discussion with the parent about their child’s language and conversation strengths and needs. Core sections of the Clinical Evaluation of Language Fundamentals (CELF 5; Wiig et al., 2017) were administered to confirm a clinical language difficulty and a non-verbal task (Pattern Construction from the British Ability Scales; Elliott & Smith, 2012) was used to ensure children referred with DLD did not have significant learning difficulties beyond language, which may affect their ability to participate in the BCC intervention.

Within the case series, each child acted as their own control, a design which is appropriate given the heterogeneity of DLD, its varied impact on conversation and parent/child interaction styles and the complex nature of the intervention (consistent with the recommendations of Tate et al., 2019). Contact time with the SLT was matched during the pre-therapy, intervention and post-therapy phase. This was to control for any Hawthorn, or ‘charm’ effects, which may have resulted due to participants’ awareness of being seen by a professional over the course of the study.

A control task (digit span) was carried out before and after intervention. While children with DLD consistently perform poorly on verbal working memory tasks
(Arslan et al., 2020), the evidence suggests that therapy aimed at everyday conversation would not be expected to impact on digit span scaled scores (Best et al., 2016). Use of an experimentally ‘stronger’ crossover design was inappropriate because of the time commitment for parents and children, including missing work and lessons. Further, it would be difficult to fully match aspects of the two interventions (e.g., parental involvement and video reflection). Finally, the aims of any impairment-focused language programme may have conflicted with the functional goals of conversation therapy (Best et al., 2016).

6.1.3 Participants

Six children with DLD, aged 6;06 - 8;02 years, and their main carers (in each case, their mothers) were recruited to the main intervention study. Referrals from the geographical areas of Greater London and Surrey were made by school Special Educational Needs Co-ordinators (SENCos), following initial contact with the schools by the PhD researcher via email or telephone calls. Criteria for inclusion were:

- Child aged between six and eight years (persisting language difficulties at this age are suggestive of poor prognosis).
- Identification as having a clinical language difficulty (to include at least two scaled scores of 7 or below on CELF-5 core language subtests).
- Having English as a main language (i.e., exposed to English at home and in an English-speaking nursery since the age of three).
- No other significant developmental diagnosis (e.g., ASD, emotional or behavioural difficulties).
- Non-verbal skills task at or above the low average range (as indexed by a percentile score ≥ 8 on the Pattern Construction task from the British Ability Scales; BAS, Elliott & Smith, 2012).
- Difficulty with conversation as reported by parents and captured in assessment of a videoed conversation (examples of difficulty include frequent conversation misunderstandings, conversations where the ratio of child-to-adult speech is markedly low and/or where the conversation is dominated by test questions from the adult).
A flow diagram, detailing the phases of enrolment, screening, assessment, intervention and follow-up, is presented in Chapter 7, Figure 7.1. All dyads were monolingual English speaking, with the exception of Dyad D, where the child's main language was English and the mother spoke both English and Jamaican Creole. Table 6.1, below, summarises children's characteristics, background language profiles and BAS scores, with CELF-5 subtests below the clinical cut-off highlighted in orange.

Table 6.1: Child participant characteristics

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Child gender</th>
<th>Child age</th>
<th>Sentence Comp*</th>
<th>Word Structure*</th>
<th>Formulated Sentences*</th>
<th>Recalling Sentences*</th>
<th>Core Language SS†</th>
<th>Percentile</th>
<th>T score §</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>M</td>
<td>7;06</td>
<td>5</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>86</td>
<td>18</td>
<td>53</td>
<td>62</td>
</tr>
<tr>
<td>B</td>
<td>M</td>
<td>6;08</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>84</td>
<td>14</td>
<td>60</td>
<td>84</td>
</tr>
<tr>
<td>C</td>
<td>M</td>
<td>6;06</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>84</td>
<td>14</td>
<td>44</td>
<td>27</td>
</tr>
<tr>
<td>D</td>
<td>F</td>
<td>7;03</td>
<td>6</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>82</td>
<td>12</td>
<td>49</td>
<td>46</td>
</tr>
<tr>
<td>E</td>
<td>M</td>
<td>6;10</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>79</td>
<td>8</td>
<td>54</td>
<td>66</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>8;02</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>70</td>
<td>2</td>
<td>44</td>
<td>27</td>
</tr>
</tbody>
</table>

*Scaled score, where < 7 indicates below average performance (-1SD and under)
†Standard score, where < 85 indicates below average performance
§ T score, where < 40 indicates below average performance
6.1.4 Procedure

6.1.4.1 Conversation sampling. Multiple video recordings were collected (three pre- and two post-therapy), due to the expected variability inherent in conversation data (Perkins et al., 1999). During their recorded interactions, parents were asked to talk with their child at home as they would typically, for example at the end of a school day. They were invited to make use of games or toys if they wished. This unstructured natural conversation was designed to be as ecologically valid as possible: there was no observer present and no topic constraint. Parents were asked to record up to 10 minutes of talk. The central five minutes of each conversation was used for analysis.

As for the TD dataset, conversations were transcribed by pre-registration Speech and Language Therapy students, who were blind to the point of data collection, and scored for the following quantitative features:

- Counts of targeted barrier and facilitator behaviours for both child and parent (see Section 6.1.5, below, for details of how these targets were identified).
- Child mean length of utterance in words, calculated following ERRNI guidelines (see Chapter 4, Section 4.1.3).
- Ratio of child-to-adult speech, timed in seconds and calculated as: number of seconds child spoke, divided by number of seconds adult spoke.

6.1.4.2 Standardised assessments. All standardised assessments were carried out by the PhD researcher with the child in a quiet room at their school. These were either audio or video recorded and were scored at a later date by pre-registration SLT students, who were blind to the point of data collection.

6.1.4.3 Participant views. These were elicited using bespoke questionnaires, based on Best et al. (2021) and visual prompts (e.g., The Language and Life Ladder), which was co-designed and administered by the PhD student before and after the intervention (see Appendices 6.4 - 6.6). Responses were used qualitatively to reflect the opinions of children and parents regarding their conversations and any perceived changes following intervention.
6.1.5 *Intervention*

Therapy sessions took place at the participants' home or in a quiet room at the child's school once a week for 6 weeks, each lasting around 45 minutes. Both the child and parent were present for all sessions. Participants viewed short clips from their pre-therapy conversations to increase insight into key positive or negative features of their interactions. The therapist facilitated the selection (from a set of suggestions) of individualised strategies for the parent and child to work on - either to increase facilitators or reduce barriers. Targeted behaviours could be strategies that participants were already using and wanted to increase or decrease, or alternative ideas which the dyad wanted to try introducing within their conversations. Multiple opportunities were provided for the dyad to reflect on and practise strategies during therapy and home tasks. Visually-accessible handouts were used to aid children's comprehension and engagement. Table 6.2, below, summarises the theme and content of each session. A full intervention protocol, described using the *TiDier* framework (Hoffmann et al., 2014), is presented in Appendix 3.1. Appendices 3.2 and 3.3 comprise a blank, then completed, 'Talk Time' record sheet. Appendix 4 illustrates example 'Top Tips' for talking. Chapter 3 contains further detail on the rationale and design of BCC.

**Table 6.2: Summary of intervention sessions**

<table>
<thead>
<tr>
<th>Session</th>
<th>Theme</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Conversation and Language Development</td>
<td>Identify parent facilitator; set up ‘Talk Time’ for home practice</td>
</tr>
<tr>
<td>2</td>
<td>Turns, sequences and actions</td>
<td>Identify a child facilitator to practise at home</td>
</tr>
<tr>
<td>3</td>
<td>Trouble and repair</td>
<td>Identify a parent barrier / agree an alternative strategy for them to use</td>
</tr>
<tr>
<td>4</td>
<td>Child-led topics of conversation</td>
<td>Use family photos / favourite books as topic starters; practise strategies and identify a barrier behaviour for the child.</td>
</tr>
<tr>
<td>5</td>
<td>Consolidation of child strategies</td>
<td>Focus on child strategies, including playing conversation-based games</td>
</tr>
<tr>
<td>6</td>
<td>Reviewing and moving forward</td>
<td>Create a poster for teachers, family and friends to share 'top tips' from therapy.</td>
</tr>
</tbody>
</table>
Therapy for all dyads was carried out by the PhD researcher, who is a qualified SLT. Prior to intervention, the researcher and her lead supervisor met to view baseline videos recorded by a dyad and to identify key barriers and facilitators to conversation. These determined the choice of video clips that were prepared for therapy, which formed the basis of participants' self-reflection and discussion. While the project team guided a dyad’s reflection in this way, the child and carer made the final decision on which strategies to practise or reduce.

6.1.6 Data analysis

All data for the study were collected and analysed by the PhD researcher, focusing on: 1) change after intervention, 2) comparison with TD children across all measures. A Poisson trend for frequencies (Howard, 2010, personal communication) was applied to raw counts of the total number of turns containing barriers and facilitators. This is a non-parametric test, which detects any significant change in the instances of behaviour post-therapy, compared with pre-therapy. Weightings were applied to the raw data to identify them as pre- or post-therapy counts, respectively (the sum of weightings was zero). A trend test for rankable counts (Meddis, 1984) was used for opportunistic behaviours, where the numerator is a proportion, e.g.: number of times a parent responds, divided by the number of times the child uses non-verbal communication. One-tailed tests were used to test hypotheses regarding change for facilitator items, which were predicted to increase, and barrier items, which were predicted to decrease. Significance was set at p < 0.05.

A statistical comparison was made between behaviour counts for individual DLD dyads and the TD group by performing Crawford modified t-tests using the Singlims_ES.exe programme (Crawford, et al 2002) on webpage: http://homepages.abdn.ac.uk/j.crawford/pages/dept/psychom.htm#conflims This programme was appropriate as it compares a control group with a single case, and the TD group of 22 exceeds the minimal number required for the programme. Two-tailed tests were used for all comparisons, with the significance level of p<0.05, because it was not predicted that DLD dyads and the TD group would differ in a particular direction. This followed Blackwell et al.'s (2014) review, suggesting that there were limited differences in parent-child conversations involving children with
language disorder and those without (though this study focused on adult behaviours within interactions with younger children).

For child MLUw and ratio of child-to-adult speech, descriptive statistics were explored to illustrate any variability in conversational behaviours over time for each dyad. Crawford modified t-tests were used to compare children's individual MLUw scores with those reported for relevant age bands by Rice et al. (2010) as well as for the TD sample from the current study. Individual ratio scores were also compared with the TD comparison group.

Wilcoxon signed rank tests were employed to compare pre- and post-intervention scores for the DLD group as a whole. Mann-Whitney U tests were used to explore whether there were significant differences between scores for the DLD and TD groups. Effect sizes were calculated according to Pallant (2007, p.225) by dividing the z value (standardised test statistic) by the square root of the number of observations.

The next section will present results for each DLD dyad in turn, detailing individualised intervention targets and rationale for their selection. Outcomes from BCC therapy will be reported in relation to research questions and hypotheses. Comparisons with TD norms from the current study, as well as previous research, will set the DLD findings in context both prior to and following intervention.
6.2 Results

6.2.1 Dyad A

Dyad A was formed by a boy, aged 7;06 years and his mother, who worked as a specialist nurse. Child A attended a mainstream primary school in a deprived area of Surrey, where the proportion of students who are eligible for the pupil premium is much higher than the national average. A had previously been referred to the Early Years Speech and Language Therapy Service and attended a block of language therapy groups, but was discharged upon school entry. He received support for his emotional and social skills at school, but was not accessing any direct SLT at the time of his involvement in the BCC project.

6.2.1.1 Identification of targeted conversation behaviours. In their pre-therapy questionnaires, both Child A and his mother reported that his main difficulties in conversation were: forgetting what he was saying and/or not understanding what others say to him. A's mother described how he 'gets angry or cross when he can't explain what's wrong... I don't know the best way to understand him or help'. Meanwhile, A explained that at school 'I just turn a little bit shy... I can't normally remember what I want to say'. Following an introduction to conversation and language development and repeated viewing and discussion of extracts from their three pre-therapy videos with the project team, the following facilitators and barriers were identified by the dyad, with support from the research therapist, as targets for intervention. Each behaviour is described in the context of Dyad A's communication, with rationale and examples from their pre-intervention transcripts. While two of the target strategies were bespoke for these participants, three behaviours, marked with an asterisk, were also coded for the TD group (see Chapter 5, Section 5.2.1).

Child Facilitator (F1): A uses strategies to support his memory and understanding.

This referred to A asking for repetition or explanation when he had forgotten or not understood what his mother had said, which he did occasionally prior to therapy and
wanted to increase, e.g., when playing a game of 'Animal Guess Who' and talking about which pictures his mother had flipped down, or 'closed', A asked:

"Huh? Which ones did you close?" (pre-therapy 2).

To aid his retrieval of words, events and ideas within conversation, A also wanted to practice using phrases to give himself extra time, e.g.:

'I'm thinking, I'm remembering' (pre-therapy 1).

'Wait, wait' (pre-therapy 2).

*Adult facilitator (F2): giving clear explanations of words or concepts.

M identified using more explicit explanations as a target facilitator to support A's understanding. There was only one example of her doing this during their pre-therapy conversations, while playing 'Animal Guess Who' and talking about which tile to flip down, or 'close' once carnivores had been eliminated:

'I was closing the ones that don’t eat meat. Gotta close the ones that do eat meat.' (pre-therapy 2).

Mother A identified several further occasions where A would have benefited from a clearer explanation from her, including the following example from the same recorded interaction:

**Example 1, 'antlers'**

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>83.</td>
<td>A</td>
<td>Wait, wait. Do... reindeers have horns?</td>
<td></td>
</tr>
<tr>
<td>84.</td>
<td>M</td>
<td>Er... they're antlers.</td>
<td></td>
</tr>
<tr>
<td>85.</td>
<td>A</td>
<td>Well.. they're a type of horn.</td>
<td></td>
</tr>
<tr>
<td>86.</td>
<td>M</td>
<td>Mmn, yer and no, but no. They're <strong>different</strong>. They'd be antlers.</td>
<td>Unclear explanation</td>
</tr>
</tbody>
</table>
*Adult facilitator (F3): repeating back or recasting what A has said.

This strategy was chosen with the dual aim of supporting A's language development and maintaining the topic and direction of their conversations together, in light of A's difficulties with remembering what he or his mother had said previously. Examples from their pre-therapy conversations include:

**Example 2, pre-therapy conversations**

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>A</td>
<td>Um… The eyes only has two eyes, but... And that happened to it’s… the sun.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>M</td>
<td>OK, but if it's only got two eyes, I don’t understand why it’s rude.</td>
<td>F3 - recast</td>
</tr>
</tbody>
</table>

**Example 3, pre-therapy conversations**

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td>A</td>
<td>The reason I’m saying sorry is just these bums [drawn on his picture]. It’s just what my friend was trying to do.</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>M</td>
<td>So your friend did it?</td>
<td>F3 - recast</td>
</tr>
</tbody>
</table>

*Child barrier (B1): Giving up when stuck on a word.

This was identified by the dyad as a barrier to the progression of their conversation, since A would often opt out using 'don't know responses,' rather using his memory strategies (F1), or trying to find another way to get his message across. Examples of this barrier behaviour included:

'I can't remember' (pre-therapy 1).

'I'm not sure' (pre-therapy 3).

Child barrier (B2): Seeking to end the conversation.

A's mother observed during their pre-therapy conversations that he would ask to finish the talking or suggest switching to a different activity if he was struggling to
answer her questions or remember what he was saying. Examples from their transcripts included:

'I think I should stop playing' (pre-therapy 2).

'When are we gonna stop this?' (pre-therapy 1).

'I'll try and improve it. I'll try and make it even nice, OK?' ((gets up and walks off with picture)). (pre-therapy 3)

Adult barrier (B3): Using three or more minimal turns consecutively.

Whilst minimal turns can be used facilitatively by adults to pass back the conversational floor and encourage the child to say more (Clark & Schaefer, 1989), for Dyad A, this often resulted in A wandering off track and losing his conversational thread. Without more focused input from his mother, he was prone to changing the subject or seeking to end the conversation, as in the example below:

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>012</td>
<td>A</td>
<td>That [a chameleon] was on the leaf. Um and at the beginning I saw it on the banana.</td>
<td></td>
</tr>
<tr>
<td>013</td>
<td>M</td>
<td>Ah ((widens eyes))</td>
<td>Minimal turn</td>
</tr>
<tr>
<td>014</td>
<td>A</td>
<td>I never seen it on the apple, but I saw it turn red on the carpet. Like this! ((lifts up a piece of thread)) A part of my pom pom. That's red. That's my car-</td>
<td>A changes subject</td>
</tr>
<tr>
<td>015</td>
<td>M</td>
<td>It is.</td>
<td>Minimal turn</td>
</tr>
<tr>
<td>016</td>
<td>A</td>
<td>Like... gone red.</td>
<td></td>
</tr>
<tr>
<td>017</td>
<td>M</td>
<td>((nods))</td>
<td>Minimal turn</td>
</tr>
<tr>
<td>018</td>
<td>A</td>
<td>Well, when we’re w- When are we gonna stop this?</td>
<td>A seeks to end the conversation</td>
</tr>
</tbody>
</table>

6.2.1.2 Therapy outcomes. Once targeted barriers and facilitators had been identified and agreed with the dyad, these were practised and refined during the six face-to-face therapy sessions and consolidated during home practice. To evaluate the effects of intervention for Dyad A, each of the research questions will be addressed in turn, with results presented for pre- and post-therapy conversation behaviours and measures, followed by standardised language scores.
1a) Does the number of targeted facilitators used by children and parents in conversation increase after intervention?

1b) Does the use of targeted communication barriers decrease following the intervention?

Table 6.3, below, displays raw counts for Dyad A’s targeted facilitators and barriers in each conversation sample (three collected prior to therapy, one immediately post- and one at follow-up, six weeks after the intervention):

Table 6.3: Dyad A facilitator and barrier counts

<table>
<thead>
<tr>
<th>Code</th>
<th>Item</th>
<th>Pre-1</th>
<th>Pre-2</th>
<th>Pre-3*</th>
<th>Av Pre</th>
<th>Post</th>
<th>Follow-up</th>
<th>Av post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Conversation Facilitators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>A uses strategy to support his memory and understanding</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>1.33</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>F2</td>
<td>M gives clear explanation of word or concept</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0.33</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>F3</td>
<td>M repeats back or recasts what A has said</td>
<td>2</td>
<td>3</td>
<td>4.64</td>
<td>3.21</td>
<td>4</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted facilitators</strong></td>
<td>3</td>
<td>7</td>
<td>4.64</td>
<td>4.88</td>
<td>11</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td><strong>Conversation Barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>A gives up when stuck on a word</td>
<td>1</td>
<td>0</td>
<td>2.32</td>
<td>1.11</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>B2</td>
<td>A seeks to end the conversation or switch to a new activity</td>
<td>1</td>
<td>2</td>
<td>1.16</td>
<td>1.39</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B3</td>
<td>M uses three or more consecutive passing turns</td>
<td>3</td>
<td>0</td>
<td>1.16</td>
<td>1.39</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted barriers</strong></td>
<td>5</td>
<td>2</td>
<td>4.64</td>
<td>3.88</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*Scores corrected to account for recorded conversation less than 5 minutes (4:18)

There was a significant increase in the dyad’s use of targeted facilitators following therapy, led by the mother's more frequent use of clear explanations (F2; Poisson trend for frequencies: $z = 2.13, p = 0.017$, one-tailed). Conversely, the number of barriers decreased significantly ($z = -1.91, p = 0.028$, one-tailed). Two out of the three targeted barriers were eliminated following the intervention, having been used
just over once each on average per five-minute conversation recorded prior to therapy (B2: A suggesting ending the conversation and B3: his mother using three or more consecutive minimal turns). Meanwhile, there were no instances of A giving up when stuck on a word (B1) in his follow-up conversation.

6.2.1.2.1 Comparisons with TD data. Three of the dyad’s targeted conversation behaviours matched with those that were investigated in relation to our typically developing group (N = 22). Crawford modified t-tests (two tailed; Crawford & Garthwaite, 2002) were used to assess whether there were significant differences between Dyad A’s counts and those of the normative sample. Mother A used fewer clear explanations for words or concepts (F2) than the TD group on average across her pre-therapy conversations (for TD behaviour counts, see Chapter 5, Table 5.2; TD M = 0.48, SD = 0.88, Mother A pre-therapy M = 0.33). However, this difference was not statistically significant (t = -0.167, p = 0.869). After therapy, she produced significantly more counts of this behaviour compared to the TD group: (Mother A post-therapy M = 3, t = 2.801, p = 0.011).

M’s use of repeating and recasting (F3) increased following therapy from an average of 3.21 to 5 times per 5-minute conversation. This did not differ significantly from the TD group either before or after therapy (TD M = 5.95, SD =4 .61, pre-therapy t = -0.523, p = 0.566; post-therapy t = -0.202, p = 0.842).

Finally, instances of Child A’s barrier behaviour: giving up when stuck on a word (B1) were significantly higher than the TD mean both pre- and post-therapy (TD M = 0.05, SD = 0.15, Child A pre-therapy M = 1.11, t = 6.911, p = <0.001; Child A post-therapy M = 1, t = 6.194, p = <0.001). This reflects his persistent difficulties with word-retrieval in conversation.

1c) Does children’s Mean Length of Utterance in words (MLUw) increase following the intervention?

Figure 6.2, below, shows Child A’s MLUw for each recorded interaction. The blue line illustrates the change from average pre-therapy to average post-therapy
conversations. There is variability across samples both pre- and post-therapy with a small increase in average MLUw following the intervention.

**Figure 6.2**: Child A MLUw before and after therapy.

Crawford modified t-tests were used to compare Child A’s MLUw scores with those reported by Rice et al. (2010) as well as with our TD sample. Child A’s average MLUw was numerically higher than that of Rice’s TD and DLD groups both pre- and post-therapy, indicating that this was not an area of concern for him, though his scores fell below those of TD children aged between 7;06 and 7;11 years whose natural conversations with their mothers were collected and analysed within the current study. There was no significant difference between the individual and normative group means at either timepoint, as illustrated in Table 6.4, below.
### Table 6.4: Crawford comparisons between Child A MLUw and group samples

<table>
<thead>
<tr>
<th>Child A pre-therapy age</th>
<th>Child A pre- M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>7;06</td>
<td>5.18</td>
<td>Rice age 7;06-7;11 (TD)</td>
<td>47</td>
<td>4.92</td>
<td>1.03</td>
<td>0.240†</td>
<td>0.421</td>
<td>0.252</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 7;06-7;11 (DLD)</td>
<td>100</td>
<td>4.33</td>
<td>0.88</td>
<td>0.950‡</td>
<td>0.345</td>
<td>0.966</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (7;06-7;11)</td>
<td>3</td>
<td>5.94</td>
<td>0.69</td>
<td>-0.966†</td>
<td>0.218</td>
<td>-1.101</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Child A post-therapy age</th>
<th>Child A post- M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>7;10</td>
<td>5.2</td>
<td>Rice age 7;06-7;11 (TD)</td>
<td>47</td>
<td>4.92</td>
<td>1.03</td>
<td>0.346†</td>
<td>0.366</td>
<td>0.272</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 7;06-7;11 (DLD)</td>
<td>100</td>
<td>4.33</td>
<td>0.88</td>
<td>1.074‡</td>
<td>0.285</td>
<td>0.989</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (7;06-7;11)</td>
<td>3</td>
<td>5.94</td>
<td>0.69</td>
<td>-0.828†</td>
<td>0.247</td>
<td>-1.072</td>
</tr>
</tbody>
</table>

† One-tailed, as Child A’s MLUw was predicted to be lower than that of the TD children. ‡ Two-tailed to test differences in either direction. zcc denotes an effect size when comparing a single-case’s score to a control sample (Crawford, Garthwaite & Porter, 2010).

**1d) Does the ratio of child-to-adult speech change after intervention?**

Child A presented with receptive language needs and his mother was encouraged to provide more verbal input to enhance his comprehension skills. The child dominated pre-therapy conversations with an average ratio of 2.51, with the mother frequently using minimal turns. Following therapy, the mother spoke more, with the ratio of child-to-adult speech falling to 0.63 immediately post-therapy. By follow-up, the child had resumed the more talkative role (ratio of 1.32), but on average the conversation was more balanced after than before the intervention (mean ratio of 0.97, where 1 would represent an equal length of utterances for both partners). Table 6.5, below, summarises ratio results before and after therapy:
Table 6.5: Dyad A ratio of child-to-adult speech

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Time child spoke (in seconds)</th>
<th>Time adult spoke (in seconds)</th>
<th>Ratio of child-to-adult speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>158</td>
<td>49</td>
<td>3.22</td>
</tr>
<tr>
<td>Pre-2</td>
<td>102</td>
<td>55</td>
<td>1.85</td>
</tr>
<tr>
<td>Pre-3</td>
<td>133</td>
<td>54</td>
<td>2.46</td>
</tr>
<tr>
<td>Average pre</td>
<td>131</td>
<td>52.67</td>
<td>2.51</td>
</tr>
<tr>
<td>Post</td>
<td>94</td>
<td>150</td>
<td>0.63</td>
</tr>
<tr>
<td>Follow up</td>
<td>123</td>
<td>93</td>
<td>1.32</td>
</tr>
<tr>
<td>Average post</td>
<td>108.5</td>
<td>121.5</td>
<td>0.97</td>
</tr>
</tbody>
</table>

- ★ Proportion of time Mother spoke (measured in seconds)
- □ Proportion of time child spoke

Crawford modified t-tests (two-tailed) were used to compare Dyad A's average pre- and post-therapy ratio of child-to-adult speech with that of the whole TD sample included in this study (N = 22). All TD children were included in this comparison since there was no association between age and ratio within the normative sample. There was no significant difference between individual and TD group ratio before or after intervention (see Chapter 5, Table 5.6, TD M = 1.29, SD = 0.75, Dyad A pre-therapy M = 2.51, t = 1.591, p = 0.127; Dyad A post-therapy M = 0.97, t = -0.417, p = 0.681).

2) Do children's standardised language scores change following the intervention?

Table 6.6, below, summarises Child A's standardised assessment scores before and after BCC. Positive changes are highlighted in green, while numerical decreases are marked in purple.
Table 6.6: Child A standardised assessment scores

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Pre-therapy</th>
<th>Post-therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CELF-5 Sentence Comprehension (SCS)*</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Word Structure (SCS)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Formulated Sentences (SCS)</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Recalling Sentences (SCS)</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Core Language (SS and percentile)</td>
<td>86 (18)</td>
<td>95 (37)</td>
</tr>
<tr>
<td>ERRNI Ideas: initial story-telling (SS and percentile)</td>
<td>86 (17)</td>
<td>100 (51)</td>
</tr>
<tr>
<td>Ideas: recall (SS and percentile)</td>
<td>93 (32)</td>
<td>103 (57)</td>
</tr>
<tr>
<td>Forgetting (SS and percentile)</td>
<td>96 (39)</td>
<td>93 (33)</td>
</tr>
<tr>
<td>Comprehension (SS and percentile)</td>
<td>117 (87)</td>
<td>96 (39)</td>
</tr>
<tr>
<td>MLU words (SS and percentile)</td>
<td>89 (24)</td>
<td>103 (59)</td>
</tr>
<tr>
<td><strong>GCC (SCS and percentile)</strong></td>
<td>16 (&lt;1)</td>
<td>22 (&lt;1)</td>
</tr>
<tr>
<td><strong>SIDC (SCS)</strong></td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td><strong>Digit span (Forwards; SCS)</strong></td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

SCS: Scaled score; SS: standard score. *A scaled score of 7 or lower indicates below average performance (>1SD below the norm) on the CELF. **For the CCC, a General Communicative Composite (GCC) below 55 is indicative of a language difficulty. A Social Interaction Deviance Composite (SIDC) of -15 or below is cause for concern and may be suggestive of ASD.

Several areas of Child A’s receptive and expressive language improved following therapy, including both sentence comprehension and sentence formation on the CELF, with comprehension being the main area of need identified prior to the intervention. There was some improvement on the ERRNI narrative assessment, though forgetting and comprehension scores fell. There was a small increase on the digit span control task, which was not predicted to change following therapy focused on conversation.

### 6.2.1.3 Summary and discussion of Dyad A’s results.

Overall, the intervention produced positive change in targeted facilitators and barriers, as well as on standardised language assessments. MLUw, which was not a focus for intervention, held stable when averaged across pre- and post-therapy conversations. Meanwhile, ratio of child-to-adult speech shifted in line with therapy targets. Facilitators more than doubled from 4.88 on average pre-therapy to 10 post-therapy during five minutes of conversation. This means that, in each minute of videoed conversation, an additional facilitative behaviour occurred, whilst barrier behaviours fell from 3.88 to 1 per 5 minutes. If the recorded conversations are representative of
the dyad’s everyday interactions, these represent important patterns, which should yield positive change in Dyad A’s conversations over time (Best et al., 2016).

Given that A used strategies to support his memory and understanding (F1) only twice on average during his post-therapy and follow-up conversations, further practice and/or prompting from his mother may have been necessary for him to employ this facilitator routinely in conversation. Both participants were successful in reducing or eliminating their targeted barriers, albeit there were relatively few of these during the pre-therapy conversations. These results may reflect differences in the mechanisms of change involved in decreasing unhelpful conversation behaviours, compared to introducing or increasing compensatory strategies. For example, Johnson et al. (2021) applied a taxonomy of behaviour change techniques (BCTs) to help specify the active ingredients of the ‘Better Conversations with Aphasia’ programme. These authors found that three core BCTs were employed consistently by SLTs to help bring about change in barriers for people with aphasia and their conversation partners: providing information about social and environmental consequences of the undesired behaviour; information on emotional consequences and prompting participants to use a substitute facilitative behaviour to replace the identified barrier.

In contrast, 15 behaviour change techniques were identified within BCA to support an increase in facilitator behaviours. These ranged from giving explicit instructions on how to perform a behaviour to offering prompts, cues and social rewards, though notably did not include providing information on the emotional consequences of the targeted behaviour, which may have been a key ingredient for promoting a reduction in barriers. These findings suggest a more complex, and variable, process for effecting change in facilitators within BCA. Since the development of BCC was informed by the BCA programme, it is likely that the mechanisms of change within the current study may also vary for facilitators versus barrier strategies.

The improvement in Child A’s formal language scores is noteworthy, since previous studies involving school-aged children with DLD have failed to capture significant effects of intervention using standardised outcome measures (Ebbels et al., 2019). Child A presented with significant comprehension difficulties and DLD with a
receptive language component is reportedly more resistant to intervention than expressive or phonological disorder, as well as being associated with poorer long-term prognosis (Boyle et al., 2010). Alongside this, the unexpected increase in Child A's digit span (which was chosen as a control task) may have been related to work within BCC, which was designed to support A's auditory memory within conversation. Alternatively, it may have reflected a more general improvement in A's memory skills, which was unrelated to the intervention. Further investigation will be necessary to determine whether these effects are replicable with children who show similar, or contrasting, language and cognitive profiles to Child A.

The overall fall in child-to-adult ratio of speech runs counter to previous PCIT studies, which reported an increase in child talk duration as a result of interaction-based therapy (Falkus et al., 2016 and Baxendale & Hesketh, 2003). However, speaking more was not a key target for Child A for whom expressive language was a relative strength and whose MLUw was above the TD norms reported by Rice et al (2010). Instead, Mother A was aiming to increase her use of clear explanations, recasting and repeating back, while decreasing minimal turns, to support her son's auditory memory and comprehension development. It could be argued that the conversation immediately post-therapy was tipped too far in favour of the mother speaking (child-to-adult ratio of 0.6). This ratio reflected her use of four explanations in the space of five minutes, which could be seen as excessively didactic within natural conversation. However, this levelled out to a more even ratio of 1.32 by the final, follow-up recording as the mother used more recasts and repeats in response to the child's own utterances, indicating a more balanced style of conversation, with the mother responding contingently to the child's utterances.

Following BCC, A's mother stated that there had been 'some improvement' in their everyday interactions. She reported that A 'sometimes tells me he doesn't understand or to explain what I mean', while she described 'asking him if he understands and explaining myself more' as the two things she had learned to help A with his language in conversation. Meanwhile, A felt that his conversations at home and at school were 'still the same,' though he also commented: 'I don't feel shy... I just talk about anything', in contrast to his pre-therapy account of becoming shy and forgetting what he wanted to say when talking with family or friends.
6.2.2 Dyad B

Child B, a boy aged 6;08 years, and his mother formed the second dyad. B attended the same mainstream primary school as Child A and both were classmates in Year Two. B was previously assessed by an SLT, following a referral by his school Special Educational Needs Co-ordinator (SENCO). His report noted that he showed 'significant difficulties in conversation', but he had not received any direct intervention prior to BCC. B had a family history of dyslexia (father) and a sister with complex learning and language needs. His mother was a full-time carer to B and his sister.

6.2.2.1 Identification of targeted conversation behaviours. In contrast to the first case, Child B’s main difficulties in conversation related to his expressive language, including marked word-finding difficulties. In her pre-therapy questionnaire, B’s mother reported that: 'He gets very frustrated, and so do I when he can't find the right words.' She also described finding it 'difficult to keep B talking,' explaining that she was ‘constantly thinking ahead to the next question' during their interactions together. Meanwhile, Child B described his conversations at school as 'Not quite good, 'cause I just can't... I've no idea'. He reported finding it 'super hard' for him to express his ideas in class and at home.

The following facilitators and barriers were identified by the dyad, with support from the therapist, as targets for intervention. All behaviours, except for F3: M responding to B's non-verbal communication, were coded for the TD group, enabling cross-comparison of counts between the dyad and the normative sample.

Child Facilitator (F1): Using gestures or acting out to help communicate meaning.

This referred to B using non-verbal strategies to counteract his word-finding difficulties and help get his message across. Examples from his pre-therapy conversations include:
Example 1, pre-therapy 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>77.</td>
<td>M</td>
<td>What em… What do you like about Cornwall?</td>
<td></td>
</tr>
<tr>
<td>78.</td>
<td>B</td>
<td>There’s a beach.</td>
<td></td>
</tr>
<tr>
<td>79.</td>
<td>M</td>
<td>You like the beach</td>
<td></td>
</tr>
<tr>
<td>80.</td>
<td>B</td>
<td>But… but when it like goes ((gestures hands out and in)) … in, I don’t like it cause I think you just take away the whole island of that part.</td>
<td>F1: B uses gestures to help communicate</td>
</tr>
</tbody>
</table>

Example 2, pre-therapy 2

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>105.</td>
<td>M</td>
<td>You were really excited, weren’t you?</td>
<td></td>
</tr>
<tr>
<td>106.</td>
<td>B</td>
<td>I was like ((acts out being excited / flapping arms)).</td>
<td>F1: B uses gestures to help communicate</td>
</tr>
</tbody>
</table>

Adult Facilitator (F2): Avoiding too many questions by using:

a) minimal turns, e.g.:

‘uhuh’ and ‘yeah’ (when not in answer to a question; pre-therapy 2).

b) contingent commenting. e.g.:

Example 4, pre-therapy 1, talking about their trip to Cornwall.

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>77.</td>
<td>M</td>
<td>Well, you went to bed. Mummy put you to bed</td>
<td>F2(b): contingent comment</td>
</tr>
<tr>
<td>78.</td>
<td>B</td>
<td>Yeah, but then… I was still awake, though.</td>
<td></td>
</tr>
<tr>
<td>79.</td>
<td>M</td>
<td>You did go to sleep for a little bit and then I think we woke you up at…</td>
<td>F2(b): contingent comment</td>
</tr>
<tr>
<td>80.</td>
<td>B</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>81.</td>
<td>M</td>
<td>Three in the morning</td>
<td></td>
</tr>
<tr>
<td>82.</td>
<td>B</td>
<td>Yeah</td>
<td></td>
</tr>
<tr>
<td>83.</td>
<td>M</td>
<td>Got you up three in the morning and put you in the car</td>
<td>F2(b): contingent comment</td>
</tr>
<tr>
<td>84.</td>
<td>B</td>
<td>No… Yeah. You put me in the car, ’cause I was freezing.</td>
<td></td>
</tr>
<tr>
<td>85.</td>
<td>M</td>
<td>Yes you were</td>
<td></td>
</tr>
<tr>
<td>86.</td>
<td>B</td>
<td>I was freezing</td>
<td></td>
</tr>
<tr>
<td>87.</td>
<td>M</td>
<td>Cause it was really cold, wasn’t it?</td>
<td>F2(b): contingent comment</td>
</tr>
</tbody>
</table>

c) recasting, e.g.:
Example 5, pre-therapy 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>88.</td>
<td>B</td>
<td>I did not do it for real.</td>
<td></td>
</tr>
<tr>
<td>89.</td>
<td>M</td>
<td>Well, you pretended.</td>
<td>F2(c) - recast</td>
</tr>
</tbody>
</table>

Adult Facilitator (F3): responding to B's non-verbal communication.

After viewing videos of their pre-therapy conversations, Mother B noted that she sometimes ignored B's non-verbal communication, even when he was clearly expressing his thoughts and emotions, e.g.:

Example 6, pre-therapy 3, talking about B's SATS tests.

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.</td>
<td>B</td>
<td>I was like ((pulls very frightened face and pretends to sob)) I was like that.</td>
<td>B uses non-verbal communication</td>
</tr>
<tr>
<td>35.</td>
<td>M</td>
<td>And what was the picnic like in the field?</td>
<td>M changes the topic</td>
</tr>
</tbody>
</table>

B's mother made it her aim to treat gesture, acting out and facial expression as full communication attempts by answering or feeding back what she had understood.

The numerator for this behaviour was the number of times the mother responded, divided by the denominator, which was the number of times B used non-verbal communication. This may include word-finding strategies (F1), as well movements or expressions which accompanied or supplemented words, e.g.:

'It was like massive ((gestures with arms out wide)).' (pre-therapy 1).

'I go like ((pulls funny face)). Jump over it.' (pre-therapy 1).

Child barrier (B1): giving up when stuck on a word.

This referred to B opting out, rather than using his chosen facilitator of gesturing or acting out when he encountered word-finding difficulties (F1). Examples from the dyad's pre-therapy transcripts include:

'I don't know' (pre-therapy 3).
‘I got no idea what’s it called’ (pre-therapy 2).

‘That’s all I got to say.’ (pre-therapy 2).

**Adult barrier (B2): using limiting questions.**

While questions form a key part of language development and can be useful for scaffolding learning for children with DLD, Mother B felt that certain types of questions were less helpful within her conversations with her son as they ‘put him on the spot’ and limited the range of his responses. Two question types were targeted for reduction by Mother B:

a) test questions, e.g.:

‘What did we do to get there?’ (pre-therapy 1).

‘Where does Granny live’? (pre-therapy 2).

‘What do you use to cook on outside in the garden?’ (pre-therapy 2).

b) forced choice questions, e.g.:

‘Do you like Cornwall or Center Parcs more?’ (pre-therapy 1).

‘Did you have a waffle or a pancake, actually?’ (pre-therapy 1).

‘Did you do your tests in little groups, or did you do them all in the big... in your normal classroom?’ (pre-therapy 3)
6.2.1.2 Therapy outcomes. Results are presented for pre- and post-therapy conversation behaviours and measures, followed by standardised language scores. Each research question will be addressed in turn:

1a) Does use of targeted conversation facilitators used by children and parents increase after intervention?

1b) Does the number of targeted communication barriers decrease following the intervention?

Table 6.7, below, shows raw counts for Dyad B's targeted facilitators and barriers in each conversation sample (three pre-therapy, one immediately post- and one at follow-up, six weeks after the intervention):

**Table 6.7: Dyad B facilitator and barrier counts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Conversation sample code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-1</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td><strong>Conversation Facilitators</strong></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>B uses gestures or acting out to support his WFD</td>
<td>2</td>
</tr>
</tbody>
</table>
| F2  | M uses:  
|    | a) minimal turns | 3 | 6.94 | 2.36 | 4.1 | 5 | 10 | 7.5 |
|    | b) contingent comments | 18 | 4.68 | 7.08 | 9.92 | 9 | 4 | 6.5 |
|    | c) recasts / repeats | 9 | 9.36 | 2.36 | 6.91 | 11 | 3 | 7 |
|    | **Sub-total:** | 30 | 20.98 | 11.8 | 20.93 | 25 | 17 | 21 |
|     | **Total number of targeted facilitators (excludes F3 because this is a proportion)** | **32** | **22.54** | **16.52** | **23.69** | **29** | **18** | **23.5** |
| F3  | i) M responds to B’s non-verbal communication*  
|    | ii) Instances of non-verbal communication by B | 3 | 1.56 | 2.36 | 1.78 | 7 | 4 | 5.5 |
|    | 4 | 1.56 | 4.72 | 3.43 | 9 | 5 | 7 |
### iii) Proportion of times M responds to B’s n.v. communication: \( \frac{i}{ii} \times 100 \)

<table>
<thead>
<tr>
<th></th>
<th>75%</th>
<th>100%</th>
<th>50%</th>
<th>75%</th>
<th>78%</th>
<th>80%</th>
<th>79%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B1</strong></td>
<td>0</td>
<td>4.68</td>
<td>3.54</td>
<td>2.74</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>B2</strong></td>
<td>7</td>
<td>32.76</td>
<td>8.26</td>
<td>16.01</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>5.9</td>
<td>2.97</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>10</td>
<td>37.44</td>
<td>17.70</td>
<td>21.71</td>
<td>6</td>
<td>7</td>
<td>6.5</td>
</tr>
</tbody>
</table>

*Scores corrected to account for recorded conversation less than 5 minutes (pre-2 - 3:12; pre-3 - 4:12).*

Immediately post-therapy, there was an increase in targeted facilitators (from an average of 23.69 per five-minute conversation pre-therapy to 29 in the post-therapy conversation). However, the frequency of facilitators fell to 18 at follow-up, giving an average post-therapy score of 23.5 (Poisson trend test for frequencies: \( z = -0.04, p = 0.483 \), one-tailed).

A trend test for rankable counts (Meddis, 1984) was used to analyse the proportion of times M responded to B’s non-verbal communication before and after therapy (F3). Instances of this opportunistic behaviour rose from 75% to 79% following BCC, but this change was not significant \( (z = -0.61, p = 0.271) \).

Importantly, overall barrier behaviours fell significantly, as predicted, from pre- to post-therapy \( (z = -3.89, p = <0.001) \). This was led by the reduction in parental test questions from an average of 16 pre-therapy to 3 following BCC. Total barriers rose marginally from a frequency of 6 to 9 between post-therapy and follow-up.

#### 6.2.2.2.1 Comparisons with TD data.** Crawford modified t-tests were used to compare Dyad B’s conversation behaviours to those of the TD group \( (N = 22) \).
The analysis showed that Child B used fewer non-verbal communication strategies (F1) than his TD counterparts both before and after therapy, however neither difference was statistically significant (for TD behaviour counts see Chapter 5, Table 5.2; TD $M = 4.25$, $SD = 5.55$, Child B pre-therapy $M = 2.76$, $t = -0.263$, $p = 0.795$; Child B post-therapy $M = 2.76$, $t = -0.308$, $p = 0.761$). With regard to Mother B’s facilitators, Crawford tests showed that she used numerically fewer minimal turns (F2a) than the TD group before therapy and more afterwards, though neither difference reached statistical significance (TD $M = 6.48$, $SD = 4.49$, Mother B pre-therapy $M = 4.1$, $t = -0.518$, $p = 0.610$; Mother B post-therapy $M = 7.5$, $t = 0.222$, $p = 0.826$).

B’s mother used fewer contingent comments (F2b) at both time points, with her average count being lower following therapy. Once again, the differences were not statistically significant (TD $M = 9.95$, $SD = 6.42$, Mother B pre-therapy $M = 9.92$, $t = -0.005$, $p = 0.996$; Mother B post-therapy $M = 6.5$, $t = -0.526$, $p = 0.605$). The mother used more recasts (F2c) than the TD group both before and after the intervention, with a slightly higher count post-therapy, though similarly this did not reach statistical significance (TD $M = 5.95$, $SD = 4.6$, Mother B pre-therapy $M = 6.91$, $t = 0.204$, $p = 0.840$; Mother B post-therapy $M = 7$, $t = 0.223$, $p = 0.826$).

Turning to barrier behaviours, Child B 'gave up when stuck on a word' (B1) significantly more frequently than his TD peers at both time points, though instances of this reduced following BCC (TD $M = 0.04$, $SD = 0.14$, Child B pre-therapy $M = 2.74$, $t = 18.862$, $p = <0.001$; Child B post-therapy $M = 1$, $t = 6.706$, $p = <0.001$). Meanwhile, the mother used numerically more test questions (B2a) than the TD sample before therapy and fewer afterwards. Despite the large drop in her use of this behaviour, individual and TD group scores did not differ significantly at either time point (TD $M = 6.52$, $SD = 5.73$, Mother B pre-therapy $M = 16.01$, $t = 1.620$, $p = 0.120$; Mother B post-therapy $M = 3$, $t = -0.601$, $p = 0.554$). Finally, for forced choice questions (B2b), Mother B used more of these than the mean for the TD group at both time points, though the difference was not statistically significant (TD $M = 0.93$, $SD = 1.15$, Mother B pre-therapy $M = 2.97$, $t = 1.735$, $p = 0.097$; Mother B post-therapy $M = 2.5$, $t = 1.335$, $p = 0.196$).
1c) Does children’s Mean Length of Utterance in words (MLUw) increase following the intervention?

Figure 6.3, below, shows Child B’s MLUw for each recorded interaction. The blue line illustrates the change from average pre-therapy to average post-therapy conversations. There was an increase in average MLUw following the intervention, with the longest MLUw recorded at follow-up (4.21).

Figure 6.3: Child B MLUw before and after therapy

Crawford modified t-tests were used to compare Child B’s MLUw scores with those reported by Rice et al. (2010) as well as with the TD sample. Child B’s average MLUw was below that of Rice’s TD and DLD groups both pre- and post-therapy, as well those of TD children aged between 6;06 and 6;11 years (pre-therapy comparison) and between 7;0 and 7;05 years (post-therapy comparison) whose natural conversations with their mothers were collected and analysed within the current study. There was no significant difference between the individual and normative group means at either timepoint, as illustrated in table 6.8, below.
Table 6.8: Crawford comparisons between Child B MLUw and group samples

<table>
<thead>
<tr>
<th>Child B age (pre/post)</th>
<th>Child B M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>6;08 (pre-therapy)</td>
<td>3.67</td>
<td>Rice age 6;06-6;11 (TD)</td>
<td>63</td>
<td>4.7</td>
<td>0.66</td>
<td>-1.548†</td>
<td>0.063</td>
<td>-1.561</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 6;06-6;11 (DLD)</td>
<td>94</td>
<td>4.18</td>
<td>0.71</td>
<td>-0.715‡</td>
<td>0.477</td>
<td>-0.718</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (6;06-6;11)</td>
<td>4</td>
<td>4.90</td>
<td>0.71</td>
<td>-1.550†</td>
<td>0.110</td>
<td>-1.732</td>
</tr>
<tr>
<td>7;01 (post-therapy)</td>
<td>4.01</td>
<td>Rice age 7;00-7;05 (TD)</td>
<td>51</td>
<td>4.72</td>
<td>0.83</td>
<td>-0.829†</td>
<td>0.205</td>
<td>-0.855</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 7;00-7;05 (DLD)</td>
<td>103</td>
<td>4.15</td>
<td>0.62</td>
<td>-0.201‡</td>
<td>0.41</td>
<td>-0.226</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (7;00-7;05)</td>
<td>5</td>
<td>5.69</td>
<td>0.93</td>
<td>-1.634†</td>
<td>0.089</td>
<td>-1.806</td>
</tr>
</tbody>
</table>

† One-tailed, as Child B’s MLUw was predicted to be lower than that of the TD children. ‡ Two-tailed to test differences in either direction between Child B and Rice et al.’s (2010) DLD group. zcc denotes an effect size when comparing a single-case’s score to a control sample (Crawford, Garthwaite & Porter, 2010).

