What are the outcomes of the Toddler Talk intervention program which considers the phonological characteristics of target words?

A thesis presented as fulfilment of the requirements for the degree

Master of Speech and Language Therapy

at

Massey University

Samantha Court

2023

Table of Contents

List of Tables

List of Figures

Abstract

The Early Language in Victoria Study (ELVS) identified that 19.7% of two-year-old children are late to acquire their first words (Reilly et al., 2009). These children are said to have Late Language Emergence (LLE), whereby they experience delayed onset of language development in the absence of any underlying aetiology (American Speech-Language-Hearing Association, 2023b). Presently, it is difficult for researchers and clinicians alike to predict which children will have no identifiable language difficulties at 5 years of age and which children will experience persistent difficulties in the acquisition of language (Dale et al., 2003; Reilly et al., 2009). Having effective intervention approaches is essential for the 19.7% of two-year-old children who could present to speech and language therapy services for the treatment of LLE.

Research has shown a correlation between language and phonological delays, with toddlers who present with LLE also demonstrating restricted syllable structures and reduced phonemic inventories, characteristic of a phonological delay (Fasolo et al., 2008). However, the clinical guidelines for Speech and Language Therapists (SLTs) on early intervention approaches that address this co-occurring phonological delay are non-existent at present (American Speech-Language-Hearing Association, 2023b). This is not surprising as research in this field is scarce, with only two preliminary studies completed to date (Kaiser et al., 2017; Philp et al., 2021).

Study Aims and Design

This research study used an exploratory case-study design including one parent-child dyad. The aim was to explore the outcomes of the Toddler Talk intervention program, which is based on theoretical and research evidence related to supporting the language and phonological development of toddlers with LLE. At the time of this study, this intervention program was being used by the researcher in her clinical practice as an SLT. There were three phases: initial data collection phase, intervention phase, and follow-up data collection phase. A range of quantitative and qualitative data analysis techniques were used to analyse the data. The researcher sought to explore the language and phonological outcomes and the social importance and acceptability of the intervention program through this research study.

Outcomes and Results

In summary, the findings were positive across the language and phonology outcome measures. Firstly, the implementation of the Toddler Talk intervention program coincided with clinically significant gains in verbal expressive vocabulary, parts of speech, and utterance length measures. The implementation also coincided with clinically significant growth in phonemic inventory, syllable shape inventory, word length inventory, and percentage consonants of correct (PCC) for early-developing consonant sounds. However, there was no clinically significant change in intelligibility.

In addition, there were socially significant findings following the implementation of the Toddler Talk intervention program. These findings suggested that the intervention program was well received by the participants, met their needs, and created positive outcomes beyond the home and clinic settings.

Conclusions and Implications

There was a lot to be learnt from this exploratory case-study which investigated the outcomes of the Toddler Talk intervention program for toddlers with LLE. While the results of this study are limited in their ability to draw conclusions, they provide support for future research into early intervention approaches that consider the phonological characteristics of target words for toddlers with LLE. This is important for adding to the knowledge base on early intervention approaches for toddlers with LLE and addressing gaps in the literature.

Acknowledgements

Firstly, I would like to acknowledge and pay my respects to the Cameraygal people, Traditional Custodians of the land on which I conducted the fieldwork for this research study. I wish to pay my respects to their Elders past and present.

Secondly, I would like to sincerely thank the family who participated in this study, contributed their time to the intervention, and shared their thoughts on the Toddler Talk intervention program. This was invaluable and without their input, this study would not have been possible. I am hopeful that, with their contribution, the findings will provide preliminary evidence for this intervention approach and guide future research in this field. In addition, I hope that the findings will, in time, support the development of clinical guidelines for the treatment of late language emergence (LLE) in Australia and New Zealand.

Additionally, I would like to thank my primary research supervisor, Dr Elizabeth Doell, who has supported me throughout my thesis journey. Her knowledge and expertise in the area of early language development were invaluable for establishing the research procedure. I would also like to thank my secondary research supervisor, Dr Sally Clendon. Your guidance and attention to detail were vital for ensuring a well-controlled study was completed.

I would also like to thank my Clinic Director who provided me with the flexibility I needed to complete this research project. Her support and encouragement throughout this process should also be acknowledged. Additionally, I would like to thank my colleagues for providing me with space to share my learnings while completing my thesis. Allowing me to articulate my ideas aloud helped shape my thesis into what is presented here today.

Finally, I would like to extend my thanks to my family who have been my cheerleaders throughout all of my postgraduate courses leading to the submission of my thesis. To my partner, John, you have been an endless source of support and you have helped me navigate the challenges of balancing work, study, and life, which was especially challenging during the Covid-19 pandemic. To our daughter, Maya, you were unknowingly my greatest motivation for completing my thesis journey, arriving in the final year of my Masters dream. To my parents, Alan and Raewyn, thank you for your continued support of

my ambitions. I would not be here without your encouragement to continue my studies in the field of speech and language therapy.

Chapter One: Introduction

This study utilised an exploratory case study design to explore the outcomes of the Toddler Talk intervention program, which is an intervention program currently used by the researcher in her clinical practice as a speech and language therapist (SLT) for toddlers with late language emergence (LLE). This design was chosen to add to the knowledge base on early intervention approaches for toddlers with LLE and address gaps in the literature. This chapter defines key concepts and provides an understanding of the context of the intervention and the rationale for the intervention.

Late Language Emergence

Children typically begin using their first words around 12 months of age, with the average range being between 10 and 14 months of age (Paul et al., 2017). The term LLE is currently used by the American Speech-Language-Hearing Association (ASHA) to describe the delayed onset of language development in the absence of any underlying aetiology (e.g., hearing loss, neurodevelopmental disorders (American Speech-Language-Hearing Association, 2023b). LLE includes toddlers with, "expressive language delays only, or they may have mixed expressive and receptive delays" (American Speech-Language-Hearing Association, 2023b).

A percentage of children with LLE will go on to receive a diagnosis of developmental language disorder (DLD) (American Speech-Language-Hearing Association, 2023b). DLD is characterised by persistent difficulties in the acquisition of language which cannot be attributed to another cause, such as hearing loss, a neurodevelopmental disorder (e.g., Down syndrome, cerebral palsy), or neurodiversity (e.g., autism spectrum disorder (ASD)) (Laasonen et al., 2018). However, it is unclear which children will demonstrate persistent difficulties with language acquisition during the early stages of language development. This was shown in the Early Language in Victoria Study (ELVS) (Reilly et al., 2009) which sought to observe how language develops from infancy to adolescence. Their research showed that around 19% of their participants presented with a language delay at two years of age (Reilly et al., 2014). However, at five years of age, only around 5% of these children continued to demonstrate language delays (Reilly et al., 2014). Therefore, the LLE diagnostic term was

considered the most appropriate term for toddlers, between 12 to 36 months of age, who presented exclusively with a language delay and, as such, LLE was used in this paper.

Prevalence of Late Language Emergence

In clinical practice, children appear to be attending speech and language therapy services for the assessment and treatment of language delays with increased frequency. Two recent prevalence studies have been completed in Australia which help to understand the true percentage of children impacted by LLE. The ELVS was a large-scale longitudinal study that found the prevalence of LLE to be 19.7%, from a sample of 1,720 toddlers (49.1% females, 50.9% males), aged 24 months (Reilly et al., 2009). While the data was limited to the Victoria region of Australia, the size of the study allowed for a wide range of children, parental factors, and family contexts to be considered in the analysis of the data which offered a more accurate representation of the population in the presentation of the findings (Andrade, 2020). In the ELVS, participants' expressive vocabulary scores on the MacArthur-Bates Communicative Development Inventories (CDI) (Fenson et al., 2006) were evaluated. The Words and Sentences form was used as this is standardised for children aged 16-30 months (Fenson et al., 2006; Reilly et al., 2009). Reilly and colleagues (2009) defined low expressive vocabulary as scoring at or below the 10th percentile. Normative data was based on the child's age (24 months) and gender (Fenson et al., 2006). When the prevalence from the ELVS was compared to other prevalence studies, the percentage of toddlers with LLE was found to be slightly higher in the ELVS (Zubrick et al., 2007). Therefore, the researchers also measured the prevalence of LLE using a stricter criterion. When the criterion point was moved to the 5th percentile, 12% of the participants met the criteria for low expressive vocabulary, which included 109 boys and 94 girls. In addition, Reilly and colleagues (2009) found that 17% of the participants were not using any word combinations, as measured on the MacArthur-Bates CDI. Given that children are typically combining words by their second birthday (Paul et al., 2017), this should also be a consideration when identifying toddlers with LLE.

Zubrick and colleagues (2007) also completed their prevalence study in Australia. They used data collected during the Randomly Ascertained Sample of Children born in Australia's Largest State (RASCALS) study, which was a longitudinal study conducted in Western Australia in the 1990s. The RASCALS study collected health-related data on infants

born in 1995 and 1996 annually until they turned 8 years old, meaning the data analysed by Zubrick and colleagues was dated compared to the ELVS. In addition, the measures used to identify toddlers with LLE differed between the RASCALS study and the ELVS, making comparisons between the two studies challenging. The RASCALS study used the Ages and Stages Questionnaire (ASQ), formally known as the Infant/Child Monitoring Questionnaire (Squires & Bricker, 1993). A recent comparison between the two assessments indicated that the CDI short form was more accurate at identifying a language delay for Korean-speaking children when compared to the communication domain of the ASQ (94% and 78% accurate, respectively) (Kim et al., 2016). No comparison studies could be sourced for English-speaking children. Based on this single study, the prevalence findings of the ELVS may be more reliable, meaning that approximately 19% of Australian toddlers present with LLE at 24 months of age. Hence, ongoing research into effective early interventions for toddlers with LLE is warranted due to the high number of children and families impacted.

Predictors of Persistent Language Difficulties

The ELVS has contributed a significant amount of information on early language development in Australia beyond prevalence data. To determine risk factors for persistent language difficulties at 4 years of age, the researchers evaluated a range of environmental and biological considerations (Reilly et al., 2010). They identified several potential risk factors for LLE, which included social disadvantage (environmental), lower maternal education level and vocabulary score (environmental), and a family history of speech and language delay (biological). In addition, being male was identified as a child-specific risk factor (biological). Despite identifying these trends across the data, the researchers concluded that these factors may influence language development, but the predictive value is modest, at best. An earlier study by Dale and colleagues (2003) also reported difficulties predicting persistent language difficulties. This highlights the importance of intervening early and not delaying important intervention for children with delayed language development. This recommendation is also supported by leaders in the field of early language development, such as The Hanen Centre (Lowry, 2016a).

Current Clinical Guidelines and Recommendations

The findings from the ELVS highlight that approximately 19% of Australian toddlers are late to acquire their first words. As such, the provision of effective early intervention is

important for improving outcomes for these children and their families. ASHA has published clinical guidelines for SLTs working with children with LLE. They note that, while many children with LLE will have no identifiable language delay at 5 years of age, it is difficult for SLTs to confidently identify these children (American Speech-Language-Hearing Association, 2023b), which is consistent with the findings presented in the ELVS. Hence, early intervention for all children with LLE is recommended as part of the guidelines. The New Zealand Speech and Language Therapists' Association (NZSTA) and Speech Pathology Australia (SPA) did not have any published guidelines for the assessment and treatment of toddlers with LLE, nor did they have any guidelines for DLD. Therefore, the guidelines that were published by ASHA were considered in the New Zealand and Australian contexts. The SLT-R took into consideration differences in access to services, funding, and service delivery models used in New Zealand and Australia when reviewing the ASHA guidelines.

The clinical guidelines published by ASHA advise that the goal of intervention for toddlers with LLE is to stimulate their language development within relevant contexts through developing the capacity of parents to support their child's development (American Speech-Language-Hearing Association, 2023b). ASHA stresses the importance of individualised intervention programs. However, they specifically reference interaction styles as being beneficial for stimulating a child's language development, referencing several older studies including Girolametto and colleagues (1999), Kaiser and colleagues (2001), Wilcox (1992) and Yoder and Warren (2001). Interaction styles that promote language development included providing models of language and relating these to the child's communication act or focus of attention, imitating the child's communication attempts and expanding on their utterances, and providing communication opportunities within interactions. Many of these interaction styles are taught to parents in the Hanen It Takes Two to Talk (ITTT) parenting program (Weitzman, 2017), which has a strong evidence base (Weitzman et al., 2017).

ASHA suggests that SLTs also assess a child's early phonological development, including their phonemic inventory and syllable structure inventory (American Speech-Language-Hearing Association, 2023b). This is in line with research that suggests that toddlers who have LLE are likely to experience co-occurring phonological delays (Fasolo et al., 2008; Rescorla & Ratner, 1996). However, ASHA does not provide specific

recommendations for consideration of the child's phonological system in their intervention recommendations. Therefore, it appears that there is a discrepancy between their assessment and intervention recommendations, which suggests there is a gap in early intervention approaches that consider the child's phonological system.

The Current Study

Research into language-focused interventions, which are widely used by SLTs for this population of children, is expansive and shows positive effects on the language system, with limited effects on the phonological system (Cable & Domsch, 2011). Conversely, research into interventions that consider the language and phonological abilities of toddlers is limited to two studies, which include children with a cleft rather than LLE (Kaiser et al., 2017; Philp et al., 2021). This project aimed to investigate the outcomes of the Toddler Talk intervention program for toddlers with LLE. This intervention program was developed by the researcher, who is also an SLT, and is based on current theoretical and research evidence that highlights the importance of simultaneously targeting the child's language and phonological development in early intervention. The term speech and language therapist-researcher (SLT-R) is used to reflect her dual role in this paper. The SLT-R piloted the program in her clinical practice to support the language and phonological development of toddlers, aged between 12 and 36 months of age, who present with LLE following an initial speech and language therapy assessment. This study is being undertaken to explore the outcomes of the Toddler Talk intervention program, add to the knowledge base on early intervention approaches for toddlers with LLE, and address gaps in the literature.

Speech and Language Therapist-Researcher Introduction

The SLT-R completed her Bachelor of Speech and Language Therapy (BSLT) in 2012 at Massey University in Auckland, New Zealand. She currently works for a paediatric private speech and language therapy practice in Sydney, Australia and is registered as a Certified Practicing Speech Pathologist (CPSP) with SPA. Speech Pathologist is the Australian term for SLT, which is used in New Zealand. At the time of this study, the SLT-R had 10 years of experience working with toddlers with LLE and their families. She had extensive knowledge of early intervention approaches to support a child's language and phonological development and undertook further professional development in this area. She utilised the principles of coaching in her clinical practice to build the capabilities of parents and

caregivers and equip them with the skills necessary to support their child's language and phonological development, in line with ASHA's recommendations (American Speech-Language-Hearing Association, 2023b).

The SLT-R completed a Post Graduate Certificate in 2019 and a Post Graduate Diploma in 2020 in speech and language therapy, focusing her coursework on early language development. After reviewing the research on assessment and intervention for toddlers with LLE, she was motivated to develop an evidence-based intervention approach for toddlers with LLE that targeted their language and phonological development to support their communication. This led to the development of the Toddler Talk intervention program, which has been piloted in the SLT-R's clinical practice for the past two years.

The SLT-R had a dual role in this study – researcher and SLT. She understood that her clinical experience and further post-graduate study could impact her ability to remain neutral and impartial as a researcher. To manage the potential influence on the data analysis and interpretation of the findings, the SLT-R remained mindful of her potential biases throughout the study (Creswell, 2015). To achieve this, the SLT-R intended to put aside her preconceived notions and analyse the data from the perspective of a researcher, rather than an SLT. She practised reflexivity over the course of the study and documented her thoughts and perceptions after each session for further reflection and discussion during the analysis of the findings (Creswell, 2015).

Clinical Context

Access to early speech and language therapy intervention varies between states in Australia. In New South Wales (NSW), children can be referred to their local health district if there are concerns regarding their communication development. Services offered by local health districts include individualised intervention sessions, group sessions, home programs, and parent education sessions (South Eastern Sydney Local Health District, 2022). Services can be classified using the tiered intervention model (Ebbels et al., 2019), with tier one interventions being focused on developing the skills of all children through parent or educator training and tier two and three interventions being focused on developing the skills of children with identified communication delays (Ebbels et al., 2019). Typically, children who are allocated to tier two interventions are performing slightly below the expected level for their age and intervention usually involves targeting specific areas of

difficulty under the direction of an SLT (Ebbels et al., 2019). Tier three interventions are typically reserved for children who present with significant and persistent communication difficulties where individualised speech and language therapy is required to improve their communication skills (Ebbels et al., 2019). The services offered through the local health districts in NSW include highly effective tier-three interventions (individualised intervention sessions and group sessions) (Ebbels et al., 2019). They also include tier two (home programs, without coaching) and tier one interventions (parent education sessions, without coaching) which are shown to be less effective in the literature (Ebbels et al., 2019).

With extensive waiting lists for public services and mounting evidence to support the effectiveness of tier three interventions (Ebbels et al., 2019) there is a high level of demand for private speech and language therapy services in NSW. Private services are typically able to be offered at the dosage recommended in the literature, bound only by the availability of the therapist and family as well as the family's financial capabilities. Some financial assistance can be provided to families through Medicare rebates and private health funds (Speech Pathology Australia, n.d.). The National Disability Insurance Scheme (NDIS) is also available (Speech Pathology Australia, n.d.). However, toddlers with LLE do not typically meet the eligibility criteria and will therefore not be able to receive funding and support through the NDIS (National Disability Insurance Agency, 2022).

Thesis Overview

Chapter one has provided an introduction to the topic of early intervention for toddlers with LLE and has detailed the aim of the current study. Chapter two will explore the theoretical frameworks and literature available to understand the relationship between language and phonological development in the early years. It will also summarise the outcomes of recent studies exploring the effectiveness of early intervention approaches used in clinical practice for toddlers with LLE.

Chapter three will provide descriptive information on the parent-child dyad that participated in this study. It will detail the case-study design and the methodology used in this study for data collection and analysis. Chapter four will present the findings from the quantitative (QUANT) and qualitative (QUAL) data collection sources. Chapter five will interpret the findings and discuss these in relation to the literature that currently exists. The

strengths and limitations of this study as well as the future research directions and clinical implications will also be discussed in this chapter.

Chapter 2: Literature Review

The purpose of this literature review is to discuss the evidence that is currently available for effective early intervention approaches for toddlers with late language emergence (LLE). This is important for identifying the current knowledge base and providing a clear rationale for this research study which aims to explore the outcomes of the Toddler Talk intervention program, an intervention approach for toddlers with LLE. This chapter will first discuss the relationship between early language and phonological development and the theoretical frameworks and research evidence that exist to understand these areas of child development. This chapter will then discuss the possible influence of selection and avoidance constraints on early word learning. Following this, the literature on early intervention programs for toddlers with LLE will be reviewed in detail. The significance of parent involvement and the service delivery model used in the intervention will also be explored. Finally, this chapter will discuss how the literature reviewed led to the current research focus.

The Relationship Between Language and Phonological Development

The goal of intervention for toddlers who have LLE is to stimulate their language development and to teach them the skills needed for communication (American Speech-Language-Hearing Association, 2023b). However, the literature shows that many children with LLE also demonstrate delays in their phonological development. In children under 3 years of age, they appear to be comparing the phonemic and syllable structure inventories of children with LLE to those with typical language development to identify the presence of a phonological delay (Fasolo et al., 2008; Rescorla & Ratner, 1996).

Fasolo and colleagues (2008) compared the babble characteristics of 12 toddlers with typical language development and 12 toddlers who had LLE to determine whether there was a relationship between language and phonological delays. Children were identified as having typical language development or LLE based on the mothers' responses on the Italian version of the MacArthur-Bates Communication Development Inventory (CDI) (Caselli & Casadio, 1995). The researchers reported no concerns regarding hearing, intelligence, or receptive language for all participants in their study. However, it was unclear how this was established based on the information provided. The researchers observed that

the toddlers with LLE demonstrated significantly different babbling patterns when compared to the typically developing toddlers in the study as they demonstrated restricted syllable structures and reduced phonemic inventories and complexities in their babble.

The toddlers in the Fasolo and colleagues' (2008) study spoke Italian and were from monolingual families. Therefore, the results should be interpreted with a degree of caution when considering English-speaking or multilingual toddlers. However, older studies including English-speaking toddlers have shown a similar relationship between language and phonological delays in children with LLE. Rescorla and Ratner (1996) compared the language and phonological profiles of 30 English-speaking toddlers, aged 24 to 31 months, with LLE to 30 toddlers with typical language development. Rescorla and Ratner reported that their findings were consistent with the findings presented in earlier studies (Paul & Jennings, 1992; Stoel-Gammon, 1989; Stoel-Gammon, 1991; Whitehurst et al., 1991). They observed that the children with LLE vocalised less frequently than the toddlers with typical language development. They also observed that the children with LLE demonstrated restricted syllable structures and reduced phonemic inventories, which was a finding shared by Fasolo and colleagues.

Several studies have shown that toddlers who have LLE are likely to experience co-occurring phonological delays (Fasolo et al., 2008; Rescorla & Ratner, 1996), whereby they have difficulty developing a system of sound contrasts to enable them to discriminate and produce, manipulate, and recall novel sequences of speech sounds (Paul et al., 2017). The origins of these difficulties are not motor based as the child does not have difficulty achieving precise and coordinated movements of their articulators (e.g., lips, tongue, palate) (Bowen, 2019). Fasolo and colleagues (2008) suggested that this is because toddlers with LLE have a more compromised linguistic system. As such, they experience difficulties understanding the rule system of language which simultaneously impacts their language and phonological development.

The literature shows there is a relationship between language and phonological acquisition, with toddlers with LLE more likely to experience co-occurring phonological delays. To ensure effective interventions are developed to support toddlers with LLE to develop their language and phonological skills, the theoretical frameworks that exist for early language development and phonological development should be explored. Secondly,

the interplay between these domains should be considered. This can be achieved through exploring selection and avoidance constraints which have been suggested to occur in children's early word learning.

Theoretical Frameworks

Early language development is a complex process and, as such, several theories have been developed to explain the multifaceted process of early language acquisition. Contemporary theories emphasise the importance of perception and production development as well as social interaction (Kuhl, 2004; Kuhl et al., 2008; Majorano et al., 2014). The premise of these theories is that language development is a neurobiological process whereby infants are primed to learn the regularities of language, whilst engaged in social exchange. These theories can also be used to understand early phonological development as early language and phonological development are not mutually exclusive from one another (American Speech-Language-Hearing Association, 2023a).

There is support in the literature for the shared importance of perception and production in the early stages of language development (Kuhl, 2004; Kuhl et al., 2008; Majorano et al., 2014). Infants are thought to be simultaneously refining their perception and production abilities across their first year of life. The Native Language Magnet (NLM) model, which was developed by Kuhl, has been used to explain the interaction between the two strands; perception and production (Kuhl, 2004). Kuhl hypothesised that infants have universal speech perception and production abilities at birth, which develop across their first year of life with exposure to the ambient language (Kuhl, 2004; Kuhl et al., 2008). The refinement of these strands is achieved through sensory learning and experience with language input. Another key component is sensory-motor learning whereby the infant has experiences with their vocal play and compares the auditory input to the motor patterns used to achieve their vocalisations. The role of sensory-motor learning can be seen in Piaget's stages of cognitive development which suggests that from birth until 18 to 24 months of age, children are engaged in sensory-motor learning (Piaget, 1957). During this stage of cognitive development, they are learning about the world through their senses and actions (Piaget, 1957).

Conversely, the Social Interactionist Theory (sociocultural theory) (Vygotsky, 1978) emphasises the importance of parent-child interactions in early language development. This

theory suggests that infants have an innate desire to communicate with others and that they learn language through interacting with a more knowledgeable other, such as a parent or caregiver. The importance of parent-child interactions can be seen in studies exploring the shared importance of joint attention and gesture in early language development. It has been suggested that pointing alongside a gaze shift to another person is an act of joint attention as it is used to shift the other person's attention to an object or event during an interaction (Bates et al., 1975). Colonnesi and colleagues (2010) analysed 25 research articles to explore the relationship between pointing and language development and concluded that there was a strong relationship. Specifically, the collective studies showed that children who had a more developed understanding of the connection between the act of pointing and the referent also demonstrated stronger word comprehension and production abilities. However, the relationship between a child's understanding of pointing and their receptive language development and the relationship between their use of pointing and their expressive language development were not able to be established based on the articles that were reviewed. Exploration of these relationships was suggested by the researchers to gain a deeper understanding of the relationship between pointing and language development.

The Social Learning Theory (Bandura, 1977) shares the belief that parent-child interactions are important for early language development. However, this theory suggests that language learning occurs through repetition and reinforcement. Goldstein and Schwade (2008) investigated the influence of parent feedback on vocal changes in infants who were babbling. They recruited 60 infants, with a mean age of 9 months, and their mothers. The researchers did not provide any additional information on the participants. The dyads attended two play sessions. The second session was broken up into three 10-minute periods; baseline 1, social response, and baseline 2. During the baseline periods, the mothers were asked to play with their children as they usually would. During the social response period, the researchers manipulated the form and frequency of feedback provided by the caregivers to determine how parent feedback influenced the infants' language learning.

The main finding of this study was that the phonological characteristics of infants' babble changed in response to contingent feedback, where the parent provided a timely

response to the child's communication attempt. Parents were asked to respond to their infants' babble by speaking (either in resonant vowels or words) whilst moving closer to, touching, and smiling at their infant. Conversely, changes in the infants' babble did not occur for the control infants where this feedback was not provided. Further, significance was only reached for the targets receiving contingent feedback (e.g., fully resonant vocalisations or vocalisations with consonant-vowel (CV) structure).

The researchers concluded that the infants discovered new phonological patterns in their mother's contingent speech. They felt that this finding provided conclusive evidence for the role of social feedback from parents through the use of contingent responses. They claimed that how a parent responded to their infant's babble had immediate implications for the child's language development. However, based on this single study, it is unclear whether these phonological changes would be observed beyond the babbling stage of development and whether contingent feedback could also influence the words a toddler is producing later in their development.

Recent research has highlighted the importance of perception and production development and social interaction for a child's phonological development. Lewkowitz and Hansen-Tift (2012) observed that infants begin to shift their eye gaze from a speaker's eyes to their mouth to receive both auditory and visual speech cues around 4 to 8 months of age. They observed that infants looked at a native speaker's eyes and mouth equally at 6 months of age. The researchers suggested that, by shifting their attention between a speaker's eyes and the mouth, the infants were gaining access to more social cues and receiving both auditory and visual information to support their phonological development. This finding becomes particularly important when considering the phonological development of toddlers with LLE during the Covid-19 pandemic. While children primarily receive communication input at home from family members, masks, covering the mouths of adult speakers, were widely worn by adults during the Covid-19 pandemic, both in the community and during speech and language therapy sessions.

While these theories provide an explanation for the process involved in early language and phonological acquisition, it is important to consider how this knowledge and understanding can be utilised to develop effective early intervention programs for children with LLE. It could be hypothesised that targeting a toddler's speech perception and

production abilities would result in positive language and phonological outcomes. In addition, targeting parent-child interactions and joint attention would also be expected to yield positive language and phonological outcomes for this population of children.

Selection and Avoidance Constraints in Early Word Learning

The literature provides evidence that there is a relationship between early language and phonological development. This relationship is also supported theoretically with frameworks for early language and phonological development highlighting the importance of perception and production development and social interaction for these areas of child development. As such, it is important to understand the interplay between these two domains to develop effective early intervention approaches for toddlers with LLE.

Researchers who have explored the co-occurring phonological delays in toddlers with LLE have suggested that the child's restricted syllable structures and reduced phonemic inventories may negatively impact on their ability to imitate linguistic targets (Rescorla & Ratner, 1996). However, research into selection and avoidance constraints that may exist in early word learning is scarce. Schwartz and Leonard (1982) completed early research into this phenomenon. They included 12 typically developing toddlers aged 12 to 15 months in their study. Across 12 bi-weekly experimental sessions, the results of their study showed that the toddlers' acquisition of words with characteristics within their phonology was significantly greater than their acquisition of words outside of their phonology. For example, if a child could produce a /b/ sound and consonant-vowel (CV) combinations, they would likely imitate or spontaneously use, "boo," "bee," or "bye". Furthermore, they found that the toddlers were able to spontaneously produce words with characteristics within their phonology significantly earlier than words outside of their phonology.

More recently, Davis and colleagues (2018) completed a study to evaluate the selection and avoidance hypothesis in early word learning. They sought to determine whether children choose words to say based on the phonological characteristics of the word and their phonological capabilities. They analysed the first words of 6 mono-lingual, English-speaking children, aged 8 months to 2 years, 11 months. They found evidence of word selection based on the initial sounds in words, which was consistent with the findings of Schwartz and Leonard (1982). However, conversely, Davis and colleagues found that the children were also choosing to say words that included sounds outside of their phonological

inventory. They suggested that, while the children appear to be using a phonological strategy for selecting words to say, there is a range of different influences at play that impact the words children are choosing to say. Davis and colleagues referenced the population of toddlers with LLE in their future research directions. The children in their study had varied verbal expressive vocabularies, ranging from less than 500 words to more than 1,000 words. They suggested that children who have less mature language and phonological systems, such as those children with LLE, may have different strategies for selecting words to say than the children who participated in their study.

Leonard and colleagues (1977) studied the selection and avoidance patterns of toddlers to determine whether there was a gradual or rapid relaxation of these selection and avoidance constraints. They included eight children between 14 and 24 months of age, with seven of the children having at least 50 words in their verbal expressive vocabulary and most children producing two-word utterances. The researchers concluded that the participants in the study had entered into a period of rapid lexical development. The results did not identify any significant selection and avoidance constraints impacting the children's imitations of non-words. In addition, the researchers observed that it was difficult to identify phonemes and syllable shapes that were absent from the children's phonological systems. The researchers concluded that there may be rapid relaxation of selection and avoidance constraints during this period of lexical and semantic-syntactic development, allowing children to rapidly acquire new words and develop their lexicon. This is contrary to the suggestions made by more recent researchers, which suggest that there is gradual relaxation of these constraints (Davis et al., 2018).

The development of the phonological system may offer some insights into the selection and avoidance constraints observed in the studies conducted by Schwartz and Leonard (1982) and Davis and colleagues (2018). It has been suggested that early lexical representations are whole words rather than individual phonemes (Ferguson 1986; Ferguson & Farwell 1975) as individual phonemes have variable stability in early lexical development. For example, a child may be using the /b/ sound in word initial position, but be unable to produce this phoneme across a variety of different words (Ferguson, 1986). Assuming that a child's phonological development includes a transitional phase, from whole words (holistic) to individual phonemes (segmental storage), Vogel Sosa and Stoel-Gammon

(2006) sought to better understand the nature of this transition. They observed the phonological development of 4 children (2 boys and 2 girls) from 12 months until 24 months. They noticed individual differences in stability between the 4 children over the 12-month period they were being observed, which the researchers attributed, in part, to individual differences in lexical development. Despite these individual differences, they were able to make some generalisations from the data. They found that the children continued to demonstrate a high rate of variability when they had 50-100 words in their verbal expressive vocabulary and that variability peaked around 150-200 words when the children were combining words into phrases. The researchers suggested that this peak in variability reflects the transition from a holistic system to a segmental storage system. The findings presented by Vogel Sosa and Stoel-Gammon (2006) provide a degree of confirmation that the phonological system is re-organised as children develop and it could be hypothesised that the selection and avoidance constraints relax later than proposed by Lenoard and colleagues (1977). However, is unclear whether the system (holistic or segmental storage) influences the selection and avoidance constraints put forward by Schwartz and Leonard (1982) and Davis and colleagues (2018).

Newbury (2014) provided some interesting insights into the role of Phonological Short-Term Memory (PSTM) and verbal expressive vocabulary development in toddlers with LLE. PSTM has been shown to play an important role in establishing memory traces for new phonological forms and, subsequently, people with weaknesses in PSTM typically experience difficulties in acquiring new phonological forms (Baddeley et al., 1998). Newbury assessed 55 toddlers with typical language development and 24 toddlers with LLE at two-time points. The toddlers were initially assessed between 24 to 30 months of age and re-assessed 18 months later, between 41 to 49 months of age. The assessments were used to explore the relationship between aspects of working memory and expressive language development. Newbury identified that the variable that differentiated the expressive vocabulary development of toddlers with typical language development from toddlers with LLE, compared using the MacArthur-Bates CDI (Fenson et al., 2006), was their performance on measures of PSTM. She proposed that PSTM capacity limits in toddlers with LLE may be constraining their early expressive language development. This would be consistent with the selection and avoidance phenomenon observed in some children with LLE, as described by

Schwartz and Leonard (1982) and Davis and colleagues (2018). Newbury suggested that these toddlers require a high level of repetition of new words to support them to store the phonological representations. In addition, Newbury observed that weaknesses in PSTM persisted in children who had resolved LLE. She suggested that children who had resolved LLE were able to overcome their weaknesses in PSTM, whereas those who went on to experience persistent language difficulties were not. Therefore, it could be argued that, while the constraints appear to relax over time, the underlying cause of this phenomenon remains unresolved over time.

Based on the results presented by the studies, it could be suggested that choosing words with phonological characteristics inside the child's phonology could increase the likelihood that the child would use a word, either on imitation or spontaneously. This is supported by the findings of Newbury (2014) who identified persistent difficulties with PSTM in toddlers who have LLE. These findings also support the frequent repetition of new targets to support the acquisition of new phonological forms. However, while the difficulties in PSTM appear to continue even in children with resolved LLE, it would be important to consider whether these constraints relax as the system changes from a holistic to a segmental storage system, as defined by Ferguson and Farwell (1982), as the intervention approach may change as the child's phonological system develops.

Current Intervention Studies

Despite the findings of the above studies, interventions supporting the phonological development of toddlers with LLE have received little focus in the literature. It is only recently that pilot studies investigating the effectiveness of intervention approaches that simultaneously target the vocabulary and phonological development of these children have been completed (Kaiser et al., 2017; Philp et al., 2021). This is reflected in the resources available to SLTs on early intervention approaches for toddlers with LLE, with the American Speech-Language-Hearing Association (ASHA) being the only professional body to provide clinical guidelines for the assessment and treatment of LLE (American Speech-Language-Hearing Association, 2023b). However, in their guidelines, there is no reference to early intervention approaches that consider or support the child's phonological development, despite ASHA recommending assessing a child's phonological development in their clinical guidelines.

This knowledge gap can also be seen in Cable and Domsch's (2011) systematic review of the literature exploring early intervention approaches for toddlers with LLE. Analysis of the studies included in their systematic review showed that language outcomes were the primary focus of the 11 studies. Of those 11 studies, only 5 used an intervention approach that included target word selection (Girolametto et al., 1995; Girolametto et al., 1996; Lederer, 2002; Weismer et al., 1993; Wilcox et al., 1991). Most of these studies referenced focused stimulation alongside other therapy approaches (Girolametto et al., 1995; Girolametto et al., 1996; Lederer, 2002; Weismer et al., 1993), such as the Hanen It Takes Two to Talk (ITTT) Parenting Program (Weitzman, 2017). Hence, it would be worthwhile exploring the benefits of focused stimulation for improving vocabulary and phonological outcomes for toddlers with LLE. The outcomes can then be considered within language-focused interventions with and without phonological considerations.

Focused Stimulation

Early intervention for toddlers with LLE typically involves speech and language therapists (SLTs) teaching parents or caregivers to use language stimulation strategies when interacting with their child (American Speech-Language-Hearing Association, 2023b). These parent-implemented strategies are used to modify the child's environment to accelerate their language development and are often embedded into play and everyday routines (Paul et al., 2017). Focused stimulation is one strategy that falls under the umbrella of language stimulation.

Focused stimulation is an interactive intervention technique that is frequently taught to parents or caregivers by SLTs to aid their child's first-word learning and vocabulary development (Weismer et al., 2017; Paul et al., 2017). Focused stimulation aims to enhance parent-child interactions by increasing the parent's responsiveness to their child during play and daily activities (Girolametto et al., 2016). The parent is taught to provide language models that are appropriate for their child's level of language development and that match their focus and interest at the time (Girolametto et al., 2016). Together, the clinician and the parent or caregiver select a target vocabulary that is developmentally appropriate, functional, and motivating for their child. The words chosen typically encompass different parts of speech (e.g., substantive and relational words) to ensure that the child develops a broad vocabulary, essential for combining words later on in their development. Once the

target vocabulary is established, the target words are modelled repeatedly to the child during episodes of joint attention, where the child and the adult have coordinated attention to one another and an object or event (Akhtar & Gernsbacher, 2007; Cable & Domsch, 2011; Weismer et al., 2017).

There is strong research evidence available to support the use of focused stimulation as a therapy technique to accelerate the language development of toddlers with LLE (Cable & Domsch, 2011; Weismer et al., 2017). Cable and Domsch's systematic review of the literature in 2011 indicated that children with LLE made significant gains in formal measures of language, mean length of utterance (MLU), and target word use with the use of focused stimulation. Wolfe and Heilmann (2010) explored whether presenting target words in a simplified condition (e.g., single words and 2-word phrases) or an expanded condition when using focused stimulation resulted in better language outcomes. Their study involved a single case study; a 25-month-old male with LLE. The results showed that the child made significant expressive language gains over the course of the 16-week intervention phase, which was consistent with the results of other studies which showed the benefits of focused stimulation (Cable & Domsch, 2011; Weismer et al., 2017). The results also showed that the child was able to master new vocabulary regardless of the utterances the researcher was using (simplified or expanded), although the child showed a slight preference for the simplified condition. The researchers suggested that this may be because the simplified condition placed fewer demands on the child's processing system, which would align with the findings of Newbury (2014) which suggested that toddlers with LLE have PSTM capacity limits. They also suggested that presenting a small number of target words through focused stimulation may have had more of an influence than the context in which the word was modelled to the child.

Wolfe and Heilmann (2010) agreed that the results of their study are inconclusive as they are based on a single case study. However, the results offer interesting insights that warrant consideration. When considered alongside the research on focused stimulation, it is clear that focused stimulation is effective for toddlers with LLE and there is tentative evidence that target words should be modelled within simplified conditions to maximise the child's vocabulary gains.

Language-Focused Intervention

Girolametto and colleagues (1997) adapted the Hanen ITTT Parenting Program (Weitzman, 2017), a language-focused, social interactionist intervention approach, to include selecting target words and teaching parents to select additional vocabulary targets for their child. These adaptations were made to incorporate focused stimulation into the Hanen ITTT Parenting Program (Weitzman, 2017) and to investigate the effectiveness of focused stimulation on the language and phonological skills of toddlers with LLE in their study.

Girolametto and colleagues included 25 parent-child dyads in their study, with children aged between 23 and 33 months at the start of the study. Participants were assigned to two groups: experimental or control, where no intervention was received. The researchers did not specify their process for assignment. However, they completed a comparison of the two groups during the pre-test phase of the study and found no significant between-group differences for chronological age, IQ score, receptive and expressive language abilities, and play level.

The researchers used the MacArthur-Bates CDI (Fenson et al., 2006) to confirm that participants had low expressive vocabulary scores, a characteristic of toddlers with LLE (American Speech-Language-Hearing Association, 2023b; Paul et al., 2017). All 25 toddlers scored below the 5th percentile on the CDI, indicating a more severe expressive language delay than if the 10th percentile cut-point was used. Five toddlers had receptive language delays greater than 6 months and three toddlers had IQ scores that fell between one and two standard deviations below the mean, However, age-equivalent test scores should be interpreted with caution as they are not a precise measure of performance (Frey, 2018). In addition, IQ scores for this age group of children should also be interpreted with caution as there is conflicting evidence about the predictability of these tests in young children (Girault et al., 2018). It was unclear at this early stage of language development if these children would have persistent difficulties in the acquisition of language. However, receptive language and cognitive delays would be considered risk factors for ongoing difficulties with language development (Sansavini et al., 2021).

Overall, the results of the Girolametto and colleagues' (1997) study showed some indirect effects of their language-focused intervention on a child's phonological system,

when compared to the control group. The children in the experimental group showed significant improvements in syllable structure, using more level 3 vocalisations, which included at least 2 consonant sounds (e.g., hat, nappy), than the control group during the post-test phase, which occurred 3 weeks after the intervention phase was completed. In addition, the experimental group showed significant gains in their consonant inventory, more so for early and middle-developing consonant sounds. They also showed greater variability in consonants used in initial and final word positions. However, the results showed no significant change in the percentage of consonants correct (PCC), which measures the accuracy of consonant productions in relation to the adult forms of words. The researchers concluded that the children did not improve in their intelligibility over the course of the intervention. Research into PCC measures for 2-year-old children shows that there is significant individual variability (Watson & Scukanec, 1997). In the study completed by Watson and Scukanec (1997), 24-month-olds had a mean PCC score of 69.2% whereas 36-month-olds had a mean PCC score of 86.2%. It is difficult to draw conclusions about the PCC measures and intelligibility in the Girolametto and colleagues' study as PCC measures were reported by group, which included toddlers across a wide age range, including children from 23 to 33 months of age.

While research in this area is sparse, this finding by Girolametto and colleagues is consistent with an older study by Fey and colleagues (1994). Therefore, it would be worthwhile considering whether selecting words based on their phonological characteristics could yield a significant improvement in a child's PCC score as this outcome was unable to be achieved by language-focused interventions.

Language-Focused Intervention with Phonological Considerations

A preliminary study that investigated embedding phonological targets within a language-focused intervention for children with a cleft showed promising outcomes for both phonological and language development. Kaiser and colleagues (2017) sought to investigate the effectiveness of Enhanced Milieu Teaching, a language-focused, behavioural intervention approach, with the inclusion of phonological targets. Enhanced Milieu Teaching had been shown to improve the receptive and expressive vocabulary of children with language delays (Kaiser & Roberts, 2013; Roberts & Kaiser, 2012). This intervention approach was designed to target specific language skills (e.g., requesting, producing two-

word utterances, developing vocabulary) during play and daily routines and the authors claimed that it was suitable for toddlers and some preschool-aged children (Kaiser & Roberts, 2011).

A study by Scherer (1999) using Milieu Teaching showed positive outcomes for participants, who also had a cleft, when vocabulary and phonological targets were embedded into therapy. Therefore, phonological emphasis was added into Enhanced Milieu Teaching for the Kaiser and colleagues' (2017) study. Phonological emphasis referred to selecting phonological targets based on the child's current inventory of phonemes and the developmental appropriateness of speech sounds. Early developing words including these sounds were selected, using the MacArthur-Bates CDI (Fenson et al., 2006) as a guide, and targeted in therapy using modelling and recasting strategies. The rationale for embedding phonological targets into intervention for children with a cleft, who have orofacial anatomical differences, was that these children often present with smaller phonological inventories and that these difficulties can persist into the preschool years even with lip or palate repairs (Chapman, 1991; Chapman et al., 2001; Jones et al., 2003).

Kaiser and colleagues (2017) included 19 children aged between 15 and 36 months of age in their study, randomly assigning participants to a treatment or non-treatment group. Based on their initial assessment, individualised vocabulary and phonological targets were selected for each of the children in the treatment group. Although the researchers identified that words were selected based on the child's current inventory of phonemes, the specific targets were not provided and, as such, it was unclear whether targets were inside or outside of the child's phonology. A later study by Philp and colleagues (2021), where Enhanced Milieu Teaching with phonological emphasis was also used, showed that target words included sounds outside of the child's phonology.

The intervention was provided by qualified SLTs at the university clinic. Kaiser and colleagues (2017) showed high treatment fidelity with adherence to all fidelity measures, such as matched turns, talking at the child's level, and recasting incorrect child utterances. This allowed for increased confidence in the results presented by the researchers as they could be attributed to the delivery of the intervention. However, as parents were not included in the delivery of the intervention in the study, it was unclear whether they could be supported to deliver the intervention accurately and effectively. This is an important

consideration in early interventions for toddlers with LLE (American Speech-Language-Hearing Association, 2023b; DeVeney et al., 2017)

In summary, the outcomes for the treatment group were positive with participants showing larger gains in language and phonological measures when compared to the non-treatment group. Consistent with previous studies (Cable & Domsch, 2011), the treatment group showed statistically significant gain scores for receptive language and expressive vocabulary when compared to the non-treatment group. However, there was no significant difference between MLU gain scores between groups. With regard to speech outcomes, PCC gain scores were statistically significant between groups. However, intelligibility gain scores between groups did not reach significance. The researchers attributed this to the reliability of their intelligibility ratings which they felt was reduced due to the small sample of words used by children in the language samples they obtained. A subsequent study using Enhanced Milieu Teaching with phonological emphasis showed intelligibility gains for all 3 of the participants (Philp et al., 2021), although it is unclear whether these gains reached significance as this was not reported on by the researchers. It is probable that the intelligibility gains reported in the Philp and colleagues' (2021) study are due to the parents implementing the intervention and providing a rating of their child's intelligibility, rather than the researcher. However, without further research, this remains uncertain.

While the findings presented in the Kaiser and colleagues' (2017) study are encouraging, there are many limitations to the conclusions that able to be drawn from this research. Firstly, the population of children included in their studies had orofacial anatomical differences in these children due to a cleft. Given that LLE occurs in the absence of any underlying aetiology, such as a cleft (American Speech-Language-Hearing Association, 2023b), the generalisability of the findings to toddlers who have LLE is limited. However, the researchers made a concerted effort to confirm typical cognitive development and that the children's hearing was within normal limits as well as to exclude children who had been identified as having a syndrome to control for these possible influences. Secondly, the exploratory nature of this study meant the sample size was small, with the researchers including only 19 children in their study. The researchers indicated that this was a limitation and recommended that a larger-scale study be completed in the future. Finally, the intervention was provided over 6 months, with bi-weekly sessions occurring. These would

be considered optimal intervention conditions. However, this is not always feasible in clinical practice for a myriad of reasons. Hence, there is merit in determining whether less frequent sessions are also able to yield positive language and phonological outcomes through future research studies using a language-focused intervention with phonological emphasis.

Furthermore, refinement of the process for selecting phonological targets within this intervention approach should be considered, particularly for children who have LLE. If the purpose of incorporating speech targets into intervention is to accelerate their expressive vocabulary development, then research on the selection and avoidance phenomenon should be taken into consideration when selecting these targets. It could be suggested that there is merit in considering the phonological abilities of toddlers with LLE in the selection of target words. Based on the findings of Schwartz and Leonard (1982) and Davis and colleagues (2018), it could be hypothesised that selecting words where the child has the initial sound in their phonemic inventory would support their expressive vocabulary development. This approach is supported by Lederer (2002) who published a framework for selecting target words for children with LLE based on the literature that is currently available. In this framework, Lederer recommends collecting and analysing data on the child's vocabulary and their inventory of speech sounds and syllable structures to support the selection of target words.

Parent Training

Parent-child interaction therapy (PCIT) encompasses different intervention approaches in speech and language therapy (Klatte et al., 2019). However, the key components of PCIT include teaching parent-specific strategies and the parent using these strategies with their child to improve their development (Klatte et al., 2019). Parent training programs, such as the Hanen ITTT Parenting Program (Weitzman, 2017), provide support for parental involvement in early intervention. A review of the literature by DeVeney and colleagues (2017) found that parent-implemented intervention leads to positive expressive language outcomes for toddlers aged 18 to 42 months with LLE, including those children with intellectual disabilities. Thus, this provides some certainty that parents could be upskilled to deliver effective language and phonological interventions to their toddlers, provided they received the correct training and support. This was further supported by a

systematic review of the literature completed by Tosh and colleagues (2017) which showed that these interventions were effective when parents received coaching from a qualified SLT. Conversely, Tosh and colleagues found that these interventions were highly ineffective without the provision of coaching.

Klatte and Roulstone (2016) explored the perceptions of 10 SLTs who delivered PCIT interventions to understand what makes these interventions successful and unsuccessful. There was a general consensus that the delivery of PCIT interventions is challenging. In particular, the therapists reported that parent engagement was an integral part of the success of these interventions and one of the most challenging components. This is consistent with the findings of Melvin and colleagues (2019) which showed that engagement is crucial for successful early speech and language therapy intervention in the New Zealand context. In addition, the therapists in Klatte and Roulstone's study identified that parent reflection, parent understanding, and the therapist's skills were integral parts of the success of PCIT interventions. The researchers suggested that if one component is not present, there is a higher chance that the PCIT intervention will be unsuccessful. Therefore, it would seem necessary to ensure that therapists are equipped with the skills needed to foster engagement and provide effective coaching and feedback to increase the success of parent-implemented interventions.