1d) Does the ratio of child-to-adult speech change after intervention?

Prior to therapy, the mother spoke more than B in all three recorded conversations (average child-to-adult ratio: 0.87). In contrast, B did the majority of the talking both immediately post-therapy and at follow-up (average post-therapy ratio: 1.33). This was consistent with the aims of therapy, which included the mother using minimal turns to give B more time and space to speak, as well as encouraging the child to use word-finding strategies, rather than giving up when stuck. Table 6.9, below, summarises ratio results before and after therapy:
Table 6.9: Dyad B ratio of child-to-adult speech

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Time child spoke (in seconds)</th>
<th>Time adult spoke (in seconds)</th>
<th>Ratio of child-to-adult speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>114</td>
<td>148</td>
<td>0.77</td>
</tr>
<tr>
<td>Pre-2</td>
<td>82</td>
<td>89</td>
<td>0.92</td>
</tr>
<tr>
<td>Pre-3</td>
<td>104</td>
<td>112</td>
<td>0.93</td>
</tr>
<tr>
<td>Average pre</td>
<td>100</td>
<td>116.33</td>
<td>0.87</td>
</tr>
<tr>
<td>Post</td>
<td>129</td>
<td>124</td>
<td>1.04</td>
</tr>
<tr>
<td>Follow up</td>
<td>127</td>
<td>78</td>
<td>1.62</td>
</tr>
<tr>
<td>Average post</td>
<td>128</td>
<td>101</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Crawford modified t-tests (two-tailed) were used to compare Dyad B's average pre- and post-therapy ratio of child-to-adult speech with that of the TD sample included in this study (N = 22). B spoke on average less than his TD counterparts, in relation to their mothers, prior to the intervention but had a marginally higher ratio afterwards. Despite this marked change for the dyad, there was no significant difference in their individual versus TD group ratio either before or after BCC (see Table 5.6, above, TD $M = 1.29$, $SD = 0.75$, Dyad B pre-therapy $M = 0.87$, $t = -0.548$, $p = 0.590$; Dyad B post-therapy $M = 1.33$, $t = 0.052$, $p = 0.959$, two-tailed).

2) Do children's standardised language scores change following the intervention?

Finally, Table 6.10, below, summarises Child B's standardised assessment results, with green indicating areas of positive change and purple signifying a fall in scores:
Table 6.10: Child B standardised assessment scores

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Pre-therapy</th>
<th>Post-therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CELF-5</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sentence Comprehension (SCS)*</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Word Structure (SCS)</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Formulated Sentences (SCS)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Recalling Sentences (SCS)</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Core Language (SS and percentile)</td>
<td>84 (14)</td>
<td>89 (23)</td>
</tr>
<tr>
<td><strong>ERRNI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideas: initial story-telling (SS and percentile)</td>
<td>98 (44)</td>
<td>93 (32)</td>
</tr>
<tr>
<td>Ideas: recall (SS and percentile)</td>
<td>69 (2)</td>
<td>65 (1)</td>
</tr>
<tr>
<td>Forgetting (SS and percentile)</td>
<td>78 (7)</td>
<td>77 (6)</td>
</tr>
<tr>
<td>Comprehension (SS and percentile)</td>
<td>95 (37)</td>
<td>65 (1)</td>
</tr>
<tr>
<td>MLU words (SS and percentile)</td>
<td>98 (44)</td>
<td>97 (42)</td>
</tr>
<tr>
<td><strong>CCC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCC (and percentile)</td>
<td>39 (3)</td>
<td>48 (7)</td>
</tr>
<tr>
<td><strong>SIDC</strong></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Digit span</strong> (Forwards; SCS)</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

SCS: Scaled score; SS: standard score. *A scaled score of 7 or lower indicates below average performance (>1SD below the norm) on the CELF. **For the CCC, a General Communicative Composite (GCC) below 55 is indicative of a language difficulty. A Social Interaction Deviance Composite (SIDC) of -15 or below is cause for concern and may be suggestive of ASD.

As for the previous case, B's CELF comprehension score increased following the intervention. This brought his Core Language Composite to within normal limits (standard score of 89). B's mother also reported an improvement in his everyday communication (GCC score of 48 post-therapy, compared to 38 pre-). However, his social interaction score fell. There was limited progress across other areas of B's language development and a decrease in scores, most notably comprehension, on the ERRNI narrative test. Given B's significant word-finding difficulties, it is regrettable that neither the ACE naming subtest nor the BPVS were administered at the time of data collection for this dyad. Unexpectedly, forwards digit span increased from a scaled score of 6 pre-therapy to 9 following the intervention.

**6.2.2.2 Summary and discussion of Dyad B's results.** Overall, the intervention produced the desired significant reduction in targeted conversation barriers, with no significant change in the frequency of facilitative strategies. MLUw in conversation rose when averaged across pre- and post-therapy recorded interactions. Meanwhile, ratio of child-to-adult speech shifted in line with therapy targets, with the child speaking more following the intervention. Results on standardised language assessments were mixed, with Child B making the most striking gains on CELF sentence comprehension, while his scores on the digit span...
control task also rose, contrary to pre-therapy predictions. It is not clear whether the increase in digit span was related to general developmental gains, which were unrelated to BCC. However, B's performance on the ERRNI narrative assessment was poorer following the intervention - most notably in relation to his comprehension of 'The Beach story' at Time 2. It should be noted that a different stimulus, 'The Fish Story', is used at initial testing. Though these narratives are matched for vocabulary and language levels, it is possible that an individual child may find one scenario easier, or more difficult, to follow, due to their personal experience and interests.

One immediate benefit of therapy for Dyad B was the ability to sustain their conversations for longer following BCC. Two out of their three pre-therapy recordings fell short of the 5-minute minimum that was requested for the analysis, whilst both of their post-therapy videos exceeded this threshold. It is likely that the reduction in Mother B's use of test questions, her increased use of minimal turns and B's success in not 'giving up' when stuck on a word, worked together to help prevent the conversation from 'drying up' prematurely. It is expected that this change would lead to richer and more satisfying conversations for the dyad over time (as evidenced by the continued improvements in conversation measures and participant reports between post-therapy and follow-up). B's ongoing challenges with word-finding in conversation are highlighted by the significant differences between his use of WFD strategies and 'giving up when stuck on a word' when compared to his TD peers.

The significant change in barrier behaviours, but not facilitators, was in line with findings by Best et al. (2016) for adults who took part in the related 'Better Conversations with Aphasia' intervention. Close examination of the data shows that both B and his mother did increase their use of facilitative behaviours immediately following therapy, but this change was not maintained at follow-up, six weeks later. Conversely, the dyad's use of undesirable barrier behaviours increased from 6 immediately post therapy to 9 at follow-up, indicating that further support may have been required for the dyad to sustain positive gains and embed targeted strategies within their everyday interactions.

B's average pre-therapy MLUw was 3.67, rising to 4.03 following the intervention. This placed him below the TD and DLD group means reported by Rice et al. (2010)
for his age group at both time points. However, the rise from T1 to T2 compares favourably to the gains reported by Rice and colleagues for their TD and DLD samples. TD children aged 6;06 - 6;11 in the 2010 study had an average MLUw of 4.70, compared to MLUw of 4.72 for those aged 7;0 - 7;05 - a marginal difference of 0.02. Meanwhile, Rice et al. (2010) reported average MLUw of 4.18 for children with DLD aged 6;06 - 6;11 years. This figure fell to 4.15 (a decrease of 0.03) for language-impaired children in the next age band. The increase in B's MLUw following six weeks of intervention, therefore, exceeded that of DLD and unimpaired peers across a longer time period.

While the improvement in B's average utterance length is numerically small, this could represent an important functional gain in his communication when scaled up across his daily interactions, allowing him to express more complex ideas, potentially including more past and future reference, since MLUw is closely correlated with grammatical and morphological development (Parker & Brorson, 2005; Rice et al., 2010). The increase in B's MLUw was also reflected in his higher child to adult speech ratio. Whilst this measure does not assess the quality of speech and language, it does reflect the extent to which the child is participating in the conversation (Falkus et al., 2016). Given the established benefits of engaging in two-way interactions with a responsive adult (Romeo et al., 2018), this is likely to result in continued gains in B's language and communication if maintained over time, by enhancing the neural mechanisms involved in linguistic and cognitive processing.

Following BCC, B's Mother reported that taking part in the intervention 'really made me less frustrated... It's given me the tools to be able to help him'. She said that, prior to therapy, she 'didn't know if he was being silly or didn't want to talk', whereas after BCC 'I realised I just need to give him more time.' B rated his conversations as 'much better' post-therapy, citing the biggest difference as his mother 'giving me more time', in line with her own description of identifying this as the key change she needed to make in her interactions with B. It may be that the shift in her perception of B's limited communication (from being something he could control to a difficulty which required her support) led to a change in her motivation for behaviour change (with reference to the COM-B Model, Michie et al., 2011).
Meanwhile, Mother B reported that her son 'now finds other ways to help find the words, like using gestures and actions,' while she uses minimal turns such as 'OK' and 'right' to encourage him to build on his previous utterances. Despite this, B reported still finding it hard to get his message across in school: 'I normally say "er". I'm like... (pulls confused face)'. This underlines the importance of sharing key conversation strategies with education staff so that B can receive consistent support with his communication both at home and in the classroom. It is unclear whether gains made by B in conversation with his mother would transfer to his wider interactions without adjustments being made by his additional communication partners.
6.2.3 Dyad C

Dyad C comprised a boy aged 6;06 years and his mother, a part-time worker in the hospitality sector, both of whom were monolingual English speakers. Child C was in Year One at his mainstream primary in Surrey, which had a higher-than-average proportion of students who were eligible for the pupil premium. C had previously been referred to Occupational Therapy, due to concerns about his walking and fine motor skills. He had not received any SLT input prior to his participation in BCC. Both C and his Mother had a diagnosis of Albright's syndrome, a condition which affects bones, skin and thyroid function but is not related to language development. C's older sister had ADHD, while his paternal Uncle had Dyslexia.

6.2.3.1 Identification of targeted conversation behaviours.

In their pre-therapy questionnaires, Child C's mother identified difficulty with naming and confabulation as the key areas which affected his everyday communication. She said: 'C can be quite silly when we're talking together. He often makes up stories, which makes it hard to know if he is telling the truth'. Evidence for this was provided during C's first meeting with the research therapist, when he stated that it was his Birthday and described his detailed plans for a party at the weekend. It subsequently emerged that C's Birthday was not for six months, and his Teaching Assistant (TA) explained that he often spoke about this favoured topic 'as a way to start a conversation'.

Despite this apparent motivation to communicate with others, C told the therapist: 'I just don't really like talking'. He said he felt 'sad sometimes in class... I don't even like other people talking because I'm trying to concentrate on my work'. He went on to describe how he found it difficult to deal with background noise at home or in the playground: 'When everyone's calm, I'm super happy. But when it's loud, I'm angry'. With support from the research SLT, the following facilitators and barriers were identified by the dyad as targets for intervention. Behaviours marked with asterisks were also coded for the TD group.
Child Facilitator (F1): Saying things another way when stuck on a word

This referred to C using circumlocution to get his message across when he was experiencing word-finding difficulties (WFDs). There were few examples of this behaviour from the dyad’s pre-therapy conversations. However, the dyad identified this as a target strategy, due to C’s marked difficulties with lexical retrieval and his clear frustration when struggling to think of the correct name. The motivation for including this facilitator was therefore not related to the frequency of occurrence, but rather to mitigate the impact of C’s WFDs, e.g.:

Example 1, pre-therapy 2, C experiences word-finding difficulties whilst trying to complete his homework.

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.</td>
<td>C</td>
<td>What- <strong>what is the name?</strong> ((looking at worksheet))</td>
<td>WFD</td>
</tr>
<tr>
<td>44.</td>
<td>M</td>
<td>What is what?</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>C</td>
<td>What is - <strong>what is this names? I can’t.</strong></td>
<td>WFD</td>
</tr>
<tr>
<td>46.</td>
<td>M</td>
<td>So it says... how- what- let’s read this out.</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>C</td>
<td>How do you spell that?</td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>M</td>
<td>((reading worksheet while pointing)) ‘Name these 3D shapes.’ So what’s this one? ((points)).</td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>C</td>
<td>It’s a- a- a- <strong>a cuboid.</strong></td>
<td>WFD</td>
</tr>
<tr>
<td>50.</td>
<td>M</td>
<td>Nooo…</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>C</td>
<td>a- <strong>(sobbing vocalisations)</strong></td>
<td>WFD</td>
</tr>
<tr>
<td>52.</td>
<td>M</td>
<td>/s/</td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>C</td>
<td>/s/ sat-</td>
<td>WFD</td>
</tr>
<tr>
<td>54.</td>
<td>M</td>
<td>Cyl-</td>
<td></td>
</tr>
<tr>
<td>55.</td>
<td>C</td>
<td>Cylinder</td>
<td></td>
</tr>
</tbody>
</table>

Adult facilitator (F2): Giving clear explanations of words and concepts

This strategy was chosen by C’s mother to help him with his naming and understanding by highlighting the meanings of key names and instructions, e.g.:

‘I think when it’s a name you have to do capitals’ (pre-therapy 3).
Example 2, pre-therapy 2:

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.</td>
<td>M</td>
<td>Well first of all we’re gonna do the homework and then-</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>C</td>
<td>Why? ((frustrated vocalisations))</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>M</td>
<td>And then…</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>C</td>
<td>Why? Why, ((strained voice)) why?</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>M</td>
<td>Because... ((points to star chart)) then you can get another sticker because it says: 'I did my homework'. That’s two stickers already today. And then you get another one when you sleep in your own bed ((points to chart)) and you get another one when you read your book later ((pointing to chart while embracing C)).</td>
<td>F2: M gives clear explanation of how to use star chart</td>
</tr>
</tbody>
</table>

Child barrier (B1): Confabulation or ‘fibbing’

This referred to C making things up that weren't true within conversation. The following example is from a recording involving C, his Mother (M) and also his Father (F). The presence of a third person may have influenced the content and flow of the interaction. Nevertheless, both parents' responses provide evidence of C's confabulation, through 'next turn proof procedure' (Hutchby & Wooffit, 2008), as they display through laughter and smiling their questioning of the veracity of C's prior turn.

Example, pre-therapy 1, 'confabulation'

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.</td>
<td>C</td>
<td>And I also done a… school trip</td>
<td>B1</td>
</tr>
<tr>
<td>31.</td>
<td>F</td>
<td>((Laughs)) You went on a school trip today?</td>
<td>Laughter indicates F knows this isn't true.</td>
</tr>
<tr>
<td>32.</td>
<td>C</td>
<td>((Nods))</td>
<td>B1</td>
</tr>
<tr>
<td>33.</td>
<td>F</td>
<td>Where did you go?</td>
<td>Going along with the confabulation</td>
</tr>
<tr>
<td>34.</td>
<td>C</td>
<td>I went all the way… to Wimbledon</td>
<td>B1</td>
</tr>
<tr>
<td>35.</td>
<td>M</td>
<td>To Wimbledon? ((smiling))</td>
<td>B2</td>
</tr>
<tr>
<td>36.</td>
<td>C</td>
<td>((Nods))</td>
<td>B1</td>
</tr>
<tr>
<td>37.</td>
<td>F</td>
<td>Ahh a school trip to Wimbledon! What, Wimbledon tennis?</td>
<td>Going along with the confabulation</td>
</tr>
<tr>
<td>38.</td>
<td>C</td>
<td>Yeah</td>
<td>B1</td>
</tr>
<tr>
<td>39.</td>
<td>F</td>
<td>Oh. Wow.</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>C</td>
<td>Me.</td>
<td>B1</td>
</tr>
<tr>
<td>41.</td>
<td>F</td>
<td>What did you do there?</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>C</td>
<td>Play tennis</td>
<td>B1</td>
</tr>
<tr>
<td>43.</td>
<td>F</td>
<td>((Laughs))</td>
<td>B2</td>
</tr>
</tbody>
</table>
Adult barrier (B2): ‘Letting things run on’ when C says something that may not be true or when there appears to be a misunderstanding.

Linked to C's previous barrier behaviour, his mother identified failing to challenge him when he appeared to be confabulating as unhelpful to the content and direction of their conversations. She said she would like to be able to talk to C about his genuine feelings and experiences, e.g., in relation to his school day, rather than have 'pretend' conversations, such as in the example above.

Adult barrier (B3): Explicitly criticising, or correcting, what C has said.

M's final target was to avoid negative evaluations of C's spoken and written language in order to avoid discouraging his communicative attempts. Examples of this barrier behaviour included:

Example 1, pre-therapy 2:

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.</td>
<td>C</td>
<td>I tried to write this one <em>(pointing at the worksheet)</em>.</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>M</td>
<td>Yeah and you’ve got it wrong, didn’t you?</td>
<td>B3</td>
</tr>
</tbody>
</table>

Example 2, pre-therapy 3:

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.</td>
<td>C</td>
<td>I love you B and- and I hope you have a nice Christmas. Love, love, love...</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>M</td>
<td>No, <em>Birthday</em></td>
<td>B3</td>
</tr>
</tbody>
</table>

6.2.3.2 Therapy outcomes.

Once targeted barriers and facilitators had been identified with the dyad, these were practised during face-to-face therapy sessions and consolidated during home practice. To evaluate the effects of intervention for Dyad C, each of the research questions will be addressed in turn, with results presented for pre- and post-therapy conversation behaviours and measures, followed by standardised language scores.

*The following results relate to RQs 1a) and 1b), above.*
Table 6.11, below, displays raw counts for Dyad C's targeted facilitators and barriers in each conversation sample:

**Table 6.11: Dyad C facilitator and barrier counts**

<table>
<thead>
<tr>
<th>Code</th>
<th>Behaviour</th>
<th>Pre-1*</th>
<th>Pre-2</th>
<th>Pre-3</th>
<th>Av Pre</th>
<th>Post</th>
<th>Follow-up</th>
<th>Av post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Conversation Facilitators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>C 'says it another way' when stuck on a name</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0.67</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F2</td>
<td>M gives clear explanation of word or concept</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>2.67</td>
<td>5</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted facilitators</strong></td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>3.33</td>
<td>5</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td><strong>Conversation Barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>C makes something up that isn't true</td>
<td>10.05</td>
<td>0</td>
<td>0</td>
<td>3.35</td>
<td>0</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>B2</td>
<td>M 'lets things run on' C says something that may not be true or there appears to be a misunderstanding</td>
<td>5.74</td>
<td>0</td>
<td>0</td>
<td>1.91</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>B3</td>
<td>M explicitly criticises or corrects C, e.g., 'You got that wrong,' or 'No. It's_'</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>1.67</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted barriers</strong></td>
<td>15.79</td>
<td>4</td>
<td>1</td>
<td>6.93</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

* Scores corrected to account for recorded conversation less than 5 minutes (3:29).
There was an increase in the dyad's average use of targeted facilitators following the intervention (from 3.33 to 4.5 per five-minute conversation). However, this did not reach statistical significance (Poisson trend for frequencies: $z = 0.66, p = 0.256$, one-tailed). As for Dyads A and B, the number of barrier behaviours decreased significantly post-therapy ($z = -2.43, p = 0.008$, one-tailed). This was led by a reduction in C's confabulations (B1) from an average 3.35 pre-therapy to 1.5 post. It should be noted that the majority of instances of this behaviour were recorded during the first pre-therapy conversation (10.05), with zero instances at pre-therapy 2 or 3. However, this high count was not treated as an outlier, since C was reported to use this behaviour frequently in his daily interactions prior to BCC. M also managed to eliminate her barrier of explicitly criticising or correcting C's communicative attempts (B3) following BCC.

6.2.3.2.1 Comparisons with TD data. Both of the dyad's facilitators, though none of their targeted barriers, were matched with those that were investigated for our typically developing comparison group ($N = 22$). Crawford modified t-tests (two tailed; Crawford & Garthwaite, 2002) were used to assess whether there was a significant difference between Dyad C's counts and those of the normative sample. C's use of 'saying things another way when stuck on a word' (F1) was higher than that of his TD peers before therapy, however this difference did not reach statistical significance (see Chapter 5, Table 5.2 for TD behaviour counts; TD $M = 0.3, SD = 0.47$, Child C pre-therapy $M = 0.67, t = 0.770, p = 0.420$). Child C did not use this strategy during his post-therapy conversations, nevertheless his score of zero did not differ significantly from the TD group ($t = -0.624, p = 0.539$).

Meanwhile, Mother C gave significantly more explanations (F2) than mothers in the TD sample beforehand (TD $M = 0.48, SD = 0.88$, Mother C pre-therapy $M = 2.67, t = 2.434, p = 0.024$). Mother C further increased her use of this facilitator following BCC (Mother C post-therapy $M = 4.5, t = 4.468, p = <0.001$). This was an example of building on an existing strength in order to support Child C's specific needs with naming and comprehension.
1c) *Does children’s Mean Length of Utterance in words (MLUw) increase following the intervention?*

Figure 6.4, below, shows Child C’s MLUw for each recorded interaction. The blue line illustrates the change from average pre-therapy to average post-therapy conversations. MLUw remains stable across pre-therapy conversations (range = 3.41 - 3.87), while there is a marked increase on this measure at post-therapy and this is partially maintained at follow-up (4.55 and 4.06).

**Figure 6.4**: Child C MLUw before and after therapy

Crawford modified t-tests were used to compare Child C’s MLUw scores with those reported by Rice et al. (2010) as well as with our TD sample. Child C’s pre-therapy average MLUw was lower than that of Rice’s TD and DLD groups, as well as the TD sample from this study, though this difference was not statistically significant. Following therapy, C's MLUw remained below Rice et al.'s TD mean, as well as the normative sample for BCC, but above that of Rice and colleagues' DLD group. Once again, there was no significant difference between the individual and normative group means, as illustrated in Table 6.12, below.
Table 6.12: Crawford comparisons between Child C MLUw and group samples

<table>
<thead>
<tr>
<th>Child C age (pre/post)</th>
<th>Child C pre-M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>6;06 (pre-therapy)</td>
<td>3.65</td>
<td>Rice age 6;06-6;11 (TD)</td>
<td>63</td>
<td>4.7</td>
<td>0.66</td>
<td>-1.578†</td>
<td>0.060</td>
<td>-1.591</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 6;06-6;11 (DLD)</td>
<td>94</td>
<td>4.18</td>
<td>0.71</td>
<td>-0.743‡</td>
<td>0.460</td>
<td>-0.746</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (6;06-6;11)</td>
<td>4</td>
<td>4.90</td>
<td>0.71</td>
<td>-0.668†</td>
<td>0.276</td>
<td>-1.761</td>
</tr>
<tr>
<td>6;09 (post-therapy)</td>
<td>4.31</td>
<td>Rice age 6;06-6;11 (TD)</td>
<td>63</td>
<td>4.7</td>
<td>0.66</td>
<td>-0.594†</td>
<td>0.277</td>
<td>-0.591</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 6;06-6;11 (DLD)</td>
<td>94</td>
<td>4.18</td>
<td>0.71</td>
<td>0.175‡</td>
<td>0.861</td>
<td>0.183</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (6;06-6;11)</td>
<td>4</td>
<td>4.90</td>
<td>0.71</td>
<td>0.157†</td>
<td>0.442</td>
<td>-0.831</td>
</tr>
</tbody>
</table>

† One-tailed, as Child C's MLUw was expected to be lower than that of the TD children. ‡ Two-tailed to test differences in either direction. zcc denotes an effect size when comparing a single-case’s score to a control sample (Crawford, Garthwaite & Porter, 2010).

1d) Does the ratio of child-to-adult speech change after intervention?

Child C presented with both receptive and expressive language needs. His relative contributions to conversation were variable (range of 0.6 - 1.14 prior to therapy; 0.67 - 1.71 following the intervention). Overall, there was an increase in average ratio following the intervention, mirroring C's increased MLUw. Table 6.13, below, summarises ratio results before and after BCC:
Table 6.13: Dyad C ratio of child-to-adult speech

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Time child spoke (in seconds)</th>
<th>Time adult spoke (in seconds)</th>
<th>Ratio of child-to-adult speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>67</td>
<td>59</td>
<td>1.14</td>
</tr>
<tr>
<td>Pre-2</td>
<td>80</td>
<td>83</td>
<td>0.96</td>
</tr>
<tr>
<td>Pre-3</td>
<td>42</td>
<td>70</td>
<td>0.6</td>
</tr>
<tr>
<td>Average pre</td>
<td>63</td>
<td>70.67</td>
<td>0.89</td>
</tr>
<tr>
<td>Post</td>
<td>101</td>
<td>59</td>
<td>1.71</td>
</tr>
<tr>
<td>Follow-up</td>
<td>67</td>
<td>100</td>
<td>0.67</td>
</tr>
<tr>
<td>Average post</td>
<td>84</td>
<td>79.5</td>
<td>1.19</td>
</tr>
</tbody>
</table>

- Proportion of time mother spoke (measured in seconds)
- Proportion of time child spoke

Crawford modified t-tests (two-tailed) were used to compare Dyad C’s average pre- and post-therapy ratio of child-to-adult speech with that of the TD sample included in this study ($N = 22$). C spoke on average less than his TD counterparts, in relation to their mothers, both prior to and following the intervention. There was no significant difference in individual versus group ratio either before or after BCC (see Chapter 5, Table 5.6; TD $M = 1.29$, $SD = 0.75$, Dyad C pre-therapy $M = 0.89$, $t = -0.509$, $p = 0.616$; Dyad C post-therapy $M = 1.19$, $t = -0.130$, $p = 0.897$, two-tailed).

2) Do children’s standardised language scores change following the intervention?

Table 6.14, below, summarises Child C's standardised assessment results, with green indicating areas of positive change, while purple denotes a decrease in scores post-therapy.
Table 6.14: Child C standardised assessment results

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Pre-therapy</th>
<th>Post-therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CELF-5</strong> Sentence Comprehension (SCS)*</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Word Structure (SCS)</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Formulated Sentences (SCS)</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Recalling Sentences (SCS)</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td><strong>Core Language SS (and percentile)</strong></td>
<td>84 (14)</td>
<td>100 (50)</td>
</tr>
<tr>
<td>BPVS SS (and percentile)</td>
<td>86 (18)</td>
<td>82 (12)</td>
</tr>
<tr>
<td>ACE Naming (SS and percentile)</td>
<td>7 (16)</td>
<td>10 (50)</td>
</tr>
<tr>
<td><strong>ERRNI Ideas: initial story-telling (SS and percentile)</strong></td>
<td>81(10)</td>
<td>79 (8)</td>
</tr>
<tr>
<td>Ideas: recall (SS and percentile)</td>
<td>80 (9)</td>
<td>83 (13)</td>
</tr>
<tr>
<td>Forgetting (SS and percentile)</td>
<td>98 (46)</td>
<td>105 (63)</td>
</tr>
<tr>
<td>Comprehension (SS and percentile)</td>
<td>100 (50)</td>
<td>90 (25)</td>
</tr>
<tr>
<td>MLU words (SS and percentile)</td>
<td>88 (21)</td>
<td>101 (52)</td>
</tr>
<tr>
<td><strong>CCC</strong> GCC (and percentile)</td>
<td>46 (6)</td>
<td>61 (16)</td>
</tr>
<tr>
<td>SICD</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Digit span (Forwards; SCS)</td>
<td>13</td>
<td>13</td>
</tr>
</tbody>
</table>

SCS: Scaled score; SS: standard score. *A scaled score of 7 or below indicates below average performance on the CELF. **For the CCC, a General Communicative Composite (GCC) below 55 is indicative of a language difficulty. A negative value for the Social Interaction Deviance Composite (SIDC) is cause for concern and may be suggestive of ASD.

While previous intervention studies involving school-age children suggest that change on standardised scores is unlikely following short-term intervention, it was predicted that the supportive communication strategies trained in BCC would lead to improvements in children’s receptive and/or expressive language, in line with PCIT studies involving younger children (e.g., Baxendale & Hesketh, 2003; Roberts & Kaiser, 2011). This was the case for Child C, who showed positive change on all four core areas of the CELF, bringing his composite language score to within the average range, compared to just over one standard deviation below the norm prior to therapy. Similar progress was made on the ACE naming task, with word-finding being a key area of difficulty which was identified by both the therapist and C’s mother during his initial assessment. The parent-reported CCC indicated a clinical language difficulty before, but not after therapy. As for children A and B, C’s GCC scores rose following BCC, while his social interaction results fell. Findings from the ERRNI assessment were mixed, with C’s recall of narrative improving following therapy, while initial story-telling remained stable and his comprehension of the storyline decreased. There was no change in C’s digit span following the intervention.
6.2.3.3 Summary and discussion of Dyad C's results.

Overall, the intervention resulted in a significant change in targeted barriers, including C's habitual use of confabulation, but not facilitators. Both MLUw and ratio of child-to-adult speech rose on average following therapy, though there was considerable variation in the latter measure across pre- and post-therapy conversations, making it difficult to be confident that the increase occurred as a result of the intervention. Contrary to previous intervention research involving children with DLD (e.g., Ebbels et al., 2019; Boyle et al., 2010), improvements in both expressive and receptive language were captured using standardised language assessments. However, as for the previous two cases, C's comprehension of the second ERRNI narrative, 'The Beach story', was poorer than his understanding of the 'Fish' scenario, which was tested prior to therapy, suggesting that this element of the assessment was not effectively matched for children in our study.

Child C did not increase his use of circumlocution as a word-finding strategy (F1) following therapy, despite this being identified as a key target for him. The intervention included repeated practice of saying things another way when stuck on a word and C's mother was encouraged to remind him to do this when appropriate during their conversations at home. However, as suggested by Johnson et al. (2017), people with communication disorder may require increased opportunity for facilitator use, e.g., explicit visual or verbal prompts provided by the communication partner. Relating results from the BCA intervention to behaviour change theory (Michie et al., 2014), Johnson and colleagues (2017, p.384) suggest that self-initiated behaviour change for people with aphasia 'may be limited, due to difficulties in comprehension or cognition'. Many children with DLD exhibit associated deficits in cognitive processes, including memory, perception, attention and executive function (Tomas & Vissers, 2018). While these factors were not fully investigated within BCC, it is possible that they may be linked to difficulties with children using self-help strategies, which are consistent with those experienced by adults with acquired communication disorders.

Mother C's use of clear explanations (F2) was significantly higher than the TD group before intervention, indicating that she was already using strategies to help support
her son’s comprehension within their everyday talk. Her choice to try and increase this further represented a desire to build on an existing communicative strength, a technique that is widely used and encouraged clinically. However, there may have been limited scope for change within a five-minute conversation. M used four explanations within both her second and third pre-therapy samples - almost one per minute. With hindsight, it may not have been desirable for her to increase this further, as this may have resulted in the adult dominating the conversation, with the focus becoming didactic, rather than interactional.

Despite the lack of significant change in targeted facilitators, both child C and his mother showed a significant reduction in their use of barrier behaviours following the intervention. In particular, C decreased his use of confabulation, or ‘fibbing’ (B1) following therapy and his mother's related behaviour of 'letting things run on' (B2) fell in response to this. It may be the case that C's barrier was a relatively straightforward target for change, since it was easy to recognise and he was evidently conscious of employing this behaviour, calling it ‘funny’. M's own behaviour in conversation was clearly influenced by her son's turns, highlighting the importance of working with both participants to address the two-way nature of their communication and how they each contribute to established patterns within their talk.

The differing results for barriers and facilitators suggest variations in the mechanisms of change engaged for increasing compensatory strategies, versus inhibiting less useful behaviours. This may be related to increased awareness and perception of the impact of these different behaviours on conversation, supported by information and discussion during the early sessions of BCC.

While Child C’s MLUw did not differ significantly from Rice et al.’s normative sample either before or after therapy, the rise in average utterance length from 3.65 to 4.61 is well above the change that would be expected over six weeks as a result of development alone. For comparison, MLUw for TD children in the Rice et al. (2010) study increased by 0.2 (from 4.72 to 4.92) between the ages of 6;06 - 6;11 and 7;0 - 7;05 years. Meanwhile, MLUw for children with DLD fell from 4.18 to 4.15 across the same time period, indicating that progress on this measure is not assured without appropriate intervention to address underlying language difficulties.
Whilst the overall ratio of child-to-adult speech rose following BCC (from 0.89 - 1.19), findings for this measure should be interpreted with caution, due to the wide variation in results across individual conversations. This contrasted with the relative within-participant stability for the TD group, though there were considerable differences in ratio between TD participants. The results for Dyad C suggest that speech ratio for this dyad may be highly context dependent; prior to therapy, C was most talkative at Time 1 when discussing his school day (ratio of 1.14), and least talkative at Time 3 when C was helping his mother to write his sister's birthday card (ratio of 0.6). This discrepancy occurred despite the first conversation containing the highest number of barrier behaviours and the lowest frequency of facilitators, suggesting that the difference was due to factors unconnected to participants' targeted conversation behaviours.

The highest proportion of child to adult talk (1.71) occurred immediately post-therapy when C was looking through a toy catalogue, yet his ratio of speech fell to 0.67 at follow-up, in the context of him playing a board game with his mother. This was in spite of the frequency of facilitators holding steady between these two time points, while overall barriers rose slightly but stayed well below their pre-therapy levels. These observations should be taken into account within the future development of the BCC programme, for example, broadening the scope to incorporate advice and discussion around the best topics and settings for encouraging children to participate actively in conversation, as well as focusing on key conversation behaviours.

While Child C showed gains on the majority of standardised language measures, it is notable that this was not the case for the digit span control task. This indicates that his progress with expressive and receptive language was not due to a natural developmental leap (Mercer, 2018), which would have occurred without the intervention. Whereas C's performance on the ACE naming task improved (from a scaled score of 7 to 10), his score for the BPVS fell slightly, indicating an overall narrowing in the gap between his receptive and expressive vocabulary, or a strengthening in his word-finding skills, in line with therapy targets. As for the previous two cases, C's outcomes for the ERRNI narrative assessment were mixed, suggesting that there is no direct generalisation from work on everyday conversation...
to structured narrative skills and/or that the two story forms ('Fish Story' and 'Beach Story') are not well matched for children with DLD.

C rated his conversations as 'much better' following therapy, stating that the main difference was 'much less fibbing'. His mother agreed that 'this has improved a lot in the last six weeks'. C stated that his mother 'helps me say words', though he did not give any details on how she did this. M clarified that she tried to 'help C to remember a name or object he is trying to talk about by asking questions related to the topic'. She also reported that she tried to support him with his goal of reducing his confabulation by 'redirecting the conversation back to the here and now'.

C's mother said that her son now 'explains different ways of what he means, for example by describing when he can't think of a name' (child facilitator F1). At the end of the therapy programme, C expressed his new-found communicative confidence 'I like talking because it's really good. It makes everyone see I'm special'. This contrasted strikingly with his pre-therapy statement: 'I just don't really like talking.' C also shared that he now felt able to help other children in conversation, using the strategies he had learned: 'I will help people whenever they are stuck on a name'. Despite these reported improvements, C expressed some continuing frustration relating to conversations at home: 'When my sister talks, I get angry because she takes so long'. This suggests the family may benefit from further advice and support to address issues such as turn-taking beyond the parent-child dyad.
6.2.4 Dyad D

Dyad D was formed by a girl, aged 7;03 years, and her mother, a nurse. Child D attended a mainstream primary school in South London, where an above-average percentage of pupils were eligible for free school meals. Her main language was English, although her parents also spoke Jamaican Creole at home. Child D was referred to the BCC research project with an existing diagnosis of DLD. She was on the school speech and language therapy service caseload but was not receiving any direct therapy at the time of the intervention. Her main language difficulties were at sentence level and beyond. This can be seen from her pre-therapy CELF-5 and ERRNI scores (see Table 6.18, p.172, below).

6.2.4.1 Identification of targeted conversation behaviours.

In their pre-therapy questionnaires, both Child D and her mother reported that her main difficulties in conversation were with understanding others and making herself understood. D also reported experiencing word-finding difficulties, while her mother felt that she became 'frustrated' when she couldn't get her message across. D's mother also stated that her daughter had trouble 'sticking to the topic of conversation' during their interactions at home.

Following an introduction to conversation and language development and repeated viewing and discussion of selected extracts from their three pre-therapy videos, the following facilitators and barriers were identified by the dyad, with support from the research therapist, as targets for intervention. Each behaviour is described in the context of Dyad D's communication, with rationale and examples from their pre-intervention transcripts. All of the target strategies were coded for the TD group (see Chapter 5), allowing for cross-comparison between the individual dyad and the normative sample.
Child Facilitator (F1): 

Asking for help, clarification or repetition when things aren't clear.

This referred to Child D using self-help strategies to signal when she hasn't followed or understood what has been said in conversation. Examples from her pre-therapy recordings included:

Example 1, pre-therapy 3

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.</td>
<td>M</td>
<td>Maybe Dad will take us to a place called Negril. It's a great place that.</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>D</td>
<td>What?</td>
<td>F1 - child asks for clarification / repetition</td>
</tr>
<tr>
<td>37.</td>
<td>M</td>
<td>To watch the sunset. It’s a great place to watch the sunset</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>D</td>
<td>Yeah</td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>M</td>
<td>It’s a very good place</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>D</td>
<td>Yeah, but what’s that?</td>
<td>F1 - child asks for clarification / repetition</td>
</tr>
</tbody>
</table>

Adult facilitator (F2): 'Holding back' in conversation by using:

a) minimal turns, e.g.:

'Mm-hmm' (pre-therapy 1).

'Okay' (pre-therapy 1).

'Alright' (pre-therapy 2).

b) extended pauses, e.g., leaving pauses of 2 seconds or longer within or between speaker turns (based on Fox Tree, 2002, and our own observations of BCC data).
Adult barrier (B1): Using test questions.

Mother D observed that she used this question type frequently during the dyad’s pre-therapy conversations, often following up one test question with another, resulting in extended word searches for D. After repeated viewings of their pre-therapy videos and discussion with the research SLT regarding D’s significant word-finding difficulties, her mother felt that her repeated use of known answer questions placed unnecessary pressure on the child to retrieve a specific word, whilst limiting the interactive scope of her turn. Examples of this maternal behaviour prior to intervention included:

Example 2, pre-therapy 1:

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.</td>
<td>M</td>
<td>What do we have here? What’s this? (points at Playmobil spring horse)</td>
<td>B1</td>
</tr>
<tr>
<td>42.</td>
<td>D</td>
<td>Like… a thing, so like… like if people are playing on it.</td>
<td>WFD</td>
</tr>
<tr>
<td>43.</td>
<td>M</td>
<td>Oh okay, so the children are playing on it.</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>M</td>
<td>So where would you find this thing? (points again at spring horse)</td>
<td>B1</td>
</tr>
<tr>
<td>45.</td>
<td>D</td>
<td>Um…</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>M</td>
<td>Where do you think you’d find it?</td>
<td>B1</td>
</tr>
<tr>
<td>47.</td>
<td>M</td>
<td>You’ve… you’ve been there the other day with Daddy.</td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>M</td>
<td>You went there, innit. Where did you go?</td>
<td>B1</td>
</tr>
<tr>
<td>49.</td>
<td>D</td>
<td>((Looks up up in the air)). Er…</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>M</td>
<td>Where did you see one of this toy?</td>
<td>B1</td>
</tr>
<tr>
<td>51.</td>
<td>M</td>
<td>You went with Daddy.</td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>D</td>
<td>Well I was a… How old was I?</td>
<td>F1</td>
</tr>
<tr>
<td>53.</td>
<td>M</td>
<td>Remember Daddy take you on the common? And I'm sure there was one of this. The funfair! You remember?</td>
<td>M provides the answer to her previous test question.</td>
</tr>
</tbody>
</table>

There were no specific barriers to communication identified for the child to work on during therapy, since it was agreed that the main obstacle to her communication was her language disorder - in particular her word finding difficulties. Instead, Child D preferred to concentrate on increasing the use of her targeted facilitator (F1).
6.2.4.2 Therapy outcomes.

Once targeted barriers and facilitators had been identified and agreed with the dyad, these were practised and refined during the six face-to-face therapy sessions and consolidated during home practice. Results are presented for each research question in turn:

1a) Does the number of targeted facilitators used by children and parents in conversation increase after intervention?

1b) Does the use of targeted communication barriers decrease following the intervention?

Table 6.15, below, displays raw counts for Dyad D’s targeted facilitators and barriers in each conversation sample (three collected prior to therapy, one immediately post and one at follow-up, six weeks after the intervention):

Table 6.15: Dyad D facilitator and barrier counts

<table>
<thead>
<tr>
<th>Code</th>
<th>Item</th>
<th>Pre-1</th>
<th>Pre-2</th>
<th>Pre-3</th>
<th>Av Pre</th>
<th>Post</th>
<th>Follow-up</th>
<th>Av post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conversation Facilitators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>D asks for help, clarification or repetition</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1.67</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>F2</td>
<td>M 'holds back' by using:</td>
<td>12</td>
<td>7</td>
<td>3</td>
<td>7.33</td>
<td>10</td>
<td>17</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>a) minimal turns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) pausing for 3 or more seconds</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0.67</td>
<td>3</td>
<td>0</td>
<td>1.5</td>
</tr>
<tr>
<td>Subtotal:</td>
<td></td>
<td>12</td>
<td>9</td>
<td>3</td>
<td>9</td>
<td>13</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Total number of targeted facilitators</td>
<td>13</td>
<td>10</td>
<td>6</td>
<td>9.67</td>
<td>13</td>
<td>19</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>
There was a significant increase in the dyad's use of targeted facilitators following therapy, led by the mother's increased use of passing turns (F2; Poisson trend for frequencies: $z = 1.99, p = 0.02$, one-tailed). This significant change in total facilitators occurred despite Child D using slightly fewer instances of her target facilitator (F1: asking for help, clarification, or repetition) following BCC. The total frequency of barrier behaviours also decreased significantly ($z = -4.10, p = <0.001$, one-tailed), as Mother D used only one test question in her follow-up conversation and zero in the post-therapy recording. It should be noted that M used the majority of TQs in the first recorded conversation, reflecting the context of playing with Playmobil figures, rather than engaging in unconstrained natural conversation.

### 6.2.4.2.1 Comparisons with TD data.

All three of the dyad's targeted conversation behaviours matched with those that were investigated in relation to our typically developing group ($N = 22$). Crawford modified t-tests showed Child D used numerically more requests for clarification or repetition (F1) than her TD peers both before and after therapy. However, neither difference was statistically significant (see Chapter 5, Table 5.2 for TD behaviour counts; TD $M = 0.57$, $SD = 0.58$, Child D pre-therapy $M = 1.67$, $t = 1.855$, $p = 0.078$; Child D post-therapy $M = 1$, $t = 0.725$, $p = 0.476$).

Mother D used more minimal turns (F2a) than adults in the TD sample both before and after therapy, but this difference was not statistically significant (TD $M = 6.48$, $SD = 4.49$, Mother D pre-therapy $M = 7.33$, $t = 0.185$, $p = 0.855$; Mother post-therapy $M = 13.5$, $t = 1.529$, $p = 0.141$). Meanwhile, for extended pauses (F2b), Mother D used this behaviour less frequently than her counterparts from the TD group both
before and after therapy. Once again, this was not a statistically significant difference (TD $M = 4.70$, $SD = 3.80$, Mother D pre-therapy $M = 0.67$, $t = -1.037$, $p = 0.311$; Mother post-therapy $M = 1.5$, $t = -0.824$, $p = 0.419$).

Finally, Mother D used her barrier behaviour (test questions, B1) more than the TD sample on average prior to therapy and less frequently afterwards. Neither difference was statistically significant (TD $M = 6.52$, $SD = 5.73$, Mother D pre-therapy $M = 5.67$, $t = 6.52$, $p = 5.73$; Mother post-therapy $M = 0.5$, $t = -1.028$, $p = 0.316$).

1c) Does children’s Mean Length of Utterance in words (MLUw) increase following the intervention?

Figure 6.5, below, shows Child D’s MLUw for each recorded interaction. The blue line illustrates the change from average pre- to average post-therapy conversations. There is a gradual increase in MLUw across the study, with the greatest change occurring between pre-therapy 3 and post-therapy, when MLUw jumped from 5.06 to 6.2.

**Figure 6.5:** Child D MLUw before and after therapy
Crawford modified t-tests were used to compare Child D's MLUw scores with those reported by Rice et al. (2010) as well as with our TD sample. Prior to therapy, Child D's average MLUw was numerically lower than that of Rice et al.'s TD group, as well as the TD sample from the current study, but higher than that of Rice et al.'s DLD group. Neither of these differences was statistically significant. Following therapy, D's post-therapy average MLUw was higher than Rice et al.'s TD group, with the direction of difference running counter to our predictions. No TD group comparisons were available from the BCC study, since only one child was recruited within the 7;06 - 7;11 age range. D's MLUw was significantly higher than that of Rice et al.'s DLD group following the intervention, with a large effect size for the difference between the individual and controls. See Table 6.16, below:

Table 6.16: Crawford comparisons between Child D MLUw and group samples

<table>
<thead>
<tr>
<th>Child D age (pre/post)</th>
<th>Child D pre- M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>7;03 (pre-therapy)</td>
<td>4.21</td>
<td>Rice age 7;00-7;05 (TD)</td>
<td>51</td>
<td>4.72</td>
<td>0.83</td>
<td>-0.609†</td>
<td>0.273</td>
<td>-0.614</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 7;00-7;05 (DLD)</td>
<td>103</td>
<td>4.15</td>
<td>0.62</td>
<td>0.096‡</td>
<td>0.923</td>
<td>0.097</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (7;00-7;05)</td>
<td>5</td>
<td>5.69</td>
<td>0.93</td>
<td>-1.413†</td>
<td>0.115</td>
<td>-1.591</td>
</tr>
<tr>
<td>7;09 (post-therapy)</td>
<td>6.72</td>
<td>Rice age 7;06-7;11 (TD)</td>
<td>47</td>
<td>4.92</td>
<td>1.03</td>
<td>1.729†</td>
<td>0.045</td>
<td>1.748</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 7;06-7;11 (DLD)</td>
<td>100</td>
<td>4.33</td>
<td>0.88</td>
<td>2.702‡</td>
<td>0.008*</td>
<td>2.716</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (7;06-7;11)</td>
<td>1</td>
<td>5.26</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

† One-tailed, as Child D's MLUw was predicted to be lower than that of the TD children. ‡ Two-tailed to test differences in either direction. *Statistically significant. zcc denotes an effect size when comparing a single-case’s score to a control sample (Crawford, Garthwaite & Porter, 2010).
1d) Does the ratio of child-to-adult speech change after intervention?