One of the major limitations of the Kaiser and colleagues (2017) study was that parents were not involved in the implementation of the intervention. This was acknowledged as a limitation by the researchers who suggested that a therapist plus parent model be trialled in future research studies. A recent pilot study by Philp and colleagues (2021) similarly used Enhanced Milieu Teaching with phonological emphasis. However, in this study, parents were trained to deliver the intervention to their children. The program was delivered exclusively via telehealth due to the Covid-19 pandemic and associated restrictions. The pilot study included three children with a cleft and their mothers. The children were between 21 and 27 months of age at the start of the study. An additional child, without a cleft, was recruited as a comparison. This child was the twin of one of the children who had a cleft so it was assumed that the mother would apply the strategies she learnt during the program to her interactions with both her children. The teach-coach-

model-review (TCMR) approach (Roberts et al., 2014) was used to support parent training, with some adaptions to ensure it was suitable for telehealth.

The findings showed that all of the parents increased their use of the intervention strategies across the intervention phase. The findings also showed that all the parents continued to use these strategies for 3 to 4 weeks after the intervention sessions ceased. The children in the Philp and colleagues' (2021) study also demonstrated improvements in their language and phonological development, even though the intervention was delivered by their parents, rather than the researcher. In addition, the parents reported a positive experience with the program, agreeing that the program helped them to better interact with their children. They also agreed that the coaching aspect of the TCMR approach was beneficial. All parents reported that they would continue to use the intervention strategies with their children.

In summary, there is conclusive evidence that parent-implemented interventions are effective for toddlers with LLE and there is emerging evidence that parents can be trained to implement interventions that simultaneously target a child's language and phonological development (Philp et al., 2021). Based on the evidence reviewed, the parent's role in an intervention program should be clearly defined and the process for providing effective training to the parent should be considered.

Telehealth Service Delivery

There has been an uptake in telehealth sessions due to the Covid-19 pandemic and associated restrictions. Hence, there is merit in exploring the evidence that exists for this service delivery model and whether the same outcomes can be achieved when services are provided via telehealth rather than in person. The recent study by Philp and colleagues (2021) offers some interesting comparisons as their intervention program was delivered exclusively via telehealth. Philp and colleagues compared the outcomes of their study to the findings of Roberts and Kaiser (2015) and Roberts and colleagues (2014), which trained parents to use Enhanced Milieu Teaching with their children. They reported similar results with regard to the ability to train parents in the use of intervention strategies. An observation, which was evident when comparing the two studies, was that the parents in the Roberts and colleagues study showed limited generalisation and maintenance of the intervention strategies following the intervention, whereas the parents in their study did. It

could be suggested that the use of telehealth allowed the intervention strategies to be taught and practised in the home context and this supported generalisation and maintenance, although further research should be conducted to confirm this hypothesis.

Philp and colleagues (2021) made generalised statements that the children in their study had similar outcomes to other studies where intervention was delivered in person. The Kaiser and colleagues (2017) study provides a comparison as both studies used Enhanced Milieu Teaching with phonological emphasis. In both studies, the children who received the intervention made gains on expressive vocabulary measures, although no statistical analysis was completed for the Philp and colleagues' study due to the small number of participants. To determine whether the gains were related to maturation, the researchers compared the verbal expressive vocabulary of the twins in the study. One twin had a cleft and received the intervention whereas the other twin did not have a cleft and, therefore, did not receive the intervention. They found that the vocabulary acquisition of the twin with a cleft increased. Conversely, the vocabulary acquisition of the twin without a cleft remained stable. The researchers concluded that the effects were not solely related to maturation. However, it appears this claim is based on productive vocabulary obtained through a language sample, as the MacArthur-Bates CDI was not repeated for the twin without a cleft during the post-intervention phase.

In addition, the children in both studies who received the intervention made gains in PCC. Philp and colleagues (2021) felt that the speech gains observed in their study could not be attributed to maturation alone as the twin without a cleft did not make substantial PCC gains (83.6% at pre-intervention and 81.2% at post-intervention) whereas the twin with a cleft palate did (30.6% at pre-intervention and 66.2% at post-intervention).

Overall, it appears that the outcomes reported in the Kaiser and colleagues (2017) study, which was delivered in-person, were similar to the Philp and colleagues (2021) study, which was delivered via telehealth. This comparison is encouraging and suggests that telehealth may be a suitable option for SLTs working with toddlers with LLE to achieve their language and phonological goals.

Summary and Application to the Current Research Focus

This literature review provides the theoretical and research evidence for the Toddler Talk intervention program, which was developed by the speech and language therapist-researcher (SLT-R) and implemented in her clinical practice prior to this research study being completed. The theoretical evidence suggests that early intervention for children with LLE should target speech perception and production as well as parent-child interactions and joint attention to promote positive intervention outcomes.

The interventions presently available to SLTs for toddlers with LLE are language-focused and do not consider the child's phonological development. However, there is a strong body of research evidence to support the relationship between language and phonological acquisition, with toddlers who have LLE more likely to experience co-occurring phonological delays. Given this relationship, it could be suggested that early intervention for toddlers with LLE should not exclusively target their language development, but also address their phonological development. However, these intervention approaches are only just emerging in the literature, with only two intervention studies being completed to date which include toddlers with a cleft, rather than LLE (Kaiser et al., 2017; Philp et al., 2021). These two research studies have shown positive vocabulary and PCC outcomes for their participants, who all had a cleft (Kaiser et al., 2017; Philp et al., 2021). These outcomes are pertinent as no significant PCC changes were observed in the language-focused interventions for toddlers with LLE. However, these results must be interpreted with caution as these results have not been replicated with children who have LLE.

Both of the research studies selected vocabulary and phonological targets for each participant and embedded these targets into play and everyday activities with the child (Kaiser et al., 2017; Philp et al., 2021). While these research studies used Enhanced Milieu Teaching, there is ample research evidence to support the use of focused stimulation with toddlers who have LLE (Cable & Domsch, 2011; Weismer et al., 2017). There is evidence that modelling target words is effective within simplified and expanded conditions (Wolfe & Heilmann, 2010), although simplified conditions may be preferred as fewer demands are placed on the child's processing system (Newbury, 2014; Wolfe & Heilmann, 2010).

The research on the selection and avoidance phenomenon in early word learning should be taken into consideration when selecting phonological targets for children with

LLE. Research into this area is sparse and suggestive, at best. However, there is some evidence that children choose to say words that have phonological characteristics within their phonology (Davis et al., 2018; Schwartz & Leonard, 1982). For example, 'baby' and 'bubble' may be appropriate targets if a child can say 'bye-bye', where the /b/ sound can be produced in word initial position and the child can produce consonant-vowel-consonant-vowel (CVCV) combinations.

The Toddler Talk intervention program developed by the SLT-R includes vocabulary targets that consider the child's inventory of phonemes and syllable structures in the selection of the target words. Parents are taught to embed these words into play and everyday activities using language stimulation strategies, one of which is focused stimulation which is supported in the literature (Cable & Domsch, 2011; Weismer et al., 2017). The inclusion of parent training has been shown to be effective for toddlers with LLE and is a component of the Toddler Talk intervention program due to the strong theoretical and research evidence (Bandura, 1977; DeVeney et al., 2017; Klatte et al., 2019; Tosh et al., 2017; Vygotsky, 1978). Finally, there is emerging evidence that early intervention approaches can be adapted and delivered via telehealth with similar outcomes. Hence, the Toddler Talk intervention program will be offered via telehealth in the event that a parent and child are unable to attend their in-clinic session. This increases the opportunities for families to access quality speech and language therapy services.

Chapter 3: Methodology

This research study was conducted at a private speech and language therapy clinic located in Sydney, Australia. The study recruited two parent-child dyads to receive the Toddler Talk intervention program, an evidence-based intervention program currently used in the speech and language therapist–researcher's (SLT-R) clinical practice for toddlers with late language emergence (LLE). However, only one of the parent-child dyads completed the intervention program in its entirety. The intervention program was delivered over an 8-week intervention phase. This chapter will outline the methodology for this research study, including the guiding research questions, study design, recruitment process, and research phases. It will also introduce the participants in this study and provide a detailed overview of the Toddler Talk intervention program.

It is important to note that the intervention was implemented by the researcher, who is also a qualified and experienced speech and language therapist (SLT). To reflect the dual role, the term SLT-R will be used. The data collection measures used in the Toddler Talk intervention program and those completed for research purposes are clearly outlined throughout this chapter to clearly differentiate between the roles of the researcher and SLT delivering the intervention.

Research Questions

The Toddler Talk intervention program was developed by the SLT-R based on the literature currently available to support the language and phonological development of toddlers with LLE. The research questions were as follows:

1. What changes in verbal expressive vocabulary and utterance length are observed when the Toddler Talk intervention program is used with a toddler with LLE?
2. What changes in phonological abilities are observed when the Toddler Talk intervention program is used with a toddler with LLE?
3. What is the social importance and acceptability of the Toddler Talk intervention program for the participants in the study?

Study Design

An exploratory case study design was used to collect data on the child's response to the Toddler Talk intervention program and the parent and child's experience with the program to answer the research questions outlined above. An exploratory design was chosen as it enabled the newly developed Toddler Talk intervention program to be explored (Yin, 2014). This allowed the SLT-R to collect preliminary evidence to support further research on this intervention program (Yin, 2014). The case study design was chosen as it allowed for the exploration of the central phenomenon within the relevant clinical context (Yin, 2014). This was important as the outcomes of the Toddler Talk intervention program were likely influenced by contextual variables, such as engagement levels (Yin, 2014). Thus, considering the contextual variables in the analysis of the data allowed for a deeper understanding of the outcomes being explored (Yin, 2014; Yin & Davis, 2007). In addition, the case study design was chosen as it allowed for a comprehensive description of the intervention process which highlighted the decisions made by the SLT-R and facilitated transferability (Vance & Clegg, 2012; Yin, 2014). It was anticipated that this would, in turn, enable SLTs to apply the Toddler Talk intervention program to similar clinical situations to achieve comparable outcomes for their clients (Nowell et al., 2017; Yin, 2014).

Inclusion and exclusion criteria were established to ensure that children selected to participate in the study were suitable for the Toddler Talk intervention program. This was important as the research questions were specific to the Toddler Talk intervention program and toddlers with LLE.

Inclusion Criteria

The children were required to be of toddler age, between 12 and 36 months of age, to be included in the study. They were also required to be at risk for LLE based on their initial assessment results. LLE was defined as a, "delay in language onset with no other diagnosed disabilities or developmental delays in other cognitive or motor domains"

(American Speech-Language-Hearing Association, 2023b). The American Speech-Language-Hearing Association (ASHA) outlines that, "Children with expressive delays show delayed vocabulary acquisition and often show delayed development of sentence structure and articulation. Children with mixed expressive and receptive language delays show delays

in oral language production and language comprehension" (American Speech-Language-Hearing Association, 2023b).

Exclusion Criteria

The Toddler Talk intervention program was specifically developed by the SLT-R for toddlers with LLE. There is theoretical and research evidence to support the use of this intervention approach with this population of children, although the evidence does not extend to the Toddler Talk intervention program which is in the initial stages of being studied. At the time of this study, there was no evidence to suggest this intervention approach would result in positive outcomes for children with delays across multiple developmental domains or for children who had a neurodevelopmental disorder (e.g., Down syndrome, cerebral palsy), or neurodiversity (e.g., autism spectrum disorder (ASD)). This was also the case for children learning two or more languages. As such, these children were not recruited for this study as there were other, more appropriate, interventions for these children that target their specific areas of need.

Recruitment

The participants were recruited through the private speech and language therapy clinic where the SLT-R worked. After receiving full ethics approval from Massey University and an initial discussion with the clinic's Director, a letter (Appendix A) was sent to provide the clinic's Director with written information on the procedures for the study along with an approval form (Appendix B) for the study to be conducted at the clinic. The clinic was selected for convenience as the SLT-R worked at the clinic as an SLT and the clinic had a waitlist of toddlers with probable LLE waiting for speech and language therapy services. Two parent-child dyads were invited to attend an initial assessment. As the two children met the inclusion criteria, based on their initial assessment results, the two parents were provided with the information sheet (Appendix C) and consent form (Appendix D) to review and sign. A comparison between the child's initial assessment data collection measures completed as part of standard clinical practice and additional data collection measures completed for research purposes is provided in Table 1.

Although two parent-child dyads were recruited for the study, only one of the parent-child dyads completed the intervention program in its entirety. One parent-child dyad withdrew from the study after completing two intervention sessions due to changes in

the family's circumstances, which included restrictions associated with the Covid-19 pandemic and the health of an extended family member. No other parent-child dyads were able to be recruited due to the time constraints of this study and the Covid-19 pandemic and associated restrictions which were prevalent during the study period.

Table 1

Comparison Between Data Collection Measures

Standard Clinical Practice	Research Purposes
• Case history questionnaire and parent discussion • Clinical observations of early communication skills, play, speech, and language development during play • Receptive-Expressive Emergent Language Test - Fourth Edition (REEL-4) - completed through a parent interview (Brown et al., 2020) • The Australian English Communicative Development Inventory (OZI) - completed through a parent checklist (Kalashnikova et al., 2016)	• Children's Independent and Relational Phonological Analysis (CHIRPA) – completed through play-based observations (McLeod & Baker, 2017)

Receptive-Expressive Emergent Language Test – Fourth Edition (REEL-4)

The purpose of the initial assessment was to obtain comprehensive information on the child's communication development to confirm their suitability for the research study prior to them being recruited. The SLT-R administered the Receptive-Expressive Emergent Language Test - Fourth Edition (REEL-4) (Brown et al., 2020) to obtain a measure of the child's receptive and expressive language development. The REEL-4 was a recently

published standardised language assessment for children from birth to three years of age (Brown et al., 2020). It was designed to measure a child's receptive and expressive language abilities as well as obtain a measure of the child's overall language ability through the Language Ability Composite Score (Brown et al., 2020). The SLT-R asked the parent the questions outlined in the REEL-4 assessment booklet, completing the assessment to the administration guidelines.

The REEL-4 was selected over other language assessments for this age group due to the ease of administration. The REEL-4 is completed through a parent interview, rather than observing the child and eliciting target responses in play (Brown et al., 2020; Zimmerman et al., 2011). In addition, it has been shown to be a reliable measure of children's language abilities (Brown et al., 2020). This is important as the Preschool Language Scales - Fifth Edition (PLS-5) (Zimmerman et al., 2011), another commonly used assessment for this age group, has received scrutiny over its sensitivity and ability to reflect a child's true language abilities due to the standardised population including children with language delays (Smith, 2014). However, a significant limitation of using the REEL-4 was that the test was standardised on the United States population, rather than the Australian population. Conversely, the PLS-5 was standardised on the Australian and New Zealand population (Zimmerman et al., 2011). Hence, the results of the REEL-4 had to be interpreted with a degree of caution and clinical judgement was required to understand the results obtained.

Clinical Observations

One limitation of the REEL-4 was that the assessment scores were based on a parent's 'yes' or 'no' response to questions asked on the assessment questionnaire. Hence, there was value in including clinical observations as part of the initial assessment process, allowing the SLT-R to observe the child's skills which were reported by the parent during the REEL-4 assessment in real life, in the clinical context. The SLT-R also had the scope to probe additional skills that were not part of the REEL-4 assessment, such as the child's early communication skills (e.g., eye contact, joint attention, use of gestures, turn-taking, and communication functions) and play skills. These observations could then be compared to developmental norms to determine the child's individual areas of strength and need and provide a holistic and comprehensive impression of the child's communication profile (Akhtar & Gernsbacher, 2007; Austin, 2013; Beuker et al., 2013; Lowry, 2015; Mundy, 2007;

Stagnitti, n.d.). Including observations of the child's early communication and play skills, in addition to the REEL-4, was important for confirming that the child's development profile was consistent with LLE and that the Toddler Talk intervention program was a suitable intervention approach for them. A child that presented with delays across multiple early communication skills or in their play development may have a more significant developmental delay impacting multiple developmental domains (Sansavini et al., 2021). Therefore, these children would not meet the definition of LLE and the Toddler Talk intervention program would not be deemed suitable for them based on the theoretical and research evidence that is currently available.

Participants

The parent-child dyad who completed the study included Emily, the mother, and Amelia, the child. To protect the identities of the participants, pseudonyms were used. Initial descriptive information about the case was obtained from Amelia's case history questionnaire, which was provided to Emily by the clinic as part of their standard intake procedures. This form was completed by Emily and submitted to the clinic prior to Amelia's initial assessment. Additional information was obtained through parent discussion during Amelia's initial assessment. The SLT-R was also included as a participant in this study due to her dual role - researcher and SLT.

Emily (the Mother)

Emily was a mother of two children, a daughter named Amelia, who was 20 months old, and a son named Henry, who was 4 years old at the time of this study. This was Emily's first experience with speech and language therapy as she had no concerns regarding Henry's communication development. No information on marital status, maternal education level, or maternal occupation was obtained.

Amelia (the Child)

Amelia was 20 months of age at the time of recruitment into the study. At the conclusion of the study, she was 22 months of age. Amelia was born at full term following an uncomplicated pregnancy and birth. She passed her Statewide Infant Screening – Hearing (SWISH) test (NSW Health, 2020) and Emily reported no concerns regarding Amelia's hearing at the time of her initial assessment. No significant medical history, such as frequent colds, ear infections, or surgeries, was reported by Emily. Emily reported concerns regarding

Amelia's communication development, specifically her expressive language development. She did not express concerns regarding any other areas of Amelia's development when asked, such as her receptive language, fine and gross motor, or play development. Amelia's first and only language was English. No information on the family's ethnicity was obtained.

Amelia was referred for an assessment by Emily as she had concerns regarding Amelia's slow vocabulary growth. Emily first reported concerns at Amelia's 18-month check-up. Her general practitioner (GP) recommended waiting until Amelia was 24 months of age to seek the support of an SLT or to schedule an appointment sooner if she was concerned. On the advice of a friend, who was an SLT, Emily referred Amelia for an assessment. Emily shared that her goal of speech and language therapy was to support Amelia to, "feel confident using her speech," and, "start linking two words together."

Amelia attended an initial assessment at the clinic with her mother, Emily, to assess her communication development and determine whether she met the inclusion criteria for this study. The assessment was 75 minutes in length. Emily was provided with an outline of the assessment plan at the start of the assessment session. She was informed that the assessment would involve parent discussion, clinical observations of Amelia's early communication skills, play skills, and speech and language development during play, and completion of the REEL-4, the Australian English Developmental Vocabulary Inventory (OZI) (Kalashnikova et al., 2016), and the Children's Independent and Relational Phonological Analysis (CHIRPA) (McLeod & Baker, 2017) assessments. The OZI was completed through a parent checklist to provide information on Amelia's expressive vocabulary development compared to Australian children (Kalashnikova et al., 2016). The CHIRPA was completed through play-based observations to create a profile of Amelia's phonological system (McLeod & Baker, 2017). Emily was invited to ask any questions during the assessment process.

Amelia was considered at risk for LLE due to her delayed verbal expressive vocabulary development, as measured by the OZI (10^{th} percentile), and the SLT-R concluded that Amelia met the inclusion criteria. Amelia also demonstrated a reduced phonemic inventory and restricted syllable structures as measured by the CHIRPA, a characteristic of toddlers with LLE (Fasolo et al., 2008). The early communication skills observed during her initial assessment while she played independently, with Emily, and with the SLT-R, are

described below. These included eye contact, joint attention, use of gestures, turn-taking, and communication functions. Amelia's play development was also observed during her initial assessment and her play is also described below. In addition, the results of her REEL-4 assessment are detailed below. As the OZI and CHIRPA were part of the initial data collection phase, the results of these assessments are provided in the results chapter.

Eye Contact

Amelia made eye contact with the SLT-R when greeted and during interactions in play. She made alternating eye contact with the purpose of sharing attention, indicated by Amelia looking between the bubbles and the SLT-R to indicate she wanted more bubbles to be blown. Amelia's eye contact was determined to be age appropriate for a child aged 20 months as she consistently made eye contact with Emily and the SLT-R and demonstrated the use of alternating eye contact, which typically emerges around 8-9 months of age (Beuker et al., 2019).

Joint Attention

Amelia demonstrated shared enjoyment in activities with the SLT-R, such as exploring the farm animal toys and rolling balls down a ball tower. Enjoyment was indicated by Amelia making eye contact, smiling, and sharing toys with the SLT-R. She responded to yes/no questions asked during these interactions. Amelia was able to shift her attention by turning to her name when it was called. She initiated joint attention by pointing and showing objects of interest to the SLT-R and Emily. Overall, Amelia's joint attention appeared to be well established, which is expected by 18 months of age (Akhtar & Gernsbacher, 2007; Mundy, 2007), as she initiated joint attention with Emily and the SLT-R, responded to requests for joint attention, and shifted her attention.

Use of Gestures

Amelia was observed to use a range of gestures during the initial assessment, including deictic gestures (e.g., showing, giving, and pointing), ritualised requests (e.g., pulling Emily or the SLT-R's hand to assist with an action, such as opening a container), and iconic gestures (e.g., shaking her head to indicate 'no' and nodding her head to indicate 'yes'). She was observed to occasionally use some complementary gestures, such as pointing to a baby and saying, "baby." However, this was observed infrequently in the clinic setting. In summary, Amelia was observed to use a range of age-appropriate gestures, including

pointing, which typically emerge around 10 months of age, and complementary gestures (e.g., pointing to a baby and saying, “baby”), which typically emerge around 18 months of age (Lowry, 2015).

Turn-Taking

Amelia demonstrated the ability to take turns with the SLT-R and she showed turn-taking with objects. When prompted with, “My turn,” Amelia passed the ball that she was holding to the SLT-R. She then waited for the SLT-R to take a turn with the ball, rolling the ball down the ball tower, before picking up the ball to take her next turn. She also showed conversational turn-taking using non-verbal communication, such as nodding and shaking her head in response to the SLT-R's questions. Hence, Amelia demonstrated the ability to take turns in play and engaged in conversational turn-taking using non-verbal communication. However, Amelia rarely imitated the SLT-R or provided a verbal response to her comments and questions during the initial assessment.

Communication Functions

Amelia was observed to be intentional in her communication and to communicate for a variety of purposes. She acknowledged the SLT-R's greeting with eye contact and a smile. She farewelled the SLT-R with a wave alongside eye contact and a smile. Amelia made requests using alternating eye contact or gestures, as described above, and she used the gestures of pointing and showing to draw Emily and the SLT-R's attention to objects of interest. In addition, she rejected by shaking her head to indicate ‘no’. While there is no specific pattern for the emergence of different communication functions (e.g., greeting, requesting, direct attention, rejecting), concerns arise when a child has a reduced repertoire of functions or demonstrates a preference for a specific function, such as requesting (Austin, 2013). Hence, Amelia’s communication functions were not of concern as she demonstrated intentional acts of communication through gestures, vocalisations, babble, and single words, which are typically displayed around 8-9 months of age (Austin, 2013) and used several different communication functions during her initial assessment.

Play Development

Amelia’s play skills were also observed during the initial assessment where she played with a range of toys appropriately. For example, Amelia was observed throwing balls, placing balls on a ball tower, and feeding a baby doll. Her play reflected actions previously

seen in the home context (e.g., eating) and included two to three similar actions (e.g., feeding the doll and then feeding herself). Amelia was heard using a small number of words during play, such as, “more,” and, “car.” However, she was observed to use gestures more than words during play and used minimal babble during play in the clinic setting. A video provided by Emily showed Amelia using babble when playing outside with her brother, Henry, in the home context. No information on Amelia’s initiation of communication or turn-taking during play was obtained from this short clip. The SLT-R’s impression of Amelia’s play skills was that they were developing in the 20-month age range, based on Karen Stagnitti’s ‘The Development of Pretend Play’ framework (Stagnitti, n.d.).