Table 6.17, below, illustrates the relative time that Child D spoke, compared to her mother, before and after therapy. There is clear change following BCC, with Mother D talking more in all pre-therapy conversations and the child talking on average more than twice as much as her mother after BCC:

Table 6.17: Dyad D ratio of child-to-adult speech

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Time child spoke (in seconds)</th>
<th>Time adult spoke (in seconds)</th>
<th>Ratio of child-to-adult speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>71</td>
<td>101</td>
<td>0.7</td>
</tr>
<tr>
<td>Pre-2</td>
<td>99</td>
<td>108</td>
<td>0.92</td>
</tr>
<tr>
<td>Pre-3</td>
<td>101</td>
<td>123</td>
<td>0.82</td>
</tr>
<tr>
<td>Average pre</td>
<td>90.33</td>
<td>110.67</td>
<td>0.81</td>
</tr>
<tr>
<td>Post</td>
<td>141</td>
<td>86</td>
<td>1.64</td>
</tr>
<tr>
<td>Follow up</td>
<td>185</td>
<td>53</td>
<td>3.49</td>
</tr>
<tr>
<td>Average post</td>
<td>163</td>
<td>69.5</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Proportion of time mother spoke (measured in seconds)
Proportion of time child spoke

Crawford modified t-tests (two-tailed) were used to compare Dyad D's average pre- and post-therapy ratio of child-to-adult speech with that of the TD sample included in this study (N = 22). Dyad D's ratio was lower than the TD mean before the intervention and higher afterwards. However, neither difference was statistically significant (see Chapter 5, Table 5.6; TD $M = 1.29$, $SD = 0.75$, Dyad D pre-therapy $M = 0.81$, $t = -0.626$, $p = 0.538$; Dyad D post-therapy $M = 2.57$, $t = 1.669$, $p = 0.110$).
2) Do children’s standardised language scores change following the intervention?

Table 6.18, below, summarises Child D's standardised assessment scores before and after BCC. Positive changes are highlighted in green, while numerical decreases are marked in purple.

**Table 6.18: Child D standardised assessment results**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Pre-therapy</th>
<th>Post-therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CELF-5 Sentence Comprehension (SCS)*</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Word Structure (SCS)</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Formulated Sentences (SCS)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Recalling Sentences (SCS)</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Core Language SS (and percentile)</td>
<td>82 (12)</td>
<td>86 (18)</td>
</tr>
<tr>
<td>BPVS SS (and percentile)</td>
<td>74 (4)</td>
<td>77 (6)</td>
</tr>
<tr>
<td>ACE Naming (SS and percentile)</td>
<td>10 (16)</td>
<td>16 (37)</td>
</tr>
<tr>
<td>ERRNI Ideas: initial story-telling (SS and percentile)</td>
<td>82 (11)</td>
<td>78 (7)</td>
</tr>
<tr>
<td>ERRNI Ideas: recall (SS and percentile)</td>
<td>87 (20)</td>
<td>78 (7)</td>
</tr>
<tr>
<td>ERRNI Forgetting (SS and percentile)</td>
<td>106 (66)</td>
<td>100 (49)</td>
</tr>
<tr>
<td>ERRNI Comprehension (SS and percentile)</td>
<td>101 (52)</td>
<td>78 (7)</td>
</tr>
<tr>
<td>ERRNI MLU words (SS and percentile)</td>
<td>122 (93)</td>
<td>99 (48)</td>
</tr>
<tr>
<td>CCC* GCC (and percentile)</td>
<td>32 (1)</td>
<td>46 (6)</td>
</tr>
<tr>
<td>SIDC</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Digit span (Forwards; SCS)</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

SCS: Scaled score; SS: standard score. * A scaled score of 7 or below indicates below average performance on the CELF. **For the CCC, a General Communicative Composite (GCC) below 55 is indicative of a language difficulty. A negative value for the Social Interaction Deviance Composite (SIDC) is cause for concern and may be suggestive of ASD.

As for the previous three cases, Child D showed improved performance on the CELF assessment following the intervention, with her post-therapy core language score falling within normal limits (standard score of 86). She also showed gains on the BPVS, a measure of receptive vocabulary, as well as on the ACE naming subtest. However, D's ERRNI results were lower across all measures at retest (using 'The Beach Story,' rather than 'The Fish Story'). The parent-reported CCC indicates an improvement in Child D's overall communication, but a decrease in her social interaction skills, in line with cases A-C. Contrary to our prediction, D's scaled scores for digit span rose following the intervention from 10 to 14.
6.2.4.2 Summary and discussion of Dyad D's results.

Overall, the intervention produced a significant increase in targeted facilitators and decrease in barrier behaviours. Both child MLUw and ratio of child-to-adult speech increased following therapy, meaning that progress was shown in all core conversation measures. The concurrent increase in her digit span scores may indicate that the observed changes were linked to wider gains in Child D's general development, which would not be expected as a result of the intervention. However, D's performance on standardised language assessments was mixed, suggesting continued difficulties with some areas of her receptive and expressive language.

The change in targeted conversation behaviours was driven by Mother D, who almost doubled her use of targeted facilitators from 9 to 16 on average across the dyad's pre- and post-therapy recordings. Meanwhile, Child D reduced her use of self-help strategies (F1) from 1.67 to 1, despite considerable time being dedicated to her practising asking for help, clarification, and repetition during therapy sessions. A prompt sheet, designed by the child, was provided for use at home and Mother D was instructed to support D in reminding her to use her facilitator to signal when she had not understood something during their conversations together. According to Johnson et al. (2021), prompting and cueing form a key behaviour change technique, which can help establish and embed new communication habits. However, it was not possible to monitor the extent to which these prompts and cues were employed within the dyad's everyday interactions.

Child D chose not to work on reducing or eliminating any identified conversation behaviour. Therefore, the decrease in barriers reflects a reduction in her mother's use of test questions from 5.67 to 0.5 on average pre- and post-therapy as the parent reported that she now gives her daughter 'time and space to speak'. When D encountered word-finding difficulties in conversation following the intervention, her mother would 'give her the word, rather than quizzing her'. These comments suggest that M's success in changing her behaviour was influenced by one or more of the following behaviour change techniques (Michie et al., 2013): feedback on the outcome(s) of behaviour (e.g., through video reflection); information about social and environmental consequences (e.g., through discussion of the impact of WFD and
DLD on children's confidence and self-esteem); monitoring of emotional consequences (e.g., noticing that her daughter was visibly frustrated or upset during instances of prolonged, unsuccessful word searches during their conversations together). Finally, it is likely M's success in decreasing her use of test questions may have been supported by behaviour substitution, e.g., replacing an undesirable behaviour with a 'wanted' or 'neutral' behaviour (Johnson et al., 2021), in this case by focusing on increasing her targeted facilitators: holding back by using minimal turns and extended pauses (F2a and F2b).

As noted previously, the dyad's first recorded conversation (pre-therapy 1) could be seen as an outlier, with the parent using 15 test questions within the 5-minute interaction (compared to a single TQ at pre-therapy 2 and 3 respectively). The context for this conversation was the dyad playing with Playmobil figures, which led to Mother D prompting her daughter to name the objects in front of her. This maternal behaviour was not evident outside of the pretend play setting, e.g., when talking about family holidays or the child's school day, but may have occurred in other activity-based contexts outside of the BCC recordings. Background factors, including topic and situation, can affect communication between the two participants (Ahlsén & Saldert, 2018; Hoff, 2010). However, these were not controlled for within the current study, following the principles of conversation analysis, which focuses on 'unconstrained' natural talk (Damico et al., 2015).

There was no significant difference between Dyad D's targeted conversation behaviours and those of the TD sample, either before or after therapy, corroborating findings by Blackwell et al. (2015), who found limited evidence for PCI differences in naturally occurring contexts involving language impaired pre-schoolers and TD controls. Dyad D's results indicate that there was not something inherently atypical about their interactions, but rather that there were some specific strategies that they found more or less personally beneficial in order to support their enjoyment, as well as the content and flow of their conversations.

Child D showed a marked increase in her MLUw across pre- and post-intervention conversations (from an average of 4.21 to 6.72). While this could be in part due to natural development, it is notable that the greatest change occurred between her
pre-therapy 3 and post-therapy recordings. The jump of 1.14 in MLUw following the six-week intervention period compares to a mean gain of 0.2 for TD children aged between 7;00 - 7;05 and the next age band: 7;06 - 7;11 (Rice et al., 2010). Similarly, children with DLD who took part in the Rice et al. study showed an average change of 0.18 between the two age groups. It is likely that the improvement in Child D's MLUw was supported by her mother's increased use of minimal turns and the reduction in maternal test questions. Both strategies allow the child more time and space to speak - giving her the opportunity to practise using more complex utterances within the facilitative context of the dyad's everyday conversations. For example, when talking about family holidays in their follow-up conversation, D was able to elaborate her ideas across multiple turns, using simple conjunctions such as 'and' or 'because' to build upon her narrative:

_Dyad D: Follow-up conversation sample (talking about their holidays)_

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.</td>
<td>D</td>
<td>Um, so I really like going to Jamaica because, because you know when we went to our hotel there was a pool outside that everyone could swim in.</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>M</td>
<td>mhmm</td>
<td>Minimal turn</td>
</tr>
<tr>
<td>37.</td>
<td>D</td>
<td>And of course, my cousins are as well.</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>M</td>
<td>mhmm</td>
<td>Minimal turn</td>
</tr>
<tr>
<td>39.</td>
<td>D</td>
<td>And and the thing that I like that there’s a park wi- with swings.</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>M</td>
<td>mhmm</td>
<td>Minimal turn</td>
</tr>
<tr>
<td>41.</td>
<td>D</td>
<td>(inaudible)</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>M</td>
<td>In Ochi. In the centre.</td>
<td>Comment</td>
</tr>
<tr>
<td>43.</td>
<td>D</td>
<td>Yeah and I really (0.1) I really like go on the beach as well because there’s very, there’s very special shells that you can collect.</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>M</td>
<td>mhmm</td>
<td>Minimal turn</td>
</tr>
<tr>
<td>45.</td>
<td>D</td>
<td>And you and make sandcastles.</td>
<td></td>
</tr>
</tbody>
</table>

There was a similar increase in Dyad D's child-to-adult ratio of speech, which may have been related to the daughter's enhanced MLUw. Conversely, Mother D boosted her use of minimal turns and extended pauses, which reduced the relative time she spent talking. Following BCC, D's mother reported: 'There are not much problems with her conversations now.' She joked that D: 'doesn't stop talking... I can't get a word in edgeways!' However, the mother added that D 'still sometimes goes off topic'. This indicates that a follow-up session may be useful for the dyad to assess
how the patterns of their communication have changed and whether any alternative facilitators or barriers can be identified to support them further within conversation.

As for all three previous cases, Child D showed positive change on her CELF composite scores, though in this instance, the increase was due to improvements in word structure and recalling sentences. There was no change in her scaled scores for sentence comprehension or formulated sentences. D's naming and vocabulary showed progress, in the context of word-finding being identified prior to therapy as a key area of need. Though this was not directly targeted during BCC, prior to the intervention, Child D experienced repeated pressure to find specific words during conversation (especially during the first recorded interaction). The opportunity of additional time to produce language may have decreased this pressure and supported her lexical retrieval, enabling her to show gains that extended to formal assessment.

Despite these improvements, D's performance on the ERRNI was lower across all five receptive and expressive measures, including MLUw. This is striking when contrasted with the increase shown in MLUw within conversation, discussed above. It may be that the drop in ERRNI scores was due to specific difficulties for Child D in understanding or retelling 'The Beach Story' at Time 2, as compared to 'The Fish Story' at Time 1. Meanwhile, D's General Communicative Composite (GCC) within the CCC rose, while her Social Interaction Deviance Composite fell, suggesting that her mother is now more aware of D's difficulties in interacting with her peers.

During therapy, Child D was encouraged to seek help from others when she had difficulties within conversation. Despite using her chosen facilitator (F1) rarely during her recorded conversations, D said she felt more confident in asking for support following the intervention and found this beneficial to her both at home and at school. In her post-therapy questionnaires, she reported: 'When I can't get the words, I just ask Mum or my friends to help me what it is.' She rated her conversations as 'much better' following BCC and stated: 'I really like talking about what's my favourite thing to do. And I like talking about imagining things... about like if I can fly'. This reflected the move away from her mother's didactic use of test questions towards more child-led interactions - as evidenced by the increase in child-to-adult ratio of speech.
6.2.5 Dyad E

Dyad E was formed by a boy, age 6;10, and his mother, a full-time parent. Both were monolingual English speakers. E was a Year Two pupil at his mainstream primary school in South London, where the proportion of children receiving free school meals was well above the national average. He had been seen as a toddler by a Speech and Language Therapist at his local Children's Centre, due to parental concern about his use of 'made up words' (jargon). However, the therapist felt that his language and communication were developing within normal limits, and he had not received any SLT intervention prior to BCC.

E was diagnosed with Langerhans cell histiocytosis, an autoimmune disorder, at age three and received radiation therapy. There is a family history of autism spectrum disorder on his father's side (three of E's paternal cousins had an ASD diagnosis). At the time of his referral to BCC, E's mother's main concerns were his difficulty with attending and waiting. A paediatrician's appointment had been made to assess E for ADHD, but no diagnosis had been given at the time of the intervention.

6.2.5.1 Identification of targeted conversation behaviours.

E's pre-therapy assessments revealed his difficulties with both receptive and expressive language (see Table 6.22, p.187, below). In their baseline questionnaires, the dyad identified word-finding and sentence formation as key challenges for E, which affected their conversations together. Prior to intervention, E stated: 'Sometimes it's hard for me to say what I want to say at home. At school, they interrupt. In the playground, in class. Everywhere.' Following discussion with the research therapist, based on repeated viewings of selected clips from their pre-therapy videos, the following facilitators and barriers were identified as targets for intervention. Below, each behaviour is detailed in turn, with examples from Dyad E's pre-intervention transcripts. All six target strategies were also coded for the TD group (see Chapter 5).
Child facilitator (F1): Using gesture or acting out to help communicate meaning.

Examples of this strategy included E using non-verbal communication to help explain to his mother what he had done during his class swimming lesson:

Example 1, pre-therapy 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>M</td>
<td>What did you learn today?</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>E</td>
<td>We, we learned, uh, we done one float, on ((cough))</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>M</td>
<td>One float?</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>E</td>
<td>Of rockets, like that <em>(both arms stretched out)</em>. And we done one float like that <em>(gestures overarm action with one hand; the other still on imaginary float)</em>.</td>
<td><em>F1 x 2 - E uses gesture to help communicate meaning</em></td>
</tr>
</tbody>
</table>

Adult facilitator (F2): Recasting or repeating back.

Examples of this behaviour include instances where the mother used recasts to a) confirm and b) correct what E had said, e.g.:

Example 2, pre-therapy 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>78.</td>
<td>E</td>
<td>But Mummy is scared of a tube.</td>
<td></td>
</tr>
<tr>
<td>79.</td>
<td>M</td>
<td>I am scared of the tube. Why am I scared?</td>
<td><em>F2 - recast confirms what E has said</em></td>
</tr>
</tbody>
</table>

Example 3, pre-therapy 2

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>111.</td>
<td>E</td>
<td>Yeah, our eggs are done.</td>
<td></td>
</tr>
<tr>
<td>112.</td>
<td>M</td>
<td>Your egg’s done. I didn’t want one.</td>
<td><em>F2 - recast corrects what E has said</em></td>
</tr>
</tbody>
</table>
Adult facilitator (F3): M uses minimal turns.

This referred to the mother using minimal verbal or non-verbal turns to support her son in holding the conversational floor, e.g.:

Example 4, pre-therapy 2, 'cooking'

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>111.</td>
<td>E</td>
<td>I’ll just give a little look ((holds plate up to camera)).</td>
<td></td>
</tr>
<tr>
<td>112.</td>
<td>M</td>
<td>Uh hm.</td>
<td>F3 - minimal turn</td>
</tr>
<tr>
<td>113.</td>
<td>E</td>
<td>This is our cheese.</td>
<td></td>
</tr>
<tr>
<td>114.</td>
<td>M</td>
<td>Is that what you wanted, egg, cheese and beans?</td>
<td></td>
</tr>
<tr>
<td>115.</td>
<td>E</td>
<td>(still holding plate up) Yep.</td>
<td></td>
</tr>
<tr>
<td>116.</td>
<td>M</td>
<td>Okay ((puts plate down.))</td>
<td>F3 - minimal turn</td>
</tr>
<tr>
<td>117.</td>
<td>E</td>
<td>Bye!</td>
<td></td>
</tr>
</tbody>
</table>

The following barriers were identified by Child E and his mother:

Child barrier (B1): E uses minimal turns.

Whilst minimal turns were chosen as a parental facilitator to encourage E to say more in conversation, the dyad agreed that E's own frequent use of this turn type was a barrier to his communicative participation. Examples from the pair's pre-therapy interactions focus on E providing a minimal response to his mother's questions, e.g., about his visits to the Natural History Museum and the O2 Arena:

Example 5, pre-therapy 3 'school trip':

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>45.</td>
<td>M</td>
<td>What was in the green zone? I can’t remember</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>E</td>
<td>Hmm</td>
<td>B1 - minimal turn</td>
</tr>
</tbody>
</table>
Example 6, pre-therapy 1 'trip to London'

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.</td>
<td>M</td>
<td>How was your Marvel outing with Nanny out to the O2?</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>E</td>
<td>Errr</td>
<td>B1 - minimal turn</td>
</tr>
</tbody>
</table>

Child barrier (B2): E uses frequent single word turns.

Linked to E's tendency to use minimal responses was his frequent use of single word turns - typically in answer to his mother's questions:

Example 7, pre-therapy 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>M</td>
<td>Did you enjoy swimming today?</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>E</td>
<td>Good</td>
<td>B2 - single word turn</td>
</tr>
</tbody>
</table>

Example 8, pre-therapy 3, 'school trip'

Mother E is trying to remember which coloured zones of the Natural History Museum each exhibit was in:

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>49.</td>
<td>M</td>
<td>The animals. That was the red, wasn’t it? No.</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>E</td>
<td>No</td>
<td>B2 - single word turn</td>
</tr>
<tr>
<td>51.</td>
<td>M</td>
<td>The red was the food?</td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>E</td>
<td>Yeah</td>
<td>B2 - single word turn</td>
</tr>
<tr>
<td>53.</td>
<td>M</td>
<td>So the green was all the mammals?</td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>E</td>
<td>Yeah</td>
<td>B2 - single word turn</td>
</tr>
</tbody>
</table>
Adult barrier (B3): test questions.

Like two of the previous dyads (B and D), Mother E identified her frequent use of test questions as a barrier to conversation with her son by limiting the interactive scope of his turns, e.g:

Example 9, pre-therapy 3

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>M</td>
<td>What else did you see?</td>
<td>B3 - test question*</td>
</tr>
<tr>
<td>8</td>
<td>E</td>
<td>Erm</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>Can you remember? Did we see a big whale?</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>E</td>
<td>Yeah</td>
<td></td>
</tr>
</tbody>
</table>

*Evidenced by M's follow-up question with prompt in line 9.

Example 10, pre-therapy 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>M</td>
<td>Who's the bad guy? I don't know any of them.</td>
<td>B3 - test question*</td>
</tr>
<tr>
<td>38</td>
<td>E</td>
<td>I don't know one of them</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>M</td>
<td>I know Iron Man, and I know, mmm, the Wasp. 'Cause I don't like the Wasp.</td>
<td></td>
</tr>
</tbody>
</table>

*Evidenced by M's knowledge revelation in line 39, despite her previous 'claim of insufficient knowledge' (as observed in classroom practices by Sert & Walsh, 2013).

6.2.5.2 Therapy outcomes.

Once targeted barriers and facilitators had been identified and agreed with the dyad, these were practised and refined during the six BCC therapy sessions and consolidated during home practice. To evaluate the effects of the intervention for Dyad E, each of the research questions will be addressed in turn, with results presented for pre- and post-therapy conversation behaviours and measures, followed by standardised language scores.

1a) Does the number of targeted facilitators used by children and parents in conversation increase after intervention?
1b) Does the use of targeted communication barriers decrease following the intervention?

Table 6.19, below, displays raw counts for Dyad E's targeted facilitators and barriers in each conversation sample (three collected prior to therapy, one immediately post and one at follow-up, six weeks after the intervention):

<table>
<thead>
<tr>
<th>Code</th>
<th>Item</th>
<th>Pre-1</th>
<th>Pre-2</th>
<th>Pre-3</th>
<th>Av Pre</th>
<th>Post</th>
<th>Follow-up</th>
<th>Av post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Conversation Facilitators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>E uses gesture or acting out to help communicate meaning</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1.5</td>
</tr>
<tr>
<td>F2</td>
<td>M repeats back or recasts what E has said</td>
<td>6</td>
<td>2</td>
<td>11</td>
<td>6.33</td>
<td>7</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>F3</td>
<td>M uses minimal turns</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>2.67</td>
<td>1</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted facilitators</strong></td>
<td>17</td>
<td>7</td>
<td>12</td>
<td>12</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td><strong>Conversation Barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>E uses minimal turns</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>3.33</td>
<td>2</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>B2</td>
<td>E uses single word turns</td>
<td>5</td>
<td>5</td>
<td>26</td>
<td>12</td>
<td>9</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>B3</td>
<td>M uses test questions</td>
<td>5</td>
<td>0</td>
<td>16</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted barriers</strong></td>
<td>11</td>
<td>10</td>
<td>46</td>
<td>22.33</td>
<td>13</td>
<td>14</td>
<td>13.5</td>
</tr>
</tbody>
</table>

There was a small numerical decrease in the dyad's use of targeted facilitators following therapy from 12 to 11 (Poisson trend for frequencies: \( z = -0.32, p = 0.37 \)). The number of barrier behaviours decreased significantly, in line with the prediction \( (z = -2.23, p = 0.01, \text{one-tailed}) \). The greatest change was observed in the mother's use of test questions, which reduced from an average of 22.33 prior to therapy to 13.5 afterwards. Child E also halved the number of minimal turns from 3.33 to 1.5 on average across his pre- to post-therapy conversations, though single word turns remained stable (12 pre-therapy, compared to 11 post).
6.2.5.2.1 Comparisons with TD data.

All six of the dyad's targeted conversation behaviours were also coded for the TD group (see Chapter 5), allowing for comparisons to be made between the individual and normative group data. There was no significant difference between Dyad E and the TD sample on any of the facilitator or barrier counts, either before or after the intervention.

The figures show that Child E used numerically fewer gestures and acting out (F1) than his TD peers at both time points (for TD behaviour counts, see Chapter 5, Table 5.2; TD $M = 4.35$, $SD = 5.55$, Child E pre-therapy $M = 3$, $t = -0.220$, $p = 0.828$; Child E post-therapy $M = 1.5$, $t = -0.485$, $p = 0.633$). Meanwhile, E's mother used more repeats and recasts (F2) than her adult counterparts from within the TD group (TD $M = 5.95$, $SD = 4.61$, Mother E pre-therapy $M = 6.33$, $t = 0.081$, $p = 0.937$; Mother post-therapy $M = 8$, $t = 0.435$, $p = 0.668$). However, she used fewer minimal turns (F3) than mothers in conversation with their TD children both before and after BCC (TD $M = 6.48$, $SD = 4.49$, Mother E pre-therapy $M = 2.67$, $t = -0.830$, $p = 0.416$; Mother post-therapy $M = 1.5$, $t = -1.085$, $p = 0.290$).

Whilst child minimal turns were identified as a barrier within Dyad E's interactions with his mother (B1), he used numerically fewer of these than the TD children both before and after therapy (TD $M = 3.64$, $SD = 4.39$, Child E pre-therapy $M = 3.33$, $t = -0.069$, $p = 0.946$; Child E post-therapy $M = 1.5$, $t = -0.477$, $p = 0.638$). This was not the case for single word turns (B2), which were used more frequently by E than children in the normative sample both prior to and following his participation in BCC (TD $M = 8.68$, $SD = 3.83$, Child E pre-therapy $M = 12$, $t = 0.848$, $p = 0.406$; Child E post-therapy $M = 11$, $t = 0.592$, $p = 0.560$). Meanwhile, Mother E used her barrier behaviour (test questions, B3) more frequently than the TD group before the intervention and less frequently afterwards (TD $M = 6.52$, $SD = 5.73$, Mother E pre-therapy $M = 7$, $t = 0.082$, $p = 0.935$; Mother post-therapy $M = 1$, $t = -0.942$, $p = 0.357$).
1c) Does children's Mean Length of Utterance in words (MLUw) increase following the intervention?

Figure 6.6, below, shows Child E's MLUw for each recorded interaction. The blue line illustrates the change from average pre-therapy to average post-therapy conversations. There is variability across samples both pre- and post-therapy with a small increase in average MLUw following the intervention.

Figure 6.6: Child E MLUw before and after therapy.
Child E’s MLUw scores were compared with those reported by Rice et al. (2010), as well as with the TD sample from within the current study, using Crawford modified t-tests. Child E’s average MLUw was significantly below that of Rice and colleague’s TD group before the intervention and was in line with Rice et al.’s DLD group, as well as with the TD sample from the current study. Following BCC, there was no longer a significant difference between Child E’s MLUw and that of the Rice TD group. E’s post-therapy scores also did not differ from the DLD children who took part in the Rice study, nor from the normative sample for BCC. For full details, see Table 6.20, below.

Table 6.20: Crawford comparisons between Child E MLUw and group samples

<table>
<thead>
<tr>
<th>Child E pre-therapy age</th>
<th>Child E pre- M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>6;10</td>
<td>3.49</td>
<td>Rice age 6;06-6;11 (TD)</td>
<td>63</td>
<td>4.7</td>
<td>0.66</td>
<td>-1.819†</td>
<td>0.037*</td>
<td>-1.833</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 6;06-6;11 (DLD)</td>
<td>94</td>
<td>4.18</td>
<td>0.71</td>
<td>-0.967‡</td>
<td>0.336</td>
<td>-0.972</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (6;06-6;11)</td>
<td>4</td>
<td>4.9</td>
<td>0.71</td>
<td>-1.776†</td>
<td>0.087</td>
<td>-1.986</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Child E post-therapy age</th>
<th>Child E post- M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>7;03</td>
<td>3.72</td>
<td>Rice age 7;00-7;05 (TD)</td>
<td>51</td>
<td>4.72</td>
<td>0.83</td>
<td>-1.193†</td>
<td>0.119</td>
<td>-1.205</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 7;00-7;05 (DLD)</td>
<td>103</td>
<td>4.15</td>
<td>0.62</td>
<td>-0.690‡</td>
<td>0.492</td>
<td>-0.694</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present study TD sample (7;00-7;05)</td>
<td>5</td>
<td>5.69</td>
<td>0.93</td>
<td>-1.934†</td>
<td>0.063</td>
<td>-2.118</td>
</tr>
</tbody>
</table>

†One-tailed, as Child E’s MLUw was predicted to be lower than that of the TD children. ‡Two-tailed to test differences in either direction. * Statistically significant. zcc denotes an effect size when comparing a single-case's score to a control sample (Crawford, Garthwaite & Porter, 2010).
1d) Does the ratio of child-to-adult speech change after intervention?

As with his MLUw scores, above, there was wide contextual variation in Child E’s contributions to conversation with his mother across both pre- and post-therapy samples. On average, child-to-adult ratio of speech for the dyad rose following therapy (from 0.61 to 0.83), with the mother continuing to speak more than her son following the intervention. Close inspection of the data reveals that the most balanced conversation occurred immediately following BCC (ratio of 0.99) when E and his mother were talking about the family’s Christmas plans. The dyad’s first conversation (about E’s swimming lesson and his trip to watch the Marvel show) also produced a near-even ratio (0.94). In contrast, E spoke least when the dyad were cooking together (pre-therapy 3), with the mother giving him multiple instructions about how to make his scrambled eggs. Table 6.21, below, summarises Dyad E’s ratio results before and after therapy:

Table 6.21: Dyad E ratio of child-to-adult speech

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Time child spoke (in seconds)</th>
<th>Time adult spoke (in seconds)</th>
<th>Ratio of child-to-adult speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>104</td>
<td>110.25</td>
<td>0.94</td>
</tr>
<tr>
<td>Pre-2</td>
<td>59</td>
<td>100.5</td>
<td>0.59</td>
</tr>
<tr>
<td>Pre-3</td>
<td>46.25</td>
<td>159</td>
<td>0.29</td>
</tr>
<tr>
<td>Average pre</td>
<td>69.75</td>
<td>123.25</td>
<td>0.61</td>
</tr>
<tr>
<td>Post</td>
<td>103.25</td>
<td>104.25</td>
<td>0.99</td>
</tr>
<tr>
<td>Follow up</td>
<td>63.5</td>
<td>94.5</td>
<td>0.67</td>
</tr>
<tr>
<td>Average post</td>
<td>83.38</td>
<td>99.38</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Legend:
- Orange: Proportion of time mother spoke (measured in seconds)
- Blue: Proportion of time child spoke
Crawford modified t-tests (two-tailed) were used to compare Dyad E’s average pre- and post-therapy ratio of child-to-adult speech with that of the whole TD sample included in this study (N = 22), since there was no association between age and ratio within this comparison group. Dyad E’s ratio was below that of the TD group both before and after intervention, but there was no significant difference between individual and normative group scores at either timepoint (see Chapter 4, Table 5.6; TD $M = 1.29$, $SD = 0.75$, Dyad E pre-therapy $M = 0.61$, $t = -0.887$, $p = 0.385$; Dyad E post-therapy $M = 0.83$, $t = -0.600$, $p = 0.555$).

2) Do children’s standardised language scores change following the intervention?

Table 6.22, below, summarises Child E’s standardised assessment scores before and after BCC. Positive changes are highlighted in green, while numerical decreases are marked in purple.

Table 6.22: Child E standardised assessment results

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Pre-therapy</th>
<th>Post-therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CELF-5 Sentence Comprehension (SCS)*</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>CELF-5 Word Structure (SCS)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>CELF-5 Formulated Sentences (SCS)</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>CELF-5 Recalling Sentences (SCS)</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Core Language SS (and percentile)</td>
<td>79 (8)</td>
<td>89 (33)</td>
</tr>
<tr>
<td>BPVS SS (and percentile)</td>
<td>82 (12)</td>
<td>88 (22)</td>
</tr>
<tr>
<td>ACE Naming (SS and percentile)</td>
<td>3 (1)</td>
<td>4 (2)</td>
</tr>
<tr>
<td>ERRNI Ideas: initial story-telling (SS and percentile)</td>
<td>75 (5)</td>
<td>90 (26)</td>
</tr>
<tr>
<td>ERRNI Ideas: recall (SS and percentile)</td>
<td>80 (9)</td>
<td>84 (15)</td>
</tr>
<tr>
<td>ERRNI Forgetting (SS and percentile)</td>
<td>106 (66)</td>
<td>92 (30)</td>
</tr>
<tr>
<td>ERRNI Comprehension (SS and percentile)</td>
<td>95 (37)</td>
<td>95 (37)</td>
</tr>
<tr>
<td>ERRNI MLU words (SS and percentile)</td>
<td>75 (5)</td>
<td>86 (17)</td>
</tr>
<tr>
<td>CCC** GCC (and percentile)</td>
<td>45 (5)</td>
<td>40 (3)</td>
</tr>
<tr>
<td>SIDC</td>
<td>-9</td>
<td>2</td>
</tr>
<tr>
<td>Digit span (Forwards; SCS)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

SCS: Scaled score; SS: standard score. * A scaled score of 7 or below indicates below average performance on the CELF. ** For the CCC, a General Communicative Composite (GCC) below 55 is indicative of a language difficulty. A negative value for the Social Interaction Deviance Composite (SIDC) is cause for concern and may be suggestive of ASD.

Overall, Child E’s CELF composite score rose from 79 to 89 following therapy, meaning he moved from over one standard deviation below the mean to within the average range for children of his age. He made the greatest improvement on the sentence comprehension subtest, with his scaled score rising from 5 to 11. Word
structure, a measure of morphology skills, also improved, suggesting that E was more able to mark verb inflections, as well as to use appropriate pronouns to refer to people, objects and possessive relationships.

E’s naming scores remained low following BCC, despite him making gains on the BPVS, which placed him within the normal range for receptive vocabulary following the intervention. It may take time for children to show gains expressively following improvement in receptive vocabulary (Owens, 2019). Alternatively, this persistent gap may be indicative of a clinically significant word-finding difficulty, which is likely to continue to affect Child E in conversation. As for several previous participants, E’s performance on the ERRNI narrative assessment was mixed, with improvements shown on initial story-telling, ideas recall and MLUw, while overall ‘forgetting’ scores fell and story comprehension remained unchanged after BCC.

In contrast to the previous cases, E’s mother rated his general communication as slightly lower following therapy, while her ratings indicated an improvement in his social interaction skills. Digit span held stable from pre- to post-therapy.

6.2.5.3 Summary and discussion of Dyad E’s results

Overall, the intervention produced the desired decrease in conversation barriers, with no significant change in the frequency of facilitative strategies. Both MLUw and ratio of child-to-adult speech rose on average following therapy, in the context of marked variation between individual conversations. E achieved improvements across several areas of his structural language, including comprehension at word and sentence level, though this did not extend to his narrative understanding.

E used his targeted facilitator of gesturing or acting out to help communicate meaning (F1) most frequently during the first pre-therapy conversation to help describe the physical act of swimming to his mother. It may be that this strategy is less helpful to him outside the context of talking about movement and ‘embodied interaction’ (Streecke et al., 2014). Whilst Mother E showed a small, non-significant increase in the number of repeats and recasts used within conversation, she did not increase her use of minimal turns. On reflection, these two facilitators may have
been difficult to work on in tandem, as one requires more verbal input from the parent, while the other calls for less. That said, these and other conversation behaviours are highly context-sensitive in their turn sequence environments and there may be more nuanced explanations for why the targeted change in these identified facilitators was not observed for this dyad.

As for all four of the previous cases, Dyad E achieved a significant decrease in targeted barriers. This was led by the reduction in maternal test questions (from 7 to 1). However, E was also successful in decreasing his own use of minimal turns - a shift which is reflected in his higher MLUw and child to adult speech ratio scores. There was considerable instability on both of these conversation measures before and after therapy, making it difficult to be confident that the change in average scores was due to the intervention, rather than contextual factors. Nevertheless, the rise in MLUw from 3.49 pre-therapy to 3.72 afterwards (a change of 0.23) was well above the mean difference of 0.02 between TD children aged between 6;06 and 6;11 and the next age band: 7;00 - 7.05 (Rice et al. 2010). MLUw for DLD children within the Rice et al. study fell from 4.18 to 4.05 across the same time-period. Meanwhile, the overall increase in Dyad E's child-to-adult ratio of speech was in line with therapy targets for E to contribute more to conversation.

Like cases A, B and C, Child E showed improvements on his CELF sentence comprehension. The ability to understand sentences of increasing length and complexity is likely to support him with following instructions and activities in class. It is not clear why this progress did not translate to E's understanding of narrative. Longer-term follow-up would be necessary to ascertain whether further support is required to encourage generalisation of receptive language gains beyond sentence level.

Whereas E's post-therapy CELF and BPVS scores placed him within normal limits for his age, the parent-reported CCC continued to indicate a communication difference of clinical significance. The combination of E's persistent difficulties with word retrieval and narrative are likely to continue to affect his everyday interactions at home and at school. This highlights the need to consider a child's overall language and communication profile, since standardised assessments may mask
ongoing challenges, which could impact on their social and educational development.

Despite this, in her post-therapy questionnaire, E's mother stated that her son's language difficulties 'don't affect our conversation'. While the mother's use of minimal turns fell slightly following BCC in the recordings used to assess change, she identified 'taking time to listen and wait till [E] has finished his sentence' as the most useful strategy she had learnt from participating in the intervention. Following therapy, E's mother also reported that E: 'will do actions to help explain things in conversation,' referring to his facilitator of using gestures or acting out to help get his message across, which also fell in frequency following BCC. These reports from the mother suggest there may be changes in their conversations not captured in the 5-minute samples analysed, or that are not evident in the behaviours measured for this dyad. Despite these reported improvements in their home conversations, E stated that he still finds it difficult to make himself understood at school: 'In the playground and in lessons, I find it hard to say what you want to say'. This suggests that further work is needed to help E communicate successfully with a wider range of conversation partners.
6.2.6 Dyad F

The final dyad was formed by Child F, a girl aged 8;02 years, and her mother, a marketing professional. Both were monolingual English speakers. F attended her local mainstream primary in an affluent suburb of London and was in Year Three. She was referred to the 'Better Conversations' project with an existing diagnosis of DLD. This was in the context of her suffering a fractured skull at birth, which may have impacted on her wider learning and development. However, F's BAS pattern construction scores were within normal limits, and she met the inclusion criteria for this study. F had previously attended private Speech and Language Therapy sessions but was not receiving any other intervention at the time of BCC. Her pre-therapy assessments showed significant difficulties with both receptive and expressive language (see Table 6.26, p.202, below).

6.2.6.1 Identification of targeted conversation behaviours.

In her pre-therapy questionnaires, Mother F reported that her daughter's main difficulties were with word-finding in conversation. She reported: 'It depends on the day, but sometimes she calls a giraffe an elephant'. M felt that working on conversation was 'the one piece that will unlock happy times'. She described how F was 'very good at starting conversations but finds it harder to keep it going'.

Following an introduction to language and conversation development and subsequent repeated viewing and discussion of extracts from their three pre-therapy recordings, the following facilitators and barriers were identified by the dyad, with support from the research therapist, as targets for intervention. Each behaviour is described in the context of Dyad F's communication, with rationale and examples from their pre-intervention transcripts. Six out of the total eight target strategies were also coded for the TD group (see Chapter 5). These are marked with an asterisk, below, and their frequency for Dyad F will later be compared with that of the normative sample.
*Child facilitator (F1): Using gestures or acting out to help communicate meaning.*

There were several examples of F using this strategy within her pre-therapy conversations. It was felt that this communicative strength could be used to help support her significant word-finding difficulties within the dyad’s everyday interactions. Examples of this target behaviour are given, below. In the first extract, F uses gesture to accompany and supplement her spoken utterances (line 86), while in the second sequence, she first uses non-verbal communication to replace the word ‘wolf’ (line 11). This appears to help cue her into retrieving the word, following M’s expectant prompt (lines 12 and 13).

Example 1, pre-therapy 2

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>84.</td>
<td>F</td>
<td>Can I get ready for party?</td>
<td></td>
</tr>
<tr>
<td>85.</td>
<td>M</td>
<td>We’ll get ready before you go to cricket, yeah.</td>
<td></td>
</tr>
<tr>
<td>86.</td>
<td>F</td>
<td>Because I want to get ready, hair (touche hair), my- take this dress off (points to dress) and put my party dress on (gestures putting a dress on).</td>
<td>F1 - Child uses gesture to help communicate her meaning.</td>
</tr>
</tbody>
</table>

Example 2, pre-therapy 3

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>M</td>
<td>A Witch! And what was Jason dressed as?</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>F</td>
<td>(Gestures paws under chin).</td>
<td>F1 - Child uses gesture to help communicate her meaning.</td>
</tr>
<tr>
<td>12.</td>
<td>M</td>
<td>A...</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>F</td>
<td>Wolf!</td>
<td>Child retrieves target word.</td>
</tr>
</tbody>
</table>

Child facilitator (F2): F uses ‘FANBOYS’ words to help extend her utterances.

This linguistic target was chosen for F, as she had been working on the use of the conjunctions ‘For, And, Nor, But, Or, Yet and So’ (FANBOYS words) in her written work at school. She was encouraged to use a prompt card, to be made available during her home conversations, to help remind her to use these words when speaking with her mother. Across her three pre-therapy conversations (without access to the prompt), she spontaneously used the word ‘and’ a total of 11 times; ‘because’ four times and ‘or’ on one occasion. Examples of sentences where F uses conjunctions include:
'Sainsbury’s first and then Waitrose’ (pre-therapy 1).

'Are we having lunch first and then drop dad off and me off?’ (pre-therapy 2).

'I know Oliver because I sawed Oliver before’ (pre-therapy 1).

*Adult facilitator (F3): Commenting, rather than questioning.

This target was chosen as Mother F felt that she was often 'directing' conversations with F by asking her closed questions, which limited her responses and made their interactions 'one-sided'. Examples of M using this alternative strategy during the dyad's pre-therapy recordings included:

'Oh look, mermaid dolls in the window’ (pre-therapy 1).

'So, baby Oliver is only about 4 weeks old' (pre-therapy 1).

'I got flour on my nose' (pre-therapy 3).

*Adult facilitator (F4): Using minimal turns.

For her second facilitator, M chose increasing her use of minimal turns in order to encourage F to say more within conversation. There was evidence of this in the dyad's first pre-therapy conversation:

Example 3, pre-therapy 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>119.</td>
<td>F</td>
<td>We need to go to ((sighs)) the shop.</td>
<td></td>
</tr>
<tr>
<td>120.</td>
<td>M</td>
<td>Yep.</td>
<td>F4 - minimal turn</td>
</tr>
<tr>
<td>121.</td>
<td>F</td>
<td>Waitrose.</td>
<td></td>
</tr>
<tr>
<td>122.</td>
<td>M</td>
<td>Mmmmm</td>
<td>F4 - minimal turn</td>
</tr>
<tr>
<td>123.</td>
<td>F</td>
<td>Sainsbury’s.</td>
<td></td>
</tr>
<tr>
<td>124.</td>
<td>M</td>
<td>Yes.</td>
<td>F4 - minimal turn</td>
</tr>
<tr>
<td>125.</td>
<td>F</td>
<td>Mm Dragonfly’s.</td>
<td></td>
</tr>
<tr>
<td>126.</td>
<td>M</td>
<td>Dragonfly, yeah.</td>
<td></td>
</tr>
</tbody>
</table>
*Adult facilitator (F5): Using extended pauses.

For her final, related facilitator, M chose to practise using pauses both within and between speaker turns to give her daughter more time and space to speak. It was agreed that she would silently count to three in order to ensure her pauses were at least two seconds in duration (Fox Tree, 2002).

*Child barrier (B1): Giving up when stuck on a word.

There were few examples of this behaviour in the dyad's pre-therapy data, however F's mother reported that the child frequently used this barrier during their everyday conversations at home. Examples from the recorded interactions include:

Example 4, pre-therapy 3

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>M</td>
<td>What were you dressed as?</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>F</td>
<td>Um.... <strong>Can you tell about your thing?</strong></td>
<td><strong>B1 - F gives up; asks M to speak for her.</strong></td>
</tr>
</tbody>
</table>

*Adult barrier (B2): using test questions.

M identified her frequent use of known answer questions as a barrier to her conversations with F, since this behaviour placed pressure on the child, particularly in the context of her significant word-finding difficulties. Examples of the mother using multiple test questions from the dyad's pre-therapy transcripts included the following example:
Example 6, pre-therapy 3:

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.</td>
<td>M</td>
<td>So we went to the houses, we said trick or treat and then what happened?</td>
<td>B2 - test question</td>
</tr>
<tr>
<td>35.</td>
<td>F</td>
<td>I walked around the field.</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>M</td>
<td>((confused face))</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>F</td>
<td>((smiles)) No, not field. Um...</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>M</td>
<td>So we said trick or treat and then we went away again?</td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>F</td>
<td>No.</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>M</td>
<td>What happened then?</td>
<td>B2 - test question</td>
</tr>
<tr>
<td>41.</td>
<td>F</td>
<td>We went a walk to another houses.</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>M</td>
<td>Did they not give you anything?</td>
<td>B2 - test question</td>
</tr>
<tr>
<td>43.</td>
<td>F</td>
<td>No.</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>M</td>
<td>No?</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>F</td>
<td>Yeah.</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>M</td>
<td>You didn’t get anything?</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>F</td>
<td>Yeah, a sweets.</td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>F</td>
<td>My bag.</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>M</td>
<td>In your bag. And quite a lot went where?</td>
<td>B2 - test question</td>
</tr>
<tr>
<td>51.</td>
<td>F</td>
<td>((Points to own stomach))</td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>M</td>
<td>In...</td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>F</td>
<td>My tummy.</td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>M</td>
<td>In your tummy, yeah.</td>
<td></td>
</tr>
</tbody>
</table>

**Adult barrier (B3): 'Jumping in' before Child F can start or complete a turn.**

Finally, this bespoke target was identified for Mother F, since there were several instances during the pair’s pre-therapy videos when she noticed herself interrupting her daughter, or cutting in when the child was about to speak, as in the following example, below:
Example 7, pre-therapy 2

<table>
<thead>
<tr>
<th>Line</th>
<th>Speaker</th>
<th>Talk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>M</td>
<td>We'll do a playdate.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>F</td>
<td>On Monday?</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>M</td>
<td>Well probably not this Monday, because you've got Popstars, haven't you after school?</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>F</td>
<td>A-and-</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>M</td>
<td>As you've just told [name]'s mum.</td>
<td>B3: M 'jumps in' before F has finished speaking.</td>
</tr>
<tr>
<td>6.</td>
<td>F</td>
<td>That her car? ((points))</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>M</td>
<td>Mmm, no. It’s a big one like that, yeah. It’s not that one, though. Hers is black. That one’s navy blue.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>F</td>
<td>It’s (3) er-</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>M</td>
<td>I think she said it was back there, didn’t she?</td>
<td>B3: M 'jumps in' before F has finished speaking.</td>
</tr>
</tbody>
</table>

6.2.6.2 Therapy outcomes.

Once targeted barriers and facilitators had been identified and agreed with the dyad, these were practised and refined during the six face-to-face therapy sessions and consolidated during home practice. To evaluate the effects of this intervention for Dyad F, each of the research questions will be addressed in turn, with results presented for pre- and post-therapy conversation behaviours and measures, followed by standardised language scores.

1a) Does the number of targeted facilitators used by children and parents in conversation increase after intervention?

1b) Does the use of targeted communication barriers decrease following the intervention?

Table 6.23, below, displays raw counts for Dyad F’s targeted facilitators and barriers in each conversation sample (three collected prior to therapy, one immediately post- and one at follow-up, six weeks after the intervention):
Table 6.23: Dyad F facilitator and barrier counts

<table>
<thead>
<tr>
<th>Code</th>
<th>Item</th>
<th>Pre-1</th>
<th>Pre-2</th>
<th>Pre-3</th>
<th>Av Pre</th>
<th>Post</th>
<th>Follow-up</th>
<th>Av post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Conversation Facilitators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>F uses gestures or acting out to help communicate meaning</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>3.33</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>F2</td>
<td>F uses 'FANBOYS' words to help extend her utterances</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>5.33</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>F3</td>
<td>M uses contingent commenting</td>
<td>11</td>
<td>2</td>
<td>6</td>
<td>6.33</td>
<td>14</td>
<td>7</td>
<td>10.5</td>
</tr>
<tr>
<td>F4</td>
<td>M uses minimal turns, e.g., 'mmhm', 'yeah'</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>6.67</td>
<td>3</td>
<td>6</td>
<td>4.5</td>
</tr>
<tr>
<td>F5</td>
<td>M uses extended pauses (of at least 2 seconds duration)</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>4.33</td>
<td>3</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted facilitators</strong></td>
<td>30</td>
<td>22</td>
<td>26</td>
<td>26</td>
<td>24</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td><strong>Conversation Barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>F gives up when stuck on a word</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0.67</td>
<td>1</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>B2</td>
<td>M uses test questions</td>
<td>2</td>
<td>2</td>
<td>16</td>
<td>6.67</td>
<td>3</td>
<td>6</td>
<td>4.5</td>
</tr>
<tr>
<td>B3</td>
<td>M 'jumps in' before F can start or complete a turn</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.67</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of targeted barriers</strong></td>
<td>5</td>
<td>5</td>
<td>20</td>
<td>10</td>
<td>5</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

Contrary to the dyad's therapy targets, there was a small decrease in their overall use of facilitative behaviours (from 26 to 25; Poisson trend for frequencies: $z = -0.22$, $p = 0.41$, one-tailed). While Mother F increased her use of contingent commenting (F3) and extended pauses (F5), instances of the child's two targeted facilitators (F1 and F2) fell. There was also a small reduction in the mother's use of minimal turns on average following therapy. Meanwhile, the number of identified barrier behaviours fell following BCC (from 10 to 6). This numerical reduction was in line with all five of the previous dyads, however the change for Dyad F did not reach statistical significance ($z = -1.51$, $p = 0.07$, one-tailed).
6.2.6.2.1 Comparisons with TD data

Six of the dyad’s targeted conversation behaviours matched with those that were investigated for the TD group (see Chapter 5). Crawford modified t-tests (all two-tailed) showed that there was no statistically significant difference between Dyad F and the TD group on any of the comparison behaviours, except for the child giving up when stuck on a word (B1). Child F used this behaviour significantly more frequently than her peers both before and after BCC (see Chapter 5, Table 5.2 for TD behaviour counts; TD $M = 0.05$, $SD = 0.15$, Child F pre-therapy $M = 0.67$, $t = 4.042$, $p = 0.001$; Child F post-therapy $M = 0.5$, $t = 2.934$, $p = 0.008$). Whilst her use of gesture and acting out (F1) was identified as a relative communicative strength for Child F, she used this behaviour on numerically fewer occasions than children in the TD group both before and after BCC (TD $M = 4.25$, $SD = 5.55$, Child F pre-therapy $M = 3.33$, $t = -0.162$, $p = 0.873$; Child E post-therapy $M = 3$, $t = -0.220$, $p = 0.828$).