Receptive and Expressive Language Development

Amelia’s receptive and expressive language development was formally assessed using the REEL-4 (Brown et al., 2020). Her index scores for receptive language, expressive language, and language ability were within the average range, as shown in Table 2. The REEL-4 Vocabulary Inventory test was not used to measure Amelia’s verbal expressive vocabulary as the SLT-R chose to use the OZI to provide a measure of Amelia’s verbal expressive language as this was standardised on the Australian population. While the results of the REEL-4 suggested that Amelia’s language was developing within the average range, she presented with low expressive vocabulary on the OZI. The SLT-R used her clinical judgement to determine that Amelia was at risk of LLE due to her expressive vocabulary delay as, “Children with expressive delays show delayed vocabulary acquisition” (American Speech-Language-Hearing Association, 2023b).

Table 2

Amelia’s Receptive-Expressive Emergent Language Test – Fourth Edition (REEL-4) results

Index	Standard Score	Percentile Rank	Interpretation
Receptive language	96	39	Within the average range
Expressive language	94	34	Within the average range
Language ability	94	34	Within the average range

The Speech and Language Therapist-Researcher

The SLT-R was also included as a participant in this study, which supported her to engage in reflexivity throughout the study (Creswell, 2015). This was important for allowing

her to acknowledge and manage potential biases that arose due to her clinical experience and further postgraduate study in early language development and early intervention. In addition, this allowed her to offer her impression of the intervention sessions and the overall implementation of the Toddler Talk intervention program (Creswell, 2015). Including the SLT-R's perspective in the presentation of the data and findings was important for gaining a detailed and contextualised understanding of the outcomes of the Toddler Talk intervention program (Creswell, 2015).

Phases

The research study was completed over 12 weeks in 2022 and included three phases: initial data collection phase, intervention phase, and follow-up data collection phase. These phases are discussed in detail below and summarised visually in Figure 1.

Initial Data Collection Phase

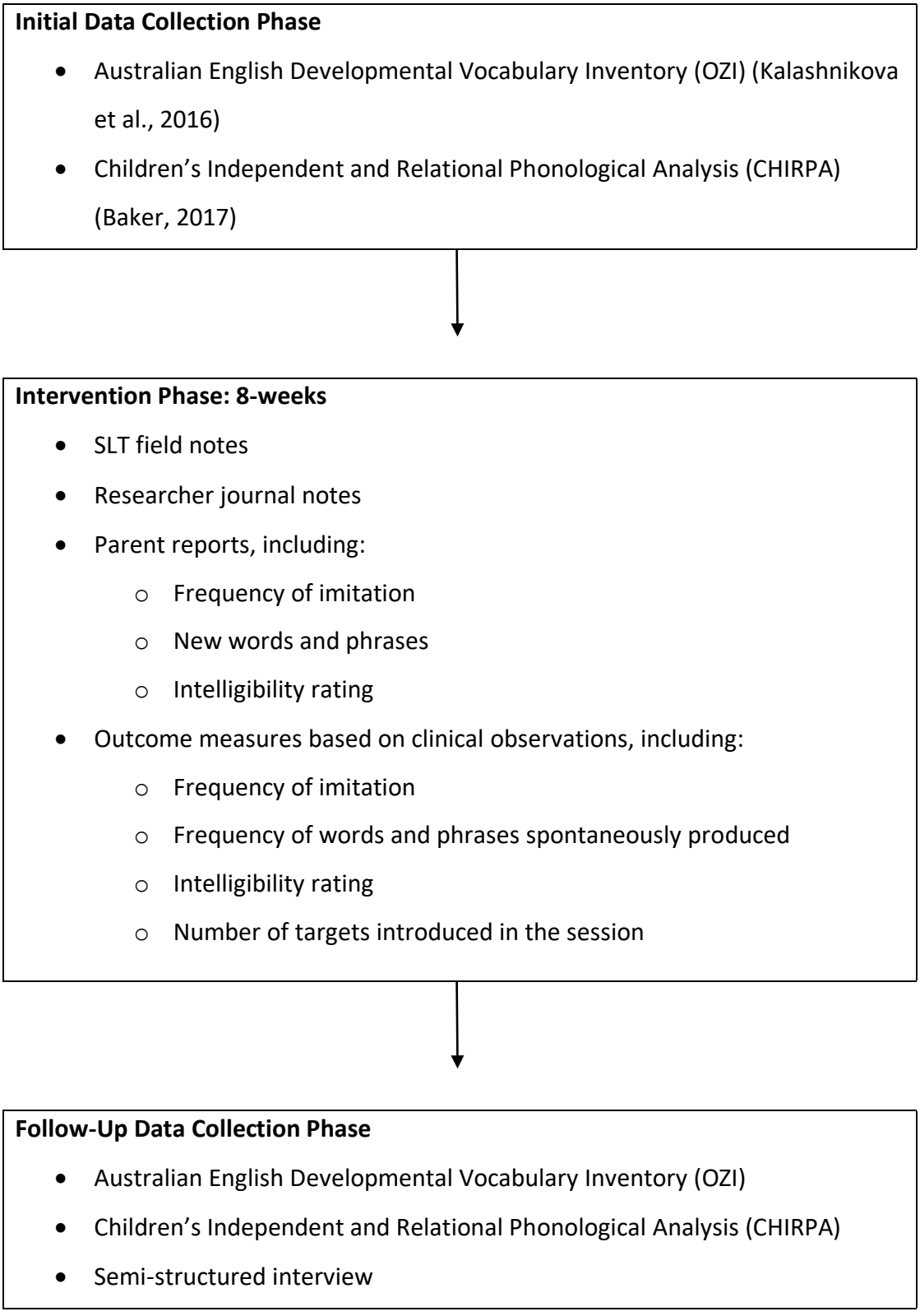
Amelia's initial assessment results were collected to determine her suitability for the research study and to provide pre-intervention outcome measures. The assessments used to provide pre-intervention outcome measures included the OZI (Kalashnikova et al., 2016) and the CHIRPA (McLeod & Baker, 2017). The OZI is part of the SLT-R's initial assessment battery for toddlers with LLE in clinical practice. However, as noted in Table 1, the SLT-R does not typically use the CHIRPA in standard clinical practice and this was therefore an additional assessment completed for research purposes.

Australian English Developmental Vocabulary Inventory (OZI)

Emily was provided with the OZI and asked to complete the form during Amelia's initial assessment appointment to ensure the list of words used by Amelia was available to the SLT-R prior to Amelia's first intervention session. The OZI was developed to provide a valid measure of expressive vocabulary development for Australian children (Kalashnikova et al., 2016), where there are linguistic and cultural differences to the normative sample used in the development of the MacArthur-Bates Communication Development Inventories (CDI) (Fenson et al., 2006; Kalashnikova et al., 2016). The OZI differs from the MacArthur-Bates

Figure 1

Summary of the Research Phases



Words and Gestures CDI, which is used for children 8 to 18 months of age, as it does not ask parents to check off the words that are understood by their child (Fenson et al., 2006;

Kalashnikova et al., 2016). Hence, the OZI only provides a measure of a child's expressive vocabulary and not their receptive vocabulary.

Emily was asked to check off the words, word forms, and word endings used by Amelia from a list of pre-determined words, word forms, and endings provided on the OZI (Kalashnikova et al., 2016). She was also asked to indicate whether Amelia had started using word combinations and to provide three examples of Amelia's longest sentences (Kalashnikova et al., 2016). The OZI includes normative data for children 12 to 30 months of age, which was standardised on the Australian population. A comparative study showed the OZI provided a more sensitive measure of a child's expressive vocabulary than the CDI for Australian children (Kalashnikova et al., 2016).

Children's Independent and Relational Phonological Analysis (CHIRPA)

Standardised assessments of a toddler's phonological abilities, such as the Profiles of Early Expressive Phonological Skills (PEEPS) (Stoel-Gammon & Williams, 2013) and the Toddler Phonology Test (TPT) (Claessen et al., 2017), would not be suitable for toddlers with LLE as they require children to produce a range of stimulus words, either spontaneously or through imitation. This would be challenging for toddlers with LLE as they have no or few words in their verbal expressive vocabulary and it would be unlikely that they would be able to imitate or spontaneously produce the targets in the two assessments. Therefore, the conclusions that could be drawn from these assessments would be extremely limited and provide little to no understanding of a child's phonological abilities.

Research studies that have investigated the speech development of toddlers with LLE have used speech sampling during play to provide information on a child's phonological development (Carson et al., 2003; Williams & Elbert, 2003). These studies used global measures of phonological ability, which were also used by Stoel-Gammon and Williams (2013) when developing the PEEPS assessment. Stoel-Gammon and Williams stressed the importance of investigating a range of domains, including sound classes, types of errors, word and syllable shapes, stress patterns, and accuracy of productions, to create a profile of a child's phonological system. Hence, speech sampling may be more appropriate for toddlers with LLE, provided a framework is used to attain a comprehensive profile of the child's phonological abilities.

The SLT-R elicited vocalisations, babble, and utterances from Amelia during play to complete the CHIRPA. This assessment tool was developed by McLeod & Baker (2017) and is widely accessible to SLTs and is based on the work of Stoel-Gammon and Dunn (1985). The independent analysis involved analysing Amelia's speech independent of the adult phonological system. This included the identification of consonants, consonant clusters, and vowels used by Amelia (McLeod & Baker, 2017). In addition, Amelia's use of syllable shapes (e.g., consonant-vowel-consonant (CVC), CVCV), word lengths (e.g., mono-syllables and poly-syllables), and stress patterns were also identified as part of the independent analysis. The relational analysis involved a comparison of Amelia's speech in relation to the adult phonological system (McLeod & Baker, 2017). This included analysis of the percentage of consonants, vowels, syllable shapes, word lengths, and stress patterns correct as well as exploration of error patterns and phonological processes. Due to Amelia's age and limited verbal expressive vocabulary, the independent analysis was more comprehensive than the relational analysis.

Intervention Phase

Emily and Amelia were invited to attend 8 weekly individual speech and language therapy sessions with the SLT-R to complete the Toddler Talk intervention program. During the intervention phase, repeated measures were collected through SLT field notes, researcher journal notes, parent reports, and outcome measures. A comparison between repeated measures completed as part of standard clinical practice and additional repeated measures completed for research purposes is provided in Table 3.

Field Notes

The SLT-R completed field notes from the perspective of an SLT implementing the intervention program immediately after each intervention session. Field notes provided a description of each intervention session, including the date and time of the session, the intervention context (e.g., in-clinic or telehealth), Emily and Amelia's arousal and engagement levels, and Amelia's behaviour across the session. In addition, field notes described any relevant conversations had with the parent.

Table 3

Comparison Between Repeated Measures

Standard Clinical Practice	Research Purposes

• SLT field notes
• Parent reports, including:
  ○ Frequency of imitation
  ○ New words and phrases
• Outcome measures based on clinical observations, including:
  ○ Frequency of imitation
  ○ Frequency of words and phrases spontaneously produced
  ○ Number of targets introduced in the session
	• Researcher journal notes
	• Parent reports, including:
	  ○ Intelligibility rating
	• Outcome measures based on clinical observations, including:
	  ○ Intelligibility rating

Journal Notes

Journal notes were completed after each session from the perspective of the researcher and included reflective information where the SLT-R recorded her impression of the session and noted any challenges or barriers to the implementation of the intervention. The SLT-R considered the underlying meaning of what had been observed in the session and identified questions that need to be addressed in future intervention sessions.

Parent Reports

The total number of new words spontaneously produced by Amelia at home between intervention sessions, as reported by Emily at each intervention session, was recorded as a numerical value. Emily recorded this information on her phone as this was the most convenient recording method for her. As Amelia's phrase length grew beyond single-word utterances, Emily started providing information on the number of new two-word phrases used by Amelia at home across the week. This was also recorded as a numerical value. In addition, Amelia's frequency of imitation of words in the home context was recorded using a 4-point scale (1 = never, 2 = occasionally, 3 = often, 4 = always). Finally,

Emily was asked to provide her impression of Amelia's intelligibility in the home context across the week with the question. She was asked, "What percentage of Amelia's words do you understand?" during each intervention session to provide an overall percentage value for Amelia's intelligibility in the home context each week.

Outcome Measures

A numerical value was given by the SLT-R to reflect the total number of words spontaneously produced by Amelia during each intervention session. A numerical value was also given for the total number of words imitated by Amelia during each session. The collective group of words Amelia imitated and spontaneously produced were categorised into parts of speech (nouns, verbs, adjectives, etc.) to provide a frequency value for each word type. Further, a numerical value was assigned to reflect the number of new targets introduced in each session. As Amelia's expressive language skills progressed, the SLT-R also collected data on the number of new two-word phrases Amelia spontaneously produced or imitated, classified according to Brown's sentence types (Brown, 1973). This was also recorded as a numerical value. In addition, the SLT-R rated Amelia's intelligibility during a 10-minute speech sample taken during play. The SLT-R also assigned a percentage value to allow for comparison between the intelligibility ratings given by Emily, a familiar listener, and the SLT-R, an unfamiliar listener.

Follow-Up Data Collection Phase

Amelia was invited, with Emily, to complete follow-up testing once Amelia had completed the 8-week block of intervention sessions. This occurred two and a half weeks after the conclusion of the intervention phase. The OZI and CHIRPA, which formed part of the initial data collection phase, were repeated during the follow-up data collection session. These assessments were completed through parent reports and child-centred, play-based observations. Following this, Emily was invited to attend a 30-minute semi-structured interview with the Clinic Director to share her thoughts on the intervention, Amelia's progress, and her learnings from the sessions. She was offered to complete this in the clinic or via telehealth without Amelia present. She opted for the interview to be completed via telehealth.

Semi-Structured Interview

One of the main benefits of using an interview was that Emily's perspective was able to be considered in the presentation of the findings. This is particularly important in speech and language therapy research as, in some instances, a child may make little progress against therapy targets, yet parents report positive outcomes when reflecting on their child's participation and well-being (Bold, 2012; Washington et al., 2012). Therefore, there was merit in considering Emily's perspective through conducting a semi-structured interview.

A semi-structured interview procedure was established (Appendix E) to explore the significance of the intervention outcomes on Emily and Amelia (Carter & Wheeler, 2019). In addition, it allowed for exploration of the feasibility of the intervention procedure (Carter & Wheeler, 2019) as Emily was given an opportunity to reflect on the ease of implementation and identify any barriers to the fulfilment of the intervention, such as time and resource constraints.

The interview was conducted by the Clinic Director to provide Emily with a safe environment to share her honest and true opinions on the intervention and minimise any potential biases that could occur from having the SLT-R present during the interview (Hersh, 2019). The SLT-R established the primary questions prior to the intervention interview being conducted. However, the semi-structured interview approach allowed the Clinic Director to ask additional questions to probe deeper and obtain more information from the interviewee (Creswell, 2015).

Toddler Talk intervention Program

Emily and Amelia attended 6 of the 8 individual, weekly speech therapy sessions with the SLT-R. These sessions were 45 minutes in length and held in the clinic, with the exception of one session which was delivered via telehealth due to the family complying with New South Wales (NSW) Covid-19 self-isolation requirements at the time of this study.

Based on the speech and language assessments completed during Amelia's initial assessment, individual target words were identified. Single-word targets were selected based on the developmental appropriateness of the words as well as Amelia's phonological abilities. Words with syllable structures and consonant sounds within her phonological

inventory were prioritised. For example, ‘moo’ was selected as Amelia could produce the /m/ consonant sound and the CV syllable structure. However, words with new syllable shapes were also targeted, provided Amelia was able to produce the initial consonant sound, in line with the research on selection and avoidance constraints in early word learning (Davis et al., 2018; Schwartz & Leonard, 1982). For example, ‘nappy’ was selected as Amelia could produce the /n/ sound in word-initial position, even though she was not yet producing variegated CVCV syllable shapes.

Prior to the first intervention session, four target words were selected for Amelia. These target words and the rationale for selecting these words are outlined in Table 4. The SLT-R made the decision to introduce two-word phrase targets towards the end of the intervention due to the unforeseen progress in Amelia’s verbal expressive vocabulary and utterance length over the course of the intervention. A comprehensive list of the target words and phrases selected over the course of the intervention can be found in Appendix I.

Two new targets were added every fortnight, regardless of Amelia’s achievement of the previous target words and phrases. Therefore, it was anticipated that Amelia would have 12 individually selected targes, at a minimum, at the conclusion of the intervention. This was reflective of clinical practice where targets would be added if little or no observable change was made. In addition, a new target was introduced when a previous target had been imitated or spontaneously produced by the child. This could either be a reported imitation by the parent or observed in the clinic.

Data Analysis

The SLT-R used a range of quantitative (QUANT) and qualitative (QUAL) data analysis techniques to analyse the data to provide a complete understanding of the phenomenon being explored (Creswell, 2015). The inclusion of QUAL data sources supported the identification of broader trends in the data. Further, the triangulation of the QUANT and QUAL data sources allowed the parent, child, and intervention context to be considered in the presentation of the findings (Creswell, 2015). This was particularly important in this study as parent engagement and participation in early speech and language therapy intervention for toddlers with LLE is recommended (American Speech-Language-Hearing

Table 4

Target Words Selected for Amelia's First Intervention Session, Rationale, and Home Practise Suggestions

Target	Rationale	Home Practise Suggestions
Go	• Is able to produce the stopped, velar /k/ sound. The /g/ sound shares the same manner and place, differing in the voicing • Is able to produce CV syllables	• To model during 'ready, set, go' games at home (e.g., bubbles) and at the playground (e.g., swings and slides)
My	• Is able to produce the /m/ sound • Is imitating CV syllables • Provides a word for self	• To model when sharing toys during play
Moo	• Is able to produce the /m/ sound • Is able to produce CV syllables • Increases imitation of symbolic noises	• To model when looking at animals in books • To model when playing with animal toys • To provide opportunities for imitation in the bath
Baa	• Is able to produce the /b/ sound • Is able to produce CV syllables • Increases imitation of symbolic noises	• To model when looking at animals in books • To model when playing with animal toys • To provide opportunities for imitation in the bath

Association, 2023b; DeVeney et al., 2017; Klatte et al., 2019). Table 5 provides an outline of the QUANT and QUAL data analysis measures used in this study.

Table 5

QUANT and QUAL Data Analysis Measures

QUANT Measures	QUAL Measures

• Australian English Developmental Vocabulary Inventory (OZI)
• Children's Independent and Relational Phonological Analysis (CHIRPA)
• Parent reports
  ○ Frequency of imitation
  ○ New words and phrases
  ○ Intelligibility rating
• Outcome measures
  ○ Frequency of imitation
  ○ Frequency of words and phrases spontaneously produced
  ○ Number of targets introduced in the session
  ○ Intelligibility rating
	• SLT field notes
	• Researcher journal notes
	• Semi-structured interview

Australian English Developmental Vocabulary Inventory (OZI)

The OZI is a parent report assessment tool with normative data for children aged 12 to 30 months of age and it served as a QUANT measure in this study. This assessment was administered as per the administration guidelines, thus allowing a norm-based percentile rank to be calculated as a measure of Amelia's verbal expressive vocabulary (Kalashnikova et al., 2016). The OZI can be administered at 6 weekly intervals and was administered during the initial data collection and follow-up data collection phases, allowing for comparison between raw scores and percentile ranks. The change in Amelia's initial and follow-up raw scores and percentile rank position in comparison to her age-matched peers were analysed

using descriptive statistics to identify whether the change over time was clinically significant.

Children's Independent and Relational Phonological Analysis (CHIRPA)

The CHIRPA is a criterion-referenced assessment tool that also served as a QUANT measure in this study. The data was quantified by counting the number of different consonants, vowels, syllable shapes, word lengths, and stress patterns obtained through the independent analysis. Percentage data was obtained for the relational analysis and the analysis tables were completed for error patterns and phonological processes present in Amelia's speech, where possible. The CHIRPA was completed before and after the intervention through conversation sampling during the initial data collection and follow-up data collection phases.

The data obtained from Amelia's CHIRPA during the initial data collection and follow-up data collection phases were compared and changes in her phonemic inventory of consonants and vowels, syllable shape, word length, and syllable stress inventories were analysed using descriptive statistics. Due to the lack of developmental norms for some measures (e.g., syllable shape inventory) and the high variability of phonological abilities in toddlers, the measures obtained from the CHIRPA were not able to be compared to typically developing children (McIntosh & Dodd, 2008). However, any atypical error patterns and phonological processes were noted and reported on as these are a predictor of persistent phonological difficulties (McIntosh & Dodd, 2008) and a reduction in these patterns and processes over time may provide additional insights into the phonological outcomes of the Toddler Talk intervention program.

Parent Reports

The parent report data was analysed quantitatively and presented visually to identify changes over time. Quantitative data included the total number of single words and two-word phrases produced by Amelia, her frequency of imitation at home, and her parent-reported intelligibility between intervention sessions. Descriptive statistics were used to describe the characteristics of the data sets and how they changed over time.

Outcome Measures

Outcome measures were also analysed quantitatively and presented visually to identify changes over time. Quantitative data included the total number of single words and two-word phrases spontaneously produced and imitated by Amelia and her intelligibility, as rated by the SLT-R. An analysis of the parts of speech and semantic relations used by Amelia was also completed. Descriptive statistics were again used to describe the characteristics of the data sets and how they changed over time.

Qualitative Procedures

The qualitative procedures were established for the analysis of the SLT field notes, researcher journal notes, and semi-structured interview. A deductive approach was used where the SLT-R developed theory-driven and structural (research-specific) codes prior to reviewing the data (DeCuir-Gunby et al., 2011). The development of these codes involved consideration of the theoretical frameworks that guided the development of the Toddler Talk intervention program (theory-driven) and the objectives of the research study (structural) (DeCuir-Gunby et al., 2011). The codes were used to assign units of meaning to information in the field notes, journal notes, and interview (DeCuir-Gunby et al., 2011). A deductive approach was chosen over an inductive approach, which would have involved the development of data-driven codes through open coding. The deductive approach allowed the SLT-R to put forward general assumptions and test these hypotheses by examining the data to reach logical conclusions (DeCuir-Gunby et al., 2011).

The SLT-R developed a code book (Appendix J) which included the deductive codes and sub-codes (DeCuir-Gunby et al., 2011). Definitions and examples were provided for each of the codes and sub-codes to guide the analysis of the data. The code book was continually reviewed and revised during the coding process to ensure the codes were appropriate within the context of the data (DeCuir-Gunby et al., 2011). The information in the field notes, journal notes, and interview was categorised into four over-arching codes which included, Amelia's outcomes, Emily's outcomes, the intervention process, and Emily's experience.

The Toddler Talk intervention program was developed based on theoretical and research evidence to support the language and phonological development of toddlers with LLE. Hence, it was important to explore these outcomes from the SLT-R and Emily's

perspectives to provide a deeper understanding of the first two research questions and identify any discrepancies between the QUANT and QUAL data (Creswell, 2015). In addition, there was a benefit in understanding any other outcomes that coincided with the implementation of the intervention program to support the third research question and understand the social importance beyond the language and phonological outcomes.

The theoretical and research evidence guided the development of the framework for the implementation of the Toddler Talk intervention program. Therefore, it was important to understand how the intervention was implemented in comparison to the theory and research in the real-world clinical context. In addition, this analysis yielded additional QUAL information which identified factors that may have contributed to the outcomes of this study (Creswell, 2015) and offered insights into engagement which has been shown to be crucial for successful early speech and language therapy interventions (Klatte et al., 2019; Melvin et al., 2019).

Finally, understanding Emily's experience and personal outcomes was important for determining whether the intervention program was well received and met the needs of Emily and Amelia. This supported the answering of the third research question which was centred around the social importance and significance of the intervention program.

Trustworthiness

The SLT-R made certain that procedures were in place to ensure the QUANT and QUAL data was collected rigorously. This was essential to increase the trustworthiness of the data and ensure meaningful results were presented (Creswell, 2015). These procedures are described below:

Quantitative Procedures to Increase the Trustworthiness

To increase the trustworthiness of the QUANT data, the SLT-R used valid assessments and sampling methods to obtain the QUANT data (Petersen, 2011). She ensured she adhered to the administration guidelines for each assessment to obtain accurate and reliable results (Petersen, 2011). She also documented her sampling methods in detail to increase the accuracy of data collection and further increase the reliability of the results and trustworthiness of the conclusions that were drawn from the data (Petersen, 2011).