Elsewhere, F’s mother went from using numerically fewer contingent comments than the TD mean prior to BCC to more comments afterwards, in line with her therapy targets (TD $M = 9.95$, $SD = 6.42$, Mother F pre-therapy $M = 6.33$, $t = -0.551$, $p = 0.587$; Mother F post-therapy $M = 10.5$, $t = -0.084$, $p = 0.934$). Conversely, she asked more test questions than the TD average pre-intervention and numerically fewer afterwards (TD $M = 6.52$, $SD = 5.73$, Mother F pre-therapy $M = 6.67$, $t = 0.026$, $p = 0.980$; Mother F post-therapy $M = 4.5$, $t = -0.345$, $p = 0.734$).

1c) Does children’s Mean Length of Utterance in words (MLUw) increase following the intervention?

Figure 6.7, below, shows Child F’s MLUw for each recorded interaction. The blue line illustrates the change from average pre-therapy to average post-therapy conversations. The longest MLUw (of 4.18) was recording during the dyad’s second pre-therapy conversation. There is a small decrease in average MLUw following the intervention.
Crawford modified t-tests were used to compare Child F's MLUw scores with those reported by Rice et al. (2010). It was not possible to perform comparisons between Child F and TD children from the current study, since only 1 child fell into F's age category at both pre- and post-therapy. Child F's average MLUw was numerically below that of Rice's TD and DLD groups both pre- and post-therapy. There was a statistically-significant difference between F and her TD counterparts following the intervention, reflecting the fall in her average MLUw, as well as her move to an older age band. See Table 6.24, below:

**Figure 6.7: Child F MLUw before and after therapy**
Table 6.24: Crawford comparisons between Child A MLUw and group samples

<table>
<thead>
<tr>
<th>Child F pre-therapy age</th>
<th>Child F pre- M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>8;02</td>
<td>3.66</td>
<td>Rice age 8;00-8;05 (TD)</td>
<td>41</td>
<td>5.08</td>
<td>0.84</td>
<td>-1.670†</td>
<td>0.051</td>
<td>-1.690</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 8;00-8;05 (DLD)</td>
<td>84</td>
<td>4.36</td>
<td>0.75</td>
<td>-0.928‡</td>
<td>0.326</td>
<td>-0.933</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Child F post-therapy age</th>
<th>Child F post- M</th>
<th>Comparison group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>zcc</th>
</tr>
</thead>
<tbody>
<tr>
<td>8;05</td>
<td>3.60</td>
<td>Rice age 8;00-8;05 (TD)</td>
<td>41</td>
<td>5.08</td>
<td>0.84</td>
<td>-1.741†</td>
<td>0.045*</td>
<td>-1.762</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice age 8;00-8;05 (DLD)</td>
<td>84</td>
<td>4.36</td>
<td>0.75</td>
<td>-1.007‡</td>
<td>0.317</td>
<td>-1.013</td>
</tr>
</tbody>
</table>

†One-tailed, as Child F’s MLUw was predicted to be lower than that of the TD children. ‡Two-tailed to test differences in either direction. *Statistically significant. zcc denotes an effect size when comparing a single-case's score to a control sample (Crawford, Garthwaite & Porter, 2010).

1d) Does the ratio of child-to-adult speech change after intervention?

Child F presented with both receptive and expressive language needs and her mother was aiming to give her daughter more time and space to speak by using more minimal turns and extended pauses (F4 and F5), while reducing test questions (B2) and increasing contingent comments (F3). Prior to therapy, the dyad’s conversations were evenly balanced, with an average child to average speech ratio of 1.12. Contrary to prediction, average ratio fell to 0.67 following BCC. Table 6.25, below, summarises ratio results before and after therapy:
Table 6.25: Dyad F ratio of child-to-adult speech

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Time child spoke (in seconds)</th>
<th>Time adult spoke (in seconds)</th>
<th>Ratio of child-to-adult speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>90.5</td>
<td>94.5</td>
<td>0.96</td>
</tr>
<tr>
<td>Pre-2</td>
<td>106</td>
<td>70.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Pre-3</td>
<td>91</td>
<td>91</td>
<td>1</td>
</tr>
<tr>
<td>Average pre</td>
<td>95.83</td>
<td>85.33</td>
<td>1.12</td>
</tr>
<tr>
<td>Post</td>
<td>71</td>
<td>116</td>
<td>0.61</td>
</tr>
<tr>
<td>Follow up</td>
<td>78.5</td>
<td>105.5</td>
<td>0.74</td>
</tr>
<tr>
<td>Average post</td>
<td>74.75</td>
<td>110.75</td>
<td>0.67</td>
</tr>
</tbody>
</table>

- Proportion of time mother spoke (measured in seconds)
- Proportion of time child spoke

Crawford modified t-tests (two-tailed) were used to compare Dyad F’s average pre- and post-therapy ratio of child-to-adult speech with that of the whole TD sample included in this study (N = 22), since there was no association between age and ratio within this comparison group. Dyad F’s child to adult speech ratio was lower than that of the TD group both before and after intervention. There was no significant difference between individual and TD group scores (see Chapter 5, Table 5.6; TD M = 1.29, SD = 0.75, Dyad F pre-therapy M = 1.12, t = -0.183, p = 0.857; Dyad F post-therapy M = 0.67, t = -0.802, p = 0.432).
2) Do children’s standardised language scores change following the intervention?

Table 6.26, below, summarises Child F’s standardised assessment scores before and after BCC. Positive changes are highlighted in green, while numerical decreases are marked in purple.

**Table 6.26: Child F standardised assessment results**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Pre-therapy</th>
<th>Post-therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CELF-5</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sentence Comprehension (SCS)*</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Word Structure (SCS)</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Formulated Sentences (SCS)</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Recalling Sentences (SCS)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Core Language SS (and percentile)</strong></td>
<td>70 (2)</td>
<td>73 (4)</td>
</tr>
<tr>
<td><strong>BPVS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS (and percentile)</td>
<td>79 (8)</td>
<td>84 (14)</td>
</tr>
<tr>
<td><strong>ACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naming (SS and percentile)</td>
<td>3 (1)</td>
<td>4 (2)</td>
</tr>
<tr>
<td><strong>ERRNI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideas: initial story-telling (SS and percentile)</td>
<td>77 (6)</td>
<td>65 (1)</td>
</tr>
<tr>
<td>Ideas: recall (SS and percentile)</td>
<td>0 (0)</td>
<td>100 (49)</td>
</tr>
<tr>
<td>Forgetting (SS and percentile)</td>
<td>77 (&lt;1)</td>
<td>100 (49)</td>
</tr>
<tr>
<td>Comprehension (SS and percentile)</td>
<td>85 (16)</td>
<td>74 (4)</td>
</tr>
<tr>
<td>MLU words (SS and percentile)</td>
<td>107 (68)</td>
<td>74 (4)</td>
</tr>
<tr>
<td><strong>CCC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCC (and percentile)</td>
<td>40 (3)</td>
<td>49 (7)</td>
</tr>
<tr>
<td><strong>SIDC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit span (Forwards; SCS)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

SCS: Scaled score; SS: standard score. * A scaled score of 7 or below indicates below average performance on the CELF. **For the CCC, a General Communicative Composite (GCC) below 55 is indicative of a language difficulty. A negative value for the Social Interaction Deviance Composite (SIDC) is cause for concern and may be suggestive of ASD.

F’s standardised scores present a mixed picture, with small improvements being shown following therapy on the CELF word structure and formulated sentences subtests. This brought her overall core language score up from 70 to 73 - still more than 1.5 standard deviations below the mean of 100. Elsewhere, F also achieved minor gains on the BPVS and ACE naming tests, which may have been due to natural maturation. Once again, results from the ERRNI assessment were equivocal, with Child F improving on both recall and forgetting, having opted out of a second telling of ‘The Fish Story’ at pre-therapy. Meanwhile, F’s initial story-telling, narrative comprehension and MLUw scores all fell following the intervention. For the latter subtest, F produced an impressive MLUw of 9 during her pre-therapy narration of ‘The Fish Story’ - well above her average utterance length within conversation. This
reduced to 6.09 for her post-therapy relating of 'The Beach Story', but remained well above her MLUw within F's recorded interactions with her mother.

Change on the parent-reported CCC was once again mixed, with F's general communicative composite score rising, while her social interaction deviance composite fell. This was in line with all previous cases, except for Child E. The digit span control task remained stable before and after therapy, indicating that BCC had no effect on this non-linguistic measure.

6.2.6.3 Summary and discussion of Dyad F’s results.

Child F was the eldest participant with DLD to take part in BCC. She entered the programme with the lowest standardised assessment scores and may have had additional learning difficulties, due to her birth history, though these were not evident during her initial screening. Overall, the intervention did not produce significant changes in the number of targeted facilitators or barriers, which were identified and worked on by the dyad. Unlike the previous five cases, Child F’s average MLUw and ratio of child-to-adult speech decreased following the intervention, while she made minor gains on some isolated areas of her expressive and receptive language, with other skills declining or showing no change.

Detailed analysis of the conversation data shows all three of the targeted barriers were reduced following the intervention (B1-B3). However, there were few recorded instances of these during the dyad's pre-therapy conversations, meaning that there was limited scope for change from pre- to post-intervention. The dyad targeted a total of eight conversation behaviours (five facilitators and three barriers), which may have made it more difficult to achieve focused practice on each area. Additionally, M's goal of increasing her use of contingent comments (F3) may have conflicted with her additional aims of employing more minimal turns and extended pauses (F4 and F5), or it may be that this behaviour was only appropriate and facilitative within certain turn sequence environments. Meanwhile, F may have found it challenging to concentrate on using more non-verbal communication (F1), alongside her target of including more 'FANBOYS' words within her conversations (F2).
The context of Dyad F's interactions may also have impacted on the results for both conversation behaviours and measures (MLUw and ratio of child-to-adult speech). For the first two videos, M set up her mobile phone on the dashboard of her car and the dyad recorded themselves chatting as they drove around town. They were later advised not to do this for safety reasons and subsequent videos were made when the pair were seated together at home. Notably, M used fewer test questions (B2) during both car-based conversations (two on each occasion, compared to 16 at pre-therapy 3 and an average of 4.5 post-therapy). Conversely, Child F used the most 'FANBOYS' words at pre-therapy 1 (F1, 6) and pre-therapy 2 (8). This was reflected in her higher pre- versus post-therapy MLUw and ratio of child-to-adult speech - both of which reached their highest peak at pre-therapy 2.

It is unclear precisely why the dyad’s ratio and child MLUw scores fell following therapy, though one plausible explanation is that the mother spoke more when fully focused on interacting with her child, rather than driving the car and watching the road ahead. Recommendations for future strategies could include engaging in an activity together, such as Play-Doh or baking, to help encourage more maternal pauses and minimal turns and redress the balance of conversation between Child F and her mother.

Child F made minimal progress on her standardised assessments following BCC, with the greatest gains being shown on the BPVS (receptive vocabulary) and on the ERRNI recall of narrative at Time 2. Her improved ERRNI subtest results reflected her inability to remember anything about 'The Fish Story' during her pre-therapy assessment, leading to a score of zero for recall on the first occasion. Notably, Child F's MLUw scores within the ERRNI dropped from a standard score of 107 at pre-intervention to 74 afterwards. This mirrored the decline in her MLUw within conversation and is concerning, due to the potential impact on her functional communication of using shorter and less complex utterances.

As for 4/5 of the previous cases, F’s mother judged that her overall communicative competence increased following her participation in BCC, while her social interaction skills reduced, according to parental report. Despite the lack of clear improvement in F’s language and conversation skills as a result of BCC, her mother felt the pair had
benefited from their participation in the study. In her post-therapy questionnaire, Mother F stated:

'More time dedicated to conversation definitely supports language development. There are lots of strategies to help, but time, space and awareness are probably the best.'

It may be that a longer intervention period would have helped F to make greater improvements, given the severity of her language difficulties in contrast to previous cases. A further area for investigation is the number and nature of child and parental targets and whether these could be refined in order to maximise the potential benefits of intervention. F's mother reported that her daughter 'loves Talk Time' (the time set aside by the dyad to practise using their target conversation strategies at home), explaining: 'We always talk, but it's our special time.' For her part, F felt that she was more able to 'ask Mum for help' if she was stuck on a word. However, she perceived that her brother 'doesn't let me talk' and that the teacher rarely chose her to answer questions in class. This illustrates the need for future work on BCC to consider involving other conversation partners once parent-child interactions have been enhanced in order to maximise communicative support for children with DLD beyond the parent-child dyad.
6.2.7 Summary of and discussion of results for case series and group

6.2.7.1 Conversation behaviours and measures.

Six children with DLD and their mothers took part in BCC research therapy. As for the TD group, all key conversation behaviours and measures were stable for the DLD participants across a 6-week period prior to intervention, despite wide individual variability. This was measured by comparing DLD group scores for their first and third recorded pre-therapy conversations. These pre-therapy results are summarised in Table 6.27, below, showing that group facilitators and ratio of child-to-adult speech showed a non-significant decrease between T1 and T3, while overall barriers and MLUw rose numerically (again, this change was not statistically significant).

Table 6.27: Comparison of DLD group scores at Time 1 and Time 3 (both conversations recorded prior to the BCC intervention):

<table>
<thead>
<tr>
<th>Conversation variable</th>
<th>Pre-therapy 1</th>
<th>Pre-therapy 3</th>
<th>z</th>
<th>p</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>Mdn</td>
<td>SD</td>
<td>M</td>
<td>Mdn</td>
</tr>
<tr>
<td>All targeted facilitators</td>
<td>15.83</td>
<td>15</td>
<td>13.32</td>
<td>11.69</td>
<td>9</td>
</tr>
<tr>
<td>All targeted barriers</td>
<td>10.5</td>
<td>10.5</td>
<td>5.86</td>
<td>15.39</td>
<td>11.17</td>
</tr>
<tr>
<td>Child MLUw</td>
<td>3.97</td>
<td>3.86</td>
<td>0.66</td>
<td>4.18</td>
<td>3.57</td>
</tr>
<tr>
<td>Child-to-adult ratio of speech</td>
<td>1.29</td>
<td>0.95</td>
<td>0.96</td>
<td>1.02</td>
<td>0.88</td>
</tr>
</tbody>
</table>
Key participant characteristics and quantitative results for all dyads' conversation behaviours and measures following the intervention (calculated by comparing mean scores pre- and post-therapy) are summarised in Table 6.28, below:

**Table 6.28: Summary of quantitative results for Dyads A-F targeted conversation behaviours and measures.**

<table>
<thead>
<tr>
<th>Child's gender</th>
<th>Dyad A</th>
<th>Dyad B</th>
<th>Dyad C</th>
<th>Dyad D</th>
<th>Dyad E</th>
<th>Dyad F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age on initial assessment</td>
<td>7;06</td>
<td>6;08</td>
<td>6;06</td>
<td>7;03</td>
<td>6;10</td>
<td>8;02</td>
</tr>
<tr>
<td>RQ1a: Statistically significant increase in targeted facilitators?</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RQ1b: Statistically significant decrease in targeted barriers?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>RQ1c: Increase in child MLUw in conversation?</td>
<td>5.17</td>
<td>5.28</td>
<td>3.67</td>
<td>4.03</td>
<td>3.65</td>
<td>4.31</td>
</tr>
<tr>
<td>RQ1d: Change in ratio of child:adult speech?*</td>
<td>2.51</td>
<td>0.97</td>
<td>0.87</td>
<td>1.33</td>
<td>0.89</td>
<td>1.19</td>
</tr>
</tbody>
</table>

*Arrows indicate direction of change, which differed for individual dyads.*
Findings for the case series showed that two dyads produced a statistically significant increase in identified conversation facilitators, while five achieved a significant decrease in barrier strategies. When considered as a group, there was no significant difference between total child and adult facilitators on average pre- and post-therapy (pre-therapy \( Mdn = 10.835 \), post-therapy \( Mdn = 13.5 \), \( z = 0.946 \), \( p = 0.172 \), \( r = 0.386 \), 1-tailed). However, once broken down into parent-only and child-only behaviours, there was a significant increase in mothers’ use of their chosen facilitators from a median of 9 prior to therapy to 12.75 following intervention (\( z = 2.201 \), \( p = 0.014 \), \( r = 0.899 \), 1-tailed). Meanwhile children's use of their own facilitative behaviours fell, contrary to therapy targets, from a median of 2.215 to 1.75: (\( z = 1.682 \), \( p = 0.046 \), \( r = 0.687 \), 1-tailed). This could indicate that it was less necessary for them to employ self-help strategies once parents had adopted a more supportive communication style, though these strategies could still prove beneficial in their interactions with other conversation partners.

Turning to the group results for barrier behaviours, there was a significant decrease in overall barriers following BCC. These more than halved from a median of 8.47 pre-therapy to 4 post- (\( z = -2.201 \), \( p = 0.014 \), \( r = -0.899 \), 1-tailed). This reflected an underlying reduction in both parents’ and children’s use of these less helpful conversation behaviours: mothers’ barriers reduced from a pre-therapy median of 6.34 to 0.75 post-therapy (\( z = -2.201 \), \( p = 0.014 \), \( r = -0.899 \), 1-tailed), while children's fell significantly from a median of 2.74 to 1 (\( z = -2.023 \), \( p = 0.022 \), \( r = -0.826 \), 1-tailed).

The overall contrast in results for facilitators and barriers indicates that the mechanisms of change may be different for increasing the frequency of targeted facilitators, compared to reducing undesirable behaviours (Johnson et al., 2017, 2021). Of the five individual conversation behaviours which were targeted by three or more dyads and could therefore be considered for pre/post comparison, notably, test questioning was the only behaviour which showed significant change across the four mothers who were aiming to reduce this strategy. Instances of this barrier strategy fell from a median of 6.835 pre-therapy to 2 post- (\( z = -1.826 \), \( p = 0.034 \), \( r = -0.745 \), 1-tailed). Further investigation of this turn type is indicated to explore
the qualitative patterns underlying this maternal behaviour and to evaluate its impact on children's conversational and linguistic response (see Chapter 8).

The significant change in barrier behaviours for DLD participants following six weeks of intervention contrasts with the stability of Time 1 and Time 2 behaviour scores, measured across the same time-period, for our TD sample (see Chapter 5), as well as T1-T3 DLD group scores. When the occurrence of individual behaviours, targeted by three or more DLD dyads, were compared to the TD mean, there were no significant differences between the two sets of scores either before or after therapy, except for the case of children giving up when stuck on a word. There was a significant difference between DLD and TD children in instances of this behaviour both before and after therapy, despite a reduction in this identified barrier by the intervention group: DLD pre-therapy $M = 1.507$, TD $M = 0.045$ ($U = 0.00$, $z = -4.887$, $p < 0.001$, $r = -0.924$, 2-tailed), DLD post-therapy $M = 0.833$, TD $M = 0.045$ ($U = 4$, $z = -3.484$, $p < 0.001$, $r = -0.659$, 2-tailed). These findings suggest that this behaviour is a key indicator of children experiencing language difficulties in conversation, which distinguishes them from their TD peers.

With regard to more formal conversation measures, five children with DLD achieved an increase in their mean length of utterance in words following the therapy. This represented a significant change for the intervention group (pre-therapy $Mdn = 3.67$, post-therapy $Mdn = 4.17$; $z = 1.992$, $p = 0.023$, $r = 0.813$, 1-tailed). The increase in MLUw results for the DLD group contrasts with the stability in T1 and T2 scores for the TD sample over the same time period (T1 $Mdn = 4.83$, T2 $Mdn = 4.86$; $z = 0.341$, $p = 0.733$, $r = 0.073$, 2-tailed), as well the pre-therapy stability reported for the DLD children (see p.199, above). Figure 6.8, below, illustrates the change in pre- to post-therapy scores, plotted in relation to norms reported by Rice et al. (2010), with the majority of BCC participants approaching, or surpassing, expectations for language disordered children following the intervention.

A change score was calculated for DLD and TD children in order to compare the difference in average MLUw before and after the six-week intervention, or control, period. Mann-Whitney U test results did not show a significant difference between
the two groups: \((U = 60.5, z = -0.308, p = 0.379, r = -0.058, 1\text{-tailed})\). It is likely this lack of significance was due to the wide variation in MLUw scores within the TD group both at T1 and T2 (T1 range: 2.3 - 8.05; T2 range: 2.69 - 7.17).

Within the DLD sample, the single child whose MLUw did not improve following BCC therapy (Child F) was the eldest in the cohort and showed the most severe receptive and expressive difficulties, based on her CELF scores both prior to and following the intervention. In addition, Dyad F was the only dyad who did not show a significant change in either facilitators or barrier behaviours following the intervention. It may be that a conversation-based approach was not the most appropriate means of supporting Child F's needs. This is in line with previous research, which suggests that a more explicit, meta-linguistic approach may be most effective for older children with severe and persistent language impairments (e.g., Calder et al., 2021; Ebbels, 2014). Alternatively, the dyad may have benefited from a longer period of intervention and/or a focus on fewer target behaviours. Further research will be needed to determine how BCC can be refined to maximise outcomes for children with more complex language needs.
Turquoise lines represent average MLUw for TD children from Rice et al. (2010) whose 6-monthly age bands match the pre-/post-therapy age of children from the BCC intervention study. Crimson lines represent average MLUw for DLD children from Rice et al. (2010) whose 6-monthly age bands match the pre/post-therapy age of children from the BCC intervention study.

Figure 6.8: Children's pre- and post-therapy MLUw scores compared with TD and DLD norms from Rice et al. (2010)
Group results for ratio of child-to-adult speech were more equivocal, with Children B, D and E speaking consistently more after the intervention, while Children A and F spoke less, and Child C showed considerable variation across pre- and post-therapy conversations. For the group as a whole, there was a non-significant increase in ratio scores following the intervention: pre-therapy $Mdn = 0.89$; post-therapy $Mdn = 1.08$ ($z = 0.314$, $p = 0.753$, $r = 0.128$, 2-tailed). Mann-Whitney U tests carried out on DLD and TD change scores also showed no significant difference between groups across the six-week measurement period, despite average TD ratio reducing from a mean of 1.41 at T1 to 1.15 at T2, while average DLD group scores rose ($U = 54$, $z = -0.672$, $p = 0.502$, $r = -0.127$, 2-tailed).

The mixed findings for speech ratio within the DLD group were likely to be, in part, related to individual therapy targets, with Mother A being encouraged to offer more verbal input in order to support her son's comprehension and help keep the conversation on track, whilst other parents were aiming to leave more time and space for their child to speak. In the case of Dyad F, the selection of multiple targets may have led to confusion for the participants, since the mother was seeking to employ more minimal turns and extended pauses, whilst simultaneously increasing her use of contingent commenting - an aim which runs counter to the first two strategies. If only dyads where there was a clear aim of increasing child to adult speech ratio are included (Dyads B - E), there was a significant increase in child-to-adult ratio of speech, in line with their individual aims: pre-therapy $Mdn = 0.84$; post-therapy $Mdn = 1.26$ ($z = 1.826$, $p = 0.034$, $r = 0.913$, 1-tailed).

6.2.7.2 Standardised language measures.

A central question for this research was whether children's standardised scores on core language measures would show change following the intervention. A core aim of BCC was to boost children's language by training parents to use supportive communication strategies within their everyday interactions. However, previous studies involving school-aged children with DLD have failed to capture significant effects of intervention using standardised outcome measures (Ebbels et al., 2019). Despite this, all six pupils showed a numerical increase in core language standard
scores on the CELF. Excluding Child F, this brought their post-therapy results to within normal limits on this composite test. Wilcoxon signed rank tests showed there was a significant difference, with large effect sizes, in children's raw scores for each CELF subtest following the intervention (see Table 6.29, below). It is likely that the mechanisms of action underlying these improvements are similar to those involved in PCIT studies with pre-schoolers, which have also reported positive change on children's receptive and expressive language measures (e.g., Roberts et al., 2011). By maximising the quality and contingency of parental language input, children have more access to linguistically rich interactions, whilst simultaneously being given more time and space to practise using their own developing communication skills within a highly supportive and attuned conversational environment.

Elsewhere within the standardised tests, children showed no significant change in their performance across any subtest of the ERRNI narrative assessment. In the context of the children's improved CELF scores, this is perhaps surprising, since story retell is a measure of connected speech, which is closely related to conversation, and would therefore seem more likely to improve in line with conversation development. Previous studies have shown that measures of children's productive ability, such as MLUw, are consistently higher in narrative samples than in conversation or free play situations (Nippold et al., 2014) and represent a child's 'maximum', rather than 'typical behaviour' (Southwood & Russell, 2004). This was the case for all children in our study, who showed higher MLUw on the ERRNI than in their recorded conversations both before and after therapy, as shown in Table 6.30, below.

While 4/6 children improved their ERRNI MLUw following BCC, it was also notable that the majority of children performed less well at Time 2 in other areas, for example story comprehension. There are two parallel forms for the ERRNI ('The Fish Story' and 'The Beach Story'). All children in the BCC study were assessed with 'The Fish Story' pre-therapy and 'The Beach Story' post-intervention. While these stimuli were designed to be matched for story structure and components, Frizelle, Thompson, McDonald & Bishop (2018) found that 'The Beach Story' elicited more complex sentences from typically developing children than the
alternative 'Fish Story'. It may be that this added complexity was linked to our DLD group's poorer performance at Time 2 - particularly in light of their improved results on the sentence comprehension subtest of the CELF.

Children also showed confusion over some specific aspects of 'The Beach Story', which may be related to their social context and experience. For example, two of the children did not identify the central item stolen by a bird as a wristwatch, with one omitting this detail entirely and the other calling it a 'Fitbit'. These findings may have wider implications for the use of ERRNI as an outcome measure for research studies. Varying the order of presentation pre- and post-therapy could help counter these issues in future larger-scale evaluation of BCC.

Separately, children's results for both the BPVS and ACE naming subtest showed positive change, which may have reflected work within BCC on children's word-finding and adults' use of commenting and recasting children's utterances, e.g., to provide the correct vocabulary. Group scores for the parent-reported CCC were unchanged following BCC, reflecting continuing challenges within children's everyday communication and perhaps an increased awareness of how language difficulties affected their social interactions. The non-verbal digit span control task also remained stable for the group, although there were three individual children for whom standard scores rose post-therapy. This suggests that for half of the children, improvements on language measures could not be attributed to wider developmental gains, while for the other half, it is less clear whether this was the case.
### Table 6.29: Summary of children's raw scores pre- and post-therapy for all standardised language measures

<table>
<thead>
<tr>
<th>Child</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Pre-post change ‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw score</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>CELF-5 sentence comp</td>
<td>17</td>
<td>21</td>
<td>22</td>
<td>25</td>
<td>16</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>word structure</td>
<td>27</td>
<td>28</td>
<td>23</td>
<td>24</td>
<td>23</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>formulated sentences</td>
<td>28</td>
<td>35</td>
<td>13</td>
<td>16</td>
<td>16</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>recalling sentences</td>
<td>28</td>
<td>27</td>
<td>24</td>
<td>26</td>
<td>32</td>
<td>42</td>
<td>27</td>
</tr>
<tr>
<td>ERRNI ideas: initial</td>
<td>17</td>
<td>20</td>
<td>18</td>
<td>18</td>
<td>12</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>ideas: recall</td>
<td>14</td>
<td>15</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>forgetting</td>
<td>3</td>
<td>5</td>
<td>17</td>
<td>18</td>
<td>1</td>
<td>4</td>
<td>-5</td>
</tr>
<tr>
<td>comprehension</td>
<td>15</td>
<td>9</td>
<td>9</td>
<td>4</td>
<td>10</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>MLUw</td>
<td>7.17</td>
<td>8.76</td>
<td>7.28</td>
<td>7.7</td>
<td>6.45</td>
<td>8.1</td>
<td>10.04</td>
</tr>
<tr>
<td>BPVS</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>74</td>
<td>78</td>
<td>72</td>
</tr>
<tr>
<td>ACE (naming)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>7</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>CCC general comm †</td>
<td>105</td>
<td>99</td>
<td>65</td>
<td>54</td>
<td>51</td>
<td>32</td>
<td>72</td>
</tr>
<tr>
<td>social interact †</td>
<td>25</td>
<td>27</td>
<td>18</td>
<td>20</td>
<td>8</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>Digit span</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

*Statistically significant. † For the CCC, a decrease in raw scores indicates an increase in communicative functioning and vice versa. ‡ Analysed for DLD group using Wilcoxon signed rank tests, one tailed, to assess whether any improvements in scores were statistically significant.
Table 6.30: Children's MLUw in conversation, versus the ERRNI narrative assessment before and after therapy.

<table>
<thead>
<tr>
<th>Child</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLUw</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Conv</td>
<td>5.17</td>
<td>5.28</td>
<td>3.67</td>
<td>4.03</td>
<td>3.65</td>
<td>4.31</td>
</tr>
<tr>
<td>ERRNI</td>
<td>7.17</td>
<td>8.76</td>
<td>7.28</td>
<td>7.70</td>
<td>6.45</td>
<td>8.10</td>
</tr>
</tbody>
</table>

6.2.7.2 Overall discussion of results and implications.

Five dyads showed change in targeted conversation behaviours (reducing barriers) following the intervention, as well as an increase in child MLUw in conversation. Significant improvements for the group were also achieved on the CELF-5, BPVS and ACE naming subtest. These changes were produced within a clinically realistic time frame (one session per week over 6 weeks). Improvements in conversation were captured during five minutes of videoed exchanges (collected three times prior to therapy, once immediately post-therapy and once at follow-up). If these recordings are representative of the dyad's regular natural interactions, this indicates positive change to the child's communication environment, which should continue to support their language and conversation development over time.

The differences in pre- and post-therapy scores for the DLD group across the six-week intervention contrasts with the stability of conversation behaviours between their first and third pre-therapy recordings, as well as measures for our TD sample before and after the same time-period. Whilst group TD scores did not differ across Time 1 and Time 2, there was a high level of within-group variation. This meant that DLD dyads did not differ significantly from their TD counterparts on any conversation characteristic, except for in the case of children giving up when stuck on a word. These results support findings by Blackwell et al. (2015), who found limited evidence for PCI differences in naturally occurring contexts involving language impaired preschoolers and TD controls. The DLD group results indicate that there was not something inherently atypical about their interactions, but rather that there were some specific strategies that they found more or less personally beneficial in order to
support their enjoyment, as well as the content and flow of their conversations. By modifying and fine-tuning these behaviours within conversation, children benefited from enhanced input and participation, which was in turn reflected in their structural language gains.

The main changes in use of targeted barriers and facilitators were led by parents, indicating that children may require more practice and prompting to embed new strategies within their everyday communication. For facilitators in particular, children failed to use their chosen strategies independently, despite regular role play and games to encourage this during therapy sessions. According to Johnson et al. (2021), prompting and cueing form a key behaviour change technique, which can help establish and maintain new communication habits. While parents were encouraged to remind their child to use their chosen facilitator, where appropriate, at home, this may have been unrealistic in the context of the adult also trying to adapt their own communication style.

Children were given visual prompts, incorporating their own words and drawings, to support them during their home conversations. However, these were not always made available during their recorded interactions, and this may have been an important omission, which should be discussed and investigated further in the future development of BCC. For example, Johnston et al. (2021) highlight the process through which behaviour is triggered through the external environment, as well as the ability to attend to and retain information (supported by prompts and cues) as important mechanisms of action to promote successful behaviour change.

The number and nature of chosen therapy targets may also have contributed to dyads’ varying responses. For example, Dyad F chose a total of eight strategies (three child and five parental) to work on during the six-week intervention block. This may have made it difficult to consistently focus on and employ any individual strategy, particularly since these did not always directly complement each other. For example, Child F was aiming to increase her (verbal) use of conjunctions (FANBOYS words), whilst also being encouraged to use more non-verbal communication. Similarly, her mother chose to increase her use of contingent commenting (to provide more rich verbal input), whilst simultaneously aiming to use more extended
pauses and minimal turns (to give her child more time and space to speak). Elsewhere, Mother B chose to respond more to her son's non-verbal communication, at the same time employing minimal turns, contingent comments and recasts. Mother E also chose potentially conflicting targets: to increase both recasts and minimal turns. These may have worked against each other to make it more difficult to achieve progress in both areas. Notably, this issue applied mainly to facilitators. Participants chose fewer and more focused barrier behaviours, which may have contributed to their greater success in achieving the desired behaviour change for this strategy type.

Another key consideration in interpreting the results was the context in which conversations took place. For Dyad C, there was marked variability across their pre- and post-therapy conversations, which appeared to be linked to contextual factors. C was most talkative when looking through a toy catalogue and considering his Christmas list (child:adult speech ratio of 1.71) and made his lowest verbal contribution when he was helping his mother to write his sister’s birthday card (ratio of 0.6). Similarly for Dyad D, the child spoke most when talking about her favourite topic – holidays (ratio of 3.49), whereas her mother dominated verbally when the conversation centred on a set of Playmobil toys, which led to the parent using multiple test questions and 'correct production sequences' (Lock et al., 2001), with the aim of prompting the child to produce a specific target word. Child D explicitly stated that she enjoyed conversations more when they involved talking about her favourite things, including imagined scenarios, such as being able to fly. In contrast, Dyad C were aiming to keep their interactions based in the here and now to redress the child’s core barrier behaviour of ‘fibbing’ in conversation. Importantly, the effect of context appears highly individual, with some dyads finding it helpful to use toys and games as a shared focus for their talk, while others chatted more freely in less play-based situations.

Background factors, including topic and situation, can affect dialogic communication between participants (Ahlsén & Saldert, 2018; Hoff, 2010). However, these were not controlled for in the current study, following the principles of conversation analysis, which focuses on ‘unconstrained’ natural talk. The impact of contextual factors could be investigated further in the future development of BCC. For example, the related.
‘Better Conversations with Primary Progressive Aphasia’ programme (BCPPA; Volkmer et al., 2023) includes a suggested topic guide to support participants in establishing their conversations together. Session 4 of BCC included explicit discussion of child-focused topics of conversation and dyads were invited to bring in family photos or favourite books to use during practice ‘Talk Time’ together. However, there was no formal written information given about specific topics or settings that may enhance the dyads’ conversations, since it was felt this would deviate from the aim of recording their most natural everyday interactions in order to maximise ecological validity for both assessment and analysis.

Another potential consideration for the future development of BCC is the inclusion of a review session to determine whether strategies should be adjusted in response to changes in interactional patterns, which have occurred following the intervention. For example, Dyad D’s average ratio of child to adult speech jumped from 0.81 pre-therapy to 2.57 post, as the child’s MLUw increased from 4.21 to 6.72. Whereas the mother was concentrating on 'holding back' by using more minimal turns and extended pauses, going forward, and in certain contexts, the child may benefit from more maternal recasts and contingent comments in response to her own turns to support the continued development and refinement of her language skills. Separately, a follow-up session for Dyad B could have provided support and encouragement to maintain their use of facilitators, which rose immediately after the intervention but fell back six weeks later. A post-therapy review for Dyad F would have helped identify which of their multiple strategies were working well, whilst highlighting others which could be eliminated to maximise progress.

Both parents and children reported improvements in their shared conversations following the intervention. However, children identified continuing challenges in their interactions with other communication partners, including siblings, peers, and education staff. The final session of BCC included making a poster with 'top tips for talking', based on individual barriers and facilitators that had been identified for each child during the research therapy. The intention was for this to be shared with others in the child’s family, school and social circle. There is also potential for direct conversation-based intervention to be extended to other CPs beyond the parent-child dyad. Suggestions for turn-taking at home were also provided for two dyads.
who reported difficulties for the child with DLD being listened to at home, for example during mealtimes. A further extension of the programme could include sessions with the wider family to raise awareness of language disorder and its impact on home conversations and to offer support in managing this. This work could help highlight that the interactions of children with DLD may not be atypical, but rather more sensitive to and dependent upon conversational partners who are primed to use tailored, supportive communicative strategies.

The case series design has enabled consideration of children and parents' individual response to BCC, relating this to the dyads' pre-therapy profile of communication strengths and needs. Change was achieved on both conversation behaviours and measures, as well as on standardised language tests. Recorded interactions from the DLD group have been compared with those from TD children and their parents in order to set findings in context and enhance our understanding of parent-child interaction for school age children with and without language disorder.

The next chapter will consider the feasibility of BCC, including recruitment and retention rates and the practicality of using conversation-based outcome measures, to explore the parameters for a larger-scale intervention trial.
Chapter 7: Feasibility of BCC

Eldridge et al. (2016) state:

‘A feasibility study asks whether something can be done, should we proceed with it, and if so, how.’ (p.1)

Such studies are used to determine whether an intervention has the potential to proceed to further development, with a view to being tested in a larger scale trial. Investigations of feasibility help to establish whether an intervention can be undertaken with the target population, whether the resources required to deliver the intervention are reasonable and/or whether progress in communication (or other targeted skills) occurs within a clinically realistic time frame.

It is beyond the scope of this PhD to investigate in detail all aspects of feasibility for the BCC programme. For example, Lancaster et al. (2004) recommend that a study must recruit at least 30 participants to inform sample size calculations for a randomised control trial (RCT). This is to avoid the over-estimation of effect sizes, which can arise when working with a small number of cases (Westlund & Stuart, 2017). This chapter will, therefore, assess the following three areas to provide preliminary information about the feasibility of a future wider-scale evaluation of BCC:

1. Recruitment and retention rates.
2. Acceptability of the intervention (including any resulting changes in protocol as a result of parental/child feedback).
3. Suitability of chosen outcome measures, including inter-rater reliability and time taken to collect and analyse conversation data.

Each area will be addressed in turn, before overall feasibility findings are drawn together to evaluate whether BCC could be piloted with a larger group of children and carers. This could form the next step towards a larger case series, implementation in practice or future RCT.
7.1 Recruitment and retention

Children and parents in the current study were recruited via their school Special Educational Needs Co-ordinators (SENCo's) or Inclusion Managers. Schools were asked to put forward children who:

- Have identified difficulties with understanding or using language (including a diagnosis of developmental language disorder).
- Have trouble in everyday conversation, including difficulties with word-finding, taking turns or establishing and maintaining topic.
- Have English as a main language
- No other significant difficulties that may affect their language or learning, such as ASD or ADHD.

A total of 13 primary schools were contacted, based in South London and North-East Surrey. Figure 7.1, below, illustrates the numbers of participants who were approached and/or assessed for eligibility, received intended treatment and whose results were analysed in the study. SENCo's were telephoned or emailed to invite them to put forward children for the 'Better Conversations' project. In addition, the PhD researcher met with parent representatives from a local communication charity, Afasic, who agreed to pass the project recruitment materials to members of their weekly youth groups for children with speech, language and communication needs.

As a result of this process, one child from Afasic was referred for screening but scored within normal limits on the CELF core language subtests. This was explained to his guardian during a face-to-face meeting, and it was agreed that he was unlikely to benefit from taking part in the research. A further 21 children were referred by their school SENCo's or Inclusion Managers, however when the Research SLT contacted their carers to explain the project, six declined to participate. Of those who gave a reason for this, three said that they did not wish themselves, or their child, to be videoed, with one mother commenting: 'That is a red line for me'. One parent stated that the time commitment to attend six sessions was too great for her, while the remaining two carers did not give a reason for withholding their participation.
**Figure 7.1:** Flow diagram of process through phases of the project (adapted from Eldridge et al., 2016).

**Invited**
- Schools invited to participate in ‘Better Conversations with Children’ (n=13)
- Local communication charity invited to participate (n=1)

**Referrals**
- Families referred to ‘Better Conversations with Children’ (n=22)
  - Declined to participate (n=6)
    - Did not wish to be videoed (n=3)
    - Time commitment too great (n=1)
    - Unknown reasons (n=2)

**Screened**
- Children screened prior to initial assessment (n=16)
  - Excluded (n=8)
    - CELF scores WNL (n=5)
    - Managed well in conversation (n=1)
    - BAS score <8th centile (n=1)
    - Additional diagnosis (ADHD; n=1)

**Initial assessment**
- Child-parent dyads completing initial assessment (n=8)
  - Did not complete intervention (n=2)
    - Needs prioritised in other areas (n=1)
    - Participation ceased due to national lockdown and school closures (n=1)

**Intervention**
- Received intervention (n=6)

**Post-therapy assessment**
- Completed post-therapy assessment (n=6)

**Follow-up**
- Completed follow-up assessment (n=6)
Following parental consent, a total of 16 children were screened for inclusion in the study. Of these, five did not meet our inclusion criteria as they scored within normal limits on the CELF. One child scored below the 8th centile on the BAS pattern construction subtest and thus did not meet inclusion criteria, while another had an additional diagnosis of ADHD, which became apparent after screening. Finally, one child was excluded from the study because he managed well in conversation, despite his identified language difficulties. This was reported by his mother and confirmed by the SLT following analysis of a 5-minute video of the parent interacting with her child, which was made as part of the screening process.

In total, eight children completed the full six-week initial assessment period between May 2018 and February 2020. However, one withdrew from the project without commencing intervention as it was mutually agreed to prioritise his needs in other areas. Six dyads went on to participate with their carers in the BCC intervention and follow-up assessment. A seventh dyad had completed one therapy session just prior to the nationwide closure of schools and stay-at-home order in March 2020. While a follow-up session was offered remotely, via Zoom, to offer advice and strategies to the parent, it was not possible to resume face-to-face delivery of BCC within the time frame for PhD data collection.

7.2 Acceptability of the intervention (including any resulting changes in protocol as a result of parental/child feedback)

Acceptability has been defined as:

'A multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention' (Sekhon et al., 2017, p.4).

Sekhon and colleagues (2017) put forward a theoretical framework, which captures seven different aspects of acceptability: affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy. Within the BCC study, acceptability of implementation was primarily assessed by
documenting the proportion of dyads who completed the full therapy programme. Following Justice et al. (2011), this was seen as the most definitive way of establishing whether parents and children could feasibly participate in the intervention through to completion. As detailed, above, six children and their mothers completed all six BCC sessions, as well as pre-therapy and post-therapy assessment. Involvement for the 7th and 8th dyads who had completed pre-therapy assessment ceased for external reasons, e.g., school closures due to the Covid-19 pandemic and one child having additional educational needs, which were prioritised over his involvement in the study. No consenting participants withdrew from the project citing reasons of non-acceptability, although concerns about the use of video and time commitment were reported to have deterred several families from signing up to the project at the outset. This highlights a distinction between 'prospective' (i.e., anticipated) and 'retrospective' (i.e., experienced) acceptability from the perspective of intervention participants (Sekhon et al., 2017).

Sekhon and colleagues (2017) stress the importance of assessing acceptability at different time points throughout the intervention period, since the perspectives of participants may change across the research study. While this was not evaluated formally (e.g., by using validated questionnaires or structured interviews), feedback from participants was sought continually during BCC in order to respond proactively to their experience and feelings about therapy. For example, the first two child participants initially enjoyed watching themselves on video and discussing aspects of their own language and conversation (as demonstrated by their willingness to sit and watch themselves / answer questions relating to the videos). However, by Session 4, both boys were managing to sit for shorter periods and needed increased support and prompting to maintain their attention to therapy tasks. Therefore, the therapy protocol was modified after the trial commencement to include more explicit practice of the children’s target facilitators, including games tailored to each child’s individual needs.

For Child A, the revised therapy plan for Session 5 involved choosing from a list of ‘Ways to help you remember’ and using these within a memory game. For Child B, a selection of word-finding strategies was presented (with visual support). Both he and his mother then trialled these and discussed their relative effectiveness whilst playing
‘What Am I?’ (a picture description game). Further modifications to the protocol were made to incorporate the principle that the choice of strategies offered to the child should be informed by the desire to target behaviours that children could use with other CPs. This followed Child A’s Mother reporting that he rarely asked for help or repetition in class, although he would occasionally do so with her. In response to her feedback, therapy was re-focused on identifying and practising conversation strategies, which could be used both at home and at school, e.g., asking for repetition or explanation when he has forgotten or not understood.

One further change was that a session on conversational topic, which was included for the first two dyads, was amended for later versions of BCC. This was due to children’s lack of engagement with this session and confusion over the meaning of ‘topic’, e.g., Child B thought that this referred to school topics, such as ‘The Romans’. Appendix 7.1 provides the original therapy protocol, with changes highlighted, in response to informal feedback during therapy regarding the intervention’s perceived effectiveness and acceptability. All other aspects of the research therapy remained unaltered, including the structure, number and length of sessions; use of video; selection of behaviours; core intervention components; content and order of session plans.

Following therapy, both parents and children were asked to comment on their overall experience of therapy, including ‘What worked well?’ and ‘What could have been better?’ The response from parents indicated a high level of satisfaction with the content and delivery of BCC. For example, one mother stated:

“I think it’s a brilliant little therapy. It’s given me the tools to be able to help [my son] ... It was so frustrating to have a conversation with him. I didn’t know if he was being silly or didn’t want to talk. But now I’ve realised I just need to give him more time”.

Another mother gave the following feedback:

“I have found this amazing and have learnt so many skills... [My child] can talk and explain so much more”.
A third parent reflected:

"More time dedicated to conversation definitely supports language development. There are lots of strategies to help, but time, space and awareness are probably the best... [My daughter] loves 'Talk Time'; we always talk, but it's our special time".

None of the parents offered specific feedback on what could be changed in order to improve the future implementation of BCC. This indicates that the programme was well matched with the needs and priorities of those who participated and that the principles behind development of BCC are sound.

Children in the study were supported to explore their own feelings about their communication and participation in the study using a bespoke visual tool called the 'Language and Life Ladder' and child-focused questionnaires (see Appendices 6.5 and 6.6), which were administered pre- and post-therapy and six weeks later, at follow-up. Following the intervention, one child commented:

"I liked the stickers and learning things".

When asked what could be better, she suggested "more games".

Other children were less forthcoming about their views on therapy, with one saying: "No idea" and another "don't know". This suggests that more work is needed to design measures which adequately capture children's feelings and opinions on research intervention in order to incorporate these into the ongoing development of BCC, following the principles of co-production (Volkmer & Broomfield, 2022). As the therapist delivering BCC was also the PhD researcher, this may have affected students' willingness to comment on the intervention.

The researcher's own views on the programme were incorporated into the design of the study. Should the intervention proceed to further development and testing within an NHS setting, an assessment of acceptability to practising clinicians will be conducted by an independent researcher, who was not involved in the design or delivery of the BCC programme.
7.3 Outcome measures

7.3.1 Inter-rater reliability.

In order to determine whether the chosen primary conversation measures (facilitator and barrier counts, child MLUw and ratio of child-to-adult speech) are appropriate for evaluating the effectiveness of BCC, a study of inter-rater reliability was conducted with the aim of establishing whether independent, trained raters were able to employ these measures consistently, and achieve similar results to ensure the objectivity of the results obtained. The degree of consistency of scoring between raters indicates how much of the variance in observed scores is due to true differences, as compared to human measurement error.

The level of agreement between raters can be quantified statistically in a number of different ways, the most common of which are: percentage agreement (Stemler, 2004) and Cohen's kappa (McHugh, 2012). The per cent agreement statistic is straightforward to calculate and easily interpreted. However, it has been criticised as a measure of IRR since it does not take into account agreements that would be expected by chance (Hallgren, 2012). The kappa statistic was designed to control for the possibility of random guessing. However, it relies on a fixed number of items that can be categorised into a defined set of mutually-exclusive categories. Therefore, it is not suitable for measuring agreement on coding conversational turns, since these could be coded more than once (or not at all) and are therefore not a suitable denominator (Best et al., 2016). In addition, kappa has been critiqued for over-estimating the amount of chance rater agreement and for assuming total independence between raters. McHugh et al. (2012) state:

"If raters are well trained and little guessing is likely to exist, the researcher may safely rely on percent agreement to determine interrater reliability" (p.282).

The question then arises as to what level of percentage agreement is acceptable for establishing reliability. Whilst 80% agreement is typically used as the gold standard for establishing IRR in naturally-occurring data (e.g., Oelschlaeger & Thorne, 1999), the cut-off point of 70% has been proposed as acceptable for new instruments.
involving observational coding from videos (Haidet et al., 2009). Best et al. (2016) reported reliability of 69% for conversation facilitators and 64% for barriers when coding dyadic communication behaviours for the 'Better Conversations with Aphasia (BCA) intervention. The authors cited the difficulty of establishing strong IRR for conversation measures, due to the natural variability of targeted behaviours across conversation samples and dyads.

In order to determine whether counts of conversation behaviours and child MLUw in conversation are appropriate measures for evaluating the effectiveness of BCC intervention, IRR was calculated using percentage agreement between the scores from two raters. In all cases, Rater 1 is the PhD researcher and the second rater is either an MSc or BSc student, who received detailed training in coding conversation behaviours (see Chapter 4, Section 4.1.1.1, above) and who carried out a project relating to BCC. Samples for analysis were chosen, based on available data at the point when students became involved in the BCC project. Random labels were assigned to each video recording so that students were blind to the point of data collection when scoring the conversation samples.

**7.3.1.1 Conversation behaviour counts.**

To assess IRR for conversation behaviours targeted during the BCC intervention, barrier and facilitator behaviours were counted independently by Rater 1 and the second rater for all conversations recorded by Dyads C and D (whose data was being analysed by students as part of their MSc projects). This represented 33% of the total BCC data set. Behaviours that were identified and coded equally by both raters were counted as agreements, while those coded for by one rater but not the other were marked as disagreements. The number of agreements, divided by the total number of agreements and disagreements, multiplied by 100, gave the percentage agreement for each individual category. The total number of agreed behaviours was then divided by the summed total of coded conversation samples to give an overall average percentage agreement across both barriers and facilitators (see Table 7.1, below):
Table 7.1: IRR summary for conversation behaviours targeted by Dyads C and D.

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Behaviour code</th>
<th>Description</th>
<th>Agreed behaviours</th>
<th>No. coded samples</th>
<th>Percentage agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>F1</td>
<td>Saying things another way when stuck (circumlocution)</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>F2</td>
<td>M gives clear explanations for names or concepts</td>
<td>14</td>
<td>24</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>C’s confabulations</td>
<td>9</td>
<td>14</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>M allows C's confabulations to run on in conversation</td>
<td>3</td>
<td>4</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>B3</td>
<td>M explicitly criticises or corrects C</td>
<td>5</td>
<td>6</td>
<td>83</td>
</tr>
<tr>
<td>D</td>
<td>F1</td>
<td>Child asks for clarification / repetition</td>
<td>5</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>F2a</td>
<td>M 'holds back' by using minimal turns</td>
<td>49</td>
<td>54</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>F2b</td>
<td>M 'holds back' by using extended pause (2 sec +)</td>
<td>4</td>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>Test questions</td>
<td>16</td>
<td>28</td>
<td>57</td>
</tr>
</tbody>
</table>

Total samples and overall average: 105, 147, 71.43%

Light green fill - child facilitator; Light orange fill - child barrier; Darker green fill - adult facilitator; Darker orange fill - adult barrier

Overall IRR for Dyads' C and D targeted conversation behaviours reached 71.43%; which is an 'acceptable' level for a new instrument involving observational coding from videos (Haidet et al. 2009). There was a high level of inter-observer agreement for adult minimal turns (91%; behaviour F2a), as well as for instances where Mother C explicitly criticised or corrected her child (83%, behaviour B3) and Mother D's use of extended pauses (80%; F2b). The lowest possible agreement level (0%) was
obtained for Behaviour F1 (Child C saying things another way when stuck / circumlocution), though there were only two instances where raters coded this facilitator, which may have skewed these results.

Since dyads in the DLD study each worked on a small number of individualised conversation strategies, a separate assessment of IRR was carried out for the TD data set, with nine randomly selected conversations being coded for all 14 targeted conversation behaviours (7 adult and 7 child-related). This represented just over 20% of the total TD sample. Once again, comparisons were made between Rater 1 and Rater 2’s scores and percentage agreement was calculated for both individual behaviours and the total data set (see Table 7.2, below).

Overall IRR for all TD behaviours was slightly higher than for conversations involving children with DLD; reaching 76.54%, against 71.43% for the DLD data set. This may reflect the fact that both participants had typically-developing language and conversation skills.

Once again, there was a high level of agreement for adult minimal turns (behaviour A6), which was identical at 91% to the DLD data set. Similarly, for pauses of 2 seconds or more within or between turns, this reached 84%, compared to 80% for the DLD sample. At the other end of the scale, test questions were similarly problematic for the TD and DLD data collections, reaching 60.37% for the TD set, against 57% for the DLD group. Meanwhile, ‘giving clear explanations of words and concepts’ (behaviour A3) gained zero IRR for adults conversing with TD children, though only 3 instances of this were coded by either of the independent raters.
Table 7.2: IRR summary for TD conversation behaviours

<table>
<thead>
<tr>
<th>Behaviour code</th>
<th>Description</th>
<th>Agreed behaviours</th>
<th>No. coded samples</th>
<th>Percentage agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Recasting / repeating back</td>
<td>46</td>
<td>65</td>
<td>70.77</td>
</tr>
<tr>
<td>A2</td>
<td>Contingent commenting</td>
<td>115</td>
<td>152</td>
<td>75.66</td>
</tr>
<tr>
<td>A3</td>
<td>Giving clear explanations of words or concepts</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>A4</td>
<td>Test questions</td>
<td>32</td>
<td>53</td>
<td>60.37</td>
</tr>
<tr>
<td>A5</td>
<td>Forced choice questions</td>
<td>2</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>A6</td>
<td>Adult minimal turns</td>
<td>75</td>
<td>82</td>
<td>91</td>
</tr>
<tr>
<td>A7</td>
<td>Pauses of 2 seconds or more within or between turns</td>
<td>21</td>
<td>25</td>
<td>84</td>
</tr>
<tr>
<td>C1</td>
<td>Asking for clarification or repetition (including 'huh')?</td>
<td>8</td>
<td>12</td>
<td>66.67</td>
</tr>
<tr>
<td>C2</td>
<td>Saying things another way when stuck (circumlocution)</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>C3</td>
<td>Using gestures or acting out to help communicate meaning</td>
<td>28</td>
<td>34</td>
<td>82.35</td>
</tr>
<tr>
<td>C4</td>
<td>Non-verbal emblem, e.g., nodding, head shake or shrugging in response to parental turn.</td>
<td>10</td>
<td>11</td>
<td>90.91</td>
</tr>
<tr>
<td>C5</td>
<td>Giving up when stuck on a word</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>C6</td>
<td>Child minimal turns</td>
<td>27</td>
<td>44</td>
<td>61</td>
</tr>
<tr>
<td>C7</td>
<td>Child single word turns</td>
<td>96</td>
<td>117</td>
<td>82.10</td>
</tr>
<tr>
<td><strong>Total samples and overall average agreement</strong></td>
<td></td>
<td><strong>460</strong></td>
<td><strong>601</strong></td>
<td><strong>76.54%</strong></td>
</tr>
</tbody>
</table>
While 'saying things another way when stuck' was targeted as a facilitator for 4/6 of the DLD children, this behaviour was coded only once amongst the TD sample and then by only one out of the two independent raters. Similarly, while 'giving up when stuck on a word' was identified as a barrier to conversation for 3/6 DLD participants, there was 100% agreement that it did not occur in any of the nine TD conversations examined for IRR, highlighting that this was a key differentiating feature of DLD versus TD conversations.

Among the behaviours that were included in the TD counts, but not for Dyads C and D, children using gestures and non-verbal emblems (C3 and C4) each obtained high levels of agreement (82.35% and 90.91%, respectively). Meanwhile, recasting and contingent commenting (behaviours A1 and A2) both met acceptable levels of 70.77% and 75.66% IRR. These categories occurred frequently in the TD sample and were chosen as facilitators by several of the parents of DLD children (though not Mothers C or D).

Only one category achieved 100% agreement between observers: adult use of forced choice questions (A5). Just two instances of this occurred in the TD data, though the same behaviour occurred frequently for Mother B, who identified this form of questioning as a barrier to her communication with her child prior to the BCC intervention. The final two related categories: child minimal turns and child single word turns (coded as C6 and C7), achieved 61% and 82.1% IRR respectively.

7.3.1.2 MLUw.

In a separate analysis, inter-rater reliability for child MLUw was also calculated using point by point percentage agreement. This was achieved by comparing the coded utterances between two raters across six conversations involving children with DLD (three from Dyad A and three from Dyad B), representing 20% of the DLD data set. Each single utterance that differed between the raters, or which was differently segmented, was counted as a single disagreement. Utterances that were coded consistently between the raters were counted as an agreement. The number of
agreements, divided by the total number of agreements and disagreements, multiplied by 100, gave the percentage agreement for each conversation for MLUw, reaching a satisfactory level overall, as shown in Table 7.3, below:

Table 7.3: Child MLUw for each rater and percentage agreement

<table>
<thead>
<tr>
<th>Conversation Code</th>
<th>Rater 1 MLU (PhD researcher)</th>
<th>Rater 2 MLU (BSc student)</th>
<th>Percentage Agreement for MLU</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>6.70</td>
<td>5.79</td>
<td>68.9%</td>
</tr>
<tr>
<td>A2</td>
<td>5.29</td>
<td>5.83</td>
<td>78.57%</td>
</tr>
<tr>
<td>A3</td>
<td>5.21</td>
<td>4.71</td>
<td>77.78%</td>
</tr>
<tr>
<td>B1</td>
<td>3.84</td>
<td>4.06</td>
<td>78.18%</td>
</tr>
<tr>
<td>B2</td>
<td>3.67</td>
<td>3.50</td>
<td>75%</td>
</tr>
<tr>
<td>B3</td>
<td>3.28</td>
<td>3.58</td>
<td>85.19%</td>
</tr>
<tr>
<td>Average / overall % agreement</td>
<td>4.67</td>
<td>4.56</td>
<td>77.27%</td>
</tr>
</tbody>
</table>

7.3.1.2 Ratio of child-to-adult speech.

Finally, Wilcoxon signed rank tests were employed to evaluate the similarity of timings for child and adult utterances, recorded in seconds, by the two independent raters. This paired difference test was chosen for ratio comparisons, rather than percentage agreement, since time is an interval and not a categorical variable. Once again, the same six conversations involving Dyad A and Dyad B were used as a basis for comparison.

Scores from Raters 1 and 2 did not differ significantly in the timed duration of child or adult speech (Wilcoxon signed-ranks test, 2-tailed, Rater 1 Mdn=119, S.D.=34.91, Rater 2 Mdn=114, S.D.=34.57, z = -1.69, p = 0.091, r = -0.49) See Table 7.4.
Table 7.4: Inter-rater reliability for child-to-adult ratio of speech.

<table>
<thead>
<tr>
<th>Measure (in seconds)</th>
<th>Dyad</th>
<th>Conversation</th>
<th>Rater 1</th>
<th>Rater 2</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time child spoke</td>
<td>A</td>
<td>A1</td>
<td>133</td>
<td>131</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A2</td>
<td>158</td>
<td>152</td>
<td>-6</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A3</td>
<td>94</td>
<td>81</td>
<td>-13</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B1</td>
<td>129</td>
<td>113</td>
<td>-16</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B2</td>
<td>104</td>
<td>94</td>
<td>-10</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B3</td>
<td>114</td>
<td>115</td>
<td>+1</td>
</tr>
<tr>
<td>Time adult spoke</td>
<td>A</td>
<td>A1</td>
<td>54</td>
<td>56</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A2</td>
<td>49</td>
<td>54</td>
<td>+5</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A3</td>
<td>150</td>
<td>142</td>
<td>-8</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B1</td>
<td>124</td>
<td>122</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B2</td>
<td>112</td>
<td>93</td>
<td>-19</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B3</td>
<td>148</td>
<td>158</td>
<td>+10</td>
</tr>
</tbody>
</table>

7.3.2 Time taken to collect and analyse conversation data

A central aim of this project was to explore the relative value and feasibility of different outcome measures, including time taken to collect and analyse conversation data. Standardised language measures used for children in the intervention study were not included in this evaluation, since these are widely used and validated within research and clinical practice. The three core measures employed within this project were: frequency of targeted facilitator and barrier behaviours; mean length of utterance in words (for the child) and the ratio of child-to-adult speech. Each of these measures were calculated from five minutes of natural conversation, transcribed orthographically from recordings made by dyads on three occasions prior to therapy and twice afterwards. Time taken to transcribe and score data for Dyads C-F was recorded systematically by pre-registration SLTs, who carried out this work as part of their MSc projects. This followed training from the PhD researcher, who developed and finalised these procedures when analysing conversations from the first two dyads (see p.75, Section 4.1.1.1. for details).

7.3.2.1 Initial transcription.

Table 7.5, below, shows the time spent (in minutes) by students in transcribing each conversation orthographically. The overall mean was 47.35 minutes, with the
shortest transcription time being 20 minutes and the longest 77. The student who transcribed Dyad F's data had previous experience as a paid transcriber and was the quickest overall (taking an average of 27.2 minutes per 5-minute conversation). Meanwhile, the student who transcribed Dyad C's recorded samples took the longest time, with a mean of 64.4 minutes across their five conversations. Her timings also showed the widest range - from 51 to 77 minutes. While the figures appear to show her becoming quicker from pre-therapy to follow-up, this pattern is misleading, since the ordering of videos was randomised to ensure students remained blind to the point of data collection.

**Table 7.5**: Time (in minutes) spent by students who transcribed conversations orthographically.

<table>
<thead>
<tr>
<th>Time</th>
<th>Dyad C</th>
<th>Dyad D</th>
<th>Dyad E</th>
<th>Dyad F</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>69</td>
<td>32</td>
<td>50</td>
<td>32</td>
<td>45.75</td>
</tr>
<tr>
<td>Pre-2</td>
<td>77</td>
<td>39</td>
<td>64</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>Pre-3</td>
<td>71</td>
<td>30</td>
<td>65</td>
<td>37</td>
<td>50.75</td>
</tr>
<tr>
<td>Post</td>
<td>54</td>
<td>39</td>
<td>61</td>
<td>23</td>
<td>44.25</td>
</tr>
<tr>
<td>Follow-up</td>
<td>51</td>
<td>35</td>
<td>74</td>
<td>24</td>
<td>46</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>64.4 (10.11)</td>
<td>35 (3.63)</td>
<td>62.8 (7.73)</td>
<td>27.2 (6.31)</td>
<td><strong>47.35 (2.55)</strong></td>
</tr>
</tbody>
</table>

**7.3.2.2 Barriers and facilitators.**

The next table (Table 7.6, below) details the time spent by students in coding and counting targeted conversation behaviours for Dyads C-F, following extensive training and practice overseen by the PhD researcher. Once again, the final student was the most efficient, with timings ranging from 10-13 minutes, while the student who coded Dyad E's data took between 22 and 48 minutes. This was the widest range of timings, with a mean of 32.2 minutes. The overall average time taken by all students to score this outcome measure was 21.32 minutes.
Table 7.6: Time (in minutes) spent coding each conversation for targeted barriers and facilitators.

<table>
<thead>
<tr>
<th>Time</th>
<th>Dyad C</th>
<th>Dyad D</th>
<th>Dyad E</th>
<th>Dyad F</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>20</td>
<td>18</td>
<td>23</td>
<td>13</td>
<td>18.5</td>
</tr>
<tr>
<td>Pre-2</td>
<td>27</td>
<td>19</td>
<td>48</td>
<td>*</td>
<td>31.33</td>
</tr>
<tr>
<td>Pre-3</td>
<td>16</td>
<td>10</td>
<td>38</td>
<td>14</td>
<td>19.5</td>
</tr>
<tr>
<td>Post</td>
<td>26</td>
<td>20</td>
<td>22</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Follow-up</td>
<td>19</td>
<td>20</td>
<td>30</td>
<td>10</td>
<td>19.75</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>21.6 (4.22)</td>
<td>17.4 (3.77)</td>
<td>32.2 (9.77)</td>
<td>12.25 (1.48)</td>
<td>21.32 (4.79)</td>
</tr>
</tbody>
</table>
*not recorded

7.3.2.2 Mean length of utterance in words.

Following orthographic transcription of the dyads’ full conversations (see section 7.3.2.1, above) children’s utterances were transferred into a separate table and divided up according to the guidance given in the Expression, Reception and Recall of Narrative Instrument (ERRNI; Bishop, 2004). Total words were calculated and divided by the overall number of child utterances to give a MLUw score for each conversation. This whole process took an average of 26.3 minutes (see Table 7.7, below). Once again, the final student was the fastest overall, with mean of 19.6 minutes. However, she also registered the widest range in timings (range of 14-35 minutes). Elsewhere, the student who scored Child D’s MLUw spent the longest time on completing the task, taking between 30 and 49 minutes to calculate this outcome measure for each five-minute sample.

Table 7.7: Time (in minutes) spent calculating MLUw for each conversation

<table>
<thead>
<tr>
<th>Time</th>
<th>Dyad C</th>
<th>Dyad D</th>
<th>Dyad E</th>
<th>Dyad F</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>32</td>
<td>35</td>
<td>19</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>Pre-2</td>
<td>26</td>
<td>41</td>
<td>23</td>
<td>20</td>
<td>27.5</td>
</tr>
<tr>
<td>Pre-3</td>
<td>25</td>
<td>49</td>
<td>19</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Post</td>
<td>21</td>
<td>41</td>
<td>20</td>
<td>14</td>
<td>24</td>
</tr>
<tr>
<td>Follow-up</td>
<td>26</td>
<td>30</td>
<td>21</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>26 (3.52)</td>
<td>39.2 (6.4)</td>
<td>20.4 (1.5)</td>
<td>19.6 (8.01)</td>
<td>26.3 (3.22)</td>
</tr>
</tbody>
</table>

7.3.2.3 Ratio of child:adult speech.

Following Falkus et al. (2016), the ratio of time that the child spoke to the time the parent spoke was calculated by repeatedly replaying the videos and timing (with a stopwatch) the utterances of children and parents during the interaction. The number
of seconds the child spoke was then divided by the parent’s results. As Falkus and colleagues state, although this measure does not assess the quality of the speech used, it does reflect the extent to which the parent is able to encourage participation by the child. The researcher watched each video twice to accurately record the length of time both parent and child spoke before computing the ratio, based on the average of timings recorded on the first and second viewing. This typically took just under 26 minutes.

The same student calculated child-to-adult ratio of speech for Dyads C and D, while a separate student analysed ratio scores for Dyads E and F. It can be seen clearly that time taken to time and calculate ratio fell sharply for each student between the first and second dyad whose data they scored. There is less variability between individual conversations, which were analysed in a random order, with video codes assigned to enable the students to remain blind to the point of data collection.

Table 7.8: Time (in minutes) spent calculating ratio for each conversation.

<table>
<thead>
<tr>
<th>Time</th>
<th>Dyad C</th>
<th>Dyad D</th>
<th>Dyad E</th>
<th>Dyad F</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1</td>
<td>31</td>
<td>17</td>
<td>29</td>
<td>22</td>
<td>24.75</td>
</tr>
<tr>
<td>Pre-2</td>
<td>32</td>
<td>14</td>
<td>32</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Pre-3</td>
<td>36</td>
<td>26</td>
<td>29</td>
<td>24</td>
<td>28.75</td>
</tr>
<tr>
<td>Post</td>
<td>28</td>
<td>12</td>
<td>25</td>
<td>24</td>
<td>22.25</td>
</tr>
<tr>
<td>Follow-up</td>
<td>25</td>
<td>*</td>
<td>38</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>Average</td>
<td>30.4</td>
<td>17.25</td>
<td>30.6</td>
<td>23.2</td>
<td><strong>25.79</strong></td>
</tr>
</tbody>
</table>

*Timings not recorded

7.3.2.4 Overall findings regarding time taken to collect and analyse conversation data

The average time spent on transcription and analysis of all conversation measures was just over two hours per recording (120.76 minutes, see Table 7.9, below). This compares favourably to related qualitative methodology, with researchers commonly reporting taking a day of work to structure and code an hour-long interview or interaction (Campbell et al., 2013; Miles et al., 2020). Whilst the conversations recorded by parents and children were relatively short, at around 5 minutes in duration, they required close, specialist analysis to account for children's disordered
language, while multiple measures were used to analyse and quantify different aspects of the dyadic interactions.

**Table 7.9:** Average time taken to transcribe and analyse each conversation.

<table>
<thead>
<tr>
<th>Task / Measure</th>
<th>Average time taken (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial transcription</td>
<td>47.35</td>
</tr>
<tr>
<td>Coding and scoring Bs and Fs</td>
<td>21.32</td>
</tr>
<tr>
<td>MLUw</td>
<td>26.3</td>
</tr>
<tr>
<td>Ratio</td>
<td>25.79</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>120.76</strong></td>
</tr>
</tbody>
</table>

### 7.4 Discussion

Eight parent-child dyads were recruited to the main intervention study, following contact with 13 schools and one communication charity. This equates to a recruitment rate of 57%. This is in the context of low public awareness of DLD, which makes recruitment for research studies with this client group notoriously challenging (St Clair et al., 2022). While recruitment rates for BCC were initially slow, with 14 dyads approached before the first two pairs were recruited, these accelerated as the project progressed, in response to positive feedback from participants and relationships being built with school SENCo's and Inclusion Managers. Two of the children who completed the research therapy were referred by a single school in Surrey, whilst a separate South London Primary put forward two eligible dyads (one of whom did not complete the programme, due to the Covid-19 pandemic). This indicates that a future, larger-scale evaluation of BCC will be facilitated by continuing to develop these contacts with schools. More use could also be made of social media channels, including parent Facebook groups, which were not part of the recruitment strategy for the current intervention project, but were used successfully to enlist participants for the typically-developing strand of this research project (see Chapter 4). Contacts could also be made with the 'Engage with Developmental Language Disorder (E-DLD)' project (St Clair et al., 2022), a newly-established international database, bringing together children and families affected by DLD, who are interested in participating in clinical research.
The 100% retention rate for dyads completing BCC (aside from the exceptional circumstance of the worldwide pandemic and the mutual decision for Child G to withdraw from the project due to his additional educational needs) compares to a retention rate of 89% for the related 'Better Conversations with Aphasia' project, which mirrors the average retention of 89% for health-related randomised control trials (Walters et al., 2017). The high retention for BCC may have been supported by the relatively short duration of the intervention, with parents, children and schools indicating that the timing and nature of therapy was acceptable to them and feasible to undertake with this population. Retention is a key consideration for clinical research (Cooley et al., 2003) because participants who do not complete a trial (study attrition) can cause results to be biased, for example if those who drop out share characteristics – such as stronger or weaker language skills, or parental SES – that may influence outcomes. According to Marcellus (2004), the internal and external validity of findings may be affected if attrition exceeds 20%. Although data on families' SES was not formally collected during the case series, publically-available information on school post codes and number of children eligible for free school meals indicates that participants came from a range of backgrounds and localities. This could be explored further in future evaluations of BCC.

While the use of video reflection during therapy was described as 'a red line' for one mother and may have deterred others from participating in the BCC study, it is important to note that recruitment for the intervention study took place prior to the Covid pandemic. The use of video conferencing is reported to have surged to 21 times the level of pre-pandemic 2019 (Campos, 2021), while teletherapy and online medical consultation have both increased during this period (Beeke et al., 2021; Jiménez-Rodríguez et al., 2020). This suggests that parents and children may be more familiar and comfortable with using platforms such as Zoom and Microsoft Teams, which could increase the acceptability of BCC for a wider range of participants. However, caution is needed to ensure that factors such as technology access and familiarity do not bias representation of specific groups within future recruitment for BCC.

One parent, who declined to participate in the intervention, stated that the time commitment was too great for her to attend therapy sessions. This is likely to be a
concern for many parents, who are balancing work and childcare commitments alongside wishing to support their school-aged child. Future trials of BCC could consider evaluating the effectiveness of delivering the intervention within four, rather than six sessions. Participants could be offered the option of attending after school or during the Summer holidays. Parents would first need to be consulted to assess whether this is likely to increase the acceptability of the programme to them. Another possibility is to train education staff, such as teaching assistants, as supportive communication partners. However, a recent randomised control trial involving 128 primary schools (Dimova et al., 2021) found no improvement in pupil outcomes, compared to a control group, following whole school and TA training aimed at enhancing adult-child interactions and improving pupil independence.

While several aspects of acceptability were assessed within the current study, future work will be needed to establish potential opportunity costs, ethicality and intervention coherence, none of which were considered systematically as part of this initial investigation. It would be important to evaluate the social validity of BCC’s objectives, methods and outcomes (Common & Lane, 2017), as perceived by children and carers. The views of practising clinicians could also be gathered through structured interviews, questionnaires or focus groups, all of which should be delivered and analysed by researchers who are independent from the core project team.

A total of 25 conversations (from both TD and DLD dyads) were examined for IRR, equating to over two hours of video-recorded samples. These were analysed for child and parent behaviours, MLUw and ratio of child-to-adult speech. While it was difficult to gain agreement across some specific behaviours, e.g., test questions and maternal explanations, overall IRR is above acceptable levels for all other variables. This is striking given that these data relate to natural conversations, including those of children with language disorder, and there was no experimental control over the topic or context of the recorded interactions. The findings suggest that the primary outcome measures were appropriate for the intervention, allowing for meaningful aspects of everyday conversation, which are key to child language development, to be captured and tracked throughout the study.
Taken together, the results from this chapter indicate that it is feasible to proceed to a wider-scale evaluation of BCC using the current, conversation-based outcome measures. An important next stage of this process would be to consult extensively with parents, young people with DLD, SLTs and school staff through patient and public involvement to ensure that therapy and recruitment protocols are robust and meet the needs of the widest sample of children with DLD and their main carers. The UK Standards for Public Involvement (National Institute for Health Research, 2019) could help guide this consultation helping to maximise service user involvement. This could include co-production of a manualised therapy resource to be used in the training of SLTs, who would then trial the delivery of BCC within NHS and education settings.

Before proceeding to the next stage of intervention development, the next chapter will further evaluate conversation data from the case series study using a conversation-analytic lens to explore individual turns as contingent, recipient-designed actions within a wider interactional context. These findings may serve as an additional tool to support the evaluation of the current study in order to inform future decisions about the refinement of BCC.
Chapter 8: Conversation Analysis of test question sequences

Findings from this chapter are published as:


The preceding chapters have presented the results of an experimental case series study, investigating the effects of a conversation-based intervention (BCC) on targeted parent and child communication behaviours, as well as on children's language skills. Frequency counts of barrier and facilitator strategies were employed as a primary measure to evaluate outcomes of the research therapy. However, it proved difficult to obtain satisfactory inter-rater agreement for specific behaviours, including test questions (TQs), which were used frequently by mothers of both typically developing children and those with DLD. Since TQs were also the most commonly chosen barrier strategy for adults participating in the intervention study, further analysis is warranted to explore the complex underlying nature of TQs and how they shape turn taking opportunities for the child to construct progressively more mature language turns in conversation. The following chapter will use a Conversation Analytic (CA) method to examine a collection of TQ sequences from two BCC dyads, with the aim of identifying fine details of turn design and organisation from the perspectives of the participants themselves. The central research question, which guided this analysis was:

*How do maternal turns identified as barriers (TQs) interfere with the child’s opportunity to take following turns in conversation and construct them using language-rich elements?*

In addition, this chapter will evaluate the usefulness of CA as a potential clinical tool, to enhance our understanding of conversation behaviours and outcomes and to provide insights which may guide the choice of barriers and facilitators for future intervention.
8.1 Test questions (TQs)

Questions are a key feature of adult-child discourse and are thought to facilitate vocabulary and narrative skills for typically-developing children (Kuchirko et al., 2016; Luo et al., 2022; Tompkins et al., 2017). Questions may perform a range of functions, from clarifying what has been said to requesting permission or seeking the views and feelings of the conversation partner. While genuine questions solicit information that the parent does not already possess (e.g., 'What did you do at school today?'), TQs, or 'known answer' questions, prompt the child to produce a specific response, which is already known to the adult, (e.g., 'What did we do at the weekend?'). In the classroom, TQs are said to account for over 60% of all questions posed by teachers to pupils (Myhill, 2006), while Yu et al. (2019) found that they made up a third of parent-child requests.

Grosse and Tomasello (2012) point out that typical TQs follow the same grammatical form as for genuine questions; taking on the status of a 'repeated routine', with predictable response patterns, which children learn to recognise and follow. Yet, according to these authors, children as young as two years are able to distinguish accurately between these two request types. Grosse & Tomasello (2013) propose that parents may highlight TQs with non-verbal cues, such as distinctive intonation and/or facial expression. Separately, Heritage (1985) argues the importance of what the questioner does after the child's answer in determining the status of the original question. Adults who pose 'real' questions typically receipt their answers with a 'change of state token', such as 'oh' (Heritage, 1985), which signals that the speaker has undergone a shift in their knowledge or point of view. By contrast, Tarplee (2010) asserts that, within a QAR sequence, a third-position receipt which 'evaluates' an answer to a question, e.g., by saying 'that's right', indicates that the adult has experienced no such change of state, but was evidently already aware of the information provided in the child's response.

According to Yu et al. (2019), TQs can play a facilitative role in supporting children's learning. For example, by asking: 'What does the button do?', the adult is directing the child's attention to the object of interest and encouraging them to think and
explore. Similarly, Grosse & Tomasello (2012) have described TQs as 'interaction vehicles' (p.193), which help to establish and maintain joint attention. This, in turn, plays a key role in children's language acquisition and wider cognitive development (Olsen-Fulero & Conforti, 1983; Shatz, 1979; Snow, 1972). However, Myhill (2006) argues that TQs, whilst encouraging an immediate response from the child, rarely build upon this in next and contingent turns. Since the child's contribution may be determined and constrained by the adult's initiating question, there is little opportunity for the co-construction of meaning or understanding beyond the immediate TQ sequence, leading her to suggest:

'The more questions teachers ask; the less children say' (p.38).

One possible explanation for the lack of progressivity generated by TQ sequences is the three-part question, answer and response (QAR) turn structure, which has been extensively described in the pedagogical literature (Cazden, 2001; Myhill, 2006). According to this framework, teachers typically initiate a topic by asking a test question (Q) that invites a specific known answer from students (A), which in turn is accorded an evaluative adult response, or receipt (R). By completing the sequence, the adult receipt acts effectively to close down the volley of turns, rather than opening up the opportunity for children to expand upon their prior talk, as with alternative teacher-child turn designs (Radford et al., 2011).

In the context of the classroom, adults' use of an evaluative receipt underlines the asymmetric relationship between teachers and pupils (Radford et al., 2012), with the former seen as holding superior epistemic authority, while children are required to display their knowledge of the 'correct' answer, rather than provide novel information. However, it is less clear how QAR sequences function within parent-child interactions, where roles and epistemic boundaries between speakers may be less well-defined. For example, while parent-child conversations play a key role in facilitating children's thinking and learning, everyday interactions may take on a more playful or emotional - rather than pedagogical - focus, depending on the immediate content and context of each individual encounter.
The use of TQs links to the distinction between epistemic status; to what extent interaction partners have access to knowledge, as well as their rights and responsibilities to know it, and epistemic stance; a more fluid position whereby communication partners may withhold or demonstrate their possession of information through the content and design of their conversational turns. According to Heritage (2012a), the sharing of information is what ‘warrants the production of talk’ (p.30), while redressing imbalance in knowledge positions represents the ‘engine’ that drives conversation forward.

Countering this view of TQs as impelling interaction, (Beeke et al., 2013) argue that TQs can act as a 'barrier' to everyday conversation by limiting communicative opportunities and producing negative social and emotional effects for people with aphasia (PWA). According to these authors, a reduction in the use of TQs may constitute an appropriate target for conversation-based therapy, as they can cause unwarranted frustration or distress; creating a 'threat to face' by placing pressure on PWA to produce a specific noun or noun phrase, which may prove elusive despite extensive word search attempts (Burch et al., 2002; Goffman, 1972). Lock et al., (2001) further found that this type of failed word search, prompted by a TQ, is often followed by a "correct production sequence"; a series of turns designed to prompt the semantic or phonological target, which the PWA is struggling to produce.

In such sequences, CPs may actively withhold information in order to elicit a specific response from the person with communication difficulties, which may not be forthcoming. Aaltonen and Laakso (2011) have explicitly likened this process to school-based activities, referring to such breakdowns in communication as 'exam halts'. Since many children with DLD exhibit word retrieval problems, which are comparable to those of adults with acquired communication disorder, it is likely that they will experience similar trouble and, potentially, socio-emotional effects within their talk. This may be linked to the finding by Luo et al. (2022) that young children with smaller vocabularies show less benefit from maternal questions than their typically-developing peers. However, there is limited evidence to support this theory, providing additional rationale for the analysis presented in this chapter.
8.2 Conversation Analysis

The literature indicates that TQs form a key turn type within adult-child interactions, yet there remains a lack of clarity around how TQs function for children learning and developing language within their everyday conversations at home. Previous studies have focused on coding and examining parental turns in talk (e.g., Cleveland & Reese, 2005; Luo et al., 2022; Yu et al., 2019). However, since TQs exert their influence on participants and the flow of conversation incrementally across turns, a more fine-grained analysis is needed to expose and evaluate the sequential organisation of talk and its effects on children’s ability to: a) take turns and b) construct them as an action built from and for both prior and subsequent talk.

One such methodology, which may be used to deepen our understanding of parent-child interactions, is that of Conversation Analysis (CA; Schegloff, 2007; Sidnell & Stivers, 2013). CA has its roots in sociological science, including ethnomethodology (Garfinkel, 1984) and interaction order (Goffman, 1972). The approach is inductive, rather than theory-driven, requiring the researcher to remain open-minded to the insights offered from the data. Thus, CA is well-suited to exploratory analysis, such as the current investigation into the nature of TQs and their role within parent-child conversations. An important principle of CA is that it uncovers the rule-governed orderliness which participants themselves produce and orient to as they co-construct meaning, turn-by-turn. This aligns well with the dyadic nature of BCC, since CA focuses on how participants design their turns in response to each other, including both verbal and non-verbal aspects of communication. Line-by-line analysis is carried out using ‘next turn proof procedure’ to establish how participants understand and respond to each other’s talk (Schegloff, 2007). This differs from other forms of qualitative research, such as thematic analysis (Braun & Clarke, 2022), which seek to code or interpret data using frameworks and categories created by the researcher. In addition, CA’s emphasis on communicative context is linked to a wariness of quantification, which places the discipline at odds with traditional approaches, which aim to measure the frequency of linguistic features or conversation behaviours, such as those targeted within the BCC intervention.
CA has previously been applied to the study of atypical interaction, including work with deaf children and specialist teachers (Mahon, 2009), children using augmentative and alternative communication (Clarke et al., 2017) and adults with a range of acquired communication disorders (Beckley et al., 2013; Beeke et al., 2013, 2014, 2015; Lindholm et al., 2017; Saldert et al., 2014). CA has been employed to examine common themes arising from problems of comprehension, expression or intelligibility, which may impact on the progressivity of turns in conversation (Wilkinson, 2015). For example, Radford et al. (2012) used an applied CA approach to examine repair practices within a specialist educational setting for children with language disorder. Detailed analysis, including of prosodic conversation features, showed that children were more likely to take up and respond to adults’ corrections when these were exposed by pitch contrasts and/or louder intonation than when recasts were embedded within talk which matched the prosody of the child’s own utterance. These insights have wider clinical implications, enabling greater understanding of how adult-child interactions function to support, or impede, children’s learning and language development.

Separately, studies by Beeke et al. (2011, 2013, 2014, 2015) have employed CA to investigate conversations involving speakers with agrammatic aphasia and their communication partners. Beeke et al. (2013) evaluated the role of TQ sequences in inviting people with aphasia to contribute to conversation. In contrast to other, more extended forms of turn construction, these authors found that TQs can prove problematic by constraining the response of language-impaired speakers and bringing their word retrieval difficulties ‘to the surface of talk’ (p.800). Beeke and colleagues (2013) argue that by using alternative turn designs, CPs may encourage greater communicative participation by people with aphasia, including more frequent topic initiation. In this and other studies, CA has been used to help deepen understanding of why particular turn designs (e.g., TQs) are problematic by investigating the response opportunity that they set up for adults with communication difficulties.
8.3 Aims

Against this backdrop, the evaluation of video-recorded data within this chapter will draw on CA techniques to investigate TQ sequences from a collection of pre-therapy conversations between two mother-child dyads who participated in the BCC intervention. These data were chosen for analysis due to their shared conversational context: the co-construction of memories which form part of the child’s everyday experience at home and at school. The aim of the current study was to examine how Mother and Child turns accomplish the activity of conversational remembering and occasion turn construction opportunities for the child to display and extend their emerging linguistic skills within TQ sequences. CA will be piloted as a method to explore in detail the nature of TQs and to provide a qualitative explanation of conversation behaviours and outcomes, leading to the evaluation of CA as a possible tool for future integration into BCC. The analysis considers TQ sequences initiated and developed from both a knowing (K+) and unknowing (K-) epistemic stance, as well as where the validity of participants’ access to information is unclear. The overriding aim of this work was to enhance understanding of the impact of DLD on parent-child interactions, informing the further development of BCC beyond the PhD programme.

8.4 Participants

Examples used in this chapter are from Dyad B and Dyad E, whose full background details and response to intervention are reported in Chapter 6. Both pairs were formed of monolingual English speakers from South-East England, with formal and informal assessment confirming that children fitted the clinical profile of DLD; each presented with difficulty producing or understanding language that affected their day-to-day functioning, in the absence of an underlying biomedical condition (Bishop et al., 2016). Both pupils scored more than 1SD below the norm on the core language composite of the Clinical Evaluation of Language Fundamentals (CELF-5; Wiig et al., 2017). Children have been assigned pseudonyms for ease of differentiation and to protect their identity.
Dyad B was formed by ‘Sidney’ (male) and his Mother. Sidney was aged 6;08 years on initial assessment and was in Year Two at his mainstream primary school. Prior to his involvement in the current study, he had been referred to the school Speech and Language Therapist, who noted his significant difficulties in conversation, but did not offer any direct input. There is a family history of dyslexia (father) and a sister with complex learning and language needs. The mother reported that Sidney experienced frequent word-finding difficulties and that she and her son had trouble understanding each other during their day-to-day interactions. She admitted finding their conversations together ‘hard work’, as Sidney’s contributions were limited, and she was ‘always thinking ahead to the next question’.

Dyad E comprised ‘Caiden’ (also male) and his Mother. Caiden was aged 6;10 years and attended a mainstream primary school. He had been referred to the Early Years SLT service, due to parental concern about his late talking, but was discharged without further contact. Teachers subsequently noticed his difficulties with language comprehension and sentence formation and referred him to the BCC project. Caiden described finding it ‘hard to concentrate when everyone is talking’. He stated that ‘it can be hard for me to say what I want to say’ and complained that people frequently interrupted him, both at school and at home. Caiden’s mother felt their conversations were ‘balanced in terms of who does the talking’. She reported ‘slowing things down’ and breaking down instructions to help Caiden follow what she was saying.

7.5 Data Collection and transcription

This chapter reports on pre-therapy findings for Dyads B and E, whose pre-intervention sequence organisation formed a collection with notable similarities of patterning. The total length of recordings gathered at this data point was 32 minutes and 11 seconds, with the central 5 minutes of each video selected for detailed transcription and analysis. This was to control for the variable length of home recordings. All transcriptions were carried out by the author of this thesis and checked by her specialist CA advisor, Dr Juliette Corrin. Where disagreements arose, or additional observations were made, these were discussed, and amendments were made as appropriate.
8.5 Findings

Examples of short and extended turns (Extracts 1-11) are examined in relation to the key research aims. The focus is on sequences where questions are used to 'test' a child's knowledge or recollection, despite the parent knowing the answer. The analysis first presents examples of typical TQ sequences (Extracts 1-4), which follow the QAR turn organisation pattern identified in the CA and child language research literature. This core set of data stands as a benchmark for analysis of other less clearly defined sequences, whose turn organisation differs from the typical pattern. Conversation samples included in this chapter were transcribed following common CA conventions (see Appendix 8.1).

8.5.1 Typical TQs

**Extract 1, Dyad E, 'school trip'.**

145. M can you remember what bus we went on?
146. C (0.9) (eyes up)) 345!
147. M 345. yeah.

In this typical QAR sequence, the status of the Mother (M's) turn as a TQ is evidenced clearly by next turn proof procedure (Hutchby and Wooffitt, 2008, p.15). The nature of her receipt as evaluative is underlined by her repetition of Caiden (C's) answer and use of the affirmative 'yeah' (line 147). This indicates that she accepts the child's response, having assessed its goodness of fit against her pre-held knowledge; a move which asserts her status as the participant with superior epistemic authority over reminiscence of their shared trip. The analysis highlights the importance of considering the third turn position, rather than the Mother's originating turn alone (as in studies such as Cleveland & Reese, 2005) which concentrate only on coding maternal turns in isolation. In line 145, M could be thought to be initiating a simple information request (Schegloff, 2007; Stivers & Rossano, 2010), from a position of not knowing, or not remembering the bus number. However, her subsequent response reveals her true epistemic status (K+), in contrast to her initial turn, which is launched from an unknowing (K-) stance; compelling C's second pair-part response 'as a matter of normative obligation' (Heritage, 2012a, p.33).
Extract 2, Dyad B, 'the weekend'.

26. M and where does granny live?
27. S at London:
29. (1.5)

A further example of this typical TQ-answer-receipt pattern occurs in lines 26-28, when Sidney (S's) mother asks the unambiguous TQ: 'Where does Granny [her own mother] live?' S replies with the 'correct' answer: 'at London'. He emphasises his response by elongating the vowels and employing a rise-fall intonation; perhaps indicating that he is aware of the status of the mother (M's) turn as a TQ and underlining the 'display' of his knowledge. M mirrors S's prosody to indicate her acceptance of his answer, alongside her repetition of the place name and implicit repair of the preposition 'at' to 'in'. Notably, the TQ sequence acts as a barrier to the progressivity of talk - leading to an extended pause in line 29. According to Heritage, (2012a, p.49), this occurs because the mother's third turn receipt indicates that a real or apparent epistemic gap has been closed, removing the 'normative warrants for talking'. If the giving or receiving of new information acts as a driver or 'grist' for conversation, the achievement or revelation of knowledge balance acts to close down the sequence and production of talk; a move which Heritage conceives as stilling 'the epistemic see-saw'.

Extract 3, Dyad B, 'the weekend'.

115. M what did we do Sunday.
116. S went to Granny's
117. M no we didn't, that was the week before!

This sequence of turns (from later in the same conversation) represents a further evaluative TQ pattern, whereby M's repair in line 117 evidences her previous turn to have been a TQ because she goes on to correct S's answer. Here, the adult's action works in the opposite direction to the examples above by rejecting, rather than confirming, the child's response. While both sequence designs affirm the original question to have been testing the child, taking into account the work of M's third turn, here the mother acts to redress the child's lack of knowledge in her 'sequence-closing third' (Schegloff, 2007, p.123). Thus, the epistemic imbalance is amended and the impetus for further discourse is removed.
Extract 4, Dyad B, 'the weekend'.

82. M what did you eat? from the barbecue?
83. S (1.2) a burger:::
84. M and what else?
85. S (.) pizza::! and chicken::.
86. M and what did you have for pudding?

While Sidney's mother explicitly challenges her son's reply in Extract 3, a third form of parental receipt within the typical QAR structure is that of an embedded acceptance of the child's turn, as can be seen in Extract 4. For example, M exposes S's 'a burger' (line 83) as matching her expected response by building upon her prior turn with a follow-up question: 'What else?' (line 84). She does this without acknowledging S's answer, or overtly demonstrating any change of knowledge status. This same pattern is repeated in lines 85-86, where M's: 'And what did you have for pudding?' acts as an implicit acceptance of S's account of eating pizza and chicken for his main course. This tacit alignment of the speakers' epistemological position (K+, K+), followed immediately by a further TQ, allows the talk to progress and the work of collective retelling continues, with each question and answer adding a piece to the memory puzzle.

In all of the above examples, the nature of the parental receipt confirms a known-answer question to be testing the child’s recall of a past event, the experience of which was shared to a greater or lesser extent between participants. The design of the third turns varies across extracts yet fulfils the same action of receipting the child’s answer (a) to the initiating question and (b) to the test of knowledge or recall. In summary, the mother may respond to the child turn by:

Repeating the key word or phrase spoken by the child; the function of this repetition can be enhanced by the prosodic features and non-vocal resources.

Repairing the child’s answer through a correction or clarification request; (other-initiated other repair or other-initiated repair; (Schegloff, 2000). In both cases, the adult's action of initiating a repair affirms the original question to have been testing the child and the child’s answer to have been failed, or to be problematic.
Embedding receipt of the child’s answer within a further question built upon the increment established by the prior question and answer. This is known to arise where questions about shared event memory challenge knowledge boundaries and epistemic status (Heritage, 2012a; You, 2015).

Across these extracts, the mother initiates talk with her child by employing an information request, which 'craves a response' (Heritage 2012b, p.25); making the second pair-part required and thereby prompting the child to engage in conversation. However, the opportunity for conversational progression and language growth is minimal, since the pattern of third turn responses closes the perceived or actual gap in knowledge between participants; removing the possibility of sequence expansion and causing a halt in talk progression. If typical TQs do not facilitate a fruitful language response from the child, further investigation is warranted to determine what alternative resources mothers use in the design of their TQs in order to scaffold children's responsive turns.

8.5.2 TQ with answer prompt

The next section presents examples which vary from the standard set, since they present a TQ, framed by the mother with an accompanying answer prompt. In Heritage's terms, for the parent to present a TQ, she must position herself as K-stance, whilst holding K+ status; an incongruity which, for Dyads B and E, is frequently revealed within the same turn.

Extract 5, Dyad E, 'school trip'.