To further increase the trustworthiness of the QUANT data, the SLT-R scored the data herself as it was collected during the study. She then re-scored all of the data after all of the data had been collected. Intra-rater reliability was measured by calculating the percentage agreement between the scores (Petersen, 2011). The QUANT data was also scored by another SLT after the SLT-R had re-scored all of the data to further increase the trustworthiness of the QUANT data. Inter-rater reliability was measured by calculating the percentage agreement between the scores (Petersen, 2011).

Qualitative Procedures to Increase the Trustworthiness

To increase the trustworthiness of the QUAL data, the SLT-R used the trustworthiness framework developed by Guba & Lincoln (1985) to guide her decision-making and increase rigour. The SLT-R included a detailed overview of Amelia's communication profile to allow readers to make connections between Amelia and their own clients (Forero et al., 2018; Hersh, 2019). The SLT-R used well-established research methods to increase the credibility of the findings (Hersh, 2019). To further increase the credibility, Emily's interview was conducted with the Clinic Director, rather than the SLT-R, to obtain honest responses from Emily and reduce researcher bias (Hersh, 2019).

The SLT-R used an appropriate coding approach to further increase the transferability of the findings (Hersh, 2019). She provided a detailed description of the procedures used to analyse the QUAL data and documented the assumptions that underpinned these decisions. This was important to ensure transparency and allow the reader to determine whether the process was credible, thus increasing the dependability of the QUAL data (Forero et al., 2018; Hersh, 2019). In addition, the SLT-R engaged in self-reflection at the end of each session to increase the dependability of the data by ensuring she remained neutral and impartial throughout the study (Forero et al., 2018; Hersh, 2019).

The codes developed by the SLT-R during the thematic analysis process were peer-reviewed by her research mentor to further increase the dependability of the data (Forero et al., 2018; Hersh, 2019). Emily was invited to provide feedback on her interview transcript and the themes and sub-themes from her interview to increase confidence that the data was true from the perspective of the participant and support the confirmability of the findings (Forero et al., 2018; Hersh, 2019). The SLT-R ensured conclusions were grounded in

data through the inclusion of specific examples to further support the confirmability of the findings (Hersh, 2019).

Triangulation of the Data

Firstly, the QUANT and QUAL data were analysed separately (Creswell, 2015), following the procedures outlined above. Following this, the QUANT and QUAL data were compared and related to one another (Creswell, 2015). This allowed for the data to be merged and patterns of convergence and divergence to be explored (Creswell, 2015). Triangulation through pattern matching across the data sets increased the credibility of the findings and enriched the understanding of the data and the research questions (Salkind, 2010). This enabled a more complete understanding of the data and allowed for a detailed explanation of the results to be provided (Creswell, 2015).

Ethical Considerations

The Northern Massey University Human Ethics Committee (MUHCE) approved the human ethics application for this study. A detailed ethical analysis of the proposed research study was completed to ensure that it protected the participants' human rights and incorporated the principles of multicultural practice.

Speech and Language Therapist-Researcher Documentation

At the time of this study, the SLT-R held a current Australian Working With Children's Check (WWCC). She also held a National Police Check.

Informed Consent

Participation in this research study required informed consent from Emily, the mother of Amelia (Massey University, 2017). Informed consent meant that Emily had full knowledge of the research study before choosing to take part and understood that participation was voluntary and that she had the right to withdraw herself and Amelia from the study at any time.

Emily was provided with the information sheet (Appendix C) and consent form (Appendix D) to review and sign by the clinic's administration staff. She was asked to contact the Clinic Director if she had any questions or concerns about the study. The SLT-R was not involved in this process to minimise the risk of coercion.

Emily provided informed consent on behalf of Amelia. This was necessary as Amelia's young age (20 months) meant that she was not able to understand the details of the study. However, her assent to the assessments, data collection, and intervention was continually considered by the SLT-R during the study. Amelia was invited into the therapy room by the SLT-R at the start of each intervention session and her assent was indicated when she happily entered the therapy room and engaged in play with the toys available, Emily, or the SLT-R. Conversely, assent was not indicated if Amelia withdrew from interactions or protested. Behaviours such as Amelia shaking her head or saying, "no," moving away from the activity, or cuddling into Emily were interpreted as her withdrawing her assent. In these instances, the SLT-R would stop what she was doing and re-evaluate the session plan in collaboration with Emily to ensure Amelia was comfortable.

Māori Research Ethical Considerations

The SLT-R reviewed the Te Ara Tika Guidelines for Māori Research Ethics (Hudson et al., 2010) prior to the commencement of the research study. This supported the SLT-R to provide tikanga Māori, foster partnership, and facilitate participation for any potential participants who identified as Māori.

Confidentiality, Privacy, and Misrepresentation

As part of the informed consent process, Emily was made aware of the strict confidentiality requirements of the study. All data would be collected and stored securely for 5 years in a Massey University password-protected OneDrive folder, with access only available to the SLT-R and research supervisors.

There was a risk to privacy and misrepresentation which was mitigated by ensuring the participants and the clinic were de-identified and any identifiable characteristics of participants were not reported in the research findings. The pseudonyms, Emily and Amelia, were used in this paper to further protect the identities of the participants. The Clinic Director was made aware that there was a possibility that the clinic could be identified if any readers were familiar with the SLT-R's workplace (Appendix A).

In addition, Emily was provided with an opportunity to provide feedback on her interview transcript to minimise misrepresentation (Bold, 2012; Creswell, 2015). She was

also provided with an opportunity to review the themes and sub-themes that were established by the SLT-R.

Avoidance of Harm

The Clinic Director severed as a point of contact for Emily to ask clarifying questions and express any concerns before enrolling in the study. Emily was informed through the information sheet (Appendix C) that Amelia was not required to participate in the study to receive the Toddler Talk intervention program and that Amelia would continue to receive the usual services of the clinic if Emily decided not to participate in the study.

Beneficence

There were benefits to the SLT profession by conducting this research as there were few clinical guidelines that considered a child's phonological abilities in early intervention recommendations approaches for toddlers with LLE. The guidelines that were available at the time of this study were based on anecdotal evidence (Lederer, 2002). Therefore, this study aimed to add to the evidence base for early intervention approaches that consider a child's language and phonological abilities. This was important for increasing the knowledge base to support SLTs to implement evidence-based practice and upholding the code of ethics (New Zealand Speech-Language Therapists' Association, 2008; Speech Pathology Australia, 2020). This was also important for informing the development of clinical guidelines for SLTs working with children with LLE (American Speech-Language-Hearing Association, 2023b) to ensure these children receive high-quality and effective interventions which improve their long-term outcomes.

Context for Assessment, Data Collection, and Intervention

As the clinic was a private practice, the standard clinic fees were applied for the assessment and intervention sessions. This was necessary to prevent coercion by enticing Emily to participate in this study by offering free sessions or a reduced rate for sessions. However, Emily was made aware that she was only paying for standard practice tasks and not additional research-specific tasks which were included in the information sheet (Appendix C).

Emily was asked to attend all of the sessions with Amelia. This was important for the implementation of the intervention as well as for ensuring Amelia's well-being throughout

the assessment and intervention process. The SLT-R ensured she established rapport with Amelia before she undertook any assessments and data collection with Amelia. This was achieved through the SLT-R utilising a child-centred approach. The SLT-R reviewed Amelia's case history questionnaire to understand her interests (e.g., baby dolls, tea party sets, and colouring) and this guided her selection of age-appropriate toys which were made available to Amelia during each session. In addition, the SLT-R ensured she followed Amelia's lead during play.

Withdrawal from the Study

Emily was informed through the information sheet (Appendix C) that she was able to withdraw from the study at any time. Emily was also made aware that she was still required to comply with the clinic's cancellation policy. The Clinic Director was the primary contact for Emily if she wished to withdraw from the study.

There was a Covid-19 contingency plan in place in case there was a Covid-19 outbreak in the Sydney region during the study resulting in a lockdown. Allied health services were considered essential services in NSW at the time of this study and could continue when detriment would occur if the service was delayed (Speech Pathology Australia, 2022). Emily was informed that face-to-face sessions would continue to be offered, adhering to the requirements set out by NSW Health. However, if Emily or Amelia had cold or flu symptoms, were household contacts, or if Emily felt uncomfortable coming into the clinic a telehealth session would be offered. The Clinic Director also served as the primary contact for Emily if she wished to adjust Amelia's sessions due to Covid-19. At the time of this study, Emily and the SLT-R were required to wear masks for all in-clinic sessions.

Methodology Summary

This chapter has outlined the methodology used in this study. An exploratory case study design was deemed the most appropriate approach for exploring the outcomes of the Toddler Talk intervention program. The research procedure has been documented in detail in this chapter to ensure the intervention is auditable, thus increasing the trustworthiness of the findings. This also allows the intervention procedure to be replicated by other SLTs, supporting the transferability of the procedure into clinical practice (Nowell et al., 2017; Yin, 2014). A convergent mixed methods approach was selected to analyse the data and draw conclusions about the Toddler Talk intervention program to answer the research questions.

To increase the robustness of the findings, seven QUANT and QUAL data sources were included. These included assessments that were completed during the initial data collection phase and repeated during the follow-up data collection phases. These also included repeated measures and observations across the intervention phase. This allowed for pattern matching across the data sources (triangulation), thus increasing the dependability of the findings (Salkind, 2010).

Finally, this chapter has outlined the ethical considerations that were made during the development of this research study. As this study involved a parent-child dyad, it was imperative that their rights and cultural beliefs and values were protected.

Chapter 4: Results

This chapter will provide a brief overview of the case study before outlining the results. This case study included three phases: initial data collection phase, intervention phase, and follow-up data collection phase. As such, this chapter will first detail the quantitative (QUANT) data collected in the initial data collection phase. Following this, the repeated measures obtained during the intervention phase will be integrated with the speech and language therapist (SLT) field notes and researcher journal notes. Finally, the QUANT data collected during the follow-up data collection phase, the reliability of the QUANT data, and the thematic analysis, including data from the SLT field notes, researcher journal notes, and Emily's interview, will be presented.

Case Study Overview

This case study included one parent-child dyad. Emily was the mother of Amelia, a 20-month-old girl who was at risk of Late Language Emergence (LLE) due to her delayed verbal expressive vocabulary development. Amelia's first and only language was English and there were no concerns regarding her hearing or any other areas of development. Hence, she met the inclusion criteria and was invited to participate. Emily's goals for Amelia's speech and language therapy sessions included supporting Amelia to, "feel confident using her speech," and, "start linking two words together."

Initial Data Collection Phase

The initial data collection phase included two QUANT data sources: the Australian Communication Development Inventory (OZI) (Kalashnikova et al., 2016) and the Children's Independent and Relational Phonological Analysis (CHIRPA) (Baker, 2017). Both assessments were completed during Amelia's initial 75-minute assessment session with the speech and language therapist-researcher (SLT-R), which she attended in the clinic with Emily.

Australian Communication Development Inventory (OZI)

Emily completed the OZI during Amelia's initial assessment. The OZI revealed that Amelia had a total of 33 words in her verbal expressive vocabulary prior to commencing the Toddler Talk intervention program. This placed her verbal expressive vocabulary at the 10th percentile (30 words) when compared to the normative sample. Amelia was using three symbolic noises, "uh-oh," "vroom," and, "woof." She was using 27 naming words (e.g.,

“bird,” “ball,” “car,” “banana,” “bath”). She was also using two action words, “drink,” and, “tickle,” and 1 describing word, “all gone.”

Children’s Independent and Relational Phonological Analysis (CHIRPA)

The vocalisations, babble, and words produced by Amelia during her initial assessment were analysed using the CHIRPA to establish her phonological abilities. It should be noted that Amelia produced fewer than 10 words during the assessment and that the CHIRPA was primarily completed through observations of her vocalisations and babble. Amelia used 8 different consonant sounds (/b/, /t/, /d/, /k/, /m/, /n/, /j/, and /ʃ/). She did not use the /p/, /w/, or /h/ consonant sounds during the assessment, which were classified as early-developing phonemes (Shriberg, 1993), and Emily reported that she had not heard Amelia use these sounds at home. Amelia used one middle-developing phoneme, /k/, and one late-developing phoneme, /ʃ/ ((Shriberg, 1993). Amelia also used 5 different vowel sounds (/eɪ/, /u/, /ɑ/, /ɔ/, and /ʌ/).

Amelia exclusively produced consonant-vowel (CV) syllable shapes, producing monosyllable (e.g., “more”) and reduplicated and variegated two-syllable (e.g., “tata,” and, “bata,” for ‘water’) words including this syllable shape. Her babble also included reduplicated and variegated CV syllable shapes. Amelia did not use any VC syllable shapes, nor did she use any syllable shapes with three or more phonemes (e.g., CVC, CCV, VCC). Amelia only used stressed-weak syllable stress.

Amelia’s percentage of consonants correct (PCC) for the early 8 consonant sounds (/m/, /b/, /j/, /n/, /w/, /d/, /p/, and /h/) was 83%. She did not produce any words containing middle or late consonant sounds for a PCC measure to be calculated. Her percentage of vowels correct (PVC) was 100%. No phonological processes were identified as no patterns could be established from the small sample of words produced by Amelia.

Intervention Phase

Emily and Amelia attended six of their eight scheduled intervention sessions, having an attendance rate of 75%. One cancellation was due to sickness and one was due to a family holiday. Five of the six sessions were attended in the clinic. One was attended online via telehealth as the family was self-isolating in line with the New South Wales Covid-19 restrictions at the time of the study. Amelia attended all her intervention sessions with

Emily. Amelia's older brother, Henry, attended session 4 with Emily and Amelia. Table 6 provides an overview of the intervention setting throughout the study.

Table 6

Overview of the Intervention Context

1	2	3	4	5	6	7	8
In-clinic	In-clinic	In-clinic	In-clinic	Telehealth	x	In-clinic	x

Repeated measures were collected during each intervention session through outcome measures and parent reports. The outcomes in the intervention and home settings are detailed separately below. Following this, the outcomes are compared across the two settings.

Outcomes in the Intervention Sessions

Outcome measures were collected by the researcher during each intervention session. The SLT field notes and researcher journal notes are integrated into the presentation of the outcomes.

Number of Words Imitated

The total number of words imitated by Amelia during each intervention session was recorded. Across sessions, there was no observable trend in the data. As the intervention progressed, Amelia started imitating two-word phrases. These were counted separately to provide an additional measure of her imitation. There were only four data collection points as Amelia started imitating two-word phrases in session 3. There was no observable trend in the data.

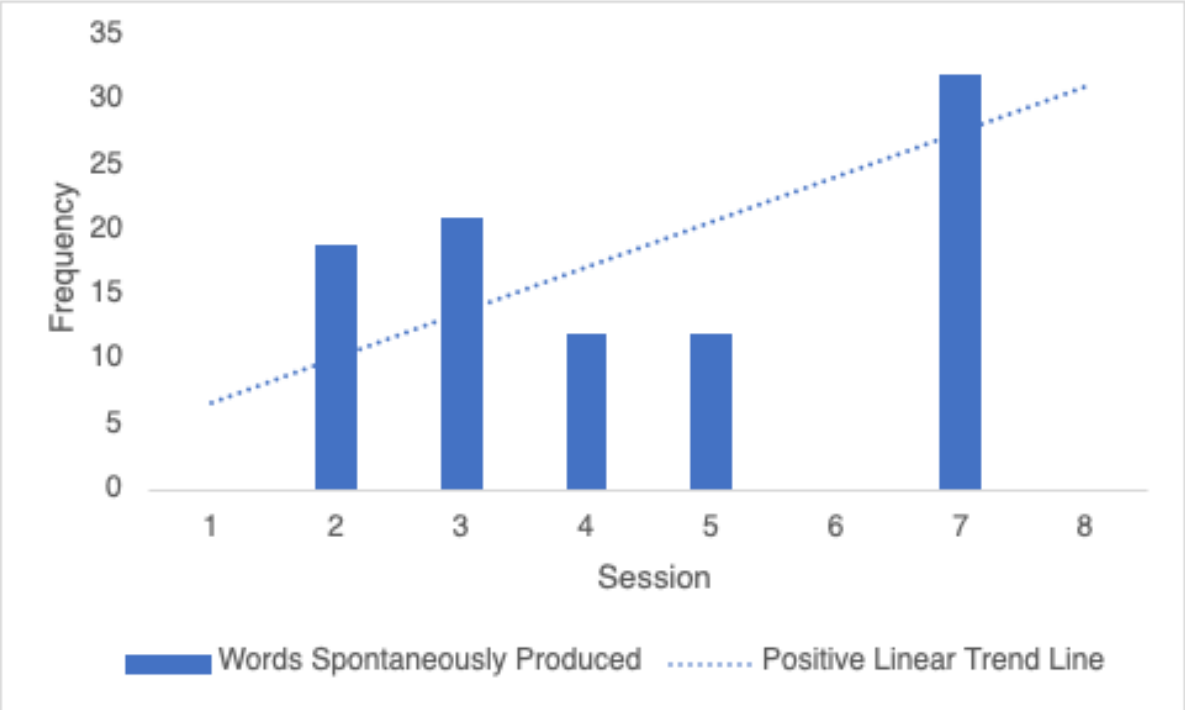
Number of Words Spontaneously Produced

The total number of words spontaneously produced by Amelia during each 45-minute intervention session was also recorded. Figure 2 shows a positive trend in the data despite the reduction in the number of words spontaneously produced by Amelia in sessions 4 (n = 12) and 5 (n = 12), compared to sessions 2 (n = 19) and 3 (n = 21). At the start of the intervention phase, Amelia spontaneously produced a total of 2 words during the 45-minute sessions. This increased to 19 words in session 2, 21 words in session 3, and 37

words in session 7. The lower values for sessions 4 and 5 could be explained by contextual changes in these sessions. In session 4, Amelia's older brother, Henry, attended the session with Emily and Amelia. The SLT-R noted in the SLT field notes that Henry, "spoke a lot and requested the toys Amelia was playing with," and suggested in the researcher journal notes that this may have, "lessened Amelia's verbal output during the session." Session 5 was conducted via telehealth and the SLT-R documented in the researcher journal notes her impression that this service delivery model impacted Amelia's engagement and participation, which the SLT-R felt impacted negatively on Amelia's verbal output during the session.

Figure 2

Number of Words Spontaneously Produced by Amelia in the Session, Including a Positive Linear Trend Line



As the intervention progressed, Amelia also started spontaneously producing two-word phrases. The number of two-word phrases spontaneously produced by Amelia was also counted to provide an additional measure. There were only two data collection points as Amelia did not start spontaneously producing two-word phrases until session 5. The data indicated that during session 5, Amelia spontaneously produced one two-word phrase. This was, "no more," which was classified as a negation-rejection phrase (Brown, 1973). During

session 7, she spontaneously produced four two-word phrases. These included, “open mama,” an action + agent phrase, “baby bottle,” a possessor + possession (object) phrase, “more bubbles,” a recurrence phrase, and, “that baa-baa,” a nomination phrase (Brown, 1973). The SLT field notes indicated that Amelia started producing two-word phrases at home between sessions 2 and 3. However, the SLT-R did not obtain information from Emily about whether the phrases were imitated or spontaneously produced by Amelia nor did she obtain information on the context in which these were used. The SLT-R did note that Amelia was repeating a single word twice (e.g., “more more,”) prior to her use of two-word phrases, both at home and in the clinic context.

In Amelia's final session, session 7, she also spontaneously produced one three-word phrase, “no more bunny.” Emily also reported hearing Amelia attempt three-word phrases at home between sessions 6 and 7 (e.g., “toot-toot with dadda”), as documented in the SLT’s field notes. However, Emily felt that the word ‘with’ was unclear. In Emily’s interview with the Clinic Director, she reported that Amelia was using, “two words and now sometimes three words,” following her participation in the Toddler Talk intervention program.

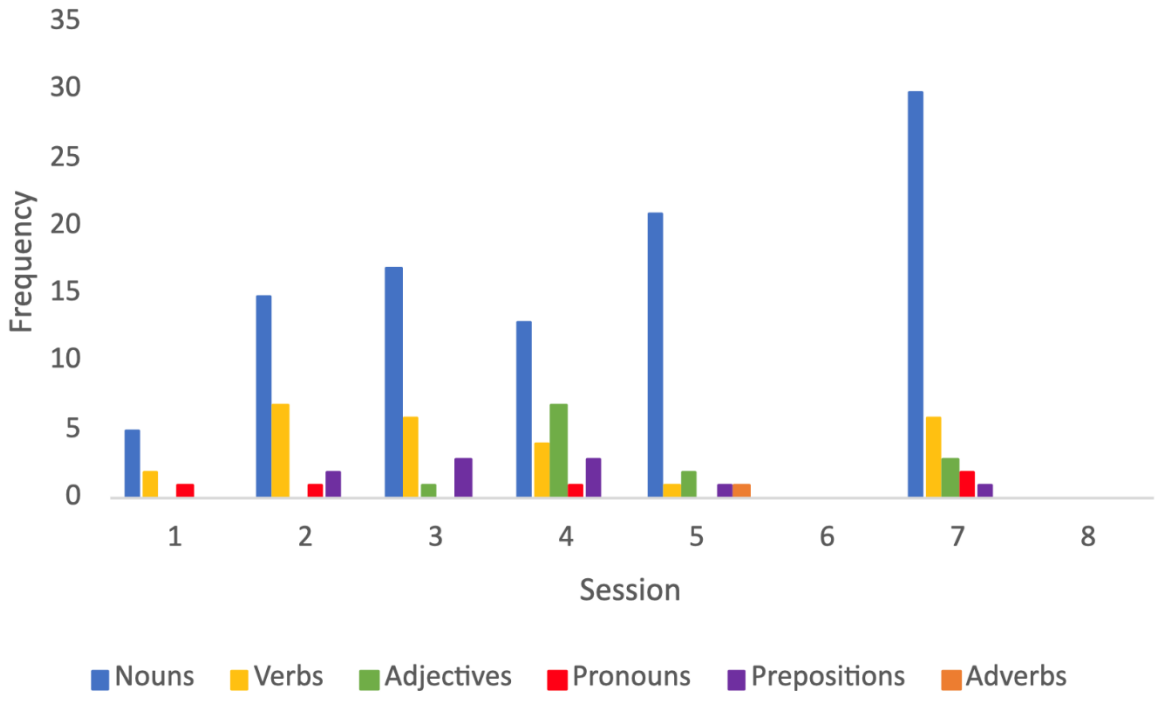
Parts of Speech Used in the Session

The words Amelia imitated and spontaneously produced were categorised into the different parts of speech to further explore her verbal expressive vocabulary development. The changes in the parts of speech that were produced by Amelia across the intervention phase are shown in Figure 3. At the beginning of the intervention, Amelia’s words could be categorised into three parts of speech: nouns, verbs, and pronouns. By the final intervention session, she had used six different parts of speech including, nouns, verbs, adjectives, pronouns, prepositions, and adverbs.

Targeted work on verbs (e.g., ‘go’ and ‘eat’) in sessions 1 and 2 corresponded with an increase in Amelia’s use of verbs across sessions 2, 3, and 4. This was also the case for prepositions (e.g., ‘up’, ‘in’, and ‘out’) which were targeted in sessions 2 and 3. Similarly, targeted work on adjectives (e.g., ‘hot’ and ‘big’) in session 3 coincided with an increase in Amelia’s use of adjectives in sessions 3 and 4. Amelia’s use of verbs, prepositions, and adjectives continued for the remainder of her sessions.

Figure 3

Parts of Speech Used by Amelia in the Session



Finally, Amelia's use of symbolic sounds, which are sounds that convey meaning (e.g., moo, beep-beep), across the intervention phase was explored as they are included as a measure in the OZI. Amelia did not use any symbolic sounds in session 1. This increased for session 2 (n = 6) ("choo-choo," "beep," "moo," "baa," "rah," and "woof") before decreasing in session 3 (n = 1) ("beep"). Amelia used 1 symbolic sound in session 5 but did not use any symbolic sounds in sessions 4 and 7. This may have reflected the activities selected with a higher number of symbolic sounds being used when animals were available during the sessions.