126. M and- we see [what was santa?] (.). what did ((gestures antlers))
127. santa?
128. (0.9)
129. C a [rein"deer"]
130. M ['ave on his:] sleigh.
131. C a /rendiː/. ((smiling))
132. M yeah, it was a giant one. (0.5) wasn't it?
133. C ↑"yeah".

Throughout this conversation, there are several instances where M recipient-designs her talk based on the assumed knowledge and competence of her conversational
The above extract provides an unambiguous example of a TQ sequence, whereby M cues Caiden into providing the word 'reindeer' by using a representational gesture (of antlers) to accompany her reference to Santa in line 126. The move is immediately successful, and C supplies the target in line 129. However, M does not immediately respond to this turn. Instead, she goes on to complete her question in line 130 - underlining the 'performative' nature of this sequence. C then repeats his statement in line 131 and this time, the mother accepts and builds upon his response: ‘Yeah, it was a giant one... wasn't it?’ (line 132). Here, her verbal action implicitly rewards C for producing the correct answer in what is effectively the third turn position, although temporally it occurs in the fifth turn. Her tag question: ‘wasn't it?’ invites C to demonstrate his alignment with her testimony that the reindeer they saw was 'giant' (lines 132-133).

Extract 6, Dyad B, 'the weekend'.

At the start of this extract (line 61), Sidney's mother immediately deviates from her standard TQ formulation by tagging a cloze sentence as a prompt to elicit her desired response from S: 'What did Grandad do? Did he make a:'.
question), versus her evident K+ status, as revealed by her subsequent prompt. Unlike Caiden, who orients to his mother's cue to produce the required target, Sidney instead completes his mother's sentence with a joke ending: 'cake', accompanied by explosive laughter (line 62). M unambiguously rejects this move: 'No, he didn't make a cake!' (line 65). She then initiates a 'correct production sequence' (Lock et al., 2001). This is characterised as a series of turns designed to elicit a correct name, even though the conversation partner already knows the target (see also Beeke et al., 2014; Gardner, 1989).

M pursues her 'practical remembering' goal (Engel, 1986) by asking the TQ: 'What did he [Grandad] cook?' (line 65), but immediately reformulates this to a yes/no question: 'Did he use a cooker?'. The design of this turn is intended to prompt S to produce the word: 'barbecue', as an alternative to 'cooker'. In line 66, there is evidence of S's struggle to retrieve the target name; he begins to repeat 'coo-(ker)', but then stops to reformulate his answer after an inhalation and a brief pause. He eventually produces the candidate answer 'oven', which his mother decisively rejects: 'No' (line 67). She then attempts to cue him with additional semantic information: ‘What d'you use to cook on outside in the garden?’ (lines 69-70). In an echo of his earlier 'cake' response, S produces the clearly outlandish turn: 'a banana'. This he supplements with laughter and smiling, in a move which could be interpreted as an attempt to save face or recruit his mother to a more playful form of exchange, in order to distract her from the pursuit of the elusive target 'barbecue'. It is not possible to see M's facial expression in order to assess how she responds non-verbally to S's turn. However, linguistically she does not deviate from her own agenda; repeating her question: 'What did he use to cook on outside in the garden?' (line 72) and attempting once again to cue S in with a cloze sentence: 'he had-' (line 73).

This prompts S to candidly admit his defeat: 'I have no idea what's it called' (line 74). But even in the face of this explicit declaration of his word-finding difficulties, M continues to pursue her correct production sequence, redesigning her turn to incorporate a phonemic cue: ‘He made a b-' (line 75). This use of hierarchical cueing, or scaffolding, is common in the interactions of Teaching Assistants and their pupils (Bosanquet et al., 2016). However, it is less common in exchanges between parents
and children. What makes this sequence particularly striking is the continued effort M devotes to support S in producing the target noun 'barbecue'. Rather than accepting 'burger' as a plausible alternative, she demonstrates great conversational labour in correcting S's response in line 77 and breaking down the word in order to emphasise its phonological features. S interprets this as a signal for him to repeat back the target word (line 78); finally completing the correct production sequence that began in line 65. Despite M's exertion, the linguistic and interactional pay-off is the production of a single word by S. Even when this is achieved, M does not acknowledge the success of her own or S's efforts by explicitly accepting his turn. Instead, she begins what appears to be a further TQ: 'And what di-' (line 79), resulting in S attempting to end the conversation by asking to view the video recording (lines 80 and 81).

Whilst Sidney's word-finding difficulties act as a continued 'epistemic engine' (Heritage 2012a), driving his mother to continue the conversation because he is unable to provide the information required to restore epistemic symmetry, there is little progression linguistically or interactionally. S's explicit request to stop the recording perhaps underlines the lack of motivation or impetus for him to expand the sequence, as he does in subsequent extracts. As such, his mother's K- stance, counter-balanced with her clearly signalled K+ status, acts as a barrier to S's participation within this conversation by limiting his opportunity and willingness to contribute.

The question-plus-prompt turn design, which has been explicated above, occurs on multiple occasions across the BCC data set; indicating that parents have expectations as to what their children know and what support they may need to display their knowledge. These expectations are reflected in sequence organisation and the use of both verbal and non-verbal devices, including gestures. Despite the parents' use of multi-modal resources to help facilitate their child's language production within conversation, the opportunities for language-learning and interactional development remain restricted; resulting in just a noun + determiner: 'a reindeer' or a noun in isolation: 'barbecue'. This raises the question of whether there are alternative turn designs, which provide greater support for children's language and conversation development.
8.5.3 Questions with answers provided

A further pattern of test questioning identified within the BCC data is that of a maternal turn which combines a TQ with providing the known answer.

Extract 7, Dyad B, 'holidays'.

155. M and we had- what did we do to get there °h
156. [we had to ] wake up in the middle of the
157. S [we had (XX)]
158. M night didn't [we? ]
159. S [yeah] (0.8) to ↑↓go.
((nods))

Here, the mother begins to formulate a comment about their holiday to Devon: 'And we had-' (line 155), before switching to her familiar TQ turn design: 'What did we do to get there?' (lines 155-156). Rather than waiting for S to answer (which he begins to do in line 157), M follows her question with the desired answer: 'We had to wake up in the middle of the night, didn't we?' The use of 'we' encourages alignment and supports the project of joint reminiscence. Meanwhile, the tag question and recycling of the 'we' pronoun in line 158 serves to invite S's agreement with M's version of events; a move that is met with both verbal and emblematic assent: 'yeah,' accompanied by nodding (line 159). The timing of M's tag question leads to overlap at the transition relevance place (TRP; Sacks et al., 1974). S then succeeds in collaborative co-construction across turns by using the elliptical phrase 'to go', elaborating upon his mother's statement in line 156.

By supplying the answer to her own probe, M has effectively switched from a K- to a K+ stance, thereby removing the pressure on S to retrieve a specific target. This has the effect of opening up the sequence of conversation and allowing him to progress the talk using language that he is able to access independently. S's mother frequently constructs this design of TQ + answer provided turns across her interactions with her son, which may act as an acknowledgement of his significant word-finding difficulties and the challenges to communication which can result.
Extract 8, Dyad E, 'Marvel show'.

69. M yeah? mpt (1.4) and was there fire? cause i- i
70. watched a clip on youtube (1.1) and they had
71. like um:
72. C yeah there [was ]
73. M [bikes] jumping through things.
74. (0.7)
75. C but on- on, when i was there, they didn't jump
76. through things
77. M did they not?
78. C ((shakes head))
79. M so it wasn't like what was on: the tv?

This extract begins with the mother asking Caiden about a show, which he attended with his Grandma in London. Unlike earlier extracts of reminiscence, M was not present at the event, a fact which changes the nature of conversational remembering into an instance of recounting. However, as we shall see, she does have some knowledge of what took place and brings this into play as the interaction progresses.

M begins by questioning C as to whether there was any fire on stage (line 69). Despite her apparently genuine enquiry, she quickly reveals the expected answer, which is related to her existing knowledge, based on her viewing of a YouTube video (line 70). C confirms that there was fire (line 72), but goes on to contradict his mother's account of the characters 'jumping through things' (line 75). M expresses her surprise at this lack of congruity between her own understanding and E's account: 'Did they not'? (line 77) but accepts his assertion: 'So it wasn't like what was on the TV?' (line 79).

In the event, it emerges that she was right to question C's dissent from her own epistemological position, as he goes on to describe exactly the narrative that she
had proposed: 'Captain America and... the Wasp was on motorbikes and guess what... they went through the fire!' (lines 85 - 88). Rather than expose the contradiction that is evidenced in C's prior turns (which could constitute a conversational 'threat to face'; (Redmond, 2015), M instead uses the news marker: 'Did they?' (line 89) to preserve C's status as a knowledgeable party and allow the exchange to continue smoothly, without the need for repair.

M's multi-layered 'question + answer provided' initiating turn (lines 69-73) effectively resolves the K-/K+ gap without the need for the child to supply a specific target. The typical next turn expected from the child is given within the mother's prior turn; scaffolding not only further turns at talk, but linguistically nutritious ones (Head Zauche et al., 2017). Across this sequence, C takes the opportunity to display a rich and lengthy description across multiple turns, in contrast to the limited linguistic and interactional possibilities offered by more typical TQ patterns. M, meanwhile, shows her flexibility and willingness to adopt a K+ or K- stance by taking into account C's event perspective (Cleveland & Reese, 2005) and offering a bridge, or scaffold, to the child's next turn through her use of follow-up questions or change of state tokens. This leads to further elaboration of the topic, which is jointly pursued, and C remains engaged in the interaction across multiple succeeding turns.

8.5.4 Questions designed and received as genuine: a shifting epistemological gradient

The recurring theme of epistemic boundaries, which has presented itself throughout this analysis, is further marked by the mothers' use of questions where it is unclear whether the answer is known to them or not. In each case, the parent adopts an 'unknowing epistemic stance' (K-; Heritage, 2012b) by asking a question which invites the child to share their knowledge and experience. Subsequent turns may reveal that the adult has feigned their ignorance in order to elicit the child's participation, though the evidence for this is not always exposed in conversation and therefore remains inconclusive for the analyst and/or conversation partner. Notwithstanding this, the sequential organisation of CP's turns follows that of an answer-not-known question, answer and receipt pattern throughout. Irrespective of
the mother’s epistemological status, her stance occasions the question as genuine for the child in their moment-by-moment experience of talk.

**Extract 9, Dyad E, 'Marvel show'.**

107. M and how did you get there?
108. C (0.6) by: a train? (.) and a tu:be. ((pinching cheeks))
109. M wow?
→
110. (1.6)
111. C but mummy: is †scared of a tube.
112. M i am scared of the tube. [why am i scared?]  
113. C [even sometimes ] nanny
114. (. becau:se (1.6) the- sometimes a tube? °h ha-
115. lights goe:s off.

This sequence begins with a triad of turns, which are organised according to the standard TQ-answer-receipt pattern. M asks C how he and Nanny travelled to the O2 Arena to watch the Marvel performance (line 107), despite the likelihood that she is well aware of the travel arrangements. When C complies with her request to describe his journey on a train and a tube (line 108), M responds with a 'wow' token, which would typically convey a change of knowledge state. However, the utterance is muted and delivered with a questioning tone. The turn is also unaccompanied by a follow-up question - providing evidence that this is not new information, despite M's use of 'wow' to signal her inferior epistemic status.

As in similar examples from conversations between this dyad, the QAR sequence is followed by a mutually-attributable pause, where the talk appears to dry up. However, C is able to make use of the 1.6 second silence (line 110) to form his own novel comment: 'But Mummy is scared of the tube' (line 111). C's use of 'but' enables him to accomplish a stepwise topic shift, away from talk about the O2, and onto a discussion about M’s tube anxiety. His turn at 111 possibly functions as the first pair part of an adjacency pair: his tonic stress on 'scared' inviting M's confirmation or rejection of his statement and thereby reversing their conversational and epistemic roles. In her response, M’s own tonic stress on ‘am’ evidences her action of confirmation. This ultimately leads to a fruitful new sub-topic, where C is able to expand on his statement across lines 113-115; revealing that Nanny is also
afraid of the underground and explaining that this is because the lights sometimes go off.

Thus, M's initiation of an apparently 'real' question, which is followed by a change of state token, rather than an evaluative response, occasions further progression of talk from C by granting him epistemological authority to expand the train topic. He responds positively, leading to an opening up of the conversation beyond the initial three initial turns and acting as an indirect facilitator for C's communication. By adopting and maintaining an 'unknowing epistemic stance' (Heritage 2012b), M invites elaboration by C and projects the possibility of sequence expansion. This contrasts with speakers who take up and reveal a more 'knowing' position by using a typical TQ; a move which characteristically invites confirmation and sequence closure (Heritage & Raymond, 2005; Raymond, 2010).

**Extract 10, Dyad E, 'Marvel show'.**

36. M who:'s the bad guy, i don't know any of them.
37. C i don't know one of them.
((...rubs eye...))
38. M i know: iron man. and i know mnm::: the wasp,
39. cause [i don't] like the wasp.
40. C [((burps))]
41. M [Caiden!]
42. C [pardon ] me. sorry!
((looking at camera))
43. M erm: spiderman?
44. C °yes°
((tilts head to M))
45. M did i say spiderman already?
46. C you said.
47. ((sounds of baby babbling))
→
48. M who else was there? erm:::
→
49. (3.5)
→
50. C OH I JUST REMEMBERED! 'i am groot!'
((finger up to camera)) ((mimics voice))
51. M ah!: ((clicks fingers)) groot. yeah.

Here, Caiden's mother goes further in feigning her epistemic status by employing a 'claim of insufficient knowledge' (CIK; Sert & Walsh, 2013) to try to elicit the names of Marvel superheroes from C. The design of her turn: 'Who's the bad guy... I don't know any of them' (line 36) is subsequently revealed as a covert TQ, as C asserts his own lack of knowledge by echoing his mother's CIK: 'I don't know one of them'
(line 37). M's follow-up turn reveals the false representation of her own knowledge state, as C's failure to provide the target information compels her to reveal her ability to access the names she had presented as unavailable to her: 'I know: Iron Man. And I know mmn... The Wasp' (line 38). This links back to M's previous strategy of providing the answer to her own TQ (see Extract 8), though here, M's switch from K- to K+ stance is prompted by C's 'don't know' response. C then produces two burps, an action which effectively hands the conversational floor back to his mother (line 40); prompting her to supply another Superhero name: 'Spiderman?' (line 44). Here, the roles of parent and child are reversed, as M takes on the role of answering her own TQ, while C receipts her turn, standing in epistemic authority, with a 'yes' (line 44).

M subsequently tries again to enlist C's support in the recall of Marvel characters by asking 'Who else was there?' (line 48). This time, she follows her question with an elongated 'erm' to indicate that she is thinking, followed by a 3.5 second pause. This subtle redesign of her 'recruitment move' (Kendrick & Drew, 2016) allows C the necessary time to retrieve the name 'Groot' (line 50). He explicitly signals the success of M's strategic pause with his exclamation: 'Oh I just remembered!' immediately before he produces the target word. M's 'ah' and clicked fingers in line 51 appear to provide next turn proof for the genuineness of this part of the question sequence, which is believable following the preceding topic build-up. Having declared she knows some of the Marvel characters legitimises her stance of having forgotten others and not remembering 'who else' there was.

The two extracts, above, demonstrate how fine the tracing of epistemic boundaries can be as a topic unfolds in the 'see-saw' fashion, described by Heritage (2012a). By using and maintaining the design of a 'real' question (whether the mother's stance is feigned or not), the epistemic balance achieved acts to facilitate turn sequencing and turn construction opportunities for the child, which are linguistically fruitful when contrasted with typically-structured TQs.
8.5.5 Building sequences of talk across turns: balancing questions with comments

In all the above sequences, conversational remembering has been built around the mothers' use of questions to help scaffold their child's language and participation. Conversations between speakers have ranged from circumstances where the parent and child have equal experience of an event or topic to those where the child has absolute knowledge and the parent has only partial information, which they may minimise or amplify, depending on their interactional agenda. Questions which are received by the child as genuine, whether feigned or not, change the epistemic balance and seem to facilitate helpful turn sequencing and turn construction opportunities when compared with typical TQs. Sitting in contrast to this set of data are cases where the mother employs more complex scaffolding to help build verbal interaction across turns, e.g., by employing comments, as well as questions to help drive forward the shared narrative; providing and soliciting linguistically nutritious input for and from her child.

Extract 11, Dyad B, 'holidays'.

52.  M  and d'you remember when we went outside? (.) in
53.  S  the swimming pool.
54.  S  [mmn:  ]
      [((nods))]
55.  M  and the- air was ↑↑cold. wasn't it?
56.  S  ((nods))
57.  M  but the water was warm.
58.  S  ((looks confused)) and i was like- freezing,
59.  S  [wasn't i?]
60.  M  [((coughs))] yeah, so we 'ad to go back inside.
61.  S  [.k(h)yeah]
      [((smiles))]

Across this extract, M notably deviates from using successive TQs; instead switching between questions and comments as an alternative approach to establishing and maintaining Sidney's engagement in joint reminiscing. At the start of the extract, she uses the yes/no question: 'Do you remember?' (line 52). Whilst limiting S's immediate opportunities to respond, placing this phrase in turn-initial position marks 'remember' as a way of drawing the child's attention and, as such, helps manage the interaction by focusing on the shared awareness between the two speakers (Tao,
Rather than putting S on the spot to display his knowledge, M then takes a lead in recalling and narrating the details of their family trip. Following her enquiry as to whether S remembers swimming in the outdoor pool, the child responds minimally (line 54). Rather than press him to provide a more content-loaded answer, M tacitly resumes the conversational floor and continues building on her theme: 'and the air was cold' (line 55), employing the tag question: 'wasn't it?' to maintain S's engagement and collaboration in the story-telling pursuit.

Once again, S uses a passing turn to hand the floor straight back to his mother (by nodding in line 56). Unusually, she continues with a comment, rather than a question: 'but the water was warm', line 57. This uncharacteristic turn design may contribute to S's look of confusion (line 58), as it is not immediately clear how he should respond outside the familiar routine of a more directive TQ sequence (Grosse & Tomasello, 2013). In the event, he resourcefully develops the mother's account by adding his personal recollection: 'and I was like... freezing'. Notably, he follows this with his own tag question: 'wasn't I?' (line 59), a move which appears designed to seek his mother's approval, or reassurance, that he has contributed appropriately. She provides this unequivocally with a 'yeah' (line 60), followed by a comment which both validates and supplements what S has said: 'so we 'ad to go back inside'. The 'so' in this instance marks the direct link between S's contribution and M's own recollection, highlighting their alignment and enabling the progressivity of the talk. S responds by reasserting his own orientation to the joint retelling and acceptance of his mother's remark by smiling and mirroring M's 'yeah'.

Taken together, the support which builds across M's turns - from collaborative yes/no reminiscing in line 52 to an elaborative comment plus yes/no tag at line 55 - combine to reveal S's competence as an engaged and engaging communicator. The accumulation of linguistically rich information provided by M, alongside the sequential implication for S to take a next and contingent turn, provides an effective framework to encourage his participation in conversation and thereby increases his access to the language-learning opportunities provided by his mother as the more experienced and communicatively responsive speaker.
8.6 Discussion

This chapter has explored the nature of TQs within the context of shared retelling of past events by parents and their primary-school children with DLD in order to determine how these turn types affect children's language-learning and interactional opportunities within everyday conversation. The analysis also sought to explore the potential of CA to inform the identification of conversation barriers and facilitators and to deepen our understanding of different turn types. In their purest form (the typical TQ, answer and evaluative receipt structure), these commonly-occurring requests can create a problem space for young speakers and may cause breakdowns in conversation by limiting interactional opportunities and undermining their epistemic status. However, the role of both parent and child in shaping and responding to TQs is crucial to the development of talk following the QAR sequence and can determine whether questions open up or close down the shared reminiscing space.

Across the extracts above, the mothers initiate talk with their children by employing requests for information, which have the immediate effect of prompting the child to engage in conversation. However, in the traditional TQ, answer, accept/reject/embedded receipt formulation (sequence type 7.5.2), the impetus for conversational progression is quickly halted once the real or purported knowledge gap between the two speakers is closed (Heritage 2012a). In 'standard TQ' sequence design, there is covert incongruity across first and third turns: the mother's stance of 'not knowing' in the initial turn (K-) becomes counter-balanced with a covert status of 'having known' in the third turn (K+).

Similarly, when mothers supplement an initial TQ with an answer prompt (either verbal or non-verbal; sequence type b), there is explicit incongruity within the first turn as well as across first and third turns: the mother's stance of not-knowing (K-) is combined with an overt stance of knowing-but-not-saying (K+), expressed as a prompt. The underlying action of this turn structure is to offer the child an incomplete version of their own next turn, which they are obliged to complete as a competence display. As for typical TQs, the interactional pay-off for this second type of sequence is minimal, with the child typically producing a single word or name following single
or multiple prompts from the mother. Arguably, this could result in the child adding a potentially useful new item to their vocabulary; a benefit which could form the motivation for employing this sequence type from the mother's perspective.

Careful evaluation of the data from two mother-child dyads has revealed alternative patterns and strategies, which occasion more fruitful opportunities for sequence expansion and extended talk. In 'TQ-with-answer-provided' (sequence 7.5.3 design), there is resolved incongruity within the two-part first turn: mothers' stance of not-knowing (K-) in the first part is amended in the second part through the status of knowing-and-telling (K+), expressed as a candidate answer for the child. Here, the parent effectively carries and displays for them their own next turn, removing the pressure on language-impaired children to produce elusive nouns or phrases. When the parent parcels both first and second turns within her first turn position (asking a question and providing a candidate answer), she alters the action required of the younger, more inexperienced speaker. In effect, the interactional tables are turned; it is now the child who has sequential opportunity for an evaluative receipt - appraising the mother's candidate answer to the question she responded to on his behalf. Hence, it would appear that, by adopting a more overtly knowledgeable position within their opening turn, mothers expand the child's response possibilities, allowing them to display their own knowledge and communicative competence.

Whilst typical TQs are marked by dissonance (whereby mothers present a K- stance in turn 1, set against the revelation of K+ status in turn 3) for 'genuine' questions (sequence type 7.5.4) - whether feigned or not - epistemic congruence is maintained across first and third turns. A maternal stance of 'not knowing' (K-) in turn 1 is congruent with her apparent change in epistemic status to become 'now-knowing' (K+) in the third turn, a shift which is marked by a change of state token rather than an evaluative receipt. The child, having been credited with imparting some new information to his mother, is cast in the role of the speaker with superior knowledge of the event under discussion. The data suggest that they are then more likely to continue the conversation by offering further intelligence on the shared topic, or by introducing a stepwise topic shift. This marks a powerful contrast to the sequence-closing effects of typical TQ sequences.
Perhaps the most flexible and effective turn construction strategy for parents, which is illustrated within these two case studies, is sequence type 7.5.5 - that of interspersing questions and comments in order to provide nutritious language input, whilst supporting the child to practise and extend their own language and conversation skills. Here, mothers subtly attune and amend their epistemic stance according to their child’s contributions to conversation turn by turn; for example, offering key information when required, whilst claiming inferior epistemic status at other points in the sequence; treating the experience as the child's to know and describe (Heritage, 2012a). In adapting their own interactional and epistemic position to support their child’s emerging language skills, parents are also modelling a range of different turn structures which will, by degrees, facilitate the child's own proficiency in conversation (Roberts & Kaiser, 2011). Hence, these everyday interactions can help promote children's language through conversation and vice versa, encouraging a virtuous circle whereby children contribute more to each exchange and receive nutritive input and feedback in return.

The body of this analysis has focused on the communicative patterns of two children with DLD in day-to-day conversation with their main carers. The use of a CA approach has allowed the investigation of two-way interactions beyond the categorising and coding of individual turns, which is prevalent across the child language literature (e.g., Cleveland & Reese, 2005; Fivush et al., 2006). This has allowed consideration of the usefulness of CA within the ongoing development of BCC and also opens up the question of its future feasibility within the SLT clinical toolbox. For example, future work could apply a CA lens to additional conversation behaviours, including both barriers and facilitators, to explore how these hinder or support children's linguistic development. Data from TD dyads could also be analysed to identify turn structures and sequences, which could be drawn upon to inform conversation-based intervention for children with language disorder.

In summary, the current investigation has shown that sequential progression of child talk and linguistic progression in turn design is influenced by (a) the epistemic nature of M’s QAR sequence (b) the linguistic content displayed by M’s prior turn for the child’s next turn use (c) the balance of questions and comments within the sequence. Conversations from two separate dyads reveal the potential of
interspersing parental questions with comments as a resource to elicit language and recall from children, without overtly pressing them to display their knowledge. This insight supports the focus on commenting as a potential facilitator within BCC, while the reduction of TQs may be an appropriate target, if participants identify this as problematic within their everyday talk. Findings from this study will feed into the further refinement of the therapy, for example by considering follow-up turns more carefully when identifying possible areas for intervention. While the time-consuming nature of CA means that it is not practical to carry this out routinely within the limitations of clinical practice, principles and insights from applied CA research (including the current study) could be used fruitfully to inform the choice of conversation strategies to target within intervention, thus guiding SLT’s analysis of video samples without transcription to consider how turns interact together to produce next and contingent turns.

Future work is needed to explore potential cultural considerations, which should be taken into account when working with families using a conversation-based approach (Burns, Annabelle and Radford, 2008). For example, therapy goals should reflect the underlying values and beliefs of the people participating in the intervention, especially in relation to epistemic status. Conversation analysis can help support this individualised approach by considering aspects of social organisation related to interaction; the value of talk and how epistemic status is handled in everyday communication. The current study indicates that there is a need to consider children’s strengths and needs, and parental style, as well as how these interact to support or hinder the flow of talk. This can lead to a deeper understanding of how children’s language and conversation skills develop, in order to find optimal ways to support this.
Chapter 9: Discussion and future directions

This project has designed and investigated a new intervention for children with developmental language disorder, 'Better Conversations with Children', grounded in interactionist theories of child language development. The programme has extended the use of PCIT strategies from pre-schoolers to school-aged children with DLD, drawing upon insights from behaviour change theory, as well as principles and methods from conversation-based therapy used widely for adults with acquired communication disorders and their CPs. The final chapter of this thesis will review the study outcomes, in relation to the five main aims which were set out at the start of the report. Findings will be set in context with previous research, before drawing together the clinical implications and limitations of the current study. Finally, future avenues for research will be identified to build upon key learnings from the PhD study.

9.1 Development of the intervention

The first aim of the study was to develop a therapy protocol, in partnership with key stakeholders, taking into account context, published theory and intervention research. Results from this work are reported in Chapter 3. Based on the available literature, along with views gathered from children and families living with DLD, a clear need was identified for a conversation-based programme, to be tailored to primary school-aged children and their main carers. Following consultation with both clinical experts and a wider advisory group, it was agreed that the intervention would focus on offering specific strategies to both children and adults to enhance the content and flow of their conversations, aiming to support children's ongoing language development. This emphasis on empowering children and families to understand and maximise their own communication skills aligns with statutory education guidance, e.g., the SEND Code of Practice (Department for Education, 2015), as well as with clinical priorities identified by the RCSLT (Bishop & Norbury, 2021).

In order to develop a programme theory to guide the design and development of BCC, a behaviour framework (Johnston et al., 2021) was used to help identify hypothesised mechanisms of change. This provides a map of behaviour change
techniques, linked to agreed mechanisms of action, based on a published literature synthesis and expert consensus study. Behaviour change theory has been used previously in CPT research to identify essential components of the BCA programme (Johnson et al., 2017, 2021). Whilst insights from this research and from the Theory and Techniques tool (https://theoryandtechniquetool.humanbehaviourchange.org/) were useful in highlighting potential intervention components which may act as active ingredients for change, these frameworks had not previously been applied with BCC’s target population and there were a number of factors that were not considered as part of the development process. These factors may, in hindsight, have influenced the results of the programme in ways that were not accounted for within the original programme theory. For example, the number of strategies chosen to be worked on by the child and parent and whether these strategies were complementary when targeted alongside each other may have influenced the outcomes of therapy, alongside participant characteristics, such as parenting style and the nature and severity of the child’s language difficulty. These additional areas would need to be taken into account in a review of the intervention logic model, before proceeding to the next stage of BCC adaption, having successfully developed a novel and complex intervention for this population, drawing on multiple influences and components from previous DLD and wider language research.

In the ongoing development of the programme, there will be a need to increase the involvement of children and parents in refining the intervention to ensure that its content and delivery can best meet their needs and priorities. While participants in the current study did not identify areas for change in their post-therapy feedback, more targeted consultation outside the context of the PhD will be important to jointly develop plans for wider implementation. Since the original draft protocol for BCC was produced, the UK Standards for Public Involvement have been published (available at: https://sites.google.com/nihr.ac.uk/pi-standards/home). These standards set out guidance for ensuring that members of the public are involved at each stage of the design and piloting process. This can include co-production of manualised resources and consultation on decisions such as the timing and length of intervention sessions (Volkmer et al., 2021; Volkmer & Broomfield, 2022). Drawing more deeply on the experience of families, alongside best available evidence and clinical expertise, increases the likelihood that the modified intervention results in the desired
behaviour change and communication outcomes. Future iterations of the BCC protocol could also highlight which aspects of the programme are essential, based on further work to identify core mechanisms of change, as well as further clarifying where materials and methods can be tailored to the individual's interests and needs.

9.2 TD study

The second main aim of the current study was to characterise the conversations of typically-developing children and their parents with respect to key variables, which were targeted in BCC and other related programmes. The results from this analysis are reported in Chapter 5. Data from 22 parent-child dyads were transcribed and coded for 14 child and adult behaviours, as well as for child MLUw and child-to-adult ratio of speech. This amounted to over three hours and 40 minutes of videoed interactions, recorded across two timepoints for each pair. The results revealed wide variability between individual dyads, which may be accounted for by multiple factors, including and beyond the linguistic abilities of children. Findings indicated that all core conversation features and measures remained stable for the group across a six-week period. There was no statistically-significant correlation between child age (which ranged from 5;02 - 8;10 years) and any of the variables under investigation.

Close analysis of the data showed that contingent commenting was the most frequently used adult behaviour, followed by test questions and recasts. There were few examples of parents giving clear explanations of words and concepts, or using forced choice questions across the TD dataset. Meanwhile, children used an average of 8.68 single word turns per five-minute conversation; the most frequently coded child behaviour. Fewer than one instance was observed on average across both Time 1 and Time 2 recordings of TD children asking for clarification or repetition, saying things another way or giving up when stuck on a word.

Within the TD sample, there was wide variation in the counts of other conversation behaviours, particularly children's use of gesture or acting out to help communicate their meaning. While there were no significant relationships observed between children's age and frequency of conversation behaviours, a trend was identified for adult test questions to decrease as children got older and for children to use fewer
single word turns. These correlations may have reached statistical significance if the age range or size of the sample was increased.

Large standard deviations were also observed for MLUw and ratio, which complicated comparisons between individual data from children with DLD and the normative sample. Findings for TD child MLUw aligned closely with a previous study by Rice and colleagues (2010), despite conversations being recorded at home with parents, rather than with a researcher. This suggests that average utterance length is a robust measure for children with typical language across different contexts and conversation partners. In contrast, results for ratio of child-to-adult speech showed TD children within this study spoke on average more than their parents when engaged in shared conversation. This runs counter to Bruce & Hansson (2019), who found that teachers spoke more than children across both teaching and play-based contexts, suggesting the relationship between child and adult forms a key mediator in determining who will take up more of the conversational space. Individual factors, such as personality type, may also influence this variable. A larger sample of TD data will further inform our understanding of potential predictors and moderators for key conversation variables. Nevertheless, this study with 44 participants highlights the potential of using conversation behaviour counts, alongside MLUw and speech ratio, to enhance our understanding of later language development within the context of natural everyday talk.

9.3 Intervention study findings

The central aim of this study was to investigate the effects of the BCC intervention for six parent-child dyads and to assess the feasibility of the programme with regard to recruitment and retention, acceptability and suitability of the chosen outcome measures. Results from the main study are reported in Chapters 6 and feasibility findings are summarised in Chapter 7. Experimentally-controlled case series findings indicated that 5/6 dyads evidenced a significant decrease in targeted barrier behaviours following the intervention, whilst children within the same five dyads showed individual increases in their MLUw within conversation. The differing response of the final dyad (Dyad F) to the research intervention raises the issue of candidacy for this form of conversation-based therapy, suggesting that
children with more severe speech and language impairments, like Child F, who did not show measurable improvements following BCC, may benefit from more explicit intervention targeting specific areas of their structural language (e.g., Calder et al., 2021; Ebbels, 2014). Nevertheless, F’s Mother did report some perceived gains from her participation in the programme, e.g., introducing regular ‘Talk Time’ and increased understanding of strategies such as giving extra time and space for F to speak. It may be that modifying BCC, for example by focusing on fewer targets and increasing the use of visual prompts for the child, would result in greater progress for this particular dyad.

Another key consideration for the future development of the BCC programme is the choice of individual strategies to target during therapy. During the current case series study, test questions emerged as the behaviour most amenable to change, compared to other barriers and facilitators. Across the four mothers who were aiming to reduce instances of this behaviour, their average use during a 5-minute conversation fell from 8.84 pre-intervention to 2.25 post. This would have major implications if scaled up for the approximate 28 minutes per day that UK mothers spend on interactive childcare and 19 minutes for fathers (Wishart et al., 2019). It could be argued that test questions showed the most potential for change (reduction) due to their high average counts pre-intervention, although a high count of a behaviour could equally show it to be endemic and, therefore, more difficult to reverse. In contrast, for certain facilitators, such as giving clear explanations of words and concepts, it may not be feasible or advisable to employ this behaviour with high frequency during natural conversations. Therefore, a more modest change could be seen as appropriate within a short, recorded interaction, but this may not reach statistical significance.

It is possible that the key driver for the observed reduction of test questions was mothers' realisation of the undesirable consequences of this behaviour, e.g., when viewing videos of the child looking confused or frustrated because they were unable to produce the desired response to a parental TQ. The consequences of other communicative turn types may be more subtle and therefore difficult to notice and motivate change. For example, a child may not show immediate uptake of a recast or contingent comment in their next and following turns (Radford et al.,...
Yet, the literature shows that these types of parental input make a crucial contribution to language learning over time (Gilkerson et al., 2018; Hirsh-Pasek et al., 2015; Masek et al., 2021). Therefore, it is important for the clinician to highlight the importance of these facilitative behaviours through education and information sharing beyond the supported reflection of participants when viewing recordings of their own conversations. More formal and objective ways of collecting comments from children and parents on their response to intervention would have strengthened the current study and allowed for a deeper understanding of what drivers were most important for effecting change in conversational behaviours.

A further key area for reflection is the number and combination of behaviours chosen by parents and children to work on during therapy. It is notable that the dyad who showed least progress (Dyad F) chose a total of eight strategies to work on (three child-led and five parental). In contrast, Dyad D focused on just three strategies - one barrier and one facilitator for the mother and a single facilitator for the child. Mother D's targets could be seen as complementary - reducing test questions and 'holding back' by using: a) minimal turns and b) extended pauses. She was able to achieve both of these aims following the six-week intervention. Meanwhile, no barrier behaviour was identified for Child D, allowing her to focus on her chosen facilitator of asking for help or repetition when she didn't understand. Though instances of this behaviour did not increase numerically following BCC, this may have been linked to an increase in the child's own contributions to conversation - facilitated by changes to her mother's communication - which may in itself have led to fewer instances of the child not following what was said. Further work, using a CA lens, may help illuminate which strategies are mutually supportive and which work against each other to make it harder to achieve participants' desired aims.

Alongside the observed modifications to the dyads' conversation behaviours, the case series study revealed changes to children's standardised assessment scores, in particular the CELF-5 (Wiig et al., 2017). These results were particularly striking, since previous research with school-aged children with DLD has indicated that it can be difficult to obtain significant effects of intervention using standardised outcome measures (Ebbels et al., 2019). In particular, 4/6 children showed positive change on
the sentence comprehension subtest. This aligns with previous PCIT research involving younger children with language impairments (e.g., Falkus et al., 2016; Roberts & Kaiser, 2011), which demonstrated change on both receptive and expressive language measures. Earlier studies had reported that language disorder with a receptive component is 'more resistant to intervention' than specific expressive or phonological difficulties (Boyle et al., 2010, p. 994). Therefore, it seems that both BCC and PCIT show promise in remediating an area of language-verbal comprehension - which has proved challenging to treat using traditional SLT techniques. It is likely that by training parents to tune into their child's communication and provide highly enriched, contingent language input, children benefit from regular access to language in a supportive context, which is both motivating and relevant to their interests and needs. Encouraging parents to set aside regular 'Talk Time', without the distractions of background noise and interruptions, appears to give a boost to children's comprehension, as well as opportunities for them to practise and hone their expressive language skills, which also showed positive change in some areas following BCC. Nevertheless, the child with the most severe receptive and expressive impairment (Child F) showed no change in this area following the intervention, indicating that progress may be easier to achieve for children with milder language disorders.

A further key outcome of this study was the finding that DLD dyads did not differ significantly from their TD counterparts on any conversation characteristic, except for in the case of children giving up when stuck on a word. This indicates that there was not something inherently atypical about the way parents were managing their interactions with children (in line with Blackwell et al., 2015). Indeed, our data shows that the range of 'typical' communication is wide and may be linked to a range of factors beyond the child's age and language level. Instead, children in the DLD group experienced specific difficulties, such as when answering test questions and finding words to express themselves. It is estimated that a quarter of children accessing language support services present with clinical word-finding difficulties, or WFDs (Messer & Dockrell, 2013). These WFDs can affect children's ability to share their thoughts and feelings in class or at home and can have implications for self-esteem, social and educational development (Best, 2005). Therefore, our finding that children with DLD show marked difficulties with word retrieval in their everyday
conversation provides strong rationale for including more targeted intervention on word-finding either integrated within, or alongside BCC. However, targeting word retrieval, or other structural areas of language, would need to be balanced with the overall aim of enhancing conversation and there is currently a lack of research investigating how to improve word-finding in discourse (Campbell et al., 2019). This was an area that was touched upon during intervention for Children B, C, E and F. However, the lack of significant progress in increasing child facilitators indicates that further practice and/or parental prompting may be required to encourage children to use these strategies regularly within their everyday communication.

The contrast in the ability of parents, versus children, to modify their communication behaviour following a six-week intervention could be taken to indicate that it is not practical or helpful to involve primary school-aged children actively in a conversation-based intervention. However, since the target of BCC was dyadic communication, it is argued that it would not be possible to work on this without the participation and awareness of both conversation partners. Whereas PCIT typically involves preschoolers who would not be able to understand or reflect upon their own communication, the school-aged participants in BCC were engaged and motivated to work on their interactions with parents and contributed readily their thoughts about what might help or hinder them in their everyday talk. For example, Child B stated clearly that he wanted his mother to continue taking responsibility for starting the conversation (rather than being given the chance to do this himself). Meanwhile, several children expressed their dislike of being asked frequent questions, with one saying: 'It confuses me' and another 'It makes me not want to talk'.

Based on previous research on identifying mechanisms of change in conversation therapy for aphasia using behaviour change theory (Johnson et al., 2017), it is likely that these comments from children changed parents' awareness and expectation of the impact of their own communication behaviours, e.g., test questions, increasing their motivation to reduce this identified barrier. Thus, while children did not show significant change in their own use of facilitators and achieved a modest reduction in barriers, compared to their carers, their views and contributions to therapy may well have acted as an important driver for the positive changes realised by adults. This aligns with research by Jokihaka et al. (2022), highlighting that synchrony and
attunement between parents and children are associated with more positive language outcomes. It was also an important principle of BCC to support children to advocate for their own communication by giving them the opportunity to comment on what helped or got in the way of their own conversations. It is hoped that the supportive questioning of the SLT (e.g., using visual aids to offer strategy choices) acted as a positive model for parents and allowed children to reveal communicative competencies, which may previously have been hidden by less facilitative adult behaviours.

9.4 Feasibility findings

Turning to the feasibility and acceptability of the BCC intervention, there were initial challenges at the start of the recruitment process related to: a) the lack of children with identified language disorder within mainstream settings and b) the reluctance of some parents to be videoed as part of the intervention. The first issue is related to the persisting pressure on SLT resources, including workforce shortages (House of Commons Health and Social Care Committee, 2022). School-based SLTs typically manage caseloads for several mainstream schools, with allocations ranging from half a day to two days per week, during which time they must prioritise children with Education and Health Care Plans, as well as offering whole school (universal) and targeted support for at risk pupils. Whilst a widely-cited prevalence study (Norbury et al., 2016) estimated that there are an average of two children with DLD in every mainstream classroom, the experience of the PhD researcher in approaching schools between March 2018 and December 2019 was that staff were rarely aware of the term DLD and very few children had this existing diagnosis. None of the children who participated in the study were receiving direct input from an SLT - a strength of the study because there was no confound with other intervention - though most had previously been referred to the Early Years or school-aged service.

This lack of SLT involvement is likely to have contributed to 16 children being screened for inclusion in the BCC project, referred by their school SENCo, eight of whom did not meet criteria based on formal language assessments (five scored within normal limits on the CELF-5), or scored below the 8th centile on the BAS, indicating below average non-verbal ability. Two further children were excluded, due
to co-occurring conditions (e.g., ADHD) or managing well in conversation, according to parental report and confirmed by viewing videos of the child interacting with his mother. It is unclear whether these children, whom teachers identified as struggling with language in class, may have benefited from some adaptation of the BCC intervention. Since recruitment for BCC was completed, there have been several international awareness campaigns (e.g., https://radld.org/), aimed at raising the profile of DLD among parents and professionals. It is anticipated that this increased public recognition would make it easier to identify children who meet the current BCC inclusion criteria in a future larger-scale project. If effective with a wider range of children, offering a parent-mediated intervention (BCC) for school-aged pupils with DLD may help ease the pressure on over-stretched SLTs and education staff and could provide a cost-effective alternative to clinician or teacher-led interventions. However, work would be required to ensure that this intervention aligned with existing service models within the UK, and/or in countries and contexts beyond where the current study was conducted.

The second factor, which affected early uptake for the PhD project was the reluctance of some parents to participate in the intervention, due to concerns over being videoed and/or the time commitment required for them to attend sessions with their children. Once again, these initial contacts with parents were made between 2018 and 2019, prior to the Covid-19 pandemic and the subsequent upsurge in families and services using video-conferencing platforms to communicate and hold professional meetings and appointments. According to the RCSLT (2022), telehealth has now been widely adopted across healthcare settings, with 'digital first' consultations routinely used across SLT and other services. This shift in everyday norms and practice is likely to have resulted in parents and children feeling more comfortable and familiar with using programmes such as Zoom to converse with others and see each other on camera.

Based on this recent societal change, is expected that future recruitment will be aided by an increased ease and acceptance by potential participants of using video as a communication tool. There is also scope to offer sessions remotely, rather than face-to-face, which may make the therapy more accessible to time-poor parents, who are managing work and other childcare alongside supporting their child with
DLD. However, it is important to bear in mind the possible inequalities which may exist between different social groups in terms of access to technology, as well as the skills and confidence to use these new tools. Further consultation with parent groups from a range of different areas and backgrounds will be necessary to determine whether telehealth should be offered as a mode of delivery, alongside or in place of face-to-face sessions.

Initial feedback from adults and children who participated in the case series study was positive, indicating that the intervention broadly met the needs and priorities of those taking part in BCC. However, it should be noted that participant views were gathered via questionnaires and informal measures, which were administered and collected by the PhD researcher. In future work, it would be important to engage an independent investigator to seek comments and criticism from project participants. This process should be undertaken at each stage of the research to ensure that the opinions of those with lived experience of DLD and language intervention are central to the ongoing development of the BCC programme.

Since BCC was a novel intervention for this target population, a wide range of methods were employed to help capture change in language and conversation targets. These included conversation behaviour counts, MLUw and ratio of child-to-adult speech, alongside formal language assessments and bespoke questionnaires. The core conversation measures proved sensitive to change following the intervention and improvements were also shown on the CELF-5, BPVS and ACE naming assessments. However, children's performance on the ERRNI assessment did not reflect the gains in narrative skills, which may perhaps have been expected to accompany the observed lengthening in their MLUw as recorded within conversation. Following findings from Frizelle et al. (2018), it appears that differences in the complexity of the two ERRNI story forms, which were used prior to and following intervention, may have impacted on the suitability of this assessment as an outcome measure for our target population.

Whilst three individual children demonstrated a small increase in their digit span scores following BCC, there was no significant change for the group as a whole, indicating that this may be an appropriate control task for future studies. Findings for
the CCC-2 were mixed, suggesting that parents may have become more aware of their child's communication difficulties following the intervention. This is an acknowledged issue with both self- and other-report measures, as an increase in knowledge and understanding of communication disorder can affect participants' ratings in a negative way (e.g., Rautakoski et al., 2008; Saldert et al., 2013). Informal feedback via bespoke child and parent questionnaires provided a more positive view of perceived improvements following therapy. However, these findings must be interpreted with caution since these measures were designed and administered by the clinician-researcher, which may have biased participant responses in favour of praising the intervention (Choi & Pak, 2005; Sedgwick, 2013).

The input of parents and children could be sought as part of the continuing refinement of core outcome measures. Going forward, it will be important to identify which areas represent the most meaningful areas of change for participants. For example, it may be appropriate to include a quality-of-life measure, such as the Pediatric Quality of Life Inventory, or PedsQL (Varni et al., 2003). However, measuring QoL outcomes for children with language disorders is notoriously complex, due to the heterogeneity of this population and the frequency of co-occurring conditions. A recent study by Eadie et al. (2018) found no difference in QoL scores between a group of children with severe ($N = 14$) and mild-to-moderate DLD ($N = 56$), suggesting it would be difficult to capture change in language-related quality of life following a short-term intervention.

Future consideration of outcome measures will also need to take into account whether pre- and post-therapy assessment schedules can be streamlined to avoid over-testing of children, as well as to reduce the time taken to transcribe and analyse conversation data. While the time dedicated to transcription and scoring (two hours per recorded interaction) was not unusual for a research project, this would not be feasible should the intervention be implemented clinically. Instead, it will be necessary to develop transcription-less processes for identifying and counting key conversation behaviours. This may include tally charts, or parent and therapist ratings scales which estimate how often target strategies are being used. Over time, future BCC research findings will converge around key conversation strategies for primary school children with DLD, making dyad-specific transcription and scoring
It will be important to identify the key indicators of progress for children and to capture these in as efficient way as possible in order to support wider adoption by SLTs within the NHS and school-based services.

9.5 CA study findings

The fifth and final aim of this study was to explore in detail how dyadic turn sequences can shape the development of children's language and communication skills by employing conversation analysis to study a set of parent-child talk in interaction. The focus of this work, reported in Chapter 8, was an examination of adult-initiated test question sequences, since this area of conversation was most frequently identified by participants as a barrier to their everyday conversations. Video-recorded data from two mother-child dyads were evaluated using CA. A recently proposed framework (Heritage 2012a, b) was used to examine TQ sequences initiated and developed from both a knowing and unknowing epistemic stance. These TQs arose in the context of co-constructing memories that formed part of children's everyday experience at home and at school.

Findings from this CA study suggest that turn-taking and turn construction opportunities for the child are shaped by a range of parental behaviours, including: the congruity of mothers' epistemic stance within and across turns; the positioning of the adult's remembering as shared, joint or collaborative and the availability of language elements within the mother's turn for the child's next turn construction. In addition, children's response to questioning was influenced by their mother's apparent, or non-apparent, expectation of a competence display by the child in their following turn. The data reveal the potential of CA to inform understanding of TQ patterns and, more widely, of the links between parental conversation behaviours and child language development. While it would not be practical or desirable for clinicians to engage in lengthy analysis of transcribed language samples within their routine practice, the finding of the importance of mothers' third, or follow-up, turns, in shaping children's own linguistic and conversational contributions could offer a practical enhancement to current interaction-based therapy, which has - up to now - tended to focus on the immediate connection between the parent's initiation and the child's adjacent response.
The outcomes from this small-scale CA study highlight the potential for ongoing partnerships between specialist researchers and SLTs in order to develop and advance evidence-based interventions for children with language disorder. By considering more routinely the reciprocal nature of conversation and the impact of one turn upon another in building sequences of talk, both practitioners and academics will drive the identification of facilitative and barrier strategies, which could be used to remediate child language difficulties.

There is also potential to inform theories of child language acquisition, in particular later language development, through bottom-up methods which draw upon observations of natural conversations between children and their carers, rather than relying upon lab-based experiments which may not reflect the nature of language learning in its truest and most ecologically-valid form. For example, by examining in fine detail conversations recorded in the home environment, unexpected patterns may emerge from these single cases, thereby inspiring new theories which can later be tested at scale (Nickels et al., 2022). Behaviours and turn construction designs which appear to be facilitative for a particular dyad can be investigated across other participants and groups to determine whether they are associated with better language outcomes for the wider population of children with and without language disorder. Conversely, CA is also uniquely suited to managing the variability across individuals with DLD, allowing aspects of communication to be systematically explored, without averaging and obscuring differences within and between groups (Barnes & Bloch, 2019).

9.6 Clinical implications

In addition to the implications drawn out in previous sections, this project has provided preliminary data, which could support the management of this common and intractable condition for school-aged children and their carers. Findings from both TD and DLD dyads have highlighted a set of key conversational variables, which can facilitate or hinder children's language and communication development. Within the intervention study, both therapy and outcome measurement were targeted at the children’s functional communication, an area which is often overlooked (Croteau et
al., 2015), but which has the potential to impact on both structural language skills and children's ability to participate in everyday conversations and activities at home and at school. Differing results for the six dyads highlight the need for SLTs to tailor their intervention to individual strengths and needs. The next step towards further refinement and wider implementation of the intervention will involve detailed consultation with specialist clinicians, as well as with parents and children who use their services.

Given the enduring impact of poor spoken language on educational attainment, continued research on evidence-based interventions for school-aged children with language disorder is a high priority for both health and education. This is particularly the case in a climate of increasing levels of need and limitations on resources. The potential for training parents to support their children's language and conversation development within a short, cost-effective block of therapy, provides an important additional pathway for managing the needs of older children with DLD, in addition to existing programmes to support vocabulary, narrative and grammar (e.g., Calder et al., 2021; Spencer & Peterson, 2020; Wright et al., 2018). Future work could consider integrating more targeted interventions alongside, or within, the BCC programme, in order to maximise children's progress and generalisation of newly learnt language and communication skills. With much developmental literature focusing on the importance of early language intervention (with pre-school and foundation stage children, e.g., Snowling & Hulme, 2011), this study indicates that primary school-aged children can also benefit from a theoretically-grounded programme targeted at their everyday communication skills.

Additional work will be needed to support generalisation of conversation targets beyond the parent-child dyad. For example, by further developing the idea of sharing 'Top Tips' from BCC with a range of communication partners both within and outside of the child's immediate family. There is also potential for adapting the BCC programme to include work with siblings and friends, as well as education staff. All of this would require ongoing consultation with key stakeholders, backed by funding to cover public patient involvement and associated research costs. Many paediatric therapists have existing training and experience of delivering PCIT approaches within Early Years settings and there is potential to supplement this with short
courses, coaching and supervision, allowing them to extend these skills to work on conversation with school-aged clients. This could be offered as part of their continuing professional development, with time allocated by trusts for clinicians to access online or face-to-face training and resources.

9.7 Limitations of the project

Whilst the researcher sought to incorporate aspects of a feasibility trial within this PhD, further development work with a larger cohort would be required to estimate the parameters for an RCT, e.g., likely means and standard deviations within the target population to support sample size calculations. It would be important to gather information on socio-economic status, which was not formally considered as part of the current study, in order to inform future decisions on candidacy and maximise equity for the BCC intervention. This project compared the response of six parent-child dyads to a new conversation-based intervention, which was conceived and developed by the researcher and her advisory team. The study was limited by time and circumstances, including the Covid-19 pandemic, meaning that it was not possible to recruit a larger number of participants. Findings from the case series, though positive, cannot be generalised to the wider population of children with DLD and their parents, since the sample was drawn from a relatively small geographical area. Children in the study all attended mainstream schools and, with the exception of Child F, showed mild to moderate difficulties with receptive and/or expressive language. Therefore, the participants may not have been fully representative of the wide heterogeneity in profiles of DLD.

A potential concern could be the absence of a control group within the intervention study. However, addressing this would be problematic without recruiting unrealistically large sample sizes, due to the high number of important variables that would require matching, e.g., the children’s receptive and expressive language profiles, the parent’s conversation style and the nature of interactions between child and carer. It would be unethical to intervene with typically-developing controls, who do not require Speech and Language Therapy, particularly where sessions were scheduled to take place during the school day. A crossover design, whereby children in the case series study received another comparator intervention before or after
BCC, was also considered unfeasible due to the additional time needed and difficulty matching the design, delivery and therapy goals.

A future RCT could include a waiting control group as a comparison for receiving BCC therapy. However, this design risks unintended 'Hawthorne' or 'charm' effects as a result of receiving the attention of trained professional (McCambridge et al., 2014). Another possible control condition is ‘usual care’. However, children with DLD in mainstream schools typically receive a mixture of indirect ('universal') intervention or groups run by Teaching Assistants, rather than regular one-to-one sessions with an SLT. Ideally, a control for BCC would involve equivalent time involvement from the both the clinician and parent, working alongside the child on other areas of language or wider aspects of their learning.

The intrinsic variability in conversation data (Perkins et al., 1999) makes it necessary to collect multiple samples in order to identify true patterns, which are occurring independent of extraneous variables, such as topic, emotional status and fatigue. While three conversations were recorded prior to therapy, only two were made afterwards. This reduces confidence that the post-therapy results are truly representative of changes made by the dyads to their everyday communication. Further conversation sampling and longer-term follow up would be necessary to provide more robust measures of change to key variables, such as counts of conversation behaviours, child MLUw and ratio of child-to-adult speech. This follow-up could also include the assessment of quality of life, social and educational outcomes if included as part of a large-scale trial.

Another potential concern with the current study is the lack of consistency regarding the context of conversations that were chosen for video recording. It could be argued that the content of conversations would vary greatly across a typical day of parent-child interaction. For example, recording the conversation straight after the child returns from school may garner more child talk as they share what happened during their class or playtime, versus during mealtimes, when it might be expected that the parent would speak more. One way of ensuring consistency across the families' recording times may be to limit these to mealtimes or bedtimes, which are both relatively universal family contexts in which parent-child interactions occur. Alternatively, periodic samplings of 5-
minute recordings across a day while keeping the timings as consistent as possible across dyads may be an alternative way of increasing the ecological validity of these findings. Nevertheless, the aim of this early-stage study was to capture participants’ everyday talk within its most natural setting, and it was considered important for parents and children to record themselves at times when they felt most comfortable and able to do so (e.g., when the child was relaxed and younger siblings were not present). The conversations collected in this study give an indication of which contexts may be most fruitful to consider in a future trial. Similarities between the MLUw findings captured during TD and DLD conversations and those reported by Rice et al. (2010) suggest that some key variables remain stable across different conversation partners and settings.

A further shortcoming of the study was that blinding of participants was not possible. Participants were, unavoidably, aware of the intervention they were receiving and when they were being recorded and assessed. The researcher carried out all therapy, which she helped to design – meaning that she was not fully impartial to the potential benefits, or detrimental effects, of BCC. She also administered all standardised outcome measures, introducing a further element of potential bias, although this was mitigated by engaging student researchers to score and analyse both formal and informal assessment data. Achieving clinical and personal equipoise is a widely-accepted challenge for most intervention trials (Cook & Sheets, 2011). This could be addressed in future studies by training practising clinicians to deliver the therapy, whilst researchers who are blind to the point of intervention could administer and score pre- and post-therapy assessments. Setting up such a project, with trained interventionists and blind assessors, would require the provision of additional resources, e.g., by external funding bodies and/or the active support and participation of SLT services, as well as coordination of student projects to facilitate the collection and analysis of conversation data.

9.8 Future directions

The project has conceived and provided a preliminary evaluation of the BCC programme, which is still in the early stages of development. Future consultation with key stakeholders, researchers and specialist clinicians will be necessary to refine the
therapy protocol further before it is piloted with more participants. The UK Standards for Public Involvement (2021) could help guide this work, helping to maximise service user involvement. This could include co-production of a manualised therapy resource to be used in the training of SLTs, who would then trial the delivery of BCC within NHS and education settings. A larger-scale case series could then be undertaken, possibly with the long-term aim of progressing to a full-scale RCT. However, there are also some benefits to continuing with the current design, as control is built into the within-participant structure by measuring change across phases of the study. Differences between participants (e.g., language level and conversation style) are therefore not of concern in answering the question of whether change follows intervention.

One difficulty in assessing the conversation skills of children with DLD is the lack of available norms to determine what constitutes a ‘typical’ conversation. This project included data from 22 TD children and their carers to provide a benchmark against which to control the DLD group. A future study could collect and analyse a larger sample of conversations from a range of children across SES groups to establish age-banded trajectories for key conversation variables. As it would not be feasible to transcribe and analyse a large corpus of conversation data by hand, methods of machine learning could be considered to help transform and annotate raw datasets. For example, using Whisper software (available at: https://openai.com/research/whisper) and collaborating with computer science experts to establish solutions to managing large sets of natural conversation data.

A further area to investigate is whether, as with the current project, there are differential effects of the intervention, which may be related to participants’ individual language and communication profiles, or other individual differences. Trialling BCC with a larger range of children and parents would allow statistical analysis of key factors, such as age and clinical severity, to determine whether these have an impact on the outcomes of therapy. It will also be important to consider aspects such as timing and dosage to establish their influence on intervention effectiveness (Frizelle et al., 2021a; Justice et al., 2017). This work could run alongside a detailed consideration of dose form (Frizelle et al., 2021b), aiming to identify which active ingredients and theoretical components contribute to change effected by BCC. This
could lead to a re-evaluation of the programme theory underlying the intervention and a revised logic model, which in turn could guide future refinements to the intervention programme.

9.9 Conclusion

This study was the first to explore the use of a conversation-based intervention, BCC, with school-aged children and their main carers. Case series findings add to the emerging evidence for conversation-based therapy, which up to now has been focused on adults with acquired language disorder. Meanwhile, feasibility results strongly support the further development of the programme, which has the potential to be rolled out clinically by training mainstream SLT providers. The project has extended the use of principles and methods from parent-child interaction therapy to older children, involving them actively in therapy alongside their parents. Positive changes in 5/6 dyads’ conversations were achieved within a clinically realistic time frame and the use of Conversation Analysis provided a detailed view of how language disorder, and targeted use of communication strategies, can impact on everyday interactions. Conversation is the primary context for language use and the main medium through which we learn, express ourselves and participate socially. By supporting children and carers to have ‘Better Conversations’, this programme has the promise to improve language outcomes and to increase children’s access to friendships, education and future life chances.
References

https://doi.org/10.1558/cam.v7i2.95

https://doi.org/10.1037/0022-3514.78.1.53

https://doi.org/10.1037/t05199-000


https://doi.org/10.1080/02687038.2018.1464645


https://doi.org/10.1016/j.ridd.2019.103522


Bishop, D. V. M., Snowling, M. J., Thompson, P. A., Greenhalgh, T., Adams, C., Archibald, L., 
Baird, G., Bauer, A., Bellair, J., Boyle, C., Brownlie, E., Carter, G., Clark, B., Clegg, J., 
Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of 
problems with language development: Terminology. *Journal of Child Psychology and 
Psychiatry and Allied Disciplines, 58*(10), 1068–1080. 
https://doi.org/10.1111/jcpp.12721

parent-child interactions: A systematic review of studies comparing children with 
primary language impairment and their typically developing peers. *Communication 

Bosanquet, P., Radford, J., & Webster, R. (2016). *The teaching assistant’s guide to effective 

Pathways of Specific Language Impairment: What Differentiates Good and Poor 
https://doi.org/10.1111/1469-7610.00799

expressive language impairment: A review. *Developmental Medicine and Child 


Discourse of Normal and Language-Disordered Children. *The Journal of Speech and 
Hearing Disorders, 47*(1), 57–62. https://doi.org/10.1044/jshd.4701.57


Manipulative Therapy, 19(1), 55–57.
https://doi.org/10.1179/106698111X12899036752014

Cooley, M. E., Sarna, L., Brown, J. K., Williams, R. D., Chernecky, C., Padilla, G., & Danao, L. L.
Cancer Nursing, 26(5), 376–386. https://doi.org/10.1097/00002820-200310000-00006

on behalf of the Medical Research Council by.
www.mrc.ac.uk/complexinterventionsguidance

https://doi.org/10.1017/S0305000912000669

https://doi.org/10.1080/02687038.2017.1350629

Life habits of school-aged children with specific language impairment as perceived by their parents and by school professionals. Journal of Communication Disorders, 58, 21–34. https://doi.org/10.1016/j.jcomdis.2015.07.005

https://doi.org/10.1080/02687038.2018.1482406


Behaviour and Communication in Biological and Artificial Systems, 14(2), 190–211. https://doi.org/10.1075/is.14.2.03for


https://doi.org/10.3109/13682828909011945


https://doi.org/10.1146/annurev-psych-113011-143802


https://doi.org/10.2307/414890


https://doi.org/10.1017/S0305000910000760

10.1038/s44159-021-00008-w.


https://doi.org/10.20982/tqmp.08.1.p023

https://doi.org/10.1080/136828200247232


https://doi.org/10.1016/j.cognition.2018.04.007


https://committees.parliament.uk/publications/23246/documents/171671/default/


https://doi.org/10.1002/14651858.CD004110


https://doi.org/10.1016/j.neuropsychologia.2013.07.011

https://doi.org/10.1017/S0142716400008511

https://doi.org/10.1016/0093-934X(87)90126-X

https://doi.org/10.1044/1092-4388(2005/060)


https://doi.org/10.1136/bmj.f3345


https://doi.org/10.1080/09500782.2012.739174

https://doi.org/10.2307/1129336


https://doi.org/10.1177/105381510502800105

https://doi.org/10.1080/02699200210126523

https://doi.org/10.1016/j.pragma.2015.02.003

https://doi.org/10.1111/cdev.12850

https://doi.org/10.1542/peds.2008-2267


### Appendix 3.1: Template for Intervention Description and Replication (TIDieR)

**Checklist for ‘Better Conversations with Children’ (BCC):**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Brief name</strong></td>
</tr>
<tr>
<td></td>
<td>Better Conversations with Children (BCC)</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Why</strong></td>
</tr>
<tr>
<td></td>
<td>The aim of BCC is to improve communication between children with Developmental Language Disorder (DLD) and their main carers, whilst promoting the use of supportive communication strategies to maximise the child’s ongoing language development. This intervention is based on parent-child interaction therapy (Falkus et al., 2016), which is used widely for pre-school children with language needs, and the techniques outlined in the Better Conversations with Aphasia programme (BCA, 2013), which is freely available at: <a href="https://extend.ucl.ac.uk/">https://extend.ucl.ac.uk/</a></td>
</tr>
<tr>
<td></td>
<td>BCC has been refined to meet the needs of primary school-aged children with DLD and their main adult communication partner (CP). The rationale is that by working with both children and their CP, use of jointly-negotiated communication strategies will be maintained for longer as they can be practised during everyday exchanges at home and target both the child with language disorder and the adult.</td>
</tr>
<tr>
<td></td>
<td>The development of BCC has been influenced by a) RCSLT Clinical Guidance on the role of Speech and Language Therapists (SLTs) in supporting children with DLD, including working with parents and facilitating communication in functional settings. BCC emphasises the joint setting of goals during therapy, facilitated by the SLT, acknowledging key principles from the Special Educational Needs and Disability (SEND) Code of Practice (2014), i.e. that ‘parents know their children best’ (p.79) and that both children and carers must be supported ‘in order to facilitate the development of the child or young person and to help them achieve the best possible educational and other outcomes’ (p.19).</td>
</tr>
</tbody>
</table>
Finally, the intervention is underpinned by behaviour change theory, e.g. therapy aims to: provide multiple opportunities for people to reflect on and practise strategies in therapy sessions and home tasks, using video feedback to support participants to gain awareness of the impact of their communication on one another and focus on elimination of barriers as well as implementation of facilitator strategies.

3. **What**

**Materials:**
Each session is accompanied by a session plan, to guide the SLT, outlining specific goals and activities for the session. Participants pre-intervention video-recorded conversation samples will be used to provide clips for video feedback during intervention sessions. These will be filmed on a smartphone or tablet provided by the participant or, where necessary, the Speech and Language Therapist. Handouts and homework sheets have been designed to accompany each session. Additional prompt sheets may be developed with the child and parent during therapy to support them to use specific strategies at home. The following provides a list of handouts and homework sheets used in the sessions:

**Session plan 1: Introduction to Language and Conversation**
- Handout 1: What is conversation about?
- Handout 2: What will happen?
- Session 1 Homebased task: Introduce regular ‘Talk Time’.
- Parent to practise agreed ‘facilitator’ strategy/ies.
- Progress to be recorded on ‘Talk Time’ notes sheet.

**Session plan 2: How conversation works (turns, sequences and actions)**
- Handout 3: Turns in conversation
- Session 2 Home based task: Child to practise facilitative strategy/ies during ‘Talk Time’. Progress to be recorded on notes sheet.

**Session plan 3: Trouble and repair**
- Handout 4: What can go wrong in conversation / ways to fix it?
- Session 3 Homebased task: Parent to practise reducing agreed barrier strategy/ies. Progress to be recorded on notes sheet.

**Session plan 4: Child-led topics of conversation**
- Participants to bring in family photos / favourite books or magazines as topic starters.
- Session 4 Homebased task: Child to practise reducing agreed barrier strategy/ies, e.g. by using replacement strategy. Progress to be recorded on notes sheet.

**Session plan 5: Consolidate child strategies**
- Bespoke handouts, according to child’s identified needs and strategies.
- Toy microphone to play ‘the microphone game’.
- Session 5 Homebased task: Both child and adult to continue practising agreed strategies. Adult to prompt child as necessary to use their chosen facilitators. Progress to be recorded on ‘Talk Time’ notes sheet.

**Session plan 6: Reviewing and moving forward**
- Review videos of early and later sessions to discuss progress towards therapy goals.
- Child and carer to produce ‘top tips for conversation’ poster, with SLT support. Print-out to be shared with school and family, as agreed by the participants.

4. **What**

Procedures: Prior to therapy, the parent and child are asked to record themselves in conversation for at least 5 minutes on three occasions ‘talking as they would normally at home’. These videos are then shared with the SLT (e.g. via an encrypted messaging platform, such as WhatsApp or Signal). Recordings are viewed repeatedly by the SLT in order to identify a selection of possible barriers and facilitators to the dyad’s conversations. During Session 1, the child and their carer are provided with information and education on conversation (what it is and how it works). The dyad is then supported to reflect on video samples of their own conversation (pre-selected by the SLT) to identify behaviours that facilitate or are a barrier to communication. Subsequently, dyads are facilitated to set goals / identify target communication strategies which
they practise during activities, role play and homework tasks. Finally, the dyad is encouraged to share successful communication strategies with others, e.g. teachers, teaching assistants, family and friends.

5. **Who provides**
BCC is designed to be delivered by qualified speech and language therapists who are experienced in working with this population. Ideally, clinicians will have been trained to use parent-child interaction therapy and will have followed the online training modules accompanying the ‘Better Conversations with Aphasia’ intervention program.

6. **How**
BCC is primarily delivered face to face to a child with DLD and their main carer. Both participants are present at all six therapy sessions. Up to two telephone or video conversations may take place in between therapy appointments to answer queries and encourage home practice.

7. **Where**
Sessions are delivered at home or in a quiet room at the child’s primary school, depending on the availability of parents and the school’s ability to provide a suitable space for therapy to take place. Ideally, at least one session will take place at home to ensure that communication is being worked on in its most natural context.

8. **When and how much**
The BCC program consists of six 45-minute sessions delivered over 6 weeks (half a school term). The following provides an overview of the aims of each intervention session:

**Session 1: Introduction to Language and Conversation**

- Discuss aims of therapy
- Discuss and explore what conversation is and what helps
- Initial viewing of their own video/s
- Parent is supported to identify a ‘facilitator’, i.e. something they are doing well to support their child’s conversation
- Introduce ‘Talk Time’ (regular home practice)
- Homebased task: Parent to practise increasing use of their agreed ‘facilitator’ strategy/ies
- Progress to be recorded by the parent and/or child on ‘Talk Time’ notes sheet
**Session 2: How conversation works (turns, sequences and actions)**

- Review progress from ‘Talk Time’
- Problem-solve any difficulties with setting up practise at home
- Discuss how people take turns in conversation (including non-verbal turns)
- View videos to explore how parent and child’s turns work
- Discuss strategies to help turn-building
- Child is supported to select a facilitative conversation strategy/ies
- Home based task: Child to practise their chosen strategy/ies during ‘Talk Time’, with parental support.
- Progress to be recorded on notes sheet.
- Parents encouraged to video at least one ‘Talk Time’ to be reviewed during future therapy sessions.

**Session 3: Trouble and repair**

- Review progress from ‘Talk Time’
- Problem solve any issues that have arisen in using identified strategies in conversations outside of therapy sessions
- Discuss what can go wrong in conversation / ways to fix it
- View videos to reflect on common breakdowns in conversation and times when the conversation progressed smoothly.
- Parent to identify a ‘barrier strategy/ies’, with support from the therapist.
- Discuss what they could do differently to help reduce this behaviour.
- Home based task: Parent to practise reducing agreed barrier strategy/ies during ‘Talk Time’
- Make new video to be viewed during next therapy session
- Progress to be recorded on notes sheet.

**Session 4: Child-led topics of conversation**

- Review progress from ‘Talk Time’
- View videos from home practice sessions to reflect on any positive changes so far.
- Child is supported to identify any ‘barrier strategies’ within their own conversation and what they could do differently.
- Use family photos / favourite books or magazines as topic starters to practice child strategies in conversation.
- Homebased task: Child to practise reducing agreed barrier strategy/ies during ‘Talk Time’, e.g. by using replacement strategy.
- Progress to be recorded on notes sheet.
- Parents encouraged to video at least one ‘Talk Time’ to be reviewed during therapy

**Session 5: Consolidate child strategies**

- Review progress from ‘Talk Time’
- View videos to reflect on any positive changes from last week.
- Bespoke conversation-based games and activities, according to child’s identified needs and strategies, e.g. playing the ‘microphone game’ for turn-taking; using word-webs as prompts for using word-finding strategies or role play to practise asking for help.
- Homebased task: Both child and adult to continue practising agreed strategies. Adult to prompt child as necessary to use their chosen facilitators.
- Progress to be recorded on ‘Talk Time’ notes sheet.
- Parents encouraged to video at least one ‘Talk Time’, if they have not done so previously.

**Session plan 6: Reviewing and moving forward**

- Review progress with ‘Talk Time’
- Watch videos of early and later sessions to discuss progress towards therapy goals.
- Problem solve any issues that have arisen in using identified strategies in conversations outside of therapy sessions
- Child and carer are supported to produce ‘top tips for conversation’ poster, to be shared with school and family members, as agreed by the participants.

### Tailoring

Individualised therapy is core to BCC. The programme is designed to be tailored for each child with DLD and their main carer / conversation partner) as follows: The approach makes use of video samples of their everyday conversation recorded before and during the intervention. These samples permit the SLT to assess the dyad’s communication strengths.
and difficulties in order to plan therapy sessions. The use of video feedback also allows participants to reflect on their own conversation style and to set goals i.e. target communication strategies, which they practise during activities, role play and homework tasks. Additional games, activities and visual prompts may be used with children to encourage explicit practice of their identified facilitators within conversation during therapy sessions. These activities and resources are selected according to what motivates the child and what level of support they benefit from to maximise their communicative participation.

10. **Modifications**
   Following consultation with our clinical and wider advisory group, the intervention protocol was modified in order to increase time spent on supporting children to practise their strategies within conversation during therapy, as well as at home. Additional games and role play activities were added to maximise children's engagement (see Session 5). No major changes to the intervention structure, procedures or delivery were made.

11. **How well**
   Planned: This will be assessed in a future study, investigating implementation fidelity for BCC when delivered with a wider participant group, administered by trained clinicians working in mainstream schools. Adherence will be assessed using clinician’s notes following each intervention session, as well as a fidelity checklist which will be completed by an independent researcher. The researcher will analyse a random sample of 20% of video recordings of all therapy sessions once the study is completed. Inter-rater reliability will be established by comparing the scores of a second researcher, who will analyse a subset of 20% of the fidelity data.
Appendix 3.2: Blank 'Talk Time' record sheet

Talk Time record sheet

Target for talk time:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic / activity</th>
<th>Comments about target</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In one sentence, please write down what you have learnt from this week’s Talk Time:
**Appendix 3.3: Completed 'Talk Time' record sheet**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic / activity</th>
<th>Comments about target</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/11/19</td>
<td>Gymnastics</td>
<td>The conversation was very varied. I made statements about my own moves and I asked about how she learned to do handstands in the pool or gym. This made the conversation more to the point of things about school. We got on well.</td>
</tr>
<tr>
<td>12/11/19</td>
<td>Today at school</td>
<td>We talked about her day at school and about the other things that she had wanted to tell me about gymnastics but I was ten and we talked about the pool.</td>
</tr>
<tr>
<td>13/11/19</td>
<td>Tomorrow</td>
<td>We had a good time and we talked about her favourite things.</td>
</tr>
<tr>
<td>14/11/19</td>
<td>Autumn and Write</td>
<td>We went on a walk in the park. She remembered a walk in the snowy woods where we made a snowman and we had a great time.</td>
</tr>
<tr>
<td>16/11/19</td>
<td>Shopping</td>
<td>I explained all the things we needed to buy.</td>
</tr>
</tbody>
</table>

In one sentence, please write down what you have learnt from this week's Talk Time:

Less questions, more statements and comments allows to explore loads more things.
Top tips for talking with B

1. Give me plenty of time to find my words and answer your questions

2. If I’m stuck, please remind me to try saying it another way, e.g. with actions, gestures or drawing

3. Use visual supports, e.g. pictures or symbols, to help me understand and follow what you want me to do

4. Please don’t ask me lots of questions at once, as it confuse me
Appendix 4.1: Guidance notes for barrier and facilitator counts.

General points:

- It is possible for the same (or different) strategies to occur more than once within an individual turn.
- It is important to use the rationale behind the therapy to inform the way we classify and code for each dyad. When working with DLD dyads who participated in the BCC intervention, use each dyad’s individual targets to underly decision making.

Test questions:

According to unpublished guidance notes from The Aphasia Conversation Measure (ACM; Beeke, Best et al, personal communication), a test question is one where the Conversation Partner (CP) ‘already knows the answer and is ‘testing' the [person with communication difficulties], either to get them to talk, and/or to keep the conversation going.’ The ACM notes state that a test question is often easy to spot by its content (e.g.: ‘Tell me the names of your sisters’) or because it is followed up by the CP cueing production of a specific name or content word (e.g.: ‘One begins with K-’).

Sometimes the CP may try to ‘disguise’ a test question by using a phrase like: ‘Do you remember?’ For example: ‘Do you remember where you go on Wednesdays?’ This may look like the conversational action of reminiscing, but it is not ‘real’ reminiscing (compare it with: ‘D’you remember when we stayed in that horrible hotel in Brussels?’), which launches the joint telling of a shared experience, to which either conversation partner can contribute. A test question with ‘Do you remember X’ is characterised by the fact that it puts the child ‘on the spot’ as the provider of the answer – there is no shared remembering taking place, and the control of the conversation and thus the power, lies firmly with CP. If the CP produces a sequence of repeated test questions, count each one separately.
Within BCC, a test question clearly occurs when the parent goes on to answer her own question. At other times, this classification is less clear cut, e.g., does the Mother definitely know what her child had for breakfast, or that his favourite part about Center Parcs is the yellow slide? Therefore, likely test questions (given the context / structure of the conversation and their function of putting the child on the spot) are included in the test questions count, as a best attempt at capturing the dyad’s interactional patterns.

Recasting:

A recast, as described by Saxton (2005), is where a more experienced speaker responds to what a child says by expanding, deleting, or changing their utterances while maintaining the original meaning. In this sense, recasting is linked to the CA concept of repair (Radford & Mahon, 2012), i.e. supporting the child in hearing how close their word or sentence is to the accurate one – leading them to re-attempt with success the next time (other-initiated self-repair). However, within BCC, a broader definition of recasting is adopted to capture instances where a carer feeds back and extends what the child is saying – not necessarily to correct them, but to respond to the child’s communicative attempts and acknowledge what they have said, whilst providing some enhanced linguistic input. This is known as a ‘growth recast’ (Krasnegor et al., 1991), i.e. adult modifications of child language, even when there wasn’t an error – to step it up to a new grammatical construction, which they haven’t yet learned.

NB: A decision was made to code only consecutive instances. So this parental facilitator can be specified as ‘repeating back or paraphrasing the child’s prior turn’. Mothers’ utterances must include at least one content word (or meaningful gesture) used by the child in his prior turn. Instances where the mother uses recasting to link back to a non-consecutive turn will not be counted, due to the difficulty in obtaining agreement for this, though it is acknowledged that this behaviour may help re-establish the topic and direction of conversation if it has gone adrift.
Forced choice questions:

Forced choice is a format of question that requires respondents to select from a limited range of possible answers, e.g.: 'Do you want milk or water?'. The response will be based on making a judgment about each response option offered by the person asking the question. Example forced choice questions include:

M: Were you allowed to run around and play games, or did you all have to sit down?

M: Do you have to throw it at people and they have to try and catch it or run somewhere?

NB A forced choice question is not the same as a yes/no question, e.g.: 'Do you like it?' It makes the respondent choose a response option that indicates a definitive opinion (and eliminates don't know / neutral responses) because they are designed to force respondents to express an opinion or attitude.

Contingent comments:

'Contingency' is the act of responding moment by moment to what a child has just said or done (Bosanquet, Radford & Webster, 2015).

Contingent commenting is a commonly used technique within PCIT programmes – including in the Falkus et al. (2016) paper. It refers to a style of communication where a parent talks about objects or actions within the child’s current focus of attention (Landry, Smith & Swank, 2006). Within BCC, this is extended to include 'semantic contingency' - talking about something relevant to the prior conversation. Semantic contingency encompasses the idea of the parent 'following the child's lead' (Snow 1979; 1986). She reviews numerous studies providing evidence that this interaction strategy facilitates language acquisition (1979, 1986). Other examples of contingent commenting serve to launch the joint telling of a shared experience, to which either conversation partner can contribute (see examples, below).
Commenting also has the advantage of providing an alternative strategy to the frequent questioning behaviour, which is common in conversations between adults and children with language disorder. From a CA perspective, comments can open up the conversational floor, as there is no ‘preferred response’ projected, in contrast to test questions, which limit the child's turn to a known answer, or don't know, response.

Within BCC, it was agreed that some comments with a tag question on the end would be included in the counts, provided that they continue, rather than disrupt, the flow of conversation, e.g.:

M: Cause it was really cold, wasn't it?
B: Cause I did not wanted to like go.

M: And the air was cold, wasn't it? But the water was warm.
B: And I was like freezing, wasn't I?

If the child had just responded with a 'yes' or 'no', this would not be coded as a contingent comment - because the child would have treated it as a question (next turn proof procedure).

Parent evaluations of what a child has just said, e.g.: 'very good' were not classified as a contingent comment, as they do not contain nutritive input, which is likely to aid the child's language development.

Commands / imperatives, such as 'Sit still', were also excluded from the contingent comments category.

**Minimal turns:**

Definition from Profile of Word Errors and Retrieval in Speech (POWERS; Herbert, Best, Hickin, Howard & Osborne, 2013):

‘Does not contribute meaningfully and hands conversation back to conversation partner’, e.g. “mmm”, “oh”, “I see”. 
Within BCC, the following examples were NOT classified within this category: 'Is there anything else you wanna tell me?'; 'Oh did you?' because they were framed as questions and therefore do not pass the turn back to the child in a neutral way.

**Full POWERS definition:**

A minimal turn is a turn which does not contribute meaningfully to the conversation, and serves only to hand the conversation back to the other speaker. Typically such turns are composed of tokens such as mmm, oh, yeah, I see, alright, OK, oh dear, I know, I don’t know etc. Combinations of such items within one turn constitute one minimal turn.

**Exclusions:**

If other lexical items occur, this is then not a minimal turn.
Where such items are used to initiate repair, e.g. Eh? this is not a minimal turn.
Where 'Yes', 'No' etc are used to answer a question, this does not constitute a minimal turn.
Where 'Yes', 'No' etc are used to affirm previous speaker’s repair attempt, this is also not a minimal turn.

**References:**
The Aphasia Conversation Measure (Beeke, Best et al, personal communication)


Appendix 4.2: Calculating MLUw in conversation guidance notes.


Calculate MLUw to two decimal places.

In addition, see ACM (Beeke, Best et al, personal communication) for times when two of the child's turns may be joined together, e.g., when they complete an utterance across two separate turns, with the parent using a minimal turn in between.

Owens (2008) states that:

‘An utterance may be a sentence or a shorter unit of language that is separated from other utterances by a drop in the voice, a pause and/or a breath that signals a new thought’.

We generally exclude partial utterances (following Bishop, 2004), but there are often incomplete utterances in conversation. In some circumstances, we may include an incomplete utterance - if relevant and seems to be understood and accepted by next speaker (next turn proof procedure).


Exclude fillers, e.g. um-m, ah-h, oh. Within BCC, 'like' was also excluded when it appeared as a non-content word within a sentence, e.g. 'like some like water of like blue'.

But include exclamations which are used as a content word, e.g. 'wow', 'oh' (and 'like' when it is used meaningfully to compare one thing with another).

Other decisions made by the project team:
Keep ‘Yeah but’ sentences together, rather than splitting ‘yeah’ and then ‘but …’ into two separate utterances,

A decision was made to include numbers and phonemes in the MLUw counts.

From SALT Software guidelines on segmenting and analysing children’s connected speech samples (based on Hughes, McGillivray, and Schmidek (1997), Loban (1976) and Strong (1998):

Yes/No responses or affirmations:

If a question or intonation prompt is posed, segment the yes/no response from the subsequent utterance when succeeded by a complete utterance. Examples:

E Is that the Spanish teacher?
C No.
C That's my science teacher.

If a question or intonation prompt is posed, do not segment the yes/no response to stand alone when followed by an incomplete utterance. Example:

E Do you have any pets?
C Yeah, a dog.

If an utterance begins with an affirmation or starter, and does not follow a question or prompt, do not segment the affirmation/starter from the subsequent words, e.g.:

E I like dogs.
C Yeah, I do too.

E That sounds interesting.
C Yeah it was.

C It was really fun.
C Yeah we had such a great time.

**Tags:**

Do not segment phrases such as 'you know', 'I guess' and 'I mean' when these are used as tags. For example:

C He's gonna live with his Dad, I guess.

C And then, you know, they were going to this town.

Additional notes from student projects (points discussed during training period and agreed before student was given data to code independently):

A child’s repetition of what the adult has said is included in MLUw segmentation, e.g.

Mother: “What did we do this Sunday?”
Child: “I can’t remem…”
Mother: “We went for a big walk…”
Child: “A big walk and”
Mother: “In Horton”
Child: “In Horton”

If a child repeats himself within two separate turns, with the Mother commenting in between, these utterances would be included, e.g.

Mother: “So Saturday, Daddy had to go to work, didn’t he?”
Child: “Yeah”
Mother: “So we stayed in.”
Child: “Yeah”

Consecutive words that are repeated exactly are excluded from MLUw count, e.g.

Child: “You have a nice birthday, love love love, from [name]”
Appendix 5.1: Parent information sheet

Better Conversations

with children

A project for typically developing children and their main carers.

Name and Contact Details of the Researchers:

Lucy Hughes
Chandler House, Wakefield Street, London WC1N 1PF
Email: 
Tel:

Information Sheet

YOU WILL BE GIVEN A COPY OF THIS TO KEEP

1. Invitation
   You and your child are being invited to take part in a research project. Before you decide what to do, it is important to understand:
   
   • Why this research is being done?
   • What will happen if my child and I take part?

   Please read this sheet carefully. You can talk about it with others. Ask us if there is anything that you don’t understand or would like to know more about.

   Take your time to decide whether or not you want to take part.

   Thank you for reading this.

2. What is the point of the project?
   To collect and analyse conversational data between typically developing children and their main carers. Our aim is to identify patterns within everyday talk, to help us understand how children’s language and conversation skills typically develop. These findings will be compared with the conversations of a second group of children with language difficulties and their parents / carers, in the hope of identifying key differences within
their interactions. These findings will help us develop a new conversation-based therapy programme for children with language disorder and their conversation partners.

At the start of the study, your child will take part in a language assessment to check that their understanding and use of language is developing normally. We will then ask you to make two short videos of you and your child playing and talking together lasting between 5 and 10 minutes in length. This can be done at home on a mobile phone or tablet. The data will be analysed to identify patterns such as the length of time each person speaks, as well as specific strategies that either help the flow or seem to be getting in the way of your everyday conversations.

You will also be offered a copy of your video files to keep as well as the results from the language assessment.

3. Why has my child been chosen?
We are looking for 20 children, aged 4-8 years, and their main carer, to take part in the study.

We are looking for children who:

- Have no identified difficulties with talking or understanding language (sometimes called Developmental Language Disorder).
- Have no trouble in everyday conversation, like frequently getting stuck on their words, not taking turns or not sticking to the topic.
- Have English as a main language
- No other difficulties that may affect their language or learning, such as Autism or ADHD.

4. Do I have to take part?
No. You should only say ‘yes’ if you want to - there will not be any problem if you decide not to take part.

If you do choose to take part, we will ask you and your child to sign a consent form and you will be given this information sheet to keep. You can still decide to stop at any time without giving a reason. If you do decide to stop part way through the study, you will be asked what should happen to your videos and other information you have given us.
5. What will happen to me if I take part?

Data collection:
You will be asked to record between 5 and 10 minutes of your everyday conversation with your child on two separate occasions. The recordings will take place six weeks apart so that we can measure any change that takes place over this period.

Publishing our results:
When we finish our research with all the children and their carers in September 2022, we would like to publish our findings in professional articles, talks and on our website. But we will not use the real names of anyone taking part. Instead, you and your child will be given false initials.

The last point when your data can be taken out of the study is September 2023. At the end of the project, we will ask whether you would be happy to be contacted by UCL researchers to take part in future studies.

6. Will I be recorded and how will the recorded media be used?
The recordings of your conversations made during the research will be used only according to your consent, either:

• for studying our results only  OR
• for both research and teaching/training purposes OR
• for research, teaching and to share with other researchers/professionals (e.g., giving examples in conference presentations)

No other use will be made of your recordings and no one outside the project will be allowed access to the videos unless you give written consent.

7. What are the possible downsides of taking part?
There are no potential adverse effects or risks for any children taking part in the study.

To protect children involved in the project, the researcher and any students or other research staff in contact with them will have Enhanced Disclosure and Barring Service certificates (police checks). We will follow the rules of
the British Educational Research Association, British Psychological Society and UCL when carrying out our research.

The data collected will be kept and used according to the Data Protection Act, to make sure it is safe.

8. **What are the possible benefits of taking part?**

We hope that taking part in the research will be fun and your child will receive a language ability assessment, the results of which will be shared with you. However, we do not expect any direct benefits of taking part in the research. Our wider findings from the project will provide us with a baseline, against which we will compare data from children with language difficulties and their main carers. This will help us to understand more about how language difficulties can affect school-aged children in their everyday lives in order to develop a therapy programme for children who need help with their conversation skills. We hope information from the study will also help future researchers, as well as other parents and teachers. If we are able to improve children’s language and conversation, this may also help them with their friendships and schoolwork.

9. **What if something goes wrong?**

   If you have any complaint about the researcher or anything to do with the project, you should first contact:

   **Professor Wendy Best:**
   Principal Investigator,

   **Email:**
   **Tel:**

   If you are still unhappy, you can email the Chair of the UCL Research Ethics Committee: [ethics@ucl.ac.uk](mailto:ethics@ucl.ac.uk)

10. **Will my taking part in this project be kept private and confidential?**

    All the information that we collect about you and your child during the course of the research will be kept strictly confidential. Data will be collected and stored according to the Data Protection Act 2018. At the start of the project, we will create an anonymous code for everyone who takes part. When we label files or publish any information about the project, we will always use these false initials, never your real names.
‘Raw data’, such as assessment forms, will be kept safe in a locked filing cabinet at UCL. Video files will be ‘encrypted’ (changed into digital code), so that no one else can see them. They will be backed up regularly on two external hard drives.

All other electronic information, such as assessment scores, will be stored in password-protected documents. We will also: lock all computer systems with a password; make sure computer software and virus protection is up-to-date. We will not send personal or confidential data via email or other file transfer unless they are encrypted.

Please note: The information we collect about your child may be checked by UCL to make sure that the research is being conducted properly. We will ask whether you agree with how we will keep and use recordings of your child in the project consent form.

11.Limits to confidentiality
As we have said above, we will keep all information about you and your child private and confidential, unless during our work together the research team hear anything which makes them worried that someone might be in danger of harm. In this case, we may have to inform relevant agencies, following legal and professional guidelines.

12.What will happen to the results of the research project?
At the end of the ‘Better Conversations’ study (September 2022), the results will be presented in the researcher’s PhD write-up. Early findings from typically developing children and carers may also be included in an Integrated Masters research project. We also hope to share what we have learnt more widely in professional research publications, within talks and on our project website. You will be able to get a copy of the published results within a year of the study ending (by September 2023). As we have said above, people who take part in the study will not be named personally in any report or publication about the study.

As part of our consent form, children and parents who take part in the project will be offered a range of choices about how long we may store your individual information – in particular video files – and whether we may share it with others. These choices will include only letting the research
team see the data; using it for teaching and student projects; for public presentations and for other research.

13. Data Protection Privacy Notice

The data controller for this project will be University College London (UCL). Your personal data will be used for the reasons given above, based your consent form.

If you are concerned about how your personal data is being processed, please contact the UCL Data Protection Office at

UCL’s Data Protection Officer is XX and he can also be contacted at XX

If you are still unhappy, you can contact the Information Commissioner’s Office (ICO). Details are on their website: https://ico.org.uk/for-organisations/data-protection-reform/overview-of-the-gdpr/individuals-rights/

This ‘local’ privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our ‘general’ privacy notice:

For participants in health and care research studies, click here

The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the ‘local’ and ‘general’ privacy notices.

The categories of personal data used will be as follows:

Pseudonym (false name or code letter)
Child’s date of birth

The lawful basis that would be used to process your personal data will be: performance of a task in the public interest.

Your personal data will be processed so long as it is required for the research project. If we are able to anonymise or pseudonymise the personal data you provide we will do this and will try to minimise the processing of personal data wherever possible.

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk.
14. Who is organising and funding the research?
   The ‘Better Conversations with Children’ study is paid for by the Economic and Social Research Council (ESRC) through the UCL, Bloomsbury and East London Doctoral Training Partnership (1 + 3 pathway).

15. Contact for further information

   Please ask if there is anything about the project that is not clear or if you would like more information. Our contact details are:

   Professor Wendy Best, Lucy Hughes, [Contact Information]
   UCL Division of Psychology and Language Sciences
   Chandler House
   2 Wakefield Street
   London WC1N 1PF
   Tel:
   Email:

   Thank you for reading this information sheet and for considering whether to take part in our research study.
Conversation Project

Dear ________________________

My name is XX (EDIT BEFORE PRINTING). I am a Master’s student studying Speech and Language Sciences at UCL.

I would like to invite you to help with my research.

I want to understand more about everyday conversation between children (age 4-8) and the adults who care for them.

What will happen?

We will ask you and your care giver to record two short videos of your everyday conversations. 6 weeks apart.

You can tell your caregiver to stop any time if you need to.

Why should I take part?

This project might help other children.
You will get a Certificate for your important part in this project.

What next?

You decide if you want to take part. Tell your caregiver if you want to do it.
CONSENT FORM FOR PARENTS AND CARERS TO PARTICIPATE WITH THEIR CHILD IN RESEARCH STUDY

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Better Conversations with children

A project for typically developing children and their main carers

UCL Research Ethics Committee Approval ID Number: 2981/003

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

I confirm that I understand that by ticking/initalling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initalled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>*I confirm that I have read and understood the Information Sheet for the ‘Better Conversations with Children’ study. I have had the chance to consider the information and what will be expected of me and my child. I have also had the chance to ask questions, which have been answered to my satisfaction. <em>I would like my child and myself to take part in an assessment of my child’s language and conversation skills, which will help us understand your child’s ability to understand and use language, including video recordings of conversations between you and your child.</em></td>
</tr>
</tbody>
</table>
| 2. | *I understand that I will be able to withdraw our data up to: September 2021*
| 3. | *I consent to the processing of my personal information, including assessment and video data, for the reasons explained to me. I understand that this information will |
be handled according to all relevant data protection laws. I understand that according to data protection legislation, ‘public task’ will be the lawful basis for processing.

4. **Use of the information for this project only**
   *I understand that all personal information will remain confidential and that all efforts will be made to make sure I and my child cannot be identified.

   I understand that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify us in any publications.

   I request that my comments are presented anonymously with no mention of my role/affiliation.

5. *I understand that my information may be reviewed by responsible people from the University (including the project funders, the Economic Social and Research Council) for monitoring and audit purposes.

6. *I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, [without the care I receive or my legal rights being affected].

   *I understand that if I decide to withdraw, any personal data I have provided up to that point will be deleted unless I agree otherwise.

7. I understand the potential risks of participating and the support that will be available to me and my child should I become distressed during the course of the research.

8. I understand the potential direct/indirect benefits of participating.

9. I understand that the project data will not be made available to any commercial organisations and is solely the responsibility of the researcher(s) undertaking this study.

10. I understand that I will not benefit financially from this study, either now or in the future.

11. I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. Yes/No

12. I consent to my therapy sessions being audio/video recorded and understand that the recordings will be used:

    **EITHER**
    - By the project team (including approved UCL students) only. When they have finished their work a year after the project completion date in September 2022 the recordings will be destroyed.

    **OR**
    - Stored anonymously, using password-protected software and will be used for teaching, quality control, public presentations audit and specific research purposes beyond the life of the project.

    *Please initial one statement only to show how you would like your video recordings to be used*

13. I agree that my anonymised and/or pseudonymised research data (other than the audio/video recordings), e.g. assessment results, may be used by others for future research.

14. I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet and explained to me by the researcher.

15. I hereby confirm that:

    (a) I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher; and
(b) I do not fall under the exclusion criteria.

16. I have informed the researcher of any other research in which I am currently involved or have been involved in during the past 12 months.

17. I am aware of who I should contact if I wish to lodge a complaint.

18. I voluntarily agree for myself and my child to take part in this study.

If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.