Intelligibility

The SLT-R rated a 10-minute sample of Amelia's speech taken during play to provide a percentage measure of Amelia's intelligibility. The SLT-R rated Amelia's intelligibility as 80% in session 1. However, Amelia produced fewer than 10 words during the sample and most of the words she produced were imitations. The SLT-R also noted in the SLT field notes that, "Amelia was talking about what she was playing with, providing [the SLT-R] with contextual information to understand the words Amelia was using." The SLT-R rated

Amelia's intelligibility as 50% for session 2 and suggested in the researcher journal notes that this was due to Amelia, "using more words and there being more phonological processes present in Amelia's speech." The SLT-R's ratings of Amelia's intelligibility steadily increased from 50% to 80% across sessions 3, 4, and 7. The SLT-R did not provide an intelligibility rating for session 6 as this was a telehealth session and the audio quality was poor.

Outcomes in the Home

Parent reports regarding Amelia's outcomes in the home were obtained at each intervention session through parent discussion. The SLT field notes and researcher journal notes were woven together with the QUANT data in the presentation of outcomes.

Frequency of Imitation

Emily was asked to rate the frequency of Amelia's imitation of words at home between each intervention session using a 4 point-scale, where 1 = never, 2 = occasionally, 3 = often, and 4 = always. Emily provided a rating based on Amelia's imitation of her for the whole period between two intervention sessions. At the beginning of the intervention, Emily rated Amelia's imitation as 'occasionally'. This increased to 'often' by the second session and 'always' by the third session. Amelia's imitation remained 'always' for the remainder of the intervention sessions (sessions 3, 5, 5, 7).

The discussion of data with Emily lead to her sharing additional information with the SLT-R, which was documented in the SLT field notes. Emily shared in session 2 that Amelia was 'often' imitating her but she was 'always' imitating her older brother, Henry. Emily also shared that Amelia was 'occasionally' imitating her grandfather, which she had not been doing prior to starting the intervention. These ratings were also based on Emily's observations of Amelia across the entire week between sessions.

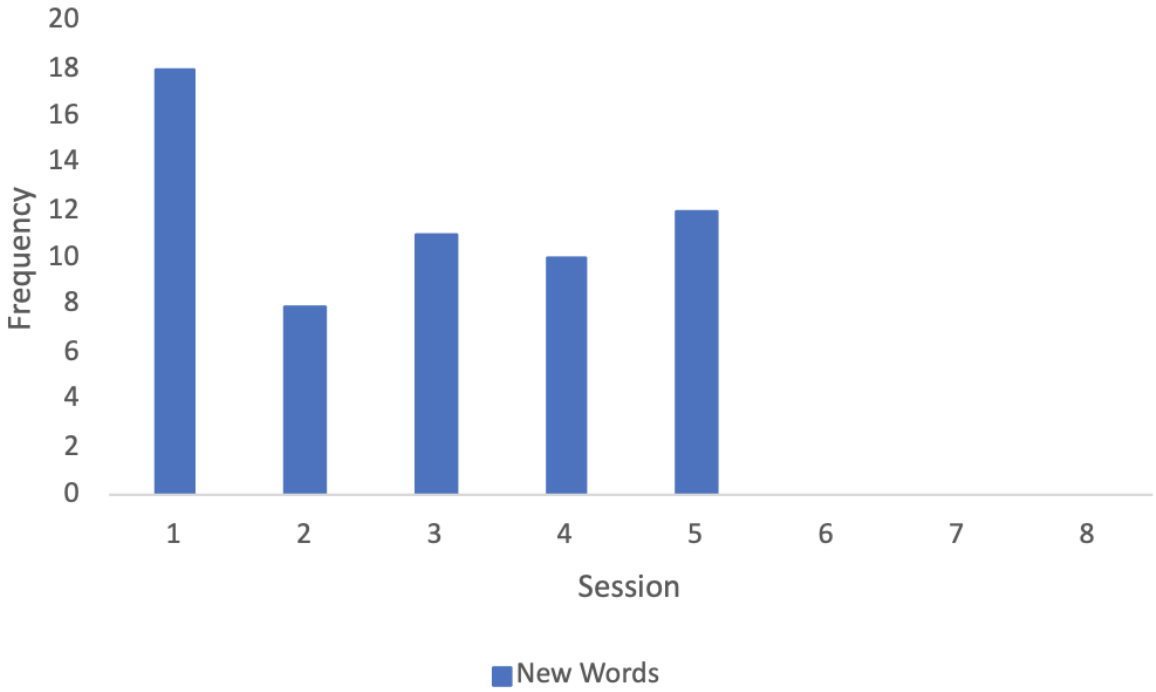
Number of New Words

Emily kept a written record of the new words used by Amelia at home between each intervention session. The total number of new words used in the home context between sessions is shown in Figure 4. No value was provided for session 7 as Emily felt that she no longer needed to keep a record of the individual words Amelia was using. Rather, she collected information on Amelia's use of two-word phrases. The value provided for session 1

(n = 18) was considered to be an outlier as it was likely influenced by there being a two-week gap between the child's initial assessment and her first intervention session, rather than the standard one-week gap that occurred between sessions 2, 3, 4, and 5. Removing the outlier, there appears to be minimal difference between the number of new words used each week, with each value being between n = 8 and n = 12.

Figure 4

Number of New Words Used by Amelia in the Home Context



As Amelia progressed with her verbal expressive vocabulary development, Emily was asked to collect data on the new two-word phrase combinations Amelia used at home. For example, if she said, "mama shake," this was recorded as action + agent. A list of the two-word phrase types used by Amelia during the study and examples are shown in Table 7. Amelia started using two-word phrases at home between sessions 2 and 3 where Emily reported 2 new two-word phrase combinations, including possessor + possession ("Max bag") and action + agent ("bye-bye Max") (Brown, 1973). As with the new words used by Amelia each week, there was no clinically significant difference between the number of new two-word phrases Amelia used at home each week, with each value being between n = 0 and n = 3.

Table 7

Examples of the Two-Word Phrases Used by Amelia, Classified According to Brown's Sentence Types (Brown, 1973)

Sentence types	Examples
Possessor + possession	"Max bag"
	"Amelia car"
	"Amelia spoon"
	"Amelia seat"
Action + agent	"Bye-bye Max"
	"Night-night nanny"
Negation - rejection	"No bunny"
Recurrence	"More cheese"
Agent + object	"Toot-toot daddy" (daddy goes on the train)
Demonstrative + entity	"That baa-baa"

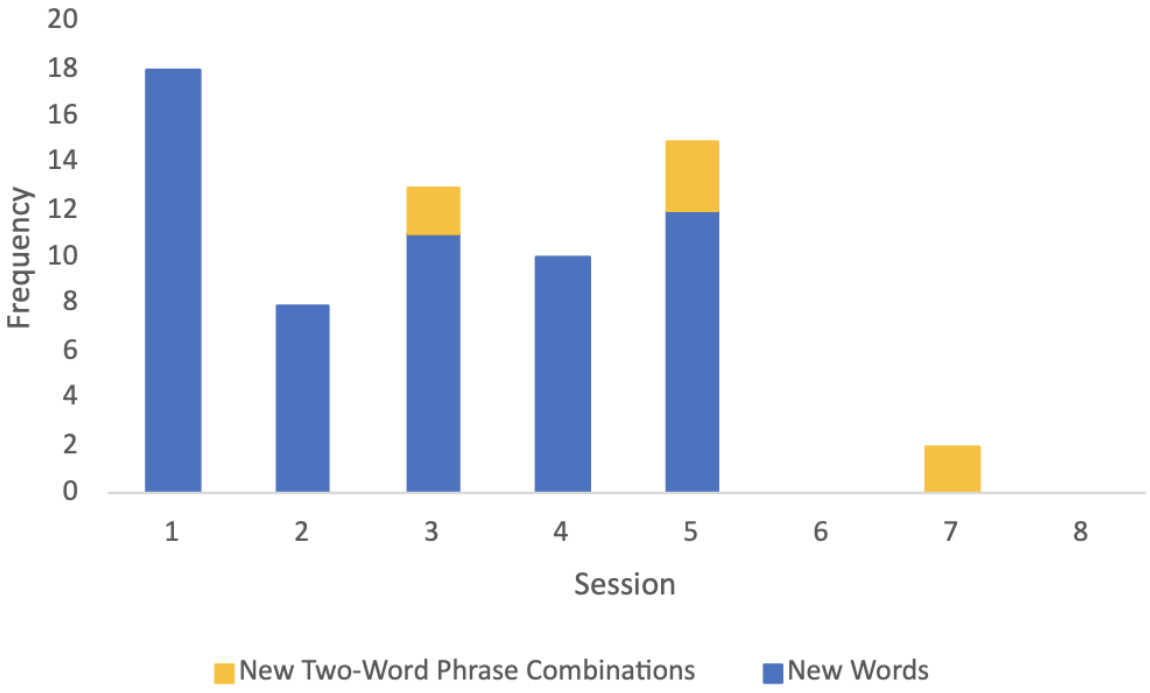
The total number of words and two-word phrase combinations used by Amelia were added together to determine whether there was a trend in the data when considering these two data sources together. This is shown in Figure 5. There was no identifiable trend in the data.

Intelligibility

Emily was asked to rate Amelia's intelligibility in the home context each week using a percentage. Emily's rating was 70% for sessions 1, 2, and 3. It increased to 70-80% for sessions 5 and 7 which indicated a positive trend.

Figure 5

Total Number of New Words and Two-Word Phrase Combinations Used by Amelia in the Home Context



Comparison Between the Outcomes

The outcomes in the home and intervention settings were compared. The first comparison was that Amelia showed an improvement in her imitation in the home setting over the course of the intervention phase. However, there was no observable trend in Amelia's imitation in the intervention session. Secondly, as Amelia's verbal expressive vocabulary increased in the home setting, the number of words spontaneously produced by Amelia in the intervention setting increased. Finally, there were positive trends in the SLT-R and Emily's ratings of Amelia's intelligibility. Conversely, the SLT-R observed an initial decrease in Amelia's intelligibility before the positive trend was identified. This was not reflected in Emily's ratings of Amelia's intelligibility.

Follow-Up Data Collection Phase

The follow-up data collection phase included QUANT and QUAL measures. The QUANT measures will be outlined before the thematic analysis of the SLT field notes, researcher journal notes, and Emily's interview is presented.

Quantitative Measures

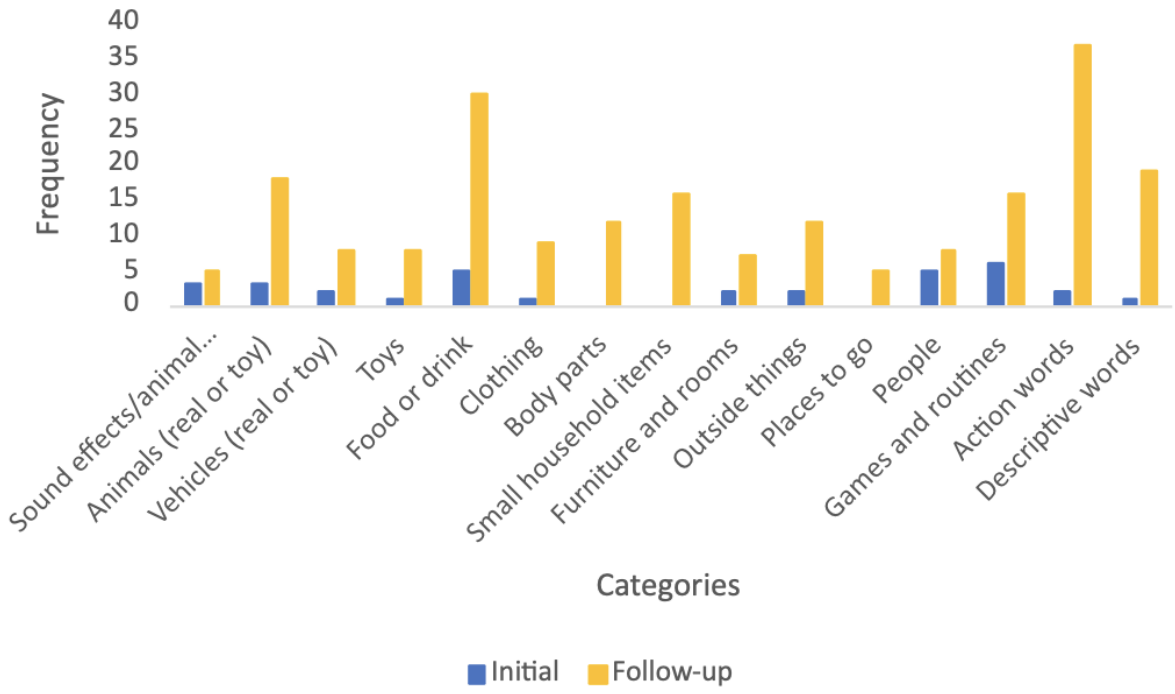
Emily and Amelia returned to the clinic two and a half weeks after the conclusion of the intervention phase for a follow-up 45-minute appointment. The OZI and CHIRPA, which were administered during the initial data collection phase, were repeated during this appointment.

Australian Communication Development Inventory (OZI)

The OZI revealed that Amelia had 210 words in her verbal expressive vocabulary following her participation in the Toddler Talk intervention program, when she was 22 months of age. Her expressive vocabulary score placed her at the 50th percentile (220 words). In addition to increasing her overall vocabulary score, Amelia showed an increase in words across all categories measured on the OZI, including symbolic noises (n = 5), nouns (n = 149), verbs (n = 37), and adjectives and adverbs (n = 19). This is reflected in Figure 6.

Figure 6

A Comparison of Amelia's Verbal Expressive Vocabulary on the OZI



Children's Independent and Relational Phonological Analysis (CHRPA)

The CHIRPA was also repeated during Amelia's follow-up appointment using the same administration procedures as in the initial data collection phase. Amelia used 11

different consonant sounds when the CHIRPA was repeated. When the CHIRPA was first completed, Amelia did not spontaneously produce the /p/, /w/, or /h/ early developing consonant sounds (Shriberg, 1993). Of these three sounds, Amelia had added the /p/ and /w/ sounds to her phonemic inventory. She also added the /s/ consonant sound, which is classified as a late-developing consonant sound (Shriberg, 1993). Amelia also added to her inventory of vowel sounds. She used 11 different vowel sounds when the CHIRPA was repeated. The new vowel sounds in her phonemic inventory included /e, i, aɪ, oʊ, ɪə, aʊ/.

Amelia continued to produce CV syllable shapes. She also demonstrated inconsistent use of VC (e.g., "at," for 'hat') and CVC (e.g., "boat") syllable shapes. Amelia continued to produce monosyllable (e.g., "go") and reduplicated and variegated two-syllable (e.g., "nana," for 'banana' and, "bunny") words including the CV syllable shape. Additionally, Amelia showed emerging use of 3-syllable words including CV, VC, and CVC syllable shapes (e.g., "alpaca" (VC-CV-CV), and, "pineapple" (CVC-VC-CV)). Amelia used appropriate syllable stress for the words she produced which meant used 4 different syllable stress patterns after the intervention, including stressed-stressed (e.g., bunny), stressed-weak (e.g., bubble), weak-stressed (e.g., open), weak-stressed-weak (e.g., alpaca).

Amelia's PCC for the early 8 consonant sounds (/m/, /b/, /j/, /n/, /w/, /d/, /p/, and /h/) was 98%, which increased by 15% from the initial data collection phase. Her PCC for the middle 8 consonant sounds (/t/, /ŋ/, /k/, /g/, /f/, /v/, /tʃ/, and /dʒ/) was 86% and her PCC for the late 8 consonant sounds (/ʃ/, /ʒ/, /θ/, /ð/, /s/, /z/, /l/, and /r/) was 23%. Overall, her PCC for the sample was 84%. Amelia's PVC was 100%.

The larger sample of words used by Amelia during her follow-up appointment allowed identification of the phonological processes operating in Amelia's speech. Table 8 lists the processes that were present in Amelia's speech alongside examples obtained during her follow-up appointment. The age at which these processes are expected to resolve is also documented in Table 8 (Bowen, 2021b).

Table 8

Phonological Processes Operating in Amelia's Speech, Examples, and the Typical Age of Resolution (Bowen, 2021b)

Phonological processes	**Examples**	**Typical age of resolution (Bowen, 2021b)**
Initial consonant deletion for the /h/ sound only (inconsistent)	'hat' --> /at/	This process is not seen in typical speech development and it is therefore considered an atypical process
Stopping of /s/	'sit' --> /dɪt/	3 years
Final consonant deletion (inconsistent)	'big' --> /bɪ/	3 years, 3 months
Consonant harmony	'farm' --> /mɑm/	3 years, 9 months
Cluster reduction	'please' --> /piz/	4 years
Weak syllable deletion	'banana' --> /bənɑnə/	4 years
Stopping of /tʃ/	'chippy' --> /tɪpi/	4 years, 6 months
Gliding of liquids	'berry' --> /bɛwi/	5 years
Stopping of /ð/	'that' --> /dat/	5 years

Qualitative Measures

The SLT field notes, researcher journal notes, and Emily's interview were analysed thematically using a deductive approach to provide qualitative (QUAL) data. The purpose of this thematic analysis was to provide information on the outcomes from the SLT-R and Emily's perspectives, understand engagement and the intervention implementation, and explore Emily's experience with the Toddler Talk intervention program. The specific codes and sub-codes and accompanying definitions and examples can be found in Appendix J.

Amelia's Outcomes

The theme of Amelia's outcomes was explored through three sub-themes. These included the SLT-R and Emily's perspectives on Amelia's language outcomes, phonological

outcomes, and other outcomes following her participation in the Toddler Talk intervention program.

Perspectives on Amelia's Language Outcomes. Amelia's expressive language development and her transition from single words to two-word phrases during the 8-week intervention phase were not anticipated by the SLT-R at the outset of the study. As a result, the SLT-R readily engaged in reflection about Amelia's progress in her researcher journal notes to make adjustments to the Toddler Talk intervention program and ensure Amelia's developmental needs were being met for the duration of the intervention. For example, the SLT-R wrote, "Amelia is progressing towards two-word phrases, as indicated by her expressive vocabulary size, and two-word phrase targets would now be more suitable for Amelia to extend her expressive language development," in her researcher journal notes after session 3.

Emily's interview included positive comments about Amelia's language outcomes. When asked about Amelia's language development, Emily shared that she noticed immediate improvements after the sessions and that overall, the, "... gains that I saw over the last 8-weeks were massive." Emily reflected on Amelia's verbal expressive vocabulary development during her interview and reported that Amelia progressed to using over 200 words. She was also able to give specific examples of two-word phrases that Amelia was using and added that, "... now sometimes three words," were being combined together by Amelia at home.

Perspectives on Amelia's Phonological Outcomes. Emily's interview included neutral comments about Amelia's phonological development. Emily shared that, "[Amelia] had more words, but the percentage of those that I understood stayed the same." When reflecting on Amelia's intelligibility with different people, Emily commented, "I know exactly what she's saying, but for other people, I think a lot of what she says, they have no idea what she is talking about..." In addition, Emily observed that Amelia, "... still doesn't sometimes finish the words," and that certain sounds remain, "really hard for her."

The SLT field notes offered specific information on Amelia's phonological development over the course of the intervention. The SLT-R noted that Amelia, "added the /s/ sound to her phonemic inventory," which was identified during session 7. However, the SLT-R continually documented that Amelia experienced, "persistent difficulties producing

the /h/ sound." In addition, the SLT-R observed that Amelia had ongoing difficulties producing VC and CVC syllable structures, with some emergence of these structures in session 7.

Other Outcomes Identified Through the Thematic Analysis. The SLT field notes suggested that Amelia made clinically significant improvements in the home context across the course of the intervention phase. During session 2, Emily reported to the SLT-R that Amelia had started using words more than gestures to communicate her message at home the previous week. Amelia's grandmother had also noticed that Amelia was speaking more and commented on this to Emily who shared this feedback with the SLT-R during session 2. Emily further reported that she had observed Amelia imitating her grandfather between sessions 1 and 2, which was something Amelia had not done prior to beginning the Toddler Talk intervention program. During session 5, Emily reported to the SLT-R that Amelia's extended family members had commented that Amelia was imitating more words. These family members also described Amelia as, "More chatty." Emily reported that she was pleased to receive this feedback. During session 7, Emily reported that Amelia was confidently saying, "night-night," to her extended family members on a family holiday together. Emily shared that the family shared enjoyment in watching Amelia go around the room to say goodnight to everyone.

Clinically significant improvements were also reported to occur in the daycare setting. The SLT-R documented in session 3 that one of Amelia's day-care teachers shared with Emily that Amelia was speaking more at daycare. Emily did not have any specific details when asked for more contextual information by the SLT-R. However, the following week, Emily reported that the teachers shared that, "Amelia was making verbal requests for songs and naming her friends at day-care." The impact of Amelia's increased verbal communication at daycare on her engagement and participation was not discussed with Emily.

Emily's interview also suggested clinically significant improvements in Amelia's confidence over the course of the intervention. When Emily was asked to reflect on Amelia's wider development, she identified that Amelia's increased verbal expressive vocabulary helped her to, "... get less frustrated." Emily also observed that Amelia was now, "... more confident to be around other kids." This was particularly significant as Emily identified that

one of her goals for Amelia's speech and language therapy sessions was to, "feel confident using her speech," in Amelia's case history questionnaire.

Emily's Outcomes

Emily's interview suggested that she had an acute awareness of Amelia's speech and language development following Amelia's participation in the Toddler Talk intervention program. She was able to identify phonemes and syllable shapes that Amelia was not yet producing. For example, she shared with the Clinic Director that, "... the H is really hard for [Amelia]… with 'hot' and 'hat' she says 'ot' and 'at'." Emily was also able to identify Amelia's utterance length ("...two words and now sometimes three words...") and discuss Amelia's use of verbs and grammatical structures ("... it's still just the 'jump', 'walk', but she's definitely using a lot more of those, describing what she's doing") during her interview. Emily reported feeling, "... pretty straight on what we need to do now," after reflecting on Amelia's communication development with the Clinic Director.

Intervention Process

The theme of the intervention process was explored through three sub-themes. These included Emily and Amelia's engagement in the intervention, variations in the implementation of the intervention, and contextual variables.

Amelia's Engagement. The SLT field notes and researcher journal notes showed Amelia's journey to engagement. The SLT-R noted that Amelia was carried into the clinic room by Emily at the start of session 1. Amelia was then reluctant to separate from Emily, taking approximately 10 minutes to leave her mother's lap to play with the toys in the room. The SLT-R felt that Amelia's engagement was facilitated by having highly preferred toys available for Amelia to play with, such as a doll and a tea party set. In sessions 2, 3, and 4, the SLT-R observed that Amelia, "walked in independently," "quickly separated from her mother," and that she was, "quick to explore the toys." However, she continued to require additional time to begin imitating and spontaneously producing words, although the SLT-R noted this decreased each session. This observation was consistent with Emily's impression of Amelia's engagement as she shared that Amelia, "... often took a while to start talking in the sessions..." during her interview. The SLT-R's impression was that Amelia was becoming more confident with each intervention session and that this facilitated her engagement and increased participation. Amelia's engagement appeared to be dynamic across the

intervention phase. At the beginning of session 7, which occurred after Amelia had missed two consecutive in-clinic sessions, the SLT-R observed that Amelia's, "initial responses were head nods," and that it took approximately 10-minutes for Amelia to begin imitating and spontaneously producing single words and two-word and three-word phrases.

The SLT-R noted that Amelia had the autonomy to choose the activities she wanted to participate in during each session and observed that Amelia only withdrew her engagement when she was redirected away from opening drawers and grabbing stationery off the SLT-R's desk. In these instances, Amelia shook her head 'no' or verbally said, "no." Amelia was able to re-engage in a different activity with encouragement from Emily or the SLT-R.

Emily's Engagement. Emily's journey to engagement was also shown through the SLT field notes and researcher journal notes. Emily attended all of Amelia's intervention sessions and participated in discussions, led by the SLT-R, regarding Amelia's development between intervention sessions. She answered questions about Amelia's imitation, use of words and phrases, and intelligibility. She provided additional insights about Amelia's progress, such as her communication with other family members and at daycare.

The SLT-R noted that Emily collaboratively selected target words that were meaningful to Amelia with the SLT-R. She also participated in discussions about suitable activities for home practice. Emily mentioned that this time was, "really valuable," as it was, "an hour of the week that was just about [Amelia] and we could specifically focus on her speech and that development," during her interview.