<table>
<thead>
<tr>
<th>Yes, I would be happy to be contacted in this way</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, I would not like to be contacted</td>
</tr>
</tbody>
</table>

Name of participant _________________ Date _________ Signature _________________

Researcher _______________________ Date __________ Signature ________________

Name and Contact Details of the Researcher: Lucy Hughes

UCL Division of Psychology and Language Sciences
Chandler House, Wakefield Street, London WC1N 1PF
Email:

Name and Contact Details of the Principal Researcher: Professor Wendy Best

Email: Tel:

Name and Contact Details of the UCL Data Protection Officer:
My name is ________________________________

I would like to take part in the Children’s Conversation Project

Yes [ ] No [ ]

I understand that I can change my mind at any time

Yes [ ] No [ ]

I am happy to be videoed as part of the project

Yes [ ] No [ ]

I am happy to be audio-recorded

Yes [ ] No [ ]
I am happy let others see clips of my videos (for research or teaching).

Yes [ ] No [ ]

I would like a copy of my videos to be kept after the study.

Yes [ ] No [ ]

Thank you for thinking about taking part in our research.
Child and family history form

Child’s name: ______________________________________________________

Birth date: _______________________________________________________

Parent/s or carer/s’ names
__________________________________________________________________

Child’s school: __________________________ School Year: ____________

Background information

What are your child’s main strengths?
__________________________________________________________________
__________________________________________________________________

What do they find most difficult?
__________________________________________________________________
__________________________________________________________________

What are their favourite interests / activities?
__________________________________________________________________

Does your child have any other developmental difficulties, aside from with language, e.g.
  • Autism
  • Dyspraxia
  • Behavioural difficulties
  • Learning difficulties (please give details)
  • Stammer
- Dyslexia
- Other (please give details)

Has your child had any history of ear infections? Yes / No
If yes, please give details here:

Does your child have any current difficulties with hearing or vision? Yes / No
If yes, please give details here:

Has your child ever been seen by a Speech and Language Therapist?: Yes / No
If yes, what was the outcome of the assessment? Please give details.

Has your child ever received any speech and language therapy, e.g.
- Language groups
- Parent-child interaction therapy
- Speech sound therapy
- Other (please give details)

What language(s) are spoken at home?

Language(s) spoken by your child?

If more than one language, what age did your child start to hear each language regularly? (e.g. Spanish since birth; English since starting nursery at 3 years). Please give details here

If your child speaks more than one language, which of these is easiest for them to understand and use?
Please comment on any family history that you feel may be significant e.g., any history of reading, speaking, hearing or coordination difficulties in the family?

___________________________________________________________________

___________________________________________________________________

Conversation skills:
Do you experience any of the following when in conversation with your child (please tick if any of the following apply):

I sometimes have trouble understanding what my child is saying:  
My child sometimes has trouble understanding me:  
One person usually talks a lot more than the other (please state who does most of the talking):  

__________________________________________________________________

My child rarely starts the conversation or topic:  
My child has difficulty sticking to the topic of conversation:  
My child sometimes has word-finding difficulties (getting stuck on a word he/she wants to say)  

In general, which of these applies most often to your child (please circle):

My child is generally chatty / usually quite quiet.

My child is happy to talk / gets frustrated trying to talk.

Any other comments:

___________________________________________________________________

___________________________________________________________________

Thank you for taking the time to complete this form.
Appendix 5.6: Advice on making video recordings for BCC.

Better Conversations
with children

Top tips for making your videos together:

Thank you for Participating in our ‘Better Conversations with Children’ project. Here are some top tips to help you when recording your videos together with your child.

Setting up for the recording:

• Turn off any background noise or distractions e.g. T.V. or radio.

• Can be recorded on mobile phone or with a video camera or tablet.

• Prop up your recording device to make sure both you and your child can be seen and heard throughout the video, you can use books or boxes to help with this.

Please make sure the videos are:

• 5-10 minutes in length

• Both Child and Carer/Parent must be audible throughout the recording.

• The video should be of the main carer/parent and their child’s everyday conversations.

• Topics could include but are not limited to:

  - What the child did in their day.
  - What holidays you have been on or plan to go on together.
  - The child’s interests for example their favourite TV show, sport, food, movie, book or game
  - Plans for the weekend

• Video recordings to be sent to Lucy Hughes via an encrypted service, such as WhatsApp, Signal or Wire. They will then be transferred onto a secure, encrypted hard drive.

If you have any questions, please do contact me on:
### Appendix 5.7: Raw data for TD conversation behaviour counts

<table>
<thead>
<tr>
<th>Dyad</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
<td>T2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>17</td>
<td>1</td>
<td>2</td>
<td>15</td>
<td>9</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>2</td>
<td>13</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>8</td>
<td>15</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>4</td>
<td>13</td>
<td>22</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td>16</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>7</td>
<td>5</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>16</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>17</td>
<td>2</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>14</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>16</td>
<td>5</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>15</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>15</td>
<td>4</td>
<td>12</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>14</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>25</td>
<td>17</td>
<td>17</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>4</td>
<td>12</td>
<td>18</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>8</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>16</td>
<td>12</td>
<td>7</td>
<td>11</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>9</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>17</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>13</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>9</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>3</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>19</td>
<td>4</td>
<td>3</td>
<td>40</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>19</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>4</td>
<td>4</td>
<td>9</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>19</td>
<td>22</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**T1: Time 1, T2: Time 2**

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recasting / repeating back</td>
<td>Contingent commenting</td>
<td>Giving clear explanations of words or concepts</td>
<td>Test questions</td>
<td>Forced choice questions</td>
<td>Adult minimal turns</td>
<td>Pauses of 2 seconds or more</td>
<td>Asking for clarification or repetition</td>
<td>Saying things another way when stuck</td>
<td>Using gestures or acting out to help communicate</td>
<td>Non-verbal emblems</td>
<td>Giving up when stuck on a word</td>
<td>Child minimal turns</td>
<td>Child single word turns</td>
</tr>
</tbody>
</table>
### Appendix 5.8: Raw data for TD mean length of utterance in words (MLUw)

<table>
<thead>
<tr>
<th>Dyad</th>
<th>MLUw Time 1</th>
<th>MLUw Time 2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4.44</td>
<td>4.22</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7.15</td>
<td>5.94</td>
<td>6.55</td>
</tr>
<tr>
<td>2</td>
<td>3.86</td>
<td>4.62</td>
<td>4.24</td>
</tr>
<tr>
<td>3</td>
<td>4.58</td>
<td>5.1</td>
<td>4.84</td>
</tr>
<tr>
<td>4</td>
<td>6.52</td>
<td>4.67</td>
<td>5.60</td>
</tr>
<tr>
<td>5</td>
<td>5.19</td>
<td>4.19</td>
<td>4.69</td>
</tr>
<tr>
<td>6</td>
<td>2.3</td>
<td>4.29</td>
<td>3.30</td>
</tr>
<tr>
<td>7</td>
<td>5.48</td>
<td>4.17</td>
<td>4.83</td>
</tr>
<tr>
<td>8</td>
<td>3.33</td>
<td>4.96</td>
<td>4.15</td>
</tr>
<tr>
<td>9</td>
<td>5.17</td>
<td>2.69</td>
<td>3.93</td>
</tr>
<tr>
<td>10</td>
<td>5.52</td>
<td>7.17</td>
<td>6.35</td>
</tr>
<tr>
<td>11</td>
<td>3.58</td>
<td>3.81</td>
<td>3.70</td>
</tr>
<tr>
<td>12</td>
<td>8.05</td>
<td>5.21</td>
<td>6.63</td>
</tr>
<tr>
<td>13</td>
<td>6.2</td>
<td>5.51</td>
<td>5.86</td>
</tr>
<tr>
<td>14</td>
<td>4.71</td>
<td>7.16</td>
<td>5.94</td>
</tr>
<tr>
<td>15</td>
<td>3.85</td>
<td>5.65</td>
<td>4.75</td>
</tr>
<tr>
<td>16</td>
<td>4.07</td>
<td>4.28</td>
<td>4.18</td>
</tr>
<tr>
<td>17</td>
<td>5.91</td>
<td>3.82</td>
<td>4.87</td>
</tr>
<tr>
<td>18</td>
<td>3.85</td>
<td>6.66</td>
<td>5.26</td>
</tr>
<tr>
<td>19</td>
<td>4.5</td>
<td>4.75</td>
<td>4.63</td>
</tr>
<tr>
<td>20</td>
<td>5.88</td>
<td>6.36</td>
<td>6.12</td>
</tr>
<tr>
<td>21</td>
<td>4.95</td>
<td>5.69</td>
<td>5.32</td>
</tr>
<tr>
<td>22</td>
<td>4</td>
<td>4.44</td>
<td>4.22</td>
</tr>
<tr>
<td>Group mean</td>
<td>4.94</td>
<td>5.05</td>
<td>5.00</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.35</td>
<td>1.14</td>
<td>0.95</td>
</tr>
</tbody>
</table>
## Appendix 5.9: Raw data for TD child-to-adult ratio of speech scores

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Time child spoke</th>
<th>Time adult spoke</th>
<th>Ratio C:A speech</th>
<th>Time child spoke</th>
<th>Time adult spoke</th>
<th>Ratio C:A speech</th>
<th>Mean ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>109.5</td>
<td>76.5</td>
<td>1.44</td>
<td>98.5</td>
<td>94</td>
<td>1.05</td>
<td>1.25</td>
</tr>
<tr>
<td>2</td>
<td>157.5</td>
<td>76.5</td>
<td>2.06</td>
<td>108</td>
<td>89</td>
<td>1.21</td>
<td>1.64</td>
</tr>
<tr>
<td>3</td>
<td>108</td>
<td>94.5</td>
<td>1.14</td>
<td>97</td>
<td>111.5</td>
<td>0.87</td>
<td>1.01</td>
</tr>
<tr>
<td>4</td>
<td>67.5</td>
<td>162</td>
<td>0.41</td>
<td>121.5</td>
<td>103.5</td>
<td>1.17</td>
<td>0.79</td>
</tr>
<tr>
<td>5</td>
<td>155</td>
<td>70</td>
<td>2.21</td>
<td>93.5</td>
<td>103.5</td>
<td>0.9</td>
<td>1.56</td>
</tr>
<tr>
<td>6</td>
<td>127.5</td>
<td>84</td>
<td>1.52</td>
<td>108</td>
<td>101.5</td>
<td>1.06</td>
<td>1.29</td>
</tr>
<tr>
<td>7</td>
<td>33.5</td>
<td>103.5</td>
<td>0.32</td>
<td>60</td>
<td>100.5</td>
<td>0.6</td>
<td>0.46</td>
</tr>
<tr>
<td>8</td>
<td>195.5</td>
<td>49.5</td>
<td>3.95</td>
<td>141</td>
<td>97</td>
<td>1.45</td>
<td>2.70</td>
</tr>
<tr>
<td>9</td>
<td>100</td>
<td>62.5</td>
<td>1.6</td>
<td>100.25</td>
<td>83</td>
<td>1.21</td>
<td>1.41</td>
</tr>
<tr>
<td>10</td>
<td>146.5</td>
<td>123.5</td>
<td>1.19</td>
<td>68.75</td>
<td>170.25</td>
<td>0.4</td>
<td>0.80</td>
</tr>
<tr>
<td>11</td>
<td>204.75</td>
<td>66</td>
<td>3.1</td>
<td>211</td>
<td>51.25</td>
<td>4.12</td>
<td>3.61</td>
</tr>
<tr>
<td>12</td>
<td>83.5</td>
<td>148.5</td>
<td>0.56</td>
<td>97</td>
<td>131.5</td>
<td>0.74</td>
<td>0.65</td>
</tr>
<tr>
<td>13</td>
<td>170</td>
<td>65.5</td>
<td>2.6</td>
<td>112.75</td>
<td>141</td>
<td>0.8</td>
<td>1.70</td>
</tr>
<tr>
<td>14</td>
<td>145.5</td>
<td>108.5</td>
<td>1.34</td>
<td>105</td>
<td>150.5</td>
<td>0.7</td>
<td>1.02</td>
</tr>
<tr>
<td>15</td>
<td>96.5</td>
<td>113.5</td>
<td>0.85</td>
<td>112.5</td>
<td>102</td>
<td>1.1</td>
<td>0.98</td>
</tr>
<tr>
<td>16</td>
<td>102.5</td>
<td>114</td>
<td>0.9</td>
<td>141.5</td>
<td>95.25</td>
<td>1.49</td>
<td>1.20</td>
</tr>
<tr>
<td>17</td>
<td>67</td>
<td>133</td>
<td>0.5</td>
<td>73</td>
<td>144.5</td>
<td>0.51</td>
<td>0.51</td>
</tr>
<tr>
<td>18</td>
<td>139.75</td>
<td>98.25</td>
<td>1.42</td>
<td>133.5</td>
<td>111.5</td>
<td>1.2</td>
<td>1.31</td>
</tr>
<tr>
<td>19</td>
<td>53</td>
<td>174</td>
<td>0.3</td>
<td>113</td>
<td>147</td>
<td>0.77</td>
<td>0.54</td>
</tr>
<tr>
<td>20</td>
<td>90</td>
<td>51</td>
<td>1.75</td>
<td>76.5</td>
<td>71.5</td>
<td>1.07</td>
<td>1.41</td>
</tr>
<tr>
<td>21</td>
<td>148</td>
<td>92</td>
<td>1.6</td>
<td>244</td>
<td>106</td>
<td>2.3</td>
<td>1.95</td>
</tr>
<tr>
<td>22</td>
<td>80</td>
<td>181</td>
<td>0.44</td>
<td>111</td>
<td>144</td>
<td>0.77</td>
<td>0.61</td>
</tr>
<tr>
<td>Mean</td>
<td>1.42</td>
<td></td>
<td></td>
<td>1.16</td>
<td></td>
<td>1.29</td>
<td></td>
</tr>
<tr>
<td>S.D.</td>
<td>0.94</td>
<td></td>
<td></td>
<td>0.77</td>
<td></td>
<td>0.75</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 5.10: Shapiro Wilk tests on the differences between T1 and T2 scores for all coded conversation behaviours

<table>
<thead>
<tr>
<th>Conversation behaviour</th>
<th>W</th>
<th>df</th>
<th>p</th>
<th>Corrected p</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Recasting / repeating back</td>
<td>0.977</td>
<td>22</td>
<td>0.861</td>
<td>0.923</td>
</tr>
<tr>
<td>A2: Contingent commenting</td>
<td>0.952</td>
<td>22</td>
<td>0.341</td>
<td>0.572</td>
</tr>
<tr>
<td>A3: Giving clear explanations of words or concepts</td>
<td>0.807</td>
<td>22</td>
<td>0.001</td>
<td>0.004*</td>
</tr>
<tr>
<td>A4: Test questions</td>
<td>0.953</td>
<td>22</td>
<td>0.368</td>
<td>0.572</td>
</tr>
<tr>
<td>A5: Forced choice questions</td>
<td>0.777</td>
<td>22</td>
<td>&lt;0.001</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>A6: Adult minimal turns</td>
<td>0.967</td>
<td>22</td>
<td>0.635</td>
<td>0.799</td>
</tr>
<tr>
<td>A7: Extended pauses</td>
<td>0.968</td>
<td>22</td>
<td>0.685</td>
<td>0.799</td>
</tr>
<tr>
<td>C1: Asking for clarification or repetition</td>
<td>0.978</td>
<td>22</td>
<td>0.011</td>
<td>0.031*</td>
</tr>
<tr>
<td>C2: Saying things another way when stuck</td>
<td>0.794</td>
<td>22</td>
<td>&lt;0.01</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>C3: Using gestures or acting out to help communicate</td>
<td>0.951</td>
<td>22</td>
<td>0.334</td>
<td>0.572</td>
</tr>
<tr>
<td>C4: Non-verbal emblems</td>
<td>0.949</td>
<td>22</td>
<td>0.297</td>
<td>0.572</td>
</tr>
<tr>
<td>C5: Giving up when stuck on a word</td>
<td>0.332</td>
<td>22</td>
<td>&lt;0.01</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>C6: Child minimal turns</td>
<td>0.956</td>
<td>22</td>
<td>0.420</td>
<td>0.588</td>
</tr>
<tr>
<td>C7: Child single word turns</td>
<td>0.980</td>
<td>22</td>
<td>0.923</td>
<td>0.923</td>
</tr>
</tbody>
</table>

*Significant at the Benjamini Hochberg corrected level, meaning that the difference between paired data (T1 and T2) does not follow a normal distribution.
Appendix 6.1: Parent information sheet

Better Conversations
with children

A project for children with language difficulties and their main carers

Name and Contact Details of the Researcher: Lucy Hughes
Chandler House, Wakefield Street, London WC1N 1PF
Email:
Tel:

Information Sheet

YOU WILL BE GIVEN A COPY OF THIS TO KEEP

Invitation
You and your child are being invited to take part in a research project. Before you decide what to do, it is important to understand:

- Why is the research being done?
- What will happen if my child and I take part?

Please read this sheet carefully. You can talk about it with others. Ask us if there is anything that you don’t understand or would like to know more about.

Take your time to decide whether or not you want to take part.

Thank you for reading this.

What is the point of the project?
We want to try out a new type of Speech Therapy for children with language difficulties and their main carers. We hope this will help your conversations together.

The therapy takes six weeks. A Speech and Language Therapist will visit you and your child at home or at school. We will also speak on the phone or by Skype.

We will ask you to make short videos of you and your child playing and talking together. This can be done at home on a mobile phone or tablet. You will
watch these with the therapist and learn about ways to make talking together easier. Both you and your child will help decide what we work on.

The therapist will assess your child’s talking and conversation before and after therapy, so that we know whether the project has helped them.

When we have finished the therapy, we will make a leaflet together for your child’s teachers, family and friends. This will let them know what we have learnt together and anything they can do to help your child. You will also be offered a copy of your video files to keep.

**Why has my child been chosen?**
We are looking for 20 children, aged 6-8 years, and their main carer, to take part in the study.

We are looking for children who:

- Have difficulties with talking or understanding language (sometimes called Developmental Language Disorder).
- Have trouble in everyday conversation, like getting stuck on their words, not taking turns or not sticking to the topic.
- Have English as a main language
- No other difficulties that may affect their language or learning, such as Autism or ADHD.

**Do I have to take part?**
No. You should only say ‘yes’ if you want to - there will not be any problem if you decide not to take part.

If you do choose to take part, we will ask you and your child to sign a consent form and you will be given this information sheet to keep. You can still decide to stop at any time without giving a reason. If you do decide to stop part way through the study, you will be asked what should happen to your videos and other information you have given us.

**What will happen to me if I take part?**
Screening session:
We will start with a 45-minute session to check whether you child is likely to benefit from the study. This will include making a video of you and your child talking and playing together. The Speech and Language Therapist will also ask your child to complete some short tasks to give us an idea of their talking,
understanding and learning skills. After the session, we will discuss how they got on and decide together whether you would like to carry on with the rest of the study.

Assessment:
If you decide to go ahead, the Speech and Language Therapist will do some more detailed assessment of your child’s speech, language and conversation skills. This will take place over 2-3 sessions, each lasting around 45 minutes.

Children can be seen with you at home, or individually in a quiet room at their school. Tasks will be presented as games, some of which do not require any talking. For example, your child may be asked to listen and point to a choice of pictures. We will also look at their naming and story-telling skills.

Your child can ask for a break at any time and can decide to stop completely if he/she wants. We will also allow time to discuss what we are doing with you, your child’s teacher or learning support assistant.

During this assessment period, you will be asked to make three short videos of yourself and your child talking together as you would normally at home (for example while playing with toys or talking about their school day).

Therapy:
Once assessment is finished, we will begin the six-week therapy programme. You and your child will take part in eight therapy sessions, six face-to-face and two either by phone or by Skype. At least one of the sessions will take place at home to make sure we are working on your most natural conversations. Other times we can meet at a quiet room at school, if this works better for you and your child.

Face-to-face sessions will last around 40 minutes and will include time for playing with your child. We will talk about ways to improve your conversations, which you can practise together at home. You can email the therapist with any questions or problems between sessions.

Follow-up:
Once therapy is complete, the therapist will assess your child’s talking again to see what progress they have made. It will take us up to six weeks to finish this follow-up after therapy, so the whole study may take a total of 18 weeks. After this, we will write a report, which we can share with the school if you wish.

Publishing our results:
When we finish our research with all the children and their carers in September 2022, we would like to publish our findings in professional articles, talks and on our website. But we will not use the real names of anyone taking part. Instead, you and your child will be given false initials.

The last point when your data can be taken out of the study is September 2021. At the end of the project, we will ask whether you would be happy to be contacted by UCL researchers to take part in future studies.

**Will I be recorded and how will the recorded media be used?**

The use of video is a key part of the conversation therapy and measuring progress throughout this project. The recordings of your conversations made during the research will be used only according to your consent, either:

- for therapy and studying our results only  
- for both research and teaching purposes  
- for research, teaching and to give examples in conference presentations.

No other use will be made of your recordings and no one outside the project will be allowed access to the videos unless you give written consent.

**What are the possible downsides of taking part?**

The researcher and her supervisor are both Speech and Language Therapists and are members of the Health Professions Council and the Royal College of Speech and Language Therapists. They are experienced in working with children and will work hard to make sure your child does not become too tired or upset during our work together. We will take a break or stop the sessions if there are any concerns about your child’s behaviour and the researcher will let her supervisors know (verbally and in writing) as soon as possible after the event.

To protect children involved in the project, the researcher and any students or other research staff in contact with them will have Enhanced Disclosure and Barring Service certificates (police checks). We will follow the rules of the British Educational Research Association, British Psychological Society and UCL when carrying out our research.

Children with language difficulties are under the care of the school. Any information told to us by a child that raises child protection issues will be passed on immediately to the child’s teacher in accordance with the school policy.
We will set up ‘user involvement groups’, including parents and teachers, and a team of Speech Therapy experts to make sure children and carers’ best interests are represented throughout our research. The data collected will be kept and used according to the Data Protection Act, to make sure it is safe.

**What are the possible benefits of taking part?**

We can’t promise that the new therapy will help you and your child. But the ideas we will use are based on things that have helped other people in their conversations, for example adults with language difficulties after a stroke. We will also teach you strategies that we know can help children’s overall language development. Our results from the project will help us understand more about how language difficulties can affect school-aged children in their everyday lives. This will help future researchers, as well as other parents and teachers. If we are able to improve children’s language and conversation, this may also help them with their friendships and school work.

**What if something goes wrong?**

If you have any complaint about the researcher or anything to do with the project, you should first contact:

Professor Wendy Best:
Principal Investigator,

Email:
Tel:

If you are still unhappy, you can email the Chair of the UCL Research Ethics Committee: ethics@ucl.ac.uk

**Will my taking part in this project be kept private and confidential?**

All the information that we collect about you and your child during the course of the research will be kept strictly confidential. Data will be collected and stored according to the Data Protection Act 1998. At the start of the project, we will create an anonymous code for everyone who takes part. When we label files or publish any information about the project, we will always use these false initials, never your real names.

‘Raw data’, such as assessment forms, will be kept safe in a locked filing cabinet at UCL. Video files will be ‘encrypted’ (changed into digital code), so that no one else can see them. They will be backed up regularly on two external hard drives.
All other electronic information will be stored in a password-protected electronic database, e.g. UCL’s Safe Haven portal. We will also: lock all computer systems with a password; make sure computer software and virus protection is up-to-date. We will not send personal or confidential data via email or other file transfer unless they are encrypted.

Please note: The information we collect about your child may be checked by UCL to make sure that the research is being conducted properly. We will ask whether you agree with how we will keep and use recordings of your child in the project consent form.

**Limits to confidentiality**

As we have said above, we will keep all information about you and your child private and confidential, unless during our work together the research team hear anything which makes them worried that someone might be in danger of harm. In this case, we may have to inform the school or other relevant agencies, following legal and professional guidelines.

**What will happen to the results of the research project?**

At the end of the study (September 2022), the results will be presented in the researcher’s PhD write-up. Early findings from children and carers who join the study during the first year may also be included in her Master of Research (MRes) project. We also hope to share what we have learnt more widely in professional research publications, within talks and on our project website. You will be able to get a copy of the published results within a year of the study ending (by September 2023). As we have said above, people who take part in the study will not be named personally in any report or publication about the study.

As part of our consent form, children and parents who take part in the project will be offered a range of choices about how long we may store your individual information – in particular video files – and whether we may share it with others. These choices will include only letting the research team see the data; using it for teaching and student projects; for public presentations and for other researchers through the UCL Human Communication Audio-Visual Archive CAVA.

**Data Protection Privacy Notice**

The data controller for this project will be University College London (UCL). Your personal data will be used for the reasons given above, based your consent form.
If you are concerned about how your personal data is being processed, please contact the UCL Data Protection Office at data-protection@ucl.ac.uk. UCL’s Data Protection Officer is XX and he can also be contacted at XX.

If you are still unhappy, you can contact the Information Commissioner’s Office (ICO). Details are on their website: https://ico.org.uk/for-organisations/data-protection-reform/overview-of-the-gdpr/individuals-rights/

This ‘local’ privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our ‘general’ privacy notice:

For participants in health and care research studies, click here

The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the ‘local’ and ‘general’ privacy notices.

The categories of personal data used will be as follows:

- Pseudonym (false name or code letter)
- Child’s date of birth

The lawful basis that would be used to process your personal data will be:

- performance of a task in the public interest.

Your personal data will be processed so long as it is required for the research project. If we are able to anonymise or pseudonymise the personal data you provide we will do this and will try to minimise the processing of personal data wherever possible.

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk.

Who is organising and funding the research?

The study is paid for by the Economic and Social Research Council (ESRC) through the UCL, Bloomsbury and East London Doctoral Training Partnership (1 + 3 pathway).
Contact for further information

Please ask if there is anything about the project that is not clear or if you would like more information. Our contact details are:

Professor Wendy Best and Lucy Hughes  
UCL Division of Psychology and Language Sciences

Tel:

Email:

Thank you for reading this information sheet and for considering whether to take part in our research study.

You will be given a copy of both this and your consent form to keep.
What next?

You decide if you want to take part.

You can ask me questions if you’re not sure.

After the study, you and your family will receive a letter telling you what we found out about your talking and conversation skills.

Your school can have a copy, but only if you and your parents agree.

I won’t share your name or details with anyone else.

Conversation project

Dear __________

My name is Lucy. I am a Speech and Language Therapist.

I would like to invite you to help with my research.

I want to understand more about why it is difficult for some children with language difficulties to take part in everyday conversation.

Then, I want to try and find out what helps.
Page 2

**What will happen?**

I will come and visit you at your home or school.

We will do some speech and language tasks together.

We will make a short video of you talking and playing with your parent or carer.

We can stop at any time if you want to.

It won’t take too long.

Page 3

**Why should I take part?**

Once we know more about your talking, we can try different things to help.

We will play with lots of different toys and games.

Our work together may help you talk more easily with others.

It might help other children too.
CONSENT FORM FOR PARENTS AND CARERS TO PARTICIPATE WITH THEIR CHILD IN RESEARCH STUDY

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study:

Better Conversations with children

A project for children with language difficulties and their main carers
UCL Research Ethics Committee Approval ID Number: 2981/003

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

<table>
<thead>
<tr>
<th>19.</th>
<th>*I confirm that I have read and understood the Information Sheet for the ‘Better Conversations with Children’ study. I have had the chance to consider the information and what will be expected of me and my child. I have also had the chance to ask questions, which have been answered to my satisfaction. I would like my child and myself to take part in (please tick one or more of the following):</th>
</tr>
</thead>
</table>

| Tick Box |
| --- | --- |
- **an assessment of my child’s language and conversation skills, which will help us understand your child’s ability to understand and use language, including videoing recordings of conversations between you and your child before, during and after therapy.**
- **a six week conversation-based therapy programme with a Speech and Language Therapist**

<table>
<thead>
<tr>
<th>20.</th>
<th>I agree for the researcher to visit my child and I at home. Some sessions may also take place at school, if my child’s head teacher agrees.</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td><em>I understand that I will be able to withdraw our data up to: September 2021</em></td>
</tr>
<tr>
<td>22.</td>
<td><em>I consent to the processing of my personal information, including assessment and video data, for the reasons explained to me. I understand that this information will be handled according to all relevant data protection laws.</em></td>
</tr>
<tr>
<td>23.</td>
<td><strong>Use of the information for this project only</strong></td>
</tr>
<tr>
<td></td>
<td><em>I understand that all personal information will remain confidential and that all efforts will be made to make sure I and my child cannot be identified.</em></td>
</tr>
<tr>
<td></td>
<td>I understand that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify us in any publications.</td>
</tr>
<tr>
<td></td>
<td>I request that my comments are presented anonymously with no mention of my role/affiliation.</td>
</tr>
<tr>
<td>24.</td>
<td><em>I understand that my information may be reviewed by responsible people from the University (including the project funders, the Economic Social and Research Council) for monitoring and audit purposes.</em></td>
</tr>
<tr>
<td>25.</td>
<td><em>I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, [without the care I receive or my legal rights being affected]. I understand that if I decide to withdraw, any personal data I have provided up to that point will be deleted unless I agree otherwise.</em></td>
</tr>
<tr>
<td>26.</td>
<td>I understand the potential risks of participating and the support that will be available to me and my child should I become distressed during the course of the research.</td>
</tr>
<tr>
<td>27.</td>
<td>I understand the potential direct/indirect benefits of participating.</td>
</tr>
<tr>
<td>28.</td>
<td>I understand that the project data will not be made available to any commercial organisations and is solely the responsibility of the researcher(s) undertaking this study.</td>
</tr>
<tr>
<td>29.</td>
<td>I understand that I will not benefit financially from this study, either now or in the future.</td>
</tr>
<tr>
<td>30.</td>
<td>I would like a written summary of my child’s participation in the project to be shared with the school. Yes/No</td>
</tr>
</tbody>
</table>
| 31. | I agree that my anonymised and/or pseudonymised research data may be used by others for future research. [By its nature, it is not possible to fully anonymise video data. However, all files will be labelled with false initials – never our real names.]
| 32. | I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. Yes/No        |
| 33. | I consent to my therapy sessions being audio/video recorded and understand that the recordings will be used by the project team (including approved UCL students):  |
|     | **EITHER**                                                                                                                         |
|     | - For research purposes only                                                                                                          |
|     | - OR                                                                                                                              |
For research and teaching
- OR
- For research, teaching and public presentations

*Please initial one statement only to show how you would like your video recordings to be used.*

*Please initial one statement only to show how you would like your video recordings to be stored:*

When they have finished their work a year after the project completion date in September 2022 the recordings will be destroyed.

OR
- Stored anonymously, using password-protected software and will be used for teaching, quality control, public presentations audit and specific research purposes beyond the life of the project.

34. I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet and explained to me by the researcher.

35. I hereby confirm that:
   (c) I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher; and
   (d) I do not fall under the exclusion criteria.

36. I have informed the researcher of any other research in which I am currently involved or have been involved in during the past 12 months.

37. I am aware of who I should contact if I wish to lodge a complaint.

38. I voluntarily agree for myself and my child to take part in this study.

39. Use of information for this project and beyond

   I would be happy for the video data I provide to be stored in the UCL Human Communication Audio-Visual Archive held at the UCL Library for as long as the Library exists, for future research.

   I know that future researchers will sign a contract to respect my confidentiality, rights and dignity, and will use videotapes in a responsible way.

---

If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.

| Yes, I would be happy to be contacted in this way |
| No, I would not like to be contacted |

Name of participant __________________ Date ________ Signature __________________
Name and Contact Details of the Researcher: Lucy Hughes
UCL Division of Psychology and Language Sciences
Email:
Tel:

Name and Contact Details of the Principal Researcher: Professor Wendy Best
Room:
Email:
Tel:

Name and Contact Details of the UCL Data Protection Officer: XX. Email:
Parent’s views

Name:

Date:

Thank you very much for agreeing for you and your child to participate in our research therapy. I would be very grateful if you could complete this form and return it to me next week.

1. How do your child’s language difficulties affect your conversations together?

2. Is there anything you do to help your child with their understanding or talking in conversation?

3. Is there anything your child does to help him/herself in conversation?

For questions 4 – 6, please put a mark on the line and add a comment if you have one.

4. Have your conversations with your child changed over the past half term?

   The same  
   Some improvement  
   Much improvement

b) How (if at all) have they changed?
5. Has your child’s reading ability changed over the last half term?

The same \hspace{1cm} Some improvement \hspace{1cm} Much improvement

Comment:

6. Has your child’s number work/maths changed over the last half term?

The same \hspace{1cm} Some improvement \hspace{1cm} Much improvement

Comment:

Please add any other comments you wish to make, including any changes that have occurred while your child has been involved in the ‘Better Conversations with Children’ project.

Many thanks for your help.

Lucy Hughes and Wendy Best

Research Team, ‘Better Conversations with Children’ project
Appendix 6.5: Child views questionnaire

Better Conversations
with children

Child’s views
(to be completed with the researcher)

Name:
Date:

1. You have told me that you sometimes have difficulty understanding and using words. How does this affect your conversations:

   a) At home?

   b) At school?

   If necessary, provide suggestions, e.g. talking with parents / talking with teacher / talking with friends / learning things / in the games and activities you like to do. Support the child to give specific examples / explain how things are affected.

2. Is there anything you do to help yourself when talking with others?

3. Is there anything your (main carer) does to help you with your talking?

4. Have your conversations changed over the last half-term? (child to make a mark along the scale, below).

   The same    Better    Much better
   🙁          🙂         😊
5. Has your reading changed over the last half-term?

The same  Better  Much better

6. Has your number work / maths changed over the last half-term?

The same  Better  Much better

7. Are there any other things you want to say about your talking or conversation at school or at home?

Thank you for your help.

Lucy Hughes and Wendy Best
Research Team, ‘Better Conversations with Children’ project
Appendix 6.6: The Language and Life Ladder (bespoke tool to elicit child views on language-related quality of life).

The Language and Life Ladder

We’re going to have a think about your talking and other things. We’re going to go through some questions. It’s your view of how things are. There is no right or wrong.

a) What are you good at?

b) What would you like to be better at?

Now let’s look at a picture (present visual ‘ladder scale’, numbered 0 – 4, below). I’m going to ask you how you feel about different things. Imagine a ladder, with steps numbered from 0 at the bottom to 4 at the top. The top of the ladder means that something’s really, really good and the bottom means it’s really, really bad (therapist points to indicate). OR you could point to one of the steps in between. This one would mean ‘quite good’. This would be ‘quite bad’. Or this one in the middle would mean ‘It’s OK – not too good and not too bad’.

Let’s practise:

How do you feel about homework? Is it really really good (therapist points to top of ladder), quite good, OK (not too good and not too bad), quite bad or really really bad? Point to the one you think.

What about ice cream?
Language and conversation

1. In general, do you feel happy to talk (near the top of the ladder), or unhappy when talking (down at the bottom)?
2. How easy is it for you to understand others?
3. How easy is it for people to understand what you mean?
4. How easy is it for you to say what you want to say?

Feelings and emotions

5. How happy are you at home?
6. How happy are you at school?

For the next two questions, show pictures of faces with scale of 0-4 reversed

7. How angry have you felt this week? (reverse scale for this answer).
   - Follow-up question: Because?

8. How worried have you felt this week? (reverse scale for this answer)
   - Follow-up question: Because?
Friendships and joining in
(Present the ladder again)

9. What are you like at making friends? If it’s really easy for you point near the top of the ladder. If it’s harder, you would point to the bottom.
10. What are you like at playing with other people?

Is there anything else you want to say about your talking or conversation?:
- At home?
- At school?

The Language and Life Ladder

References:
The Paediatric Quality of Life Inventory (Paeds QL™, Varni et al., 1999)
Paediatric Speech and Language Quality of Life Scale (Markham et al., 2011)
World Happiness Report (Helliwell et al., 2018).
Appendix 7.1: BCC draft therapy protocol.

**Core principles:**

1. Children with Developmental Language Disorder and their main carer will work collaboratively with their Speech and Language Therapist in order to gain insight into Conversation skills.

The intervention is based on methods and principles from Conversation Therapy (sometimes called Interaction-focused therapy), which has been used successfully for adults with aphasia and their partners to enhance aspects of conversation such as turn-taking, topic and repair (Beeke et al., 2015; Wilkinson, 2014). The programme also incorporates techniques and materials from Parent Child Interaction (Falkus et al., 2016; Cummins and Hulme 2001; Kelman and Schneider 1994), which is widely used for training and supporting parents of younger children with speech and language difficulties.

2. The child and carer, guided by the therapist, will use video as a tool to help identify individual strengths and difficulties that arise within their everyday interactions in order to set joint targets and make changes in their conversation.

The overarching principle of Better Conversations with Children (BCC) is that change is best achieved using video to show participants what they are already doing that works to support their conversational interactions (e.g. adults pausing, waiting for eye contact, repeating, rephrasing; child using a topic-setting word). The approach also helps to identify potential ‘barriers’ to successful conversation (e.g. adult repeatedly asking the child ‘test questions’, or spending too long trying to ‘fix’ errors of pronunciation). The programme aims to develop the understanding of key aspects of conversation such as turns, sequences, trouble and repair. The therapist then supports both partners to choose individual strategies to work on, in order to enhance their everyday conversations.

3. Therapy will incorporate principles known to aid children’s language development.
This will include oral techniques proven to support school-aged children with DLD, including recasting (i.e. rephrasing a child’s utterances to include longer or ‘correct’ vocabulary and grammar) and ‘scaffolding’, including prompt fading, to increase the child’s active involvement (Bosanquet et al., 2016; Radford, 2010).

4. A further principle of the BCC programme is to alter behaviour in ways congruent with maximising overall language and communication development for each child. This may include using clinically appropriate games and materials to support the child in working towards their individual barriers and facilitators.

5. Participants will practise and trial new strategies and techniques, with support, both within therapy sessions and in the home environment.

The later stages of the therapy programme concentrate on practising strategies with coaching from the SLT, alongside continued use of the target techniques during regular ‘Talk Time’ (also called ‘Special Time’; Cummings & Hulme, 1997) at home. Progress is reviewed weekly throughout the intervention period.

Wider theoretical frameworks:

The ‘Better Conversations’ approach aligns with the World Health Organisation’s ICF model, which requires disorders, including those of communication, to be considered ‘as they occur in everyday life’, i.e. in the context of activity and participation, as well as impairment.

In addition, the therapy has been designed systematically to incorporate ideas and principles from Behaviour Change theory (Michie et al., 2011). This includes developing an understanding of target communication behaviours in context, e.g. by using videos of naturally-occurring conversation with reference to Michie et al.’s COM-B Model, taking into account capability, motivation and opportunity, which can support or inhibit participants from achieving their therapeutic goals.

The BCC intervention is an adaptation of strongly related evidence-based approaches, by a team experienced in working with primary-aged children. It will be further informed by input from an advisory group of parents and children with DLD, as well as experienced SLTs and specialist teachers who have helped finalise the adaptations appropriate to the children’s age and development.
Key features of therapy:

- Parent and child present for all therapy sessions
- Therapy targets Barrier & Facilitator behaviours in conversation
- Through this, therapy also aims to develop the child’s wider language and communication skills.
- Strategies practiced via coached conversation, and homework activities

Procedures:

- Each child-carer dyad will participate in eight therapy sessions, six of which will be face to face, delivered at home and/or in a quiet room at school (at least one session will take place in the home environment to ensure that conversation can be observed and worked on in its most natural context). The remaining two sessions will take place remotely, either by telephone or Skype.
- Participants will be encouraged to email the therapist with any queries or problems if necessary. Direct sessions will last approximately 40 minutes and will include space for play together. Both direct and remote sessions will include reflection on videos and on the use of therapy strategies in conversations between the therapy sessions.
- Conversations collected pre-therapy will be used to illuminate how the child’s speech and language difficulty is impacting on their naturally-occurring interactions. Goals will be agreed from discussion with parents and child whilst viewing selected extracts from their conversations. These will be chosen to illustrate positive strategies and key barriers for both conversation and language development. In this way, therapy targets will reflect the daily interactions of individual children and their carers.
- Targets will be ‘Specific, Measurable, Achievable, Realistic and Timely’ (SMART; Doran, 1981). These may include techniques that the adult can use to help support the child in conversation and develop their language skills, as well as strategies for the child themselves to help increase their participation and successful communication. This may include building on nonverbal strategies already used by the child, which have been identified in the analysis of video interactions.
- Talk Time (known as ‘Special Time’ in PCI) will be a central component of the programme. Parents will be encouraged to set aside regular times when they are able to focus one:one on talking with their child.
- Between intervention sessions parents and children will be given homework tasks to encourage them to use the conversation strategies in their daily interactions and to reflect on how this works for them. Parent and child will be encouraged to keep a conversation diary, noting any difficulties and positive changes to facilitate discussion at the next therapy session. A video diary may be preferred by some of the children.
**Materials:**

Portable video camera, or tablet, to record and play back conversations between children and their carers.

Handouts to guide discussion, e.g. helpful conversational strategies.

Therapy notes sheets.

Selection of games and Playmobil toys for use during therapy sessions.

Family photos / pictures / items to be provided by participants, to act as possible topic starters (see Session 4).

**Detailed session plans:**

**SESSION 1:**
Introduction to Conversation and Language Development
- Discuss aims of therapy
- Explore what conversation is and why it is important
- Initial exploration of how Developmental Language Difficulties can affect conversation
- Watch video and jointly pick out one positive strategy for parent or carer do more of
- Setting up ‘Talk Time’ to practise the above at home
- Provide record sheets to record what activities were carried out / comments on how it went.

**SESSION 1a**
Phone or Skype call in between Week 1 and 2 therapy sessions to discuss progress with ‘Talk Time’ and problem-solve any difficulties that have arisen with home practise of targets.

**SESSION 2:**
Turns, sequences and actions
- Discuss and explore conversational turns, sequences and aims of turns
- Discuss how DLD may affect turn-taking in conversation
- Watch pre-therapy videos together to identify and agree facilitator for the child to practise within the session and then during ‘Talk Time’ at home.
SESSION 3:
Trouble and repair

- Review goals / progress with special time at home
- Discuss trouble in talk – what sorts of trouble can occur with DLD, e.g. word-finding; intelligibility; child not understanding what was said.
- Identify common problems specific to this dyad - use previous video to help agree a barrier behaviour in parent/carer’s conversation style and whether there is an alternative strategy they could replace this with.

Key questions:

1. What are the main things that go wrong in your conversations?
2. Who notices when there is a problem?
3. How are problems solved?

- Brainstorm what helps to prevent / respond to trouble, / what helps language development in general e.g. waiting for the child to start the talking, use of silence to give extra thinking / processing time; extending / repeating back / recasting; replace questions with comments. Use of handout to help guide discussion / give options of specific strategies that may be relevant.
- Also discuss potential barriers to conversation: don’t spend ages fixing things / asking the child to repeat ‘correctly’ if you already understand.
- Make new video, practising agreed strategy, which may have been slightly modified following the above discussion.
- Homework: Continue practising individual strategies during ‘Talk Time’ and record progress on home record sheets.

SESSION 3a:
Phone or Skype session to review progress so far / ensure families are continuing with regular ‘Talk Time’ at home.

SESSION 4:
Topics of Conversation – clinical advisory group suggesting removing this session, as a similar plan was not successful in BCA. However, topic emerged as a central concern for both dyads taking part in the MRes study. Therefore, it was decided to reinstate the following activities for BCC:

- Review progress with ‘Talk Time’ strategies.
Discuss the idea of topic; how these get introduced and developed in conversations. Who tends to set the topic / help topics flow? What can get in the way of this?

Use examples from videos to help guide the discussion – one clip chosen to show a difficulty with topic initiation / development (e.g. topic dries up or adult takes control) versus another to show positive topic-focused strategies / further explore individual patterns of topic initiation and flow for the parent and child.

Together choose a barrier behaviour for the child and discuss how this could be modified to increase the flow of conversation.

Reinforce effective topic initiation / play initiation by the child and practise strategies to help the flow.

Parent to supply family photos / pictures from child’s favourite magazine or book as possible conversation topic starter.

Adult and child to have a short practice conversation with each other - to put chosen strategies into action

Agree what specific things the child and carer will practise during ‘Talk Time’ this week.

SESSION 5:

Focus on child strategies

- Review progress with ‘Talk Time’ at home.
  - Explicit discussion of child strategies, including non-verbal aspects of communication (use of eye contact, gesture, writing/drawing etc)
  - Play games to practise these, e.g. picture description game for word-finding / Black Sheep memory game
  - Microphone game to consolidate use of new strategies in conversation
  - Agree final targets for the dyad to optimise the child’s language development throughout conversation.

SESSION 6:

Reviewing and moving forward

- Discuss use of strategies / positive effects of these
- Together construct a summary sheet for teachers, family and friends to share main insights from child and parent’s experience of therapy / any key strategies the child would like others to use in conversation with them.
- Any questions about the therapy / strategies following the intervention.
Appendix 8.1: Conversation Analysis transcription conventions

Symbols

The following symbols can either be found on the keyboard, or accessed as follows:- choose *insert* menu: choose *symbol* to access ‘symbol’ window. To access an IPA font enter *insert* menu, choose *symbol* to access the window, and then click on *font* arrow to select the IPA font of your choice.

\[\] a large left-hand bracket links an ongoing utterance with an overlapping
utterance or non-verbal action at the point where the overlap/simultaneous non-verbal action begins

\] a large right-hand bracket marks where overlapping utterances/simultaneous non-verbal actions stop overlapping

e.g. 01 PR how have you been since I last saw [you]
02 AM \[not\] so \[good\] \[((AM shakes head))\]

\[=\] an equals sign marks where there is no interval between adjacent utterances

e.g. 01 DG did he really say that?=
02 FB =yes

(.) a full stop in single brackets indicates an interval of tenth of a second or less in the stream of talk

oh: a colon indicates an extension of the sound or syllable it follows (more colons prolong the stretch)

, a full stop indicates a stopping fall in tone, *not necessarily the end of a sentence*

, a comma indicates a continuing intonation

? a question mark indicates a rising inflection, *not necessarily a question*

! an exclamation mark indicates an animated tone, *not necessarily an exclamation*

but- a single dash indicates a halting, abrupt cut off to a word or part of a word

\[\uparrow\downarrow\] marked rising and falling shifts in intonation are indicated by upward and downward pointing arrows immediately *prior* to the rise or fall

stress underlining indicates emphasis

°no° degree signs indicate a passage of talk which is *quieter* than surrounding talk
TALK capital letters indicate talk delivered at a *louder volume* than surrounding talk
h,heh indicates discernable aspiration or laughter (the more hs the longer the aspiration/laughter)

fu(h)n an h in single brackets marks discernable aspiration or laughter *within* a word in an utterance

°h discernable inhalation (the more hs the longer the inhalation)

>talk< lesser than/greater than signs indicate sections of an utterance delivered at a *greater speed* than the surrounding talk

[yes text in double brackets represents a gloss or description of some non-verbal aspect of the talk, and is linked to the relevant section of talk with large brackets (see above)

(1 syllable)
(dog) single brackets containing either a word, phrase, or syllable count (if utterance is very unclear) mark where target item(s) is/are in doubt

/əʊʊə/ transcribe paraphasias and jargon between slashes, using an IPA font. Check with your supervisor about which vowel transcription system to use.

------ a broken underline in *bold* indicates speaker’s gaze is directed at listener (place on separate line directly below relevant talk). Only note eye gaze if (a) it seems particularly relevant/important to the interaction, or (b) you are particularly interested in analysing it.

e.g. 01 IB did you hear about John? ------

02 JM no (.) what?

→ an arrow in *column 2* alerts the reader as to which line contains the issue discussed in the analysis

Suzanne Beeke and Ray Wilkinson, UCL, 2000
Updated by Beeke (2010) and by Beeke and Bloch (2012)