The SLT-R felt that Emily was engaged in the intervention process, observing the SLT-R and receiving coaching and feedback. However, Emily's engagement appeared to be impacted in sessions 4 and 5 due to contextual challenges. The SLT-R felt that Emily's attention was on Henry, Amelia's older brother, during session 4, reducing the opportunities for observation, coaching, and feedback during the session. In contrast, during session 5, the SLT-R felt that Emily's focus was on supporting Amelia's engagement during the telehealth session.

Emily reported consistent home practice between sessions. During her interview, Emily shared that she would, "... do games and activities in the bath," or have, "one on one

time talking and interacting with [Amelia].” The SLT-R documented that Emily provided specific feedback on Amelia’s achievement of the targets. For example, Emily shared Amelia was not interested in animals, which made modelling ‘moo’ and ‘baa’ difficult. She also expressed difficulty targeting one of the two-word phrases at home. In these instances, the SLT-R and Emily were able to identify additional activities that may be suitable for these targets. For example, including animals within preferred activities, such as colouring a picture of a cow. In addition, Emily provided a video example of Amelia saying the target word, “go,” at home.

Implementation. Emily was introduced to several different language stimulation strategies over the course of the intervention. While the SLT-R had identified that language stimulation strategies would be used in the implementation of the intervention, the scope and sequence of these strategies were not outlined in the intervention procedure. The SLT field notes indicated that a variety of language stimulation strategies were used in the implementation of the Toddler Talk intervention program. The SLT-R started by introducing the strategies of being face-to-face during interactions, bringing objects to the face when speaking with Amelia, pausing and waiting to encourage Amelia to take a turn, modelling single words to Amelia during play and daily activities, and adding on a word to what Amelia has said (expansion). The SLT-R provided coaching and feedback to Emily on the use of these strategies during the session and the SLT-R’s impression was that Emily was competent at using all the strategies by the end of the session. Emily reported the use of these strategies at home and demonstrated consistent use of all strategies in session 2. Emily reported concerns with the expansion strategy as Amelia, “will often imitate one of the words but say it twice.” The example she gave was Amelia imitating, “more cheese,” as “more more.” The SLT-R acknowledged Emily’s concerns and the continued use of this strategy was discussed. Amelia started accurately imitating both words in two-word phrases at home between sessions 2 and 3.

The SLT-R introduced the strategy of slowing down when modelling two-syllable words, maintaining usual stress patterns, during session 2. This coincided with the two-syllable target words ('nappy’ and ‘tiger’) being introduced. The SLT-R noted that this strategy was added to support Amelia to add to her inventory of syllable structures as she was not using variegated CVCV syllables, suggesting that the SLT-R was being responsive to

Amelia's needs in her strategy choice. Again, Emily received coaching and feedback and the SLT-R felt that Emily was competent in using this strategy. Emily reported achievement of the two-syllable targets when she returned to the clinic the following week. However, she did not provide specific information on her use of this strategy to support Amelia's acquisition of the target words.

During session 4, the SLT-R then expanded on the strategy of modelling to include modelling a combination of single words and two-word phrases when two-word phrase targets were added (e.g., 'bye + noun'). However, the SLT-R's impression was that Emily was already modelling two-word phrases to Amelia without coaching and feedback from the SLT-R, which she felt was explained by Emily's knowledge of the adding-on strategy introduced in an earlier session. Emily reported the use of this strategy in session 5 and that Amelia had achieved two of the three two-word phrase targets. The SLT-R also documented that Emily had, "heard more two-word phrases at home over the past week," in session 5, which coincided with the introduction of this strategy.

Finally, the SLT-R added the strategy of modelling sounds in isolation and CV and CVC structures to Amelia during play to introduce the /s/ sound which was not widely used by Amelia at the time. The SLT-R documented her rationale, as the inclusion of individual sound targets was not part of the initial intervention procedures. Her reasoning for targeting the /s/ sound was to, "provide opportunities for Amelia to hear this sound in isolation and words to increase her experiences with this sound." The SLT-R provided Emily with examples of words to model (e.g., 'see', 'sit', 'soap', 'sock') and demonstrated how to incorporate these words into play and daily activities.

During Emily's interview she recalled the strategies of bringing objects to her face and modelling words and sounds. She also identified that, through the Toddler Talk intervention program, she understood the importance of reducing pressure on Amelia, which was not directly discussed during the program. Emily described the strategies as, "tools," and she reported that these were, "...really, really helpful." Emily reported that she could, "understand the tools and tips that [the SLT-R] was giving to me and why she was giving them to me."

The SLT field notes also identified that three to four new targets were introduced each session as each week Amelia achieved 75-100% of the targets from the previous week. The SLT field notes on the language samples obtained from each of the sessions indicated that two-word phrase targets were introduced once Amelia had a total of 70 single words in her verbal expressive vocabulary and was using a range of different parts of speech (e.g., nouns, verbs, adjectives, pronouns). This occurred at session 4 when the SLT-R heard Amelia use 13 nouns, 4 verbs, 7 adjectives, 1 pronoun, and 3 prepositions during the session. Appendix I outlines the target words and phrases selected over the course of the intervention and the rationale for the selection of these targets.

Contextual Influences. Three significant contextual influences were identified during the study. The first was the attendance of Amelia's older brother, Henry, who attended session 4 with Emily and Amelia. The SLT-R observed a clinically significant impact on Amelia's engagement during this session. As described above, Amelia produced fewer spontaneous words in session 4 compared to earlier sessions which corresponded with Henry's attendance. Henry's attendance also coincided with reduced engagement from Emily. Emily was present in the clinic room for the duration of each of Amelia's sessions, with the exception of session 4 as she had to step out of the session for 5 minutes to settle Henry. The SLT-R also observed that Emily spent most of session 4 settling Amelia's older brother in the clinic room as he was talking over Amelia and the SLT-R, requesting the toys that Amelia was playing with, and becoming upset and crying when he was not able to have the toy that he wanted. The SLT-R noted that, consequently, there were fewer opportunities for observation, coaching, and feedback as Emily was distracted by Henry.

The second contextual influence was the telehealth session, which presented some challenges that were not present during Amelia's in-clinic sessions. During her telehealth session, Amelia frequently requested, "Nanny," who was in another room of the house. Although Amelia was able to be redirected back to the activity, the SLT-R felt that the distraction of Nanny being nearby impacted the amount of time Amelia was engaged in the session. A second challenge of the telehealth session was that the audio quality was low meaning that some of the words used by Amelia were inaudible to the SLT-R. The SLT-R commented that, "interpretation of what Amelia had said from Emily was often required," in the SLT field notes and her impression was that this impacted her ability to accurately

document the productions of Amelia's words. Conversely, the SLT-R noted that one of the benefits of the telehealth session was that she was able to see the toys Amelia played with at home and observe, "Amelia's play, interaction, and speech and language development in a naturalistic setting."

Finally, mask-wearing was identified as a third contextual influence. During Emily's interview, Emily identified that Amelia, "... often took a while to start talking in the sessions..." which was also documented by the SLT-R in the SLT field notes. Emily suggested that this could be explained by the wearing of masks by her and the SLT-R during all in-clinic sessions. She felt that the masks restricted Amelia from seeing the, "mouths and faces," of the people she was interacting with.

Emily's Experience. Emily's interview suggested that she had a positive experience with the Toddler Talk intervention program. Reflecting on the intervention as a whole, Emily reported that she was, "... feeling very positive about how it all went." She identified that the intervention sessions helped her to ensure she was "... carving out time in the day..." to implement the intervention with Amelia and to ensure that her interactions with Amelia were, "more intentional."

Emily reported a positive experience using the language stimulation strategies suggested by the SLT-R, and stated that she "... noticed almost immediate change using some of the tools, like you know holding something up to your face and saying the word..." Additionally, she commented that she, "… could understand the tools and the tips that [the SLT-R] was giving to me and why she was giving them to me." Emily reported that she enjoyed working on the goals in play and during her everyday interactions with Amelia and she shared that it, "... takes the pressure off me as a parent because I'm not stressed about having to work on this with her … I actually found it wasn't a hard thing." Emily reported that she, "would recommend [the Toddler Talk intervention program] to other people." When asked, Emily did not have any suggestions for improvements to the program.

Reliability of the Quantitative Measures

The SLT-R re-scored the QUANT data at the conclusion of the study to measure the intra-rater reliability. The QUANT data was also reviewed by another SLT to measure inter-rater reliability. QUANT data included the OZI, CHIRPA, number of words imitated in the session, number of words spontaneously produced in the session, and intelligibility. The

intra-rater reliability was above 90%. The inter-rater reliability was above 98% for all measures when using the SLT-R's finalised data.

Results Summary

This chapter has summarised the results of this case study which were collected across three phases: initial data collection phase, intervention phase, and follow-up data collection phase. The results included 4 QUANT data sources; the OZI, CHIRPA, parent reports, and outcome measures. The results also included a thematic analysis to obtain QUAL data from the SLT field notes, researcher journal notes, and semi-structured interview.

Chapter 5: Discussion

This exploratory case study aimed to investigate the outcomes of the Toddler Talk intervention program for a toddler with Late Language Emergence (LLE). This chapter will first revisit the research questions before exploring Amelia's suitability and readiness for the Toddler Talk intervention program to provide a context for the findings of this study. Following this, the findings will be presented in relation to three themes: Amelia's outcomes, Emily's outcomes, and the intervention process. The researcher's impressions will then be considered before the strengths and limitations of this study are discussed. Finally, future research directions and the clinical implications of this present study will be explored.

Amelia's Suitability and Readiness

Amelia was invited to participate in this research study as she was at risk of LLE due to her delayed verbal expressive vocabulary development, as defined by the American Speech-Language-Hearing Association (ASHA) (American Speech-Language-Hearing Association, 2023b). Amelia's early communication skills (e.g., eye contact, joint attention, use of gestures, turn-taking, and communication functions) and play skills were observed to be developing appropriately for her age. This suggested that she would experience positive outcomes from participating in the Toddler Talk intervention program as these skills foster language development. For example, Amelia demonstrated age-appropriate joint attention skills, also indicated by her use of pointing and gaze shift (Bates et al., 1975; Colonnesi et al., 2010). Amelia's ability to successfully participate in episodes of joint attention would have supported the focused stimulation approach used in the Toddler Talk intervention program where target words were modelled repeatedly during episodes of joint attention (Akhtar & Gernsbacher, 2007; Cable & Domsch, 2011; Weismer et al., 2017). Furthermore, Amelia's average receptive language skills also suggested she would experience positive outcomes. Receptive language, which involves understanding and gaining meaning from language (Paul et al., 2017), provided a stronger foundation for Amelia's expressive language development.

Amelia's Outcomes

Understanding changes in Amelia's language development was important as the goal of early intervention for toddlers with LLE is to stimulate their language development and to

teach them the skills needed for communication (American Speech-Language-Hearing Association, 2023b). Additionally, understanding changes in Amelia's phonological development was important as the Toddler Talk intervention program aims to create meaningful change in the phonological development of toddlers with LLE. Further, it was important to consider other outcomes which coincided with the implementation of the Toddler Talk intervention program to understand any wider benefits of the program.

Language Outcomes

The combination of quantitative and qualitative data showed positive growth in Amelia's verbal expressive vocabulary development over the course of the 8-week Toddler Talk intervention program. At the conclusion of the intervention, her verbal expressive language development was within the average range and Emily expressed satisfaction with this outcome during her interview. Positive expressive vocabulary outcomes were shared by Kaiser and colleagues (2017) who provided a similar language-focused intervention with phonological considerations to their participants. Kaiser and colleagues observed larger gains in expressive vocabulary for the treatment group compared to the non-treatment group. However, they did not indicate whether the participants achieved expressive vocabulary scores within the average range at the conclusion of the study. It is important to note that there were fundamental differences between the present study and the study conducted by Kaiser and colleagues which makes drawing sound comparisons challenging. Firstly, Kaiser and colleagues included toddlers with a cleft rather than LLE. Secondly, they used Enhanced Milieu Teaching as their language-focused intervention approach which is a behavioural intervention approach. They also did not include parent training as a component of their intervention.

Kaiser and colleagues (2017) did not provide a measure of parts of speech used by their participants. This was also the case for intervention studies exploring the outcomes of language-focused interventions (Cable & Domsch, 2011). The present study explored changes in the parts of speech used by Amelia to provide a deeper understanding of her expressive vocabulary development. In summary, Amelia increased her use of all parts of speech (e.g., nouns, verbs, adjectives, etc.) which broadened her expressive vocabulary and assisted her to combine words into phrases (Kjesbo, n.d.). Amelia's increased use of verbs was particularly significant as recent research has shown that children who have larger verb

vocabularies at 24 months of age have stronger grammatical skills 6 months later, at 30 months of age (Hadley et al., 2016). With most typically developing children using 40 different verbs by 24 months of age (Lowry, 2016c) and Amelia using 37 different verbs at 22 months of age, it could be hypothesised that Amelia would have improved long-term outcomes associated with her increased verb vocabulary.

Positive changes in Amelia's semantic relations were also observed across the 8-week Toddler Talk intervention program, which is consistent with her increased verbal expressive vocabulary development for different parts of speech, in particular for verbs (Hadley et al., 2016). Amelia was using several different two-word phrase combinations, including possessor + possession, action + agent, negation – rejection, recurrence, agent + object, and demonstrative + entity (Brown, 1973), and she was beginning to produce three-word phrases (e.g., "no more bunny"). Amelia's phrase length was age-appropriate at the conclusion of the intervention as children typically combine two words together by 24 months of age (Hagan et al., 2018). This finding was not able to be compared to the findings of other research studies as the SLT-R did not calculate Amelia's Mean Length of Utterance (MLU). MLU served as a comparison of utterances produced in several other research studies (Cable & Domsch, 2011; Kaiser et al., 2017). However, this outcome suggests that Amelia's risk of LLE is low following her participation in the Toddler Talk intervention program as she started combining words before 24 months of age and will have better long-term language outcomes as a result (Rudolph & Leonard, 2016).

Phonological Outcomes

Overall, Amelia increased her phonemic inventory for consonants and vowels over the course of the 8-week Toddler Talk intervention program. The changes occurred over a short period of time and are therefore unlikely to be explained by spontaneous development. However, while this finding is encouraging, it has been identified as an indirect effect of the Hanen It Takes Two to Talk (ITTT) (Weitzman, 2017) language-focused intervention program (Girolametto et al., 1997). Girolametto and colleagues (1997) saw a significant increase in the participants' inventories of early, middle, and late-developing consonant sounds with large effect sizes for early and middle-developing consonant sounds. Amelia increased her inventories of early and late-developing consonant sounds, with no changes for middle-developing consonant sounds. The phonemic inventory outcomes in this

study should be interpreted tentatively as they cannot be directly attributed to phonological considerations being included in the Toddler Talk intervention program and may reflect spontaneous development or Amelia using a greater variety of words.

In addition to the gains made in her phonemic inventory, Amelia also increased her inventories of syllable shapes and word lengths across the intervention phase. Amelia's syllable stress inventory also increased and reflected her ability to produce longer words with more varied stress patterns at the conclusion of the intervention. There is limited information in the literature on the development of syllable structures and word lengths. However, it has been shown that toddlers with LLE have restricted syllable structures compared to their typically developing peers (Falsolo et al., 2008; Rescorla & Ratner, 1996). Hence, Amelia's increased inventory of syllable shapes and word lengths are encouraging outcomes. Although, these findings were also identified as indirect effects of the Hanen ITTT program (Girolametto et al., 1997). Girolametto and colleagues (1997) categorised syllable structures into three levels. They observed a significant increase in level 3 syllable shapes which included syllables with two or more different consonant sounds (e.g., CVC, CVCV). Amelia demonstrated similar improvements when identifying changes in her syllable shape and word length inventories together. While the changes in Amelia's syllable shape and word length inventories may be unrelated to phonological considerations being included in the Toddler Talk intervention program, it could be hypothesised that these changes were related to her verbal expressive vocabulary development and her use of a wider variety of words.

Amelia's PVC remained consistent across the intervention and there was minimal change in her PCC at the conclusion of the intervention. However, Amelia's PCC prior to commencing the Toddler Talk intervention program (83%) was above the mean for children aged 24 months of age (62.9%) (Watson & Scukanec, 1997). Girolametto and colleagues (1997) also observed no significant difference in PCC for their participants who received the Hanen ITTT program and suggested that language-focused interventions alone did not have indirect effects on a child's ability to achieve the adult forms of words. Conversely, Kaiser and colleagues (2017) reported significant changes in total PCC for their participants who received a language-focused intervention with phonological considerations. However, the pre-intervention PCC for their participants was much lower than Amelia's, ranging from

7.7% to 30.6%. This could be explained by the children in their study having orofacial anatomical differences associated with a cleft rather than LLE. A deeper analysis of changes in Amelia's PCC revealed that her PCC score for early-developing consonant sounds increased from 83% to 98% over the course of the intervention.

Despite the improvements in Amelia's phonemic, syllables shape, and word length inventories and her increased PCC for early developing consonants, quantitative data revealed minimal change to Amelia's parent-reported intelligibility over the course of the Toddler Talk intervention program. However, consistent with Amelia's PCC score, Amelia's intelligibility, as rated by Emily, was considered within the average range as children aged 24 months are typically 50-75% intelligible to their parents (Bowen, 2021a). The SLT-R did observe improvements in Amelia's intelligibility over the course of the intervention. Although, this change may be explained by the SLT-R becoming familiar with the phonological processes present in Amelia's speech, as her overall PCC remained unchanged.

Finally, Amelia presented with age-appropriate phonological processes at the conclusion of the intervention, with the exception of initial consonant deletion for the /h/ sound (Bowen, 2021b). Therefore, it could be proposed that the Toddler Talk intervention was not able to resolve this atypical phonological process. This is an important consideration as the presence of atypical phonological processes in a child's speech is a predictor of persistent phonological difficulties (McIntosh & Dodd, 2008).

Other Outcomes

Imitation was an important consideration when understanding the outcomes in this study as imitation of sounds, symbolic sounds, words, and phrases play an important role in a child's early language development (Lowry, 2016b). The quantitative data indicated that Amelia's imitation increased immediately in the home setting as Amelia started imitating Emily with increased frequency although her imitation in the clinic setting over the course of the intervention was variable. The qualitative data identified that Amelia also increased her imitation of her older brother, Henry, and her grandfather in the home setting. Further, Emily reported that extended family members commented on Amelia's increased imitation. Together, the quantitative and qualitative data suggest that Amelia was paying attention and tuning into the words used by Emily and her family members with increased frequency

following her participation in the Toddler Talk intervention program which will support her language and phonological development (Lowry, 2016b).

Generalisation is another important consideration as it suggests that an intervention has meaningful benefits beyond the intervention context (clinic and home settings) (American Speech-Language-Hearing Association, 2023c). The qualitative data suggested that Amelia experienced positive outcomes in the day-care setting as she was reported to increase her use of language at day-care, speak more, make requests for songs, and name her friends at day-care during the intervention program. Therefore, it could be proposed that the Toddler Talk intervention program has benefits in everyday life which increases the value of the intervention.

Emily's Outcomes

The qualitative outcomes of the Toddler Talk intervention program extended to Emily, Amelia's mother, who appeared to have an acute awareness of Amelia's speech and language development following her participation in the program. Emily was able to provide specific details on Amelia's expressive vocabulary and utterance length as well as identify phonemes and syllable structures Amelia continued to experience difficulty with at the conclusion of the intervention. In her interview, she also expressed confidence in her ability to support Amelia's continued communication development without the input of the SLT-R. Therefore, it could be hypothesised that the Toddler Talk intervention program has the potential to build the capability of parents who attend the intervention sessions with their children. Parents are at the centre of learning for their children (Bandura, 1977; Colonnesi et al., 2010; Goldstein & Schwade, 2008; Vygotsky, 1978) and have a crucial role in family-centred early interventions. Developing the competence and confidence of parents to deliver speech and language therapy interventions has been shown to result in improved speech and language skills, particularly for children with an expressive language delay (Ebbels et al., 2019). It is plausible that this outcome was facilitated by Emily receiving coaching and feedback from the SLT-R as part of the Toddler Talk intervention program, which has been shown to be an essential component of successful parent-implemented interventions (Ebbels et al., 2019; Tosh et al., 2017).

Intervention Process

The success of early intervention programs is multifaceted. Hence, it was important to consider how Emily and Amelia's engagement, the implementation of the intervention and contextual influences, and Emily's experience may have contributed to the outcomes of the Toddler Talk intervention program.

Engagement

Engagement is a complex and dynamic process (Melvin et al., 2017) and this was evident in Emily and Amelia's engagement across the 8-week intervention program. Emily attended and participated in all of Amelia's intervention sessions. However, her engagement was reduced when Amelia's older brother, Henry, attended a session and when she was focused on supporting Amelia's engagement during a telehealth session. While Emily's engagement was impacted during these sessions, she made a concerted effort to create opportunities to interact with Amelia without any distractions present at home between intervention sessions. Conversely, Amelia's engagement was highly variable, which was likely due to her age at the time of this study. Amelia took less time to engage in the intervention sessions each week as she became more familiar and comfortable in the clinic setting. However, she required additional time to engage after breaks from in-clinic sessions. This highlights the importance of including parent training as a component of the Toddler Talk intervention program as Emily's journey to engagement was quicker and more consistent than Amelia's journey to engagement.

Parent engagement is an essential component of successful early speech and language therapy interventions (Melvin et al., 2017). However, one of the challenges of parent-child interaction therapy (PCIT), which is a component of the Toddler Talk intervention program, is facilitating parent engagement (Klatte et al., 2019). Fostering mutual understanding, constructive relationships, and parental empowerment have been shown to support parents to take an active role in their child's intervention (Klatte et al., 2019; Melvin et al., 2017). These elements were reflected in the implementation of the Toddler Talk intervention program. For example, Emily reported understanding the language stimulation strategies and the rationale for their use, supporting mutual understanding. She expressed concerns regarding the expansion strategy which was acknowledged by the SLT-R and discussed during the session, demonstrating a constructive

relationship. In addition, Emily was empowered to select activities to target words and phrases at home collaboratively with the SLT-R and updated the SLT-R on Amelia's progress each week.

Implementation

There were several factors that likely aided the successful implementation of the Toddler Talk intervention program. The Toddler Talk intervention program used focused stimulation to target words and phrases which has been shown to increase target word use in toddlers with LLE (Cable & Domsch, 2011). This is important as it has been suggested that children with LLE require frequent repetitions of new words due to phonological short-term memory (PSTM) capacity limits (Newbury, 2014). Amelia increased her use of target words across the 8-week intervention. An additional quantitative finding was that targeting specific parts of speech (e.g., verbs and adjectives) coincided with Amelia using these parts of speech with increased frequency in subsequent intervention sessions. This expands on the findings of Cable and Domsch's (2011) systematic review and suggests that targeting specific parts of speech using focused stimulation results in expressive vocabulary change beyond the individual targets selected.

Several other language stimulation strategies were introduced over the course of the intervention and qualitative data indicated that these were well received and understood by Emily. The SLT-R's impression was that these strategies were complementary to the focused stimulation approach as they were selected to support Amelia's achievement of the target words and phrases introduced each week. For example, the strategy of slowing down when modelling two-syllable words, maintaining usual stress patterns, was introduced when focused stimulation targets included two-syllable words (e.g., 'nappy' and 'tiger').

The Toddler Talk intervention program also included parent coaching to develop Emily's competence and confidence with focused stimulation and other language stimulation strategies introduced by the SLT-R. Parent coaching has been identified as an essential component of successful parent-implemented interventions (Ebbels et al., 2019; Tosh et al., 2017). The SLT-R's impression was that Emily was an active participant in the intervention program and the qualitative data showed that the coaching and feedback provided by the SLT-R were most successful when Emily was engaged during the intervention sessions. Emily shared positive outcomes from the Toddler Talk intervention

program during her interview, describing the developments in Amelia's language as, "massive." She attributed this to the strategies that were introduced and her understanding of why these were valuable strategies for supporting Amelia's development.

Contextual Influences

Conversely, there were several barriers that impacted the implementation of the intervention and Emily and Amelia's engagement in the intervention. The Covid-19 pandemic and the associated restrictions of mask-wearing and self-isolation were identified in the mixed methods data as contributing factors to the implementation of the intervention. These contextual influences were unavoidable, but they needed to be considered to understand their potential influences on the intervention implementation and the subsequent outcomes.

Firstly, the SLT-R and Emily were required to wear masks for all in-clinic sessions. It is not possible to draw conclusions about the impact of mask-wearing on the outcomes in this study as there was no comparison measure. However, language development is a complex neurological process involving perception, production, and social interaction (Bandura, 1977; Kuhl, 2004; Kuhl et al., 2008; Majoranoet al., 2014; Piaget, 1957; Vygotsky, 1978). Recent research has also shown that language learning involves the integration of auditory and visual information (Lewkowitz & Hansen-Tift, 2012). Therefore, it could be hypothesised that mask-wearing impacted several language learning processes for Amelia as she was unable to see the facial expressions of the SLT-R and Emily which is necessary for receiving social cues and contingent feedback important for supporting Amelia to discover new phonological patterns in the SLT-R and Emily's speech (Goldstein & Schwade, 2008; Lewkowitz &Hansen-Tift, 2012). In addition, Amelia was unable to see the mouth movements of the SLT-R and Emily and it is anticipated that this reduced the auditory and visual speech cues she received which is important for phonological development (Lewkowitz &Hansen-Tift, 2012). Recent research into the effects of mask-wearing shows that younger children experience more difficulties than older children in language processing tasks when masks are worn (Bourke et al., 2022). Bourke and colleagues (2022) also identified that mask-wearing has a significant effect on children's emotional recognition accuracy. This highlights the importance of parent training as a component of the Toddler Talk intervention program as the SLT-R provided coaching and feedback to Emily, which

supported her to implement the intervention with Amelia in the home setting where masks were not worn.

In addition to the mask-wearing requirements for allied health services at the time of this study, Emily and Amelia were required to self-isolate for one week of the intervention phase. As both Emily and Amelia were well, they participated in a telehealth intervention session. The literature shows comparable outcomes between in-clinic and telehealth for early intervention speech and language therapy services on measures of child and parent outcomes (Philp et al., 2021). While it was not possible to draw conclusions about the impact of the telehealth session on the outcomes in this study, the qualitative data suggested that the implementation of the intervention was not as successful when delivered via telehealth. The SLT-R observed that Amelia was more distracted during the telehealth session compared to her in-clinic sessions and the SLT-R's impression was that this impacted Amelia and Emily's engagement in the intervention. This coincided with a reduction in the number of words spontaneously produced by Amelia during the telehealth session. Recent research into telehealth speech and language therapy services identified the presence of distractions in the environment as one of the main barriers to successful telehealth interventions (Kwok et al., 2022). Parent and child engagement and the therapist's capabilities were also identified as elements influencing the success of telehealth (Kwok et al., 2022). In summary, it could be hypothesised that delivering the Toddler Talk intervention program via telehealth does not promote child engagement in the intervention, although the degree to which this impacted the outcomes of this program remains unclear. It may be that sessions delivered via telehealth should rather focus solely on parent training to allow the parent to fully engage in the session, without the distraction of the home environment.

Emily's Experience

Emily reported a positive experience with the Toddler Talk intervention program in her interview. Emily described observing almost immediate changes in Amelia's language development using the strategies introduced by the SLT-R during the intervention sessions. Prior to commencing the intervention program, Emily identified that one of her priorities for Amelia's speech and language therapy intervention was for Amelia to, "feel confident using her speech." This outcome was achieved during the 8-week intervention program as Emily

reported that Amelia was less frustrated and more confident being around other children following her participation in the program. Another priority for Emily was for Amelia to, "start linking two words together." Emily was able to provide specific examples of two-word phrases that Amelia was using during her interview and indicated that Amelia was beginning to combine three words together, which suggested that Amelia also achieved this outcome. These outcomes were important to Emily and indicated that Emily's aspirations for Amelia were able to be met through the Toddler Talk intervention program and likely fostered her engagement in the intervention program (parental empowerment). Overall, Emily expressed that she would recommend the Toddler Talk intervention to other parents. Qualitative data suggested that this was due to parental empowerment as Emily felt Amelia's progress was, "massive," she could recognise the relevance of the strategies she was learning, and she felt the program was feasible to implement as she was working on the goals during play and daily activities.

Researcher's Impressions

Emily and Amelia completed the intervention program and their engagement, although variable, was maintained across the 8-weeks. The outcomes for Emily and Amelia were encouraging with Amelia showing improvements in measures of language and phonological development following her participation in the intervention program. Positive outcomes were also observed qualitatively for Amelia in the day-care setting and extended to Emily who showed an acute awareness of Amelia's speech and language development at the conclusion of the intervention. Overall, the researcher's impression was that the Toddler Talk intervention program laid the foundation for future speech and language therapy intervention for Amelia should this be required.

The Toddler Talk intervention program utilised focused stimulation and other language stimulation strategies that early intervention SLTs will be familiar with, enabling other SLTs to implement the intervention without any additional training. However, Amelia's progress during the Toddler Talk intervention program exceeded the researcher's expectations at the outset of the study. Consequently, the researcher frequently engaged in reflection about Amelia's progress and made adaptions to the intervention program to ensure that Amelia's developmental needs were being met over the course of the study. Hence, the researcher's impression was that the Toddler Talk intervention program requires

further development in order to support other SLTs to deliver the intervention in their own clinical practice.

Summary

The speech and language therapist–researcher (SLT-R) developed the Toddler Talk intervention program to support the language and phonological development of toddlers with LLE. The intervention program was based on theoretical and research evidence. The research questions were as follows:

1. What changes in verbal expressive vocabulary and utterance length are observed when the Toddler Talk intervention program is used with a toddler with LLE?
2. What changes in phonological abilities are observed when the Toddler Talk intervention program is used with a toddler with LLE?
3. What is the social importance and acceptability of the Toddler Talk intervention program for the participants in the study?

In summary, there were positive expressive vocabulary and utterance length outcomes for the toddler with LLE in this study. There were also positive changes in the toddler's phonological abilities including phonemic inventory, syllable shape inventory, word length inventory, and PCC for early developing consonant sounds. In addition, there were socially significant findings following the implementation of the Toddler Talk intervention program which suggested that the intervention program was well received by the participants, met their needs, and created positive outcomes beyond the home and clinic settings.

Strengths of the Research

There was a lot to be learnt from this exploratory case-study which investigated the outcomes of the Toddler Talk intervention program for toddlers with LLE. The exploratory case-study design enabled the researcher to provide a rich description and detailed understanding of the outcomes for the participants, thus supporting the transferability of the data to the relevant population (Forero et al., 2018; Hersh, 2019). The researcher included a combination of seven quantitative and qualitative data sources which supported the triangulation of the data. This allowed the researcher to compare and contrast the

findings to increase the credibility of the findings and enriched the understanding of the data and the research questions (Creswell, 2015; Salkind, 2010).

The researcher developed the Toddler Talk intervention program and had a dual role (researcher and SLT) in the study. The researcher understood that her clinical experience and further post-graduate study could impact her ability to remain neutral and impartial as a researcher and, as such, she made a concerted effort to reduce any potential biases. The researcher engaged in reflexivity and documented her thoughts and feelings in a researcher journal to increase the dependability of the data (Forero et al., 2018; Hersh, 2019). Further, Emily's interview was conducted with the Clinic Director, rather than the SLT-R, in order to obtain honest responses from Emily, reduce researcher bias, and increase the credibility of the findings (Hersh, 2019). In addition, dependability was increased through intra-rater and inter-rater reliability measures and by offering Emily the opportunity to provide feedback on her interview transcript and the themes and sub-themes from her interview.

Limitations of the Research

While the researcher made an effort to support the transferability of the data to the relevant population, the exploratory case-study design with one parent-child dyad limits the generalisation of the conclusions to other populations (Yin, 2014). In addition, it was evident that the methodology used in this study did not have the rigour needed for replication to achieve similar outcomes to those presented in this study (Yin, 2014).

Although the researcher planned to reduce potential biases that could result from her developing the Toddler Talk intervention program and her dual role, bias may still exist within the results and interpretation of the study outcomes due to the researcher conducting the assessments, implementing the program, and collecting and analysing the data. Further, Emily elected not to review her interview transcript or the themes and sub-themes from her interview. Therefore, there is a possibility that the researcher's interpretation of Emily's comments is different to the message that Emily was conveying, resulting in inaccuracies in the findings (Bold, 2012; Creswell, 2015).

Future Research Directions

The findings of this exploratory case study were promising and aligned with previous research on similar intervention programs. Future research would benefit from refinement

of the intervention procedures and methodology used in this study to allow stronger conclusions to be drawn from the data. It would be beneficial to explore the outcomes of the Toddler Talk intervention program including toddlers with different LLE profiles (e.g., mixed receptive-expressive language delay, expressive language delay, delayed verbal expressive vocabulary development) and varying levels of language and phonological abilities in future studies. In addition, it would be beneficial to include toddlers from different cultural and linguistic backgrounds. It would be important to ensure that there are appropriate adaptations to the intervention procedures, such as selecting target vocabulary across the child's languages, to meet the needs of these children and their families.

Firstly, the results of the Receptive-Expressive Emergent Language Test – Fourth Edition (REEL-4) (Brown et al., 2020) and the Australian English Developmental Vocabulary Inventory (OZI) (Kalashnikova et al., 2016) provided conflicting measures of Amelia's expressive language abilities and, as a result, the SLT-R was required to apply her clinical judgement to determine that Amelia was at risk of LLE due to her expressive vocabulary delay. Future research studies should consider the benefits of using the Vocabulary Inventory test of the REEL-4 as the expressive vocabulary measure. This may offer continuity between the measures due to the same standardised population being used. In addition, the SLT-R confirmed that Amelia's early communication and play skills were developing appropriately for her age based on developmental norms and her clinical judgement. While this was suitable for a case-study design, it does not have the rigour to suit a larger-scale study. Future research studies should consider using an established assessment for the collection and analysis of the participants' early communication and play development, such as the Rossetti Infant-Toddler Language Scale (Rossetti, 2006).

Secondly, there was a high level of individualisation in the Toddler Talk intervention program in this study which offered a holistic and adaptable intervention for Emily and Amelia. However, this poses challenges for the replication of the intervention program with a larger cohort of participants. Future research studies would benefit from including guidelines for the selection of language stimulation strategies that complement the words and phrases that are targeted during the intervention and the coaching strategies used by the researcher. In addition, a script for explaining the different strategies to parents would be useful within the guidelines to provide more transparent documentation of how these

are introduced to parents. Further, fidelity measures should be included to evaluate the reliability of the implementation and increase the accuracy of the conclusions that are drawn from the data.

In addition, the delivery of the Toddler Talk intervention program via telehealth requires consideration for future research studies. There has been an uptake in telehealth services since the Covid-19 pandemic and these services will likely continue to be offered by private speech and language therapy services to maintain the momentum of therapy. While similar outcomes can be achieved when early intervention programs are delivered via telehealth (Philp et al., 2021), this study suggested that parent and child engagement can be reduced. Hence, future research studies should explore the best way to deliver the intervention program via telehealth to foster engagement.

Finally, some of the quantitative measures would benefit from reconsideration and refinement in future research studies. For example, it would be beneficial to define the contexts for the collection of imitation and intelligibility repeated measures in the home setting to offer stronger comparisons that consider the context of the interaction (e.g., child and parent interacting, child and sibling interacting). In addition, the repeated measure of Amelia's imitation in the clinic setting would be better measured as a percentage. The percentage of words imitated from the number of opportunities provided would serve as a more informative measure of Amelia's imitation than the total number of words imitated in each intervention session. Further, a mean length of utterance (MLU) measure of Amelia's utterance length would have provided a stronger comparison to other research studies and should be considered in future research studies.

Clinical Implications

The Toddler Talk intervention program was developed by the SLT-R based on current theoretical and research evidence. This program aims to support the language and phonological development of toddlers who have LLE and includes the use of focused stimulation and other language stimulation strategies to target words and phrases within play and daily routines. In addition, it incorporates the principles of PCIT through the inclusion of parent coaching and feedback.

The application of the findings from this study to clinical practice is limited due to the exploratory case study design. However, there were some encouraging outcomes for the participants in this study which were supported by the findings of previous studies.

Final Thoughts

Early intervention programs that consider the language and phonological skills of toddlers is a new and emerging area of research. The Toddler Talk intervention program, which is grounded in theory and research, offers a new approach to early intervention for toddlers with LLE that is dynamic and responsive to the needs of the parent and child. This exploratory case study provided the first look at the outcomes which coincided with the implementation of this intervention program. Amelia experienced improvements in her verbal expressive vocabulary development and utterance length over the course of the 8-week intervention. She also experienced improvements in her phonemic inventory, syllable shape inventory, word length inventory, and PCC for early developing consonant sounds. The findings were consistent with intervention studies using a similar approach with toddlers with a cleft (Kaiser et al.,2017; Philp et al., 2021). In addition, the findings suggested that the intervention was well received by the participants, met their needs, and created positive and meaningful change beyond the intervention contexts (clinic and home settings).

The exploratory case-study design was appropriate for exploring the outcomes of the newly developed Toddler Talk intervention program. The findings from this study have provided the evidence needed to support the continued exploration of this intervention approach with toddlers who have varying LLE profiles. With further high-quality research, it is hoped that the impact of selecting intervention targets that consider a child with LLE's language and phonological skills can be better understood. This will enable SLTs to continue to provide high-quality, effective early intervention to toddlers with LLE and their families.

References

Akhtar, N., & Gernsbacher, M. A. (2007). Joint attention and vocabulary development: A critical look. *Language and Linguistics Compass, 1*(3), 195-207. https://doi.org/10.1111/j.1749-818X.2007.00014.x

American Speech-Language-Hearing Association. (2023a). *Language in brief.* https://www.asha.org

American Speech-Language-Hearing Association. (2023b). *Late language emergence*. https://www.asha.org/

American Speech-Language-Hearing Association. (2023c). *Transitions/generalizations of skill*. https://www.asha.org/

Andrade, C. (2020). Sample size and its importance in research. *Indian Journal or Psychological Medicine, 42*(1), 102-103. https://doi.org/10.4103/IJPSYM.IJPSYM_504_19

Austin, S. (2013). Communicative Functions. In F. R. Volkmar (Eds.), *Encyclopedia of Autism Spectrum Disorders* (pp. 751–752). Springer.

Baddeley, A., Gathercole, S., & Papagno, C. (1998). The phonological loop as a language learning device. *Psychological Review, 105*, 158-173. https://doi.org/10.1037/0033-295x.105.1.158

Bandura, A. (1977). *Social learning theory.* Prentice Hall.

Bates, E., Camaioni, L., & Volterra, V. (1975). The acquisition of performatives prior to speech. *Merrill-Palmer Quarterly, 21*(3), 205–226. Retrieved from: https://www.researchgate.net/

Beuker, K. T., Rommelse, N. N., Donders, R., & Buitelaar, J. K. (2013). Development of early communication skills in the first two years of life. *Infant Behavior and Development, 36*(1), 71-83. https://doi.org/10.1016/j.infbeh.2012.11.001

Bold, C. (2012). *Using narrative in research*. SAGE Publications.

Bourke, L., Lingwood, J., Gallagher-Mitchell, T., & López-Pérezb, B. (2022). The effect of face mask wearing on language processing and emotion recognition in young children. *Journal of Experimental Child Psychology, 226*, 1-9. OURKEhttps://doi.org/10.1016/j.jecp.2022.105580

Bowen, C. (2019). *Communication disorders glossary with an emphasis on children's speech*. https://www.speech-language-therapy.com/

Bowen, C. (2021a). *Table 1: Intelligibility*. https://www.speech-language-therapy.com/

Bowen, C. (2021b). *Table 3: Elimination of phonological processes*. https://www.speech-language-therapy.com/

Brown, R. (1973). *A first language: The early stages.* George Allen & Unwin.

Brown, V., Bzoch, K., & League, R. (2020). *Receptive-Expressive Emergent Language Test* (4th ed.). Pro-Ed.

Cable, A. L., & Domsch, C. (2011). Systematic review of the literature on the treatment of children with late language emergence. *International Journal of Communication Disorders, 46*(2), 138-154. https://doi.org/10.3109/13682822.2010.487883

Carson, C. P., Klee, T., Carson., D. K., & Hime, L. K. (2003). Phonological profiles of 2-year olds with delayed language development: Predicting clinical outcomes at age 3. *American Journal of Speech-Language Pathology, 12*, 28-39. https://doi.org/10.1044/1058-0360(2003/050)

Carter, S. L., & Wheeler, J. J. (2019). *The social validity manual: Subjective evaluation of interventions* (2nd ed.). Elsevier.

Caselli, M.C., & Casadio, P. (1995). *Il primo vocabolario del bambino*. Franco.

Chapman, K. L. (1991). Vocalizations of toddlers with cleft lip and palate. T*he Cleft Palate-Craniofacial Journal, 28*, 172–178. https://doi.org/10.1597/15451569_1991_028_0172_votwcl_2.3.co_2

Chapman, K. L., Hardin-Jones, M., Schulte, J., & Halter, K. A. (2001). Vocal development of 9-month-old babies with cleft palate. *Journal of Speech, Language, and Hearing Research, 44*, 1268–1283. https://doi.org/10.1044/1092-4388(2001/099)

Chomsky, N. (1965). *Aspects of the theory of syntax.* MIT Press.

Claessen, M., Beattie, T., Roberts, R., Leitao, S., Whitworth, A., & Dodd, B. (2017). Is two too early? Assessing toddlers' phonology. *Speech, Language and Hearing, 20*(2), 91-101. https://doi.org/10.1080/2050571X.2016.1222723

Colonnesi, C., Stams, G. J., Stams, J. M., Koster, I., and Noom, M. J. (2010). The relation between pointing and gesture development: A meta-analysis. *Developmental Review, 30*(4), 352-366. https://doi.org/10.1016/j.dr.2010.10.001

Creswell, J. W. (2015). *A concise introduction to mixed methods research*. Los Angeles, SAGE Publications.

Dale, P. S., Price, T. S., Bishop, D. V. M., & Plomin, R. (2003). Outcomes of early language delay: I. Predicting persistent and transient delay at 3 and 4 years. *Journal of Speech, Language and Hearing Research, 46*, 544–560. https://doi.org/10.1044/1092-4388(2003/044)

Davis, B., van der Feest, S. V., Yi, H. (2018). Speech sound characteristics of early words: Influence of phonological factors across vocabulary development. *Journal of Child Language, 45*(3), 1-30. https://doi.org/10.1017/S0305000917000484

DeCuir-Gunby, J. T., Marshall, P. L., & MuCulloch, A. W. (2011). Developing a codebook for the analysis of interview data: An example from a professional development research project. *Field Methods, 23*(2), 136-155. https://doi.org/10.1177/1525822X10388468

DeVeney, S. L., Hagaman, J. L., & Bjornsen, A. L. (2017). Parent-implemented versus clinician-directed interventions for late-talking toddlers: A systematic review of the literature. *Communication Disorders Quarterly, 39*(1), 293-302. https://doi.org/10.1177/1525740117705116

Ebbels, S. H., McCartney, E., Slonims, V., Dockrell, J. E., & Norbury, C. F. (2019). Evidence-based pathways to intervention for children with language disorders. *International Journal of Language and Communication Disorders, 54*(1), 3-19. https://doi.org/10.1111/1460-6984.12387

Fasolo, M., Majorano, M., & D'Odorico, L. (2008). Babbling and first words in children with slow expressive development. *Clinical Linguistics and Phonemics, 22*(2), 83-94. https://doi.org/10.1080/02699200701600015

Fenson, L., Marchman, V. A., Thal, D. J., Dale, P. S., Reznick, J. S., & Bates, E. (2006). *MacArthur-Bates Communicative Development Inventories* (2nd ed.). Paul H. Brookes.

Ferguson, C. A. (1986). Discovering sound units and constructing sound systems: It's child's play. In J. S. Perkell & D. H. Klatt (Eds), *Invariance and variability in speech processes* (pp. 36–57). Erlbaum.

Ferguson, C. A., & Farwell, C. B. (1975). Words and sounds in early language acquisition. *Language, 51*(2), 419–39. https://doi.org/10.2307/412864

Fey, M. E., Cleave, P. L., Ravida, A. I., Long, S. G., Dejmal, A. E., & Easton, D. L. (1994). Effects of grammar facilitation on the phonological performance of children with speech and language impairments. *Journal of Speech, Language, and Hearing Research, 37*(3), 594-607. https://doi.org/10.1044/jshr.3703.594

Forero, R., Nahidi, S., De Costa, J., Mohsin,M., Fitzgerald, G., Gibson, N., McCarthy, S., & Aboagye-Sarfo, P. (2018). Application of four-dimension criteria to assess rigour of qualitative research in emergency medicine. *BMC Health Research Medicine, 18*(1), 120. https://doi.org/10.1186/s12913-018-2915-2

Frey, B. B. (2018). *The SAGE encyclopaedia of educational research, measurement, and evaluation.* Sage Publications.

Girault, J. B., Langworthy, B. W., Goldman, B. D., Stephens, R. L., Cornea, E., Reznick J. S., Fine, J., & Gilmore, J. H. (2018). The predictive value of developmental assessments at 1 and 2 for intelligence quotients at 6. *Intelligence, 68,* 58-65. https://doi.org/10.1016/j.intell.2018.03.003

Girolametto, L., Pearce, P. S., & Weitzman, E. (1995). The effects of focused stimulation for promoting vocabulary in young children with delays: A pilot study. *Communication Disorders Quarterly, 17*(2), 39-49. https://doi.org/10.1177/152574019501700205

Girolametto, L., Pearce, P. S., & Weitzman, E. (1996). Interactive focused stimulation for toddlers with expressive vocabulary delays. *Journal of Speech and Hearing Research, 39*(6), 1274-1283. https://doi.org/10.1044/jshr.3906.1274

Girolametto, L., Pearce, P. S., & Weitzman, E. (1997). Effects of lexical intervention on the phonology of late talkers. *Journal of Speech, Language, and Hearing Research, 40*(2), 338-48. https://doi.org/10.1044/jslhr.4002.338

Girolametto, L., Pearce, P. S., & Weitzman, E. (2016). The effects of focused stimulation for promoting vocabulary in young children with delays: A pilot study. *Communication Disorders Quarterly, 17*(2), 39-49. https://doi.org/10.1177/152574019501700205

Girolametto, L., Weitzman, E., Wiigs, M., & Pearce, P. S. (1999). The relationship between maternal language measures and language development in toddlers with expressive vocabulary delays. *American Journal of Speech-Language Pathology, 8*(4), 364-374. https://doi.org/10.1044/1058-0360.0804.364

Goldstein, M. H., & Schwade, J. A. (2008). Social feedback to infants' babbling facilitates rapid phonological learning. *Psychological Science, 19*(5), 515-523. https://doi.org/10.1111/j.1467-9280.2008.02117.x.

Guba, E., & Lincoln, Y. (1985). *Naturalistic inquiry.* Sage Publications.

Hadley, P. A., Rispoli, M. & Hsu, N. (2016). Toddlers' verb lexicon diversity and grammatical outcomes. *Language, Speech, and Hearing Services in Schools, 47*(1), 44–58. https://doi.org/10.1044/2015_LSHSS-15-0018

Hagan, J., Shaw, J. S., & Duncan, P. M. (2008). *Bright futures: Guidelines for health supervision of infants, children, and adolescents* (3rd ed.). American Academy of Pediatrics.

Hersh, D. (2019). *Rigour on qualitative research* [Handout].

Hudson, M., Milne, M., Reynolds, P., Russell, K., & Smith, B. (2010). *Te Ara Tika Guidelines for Māori research ethics: A framework for researchers and ethics committee members*. Health Research Council of New Zealand.

Jones C. E., Chapman K. L., & Hardin-Jones M. A. (2003). Speech development of children with cleft palate before and after palatal surgery. *Cleft Palate-Craniofacial Journal, 40*, 19-31. https://doi.org/10.1597/1545-1569_2003_040_0019_sdocwc_2.0.co_2

Kaiser, A. P., Hester, P. P., & McDuffie, A. S. (2001). Supporting communication in young children with developmental disabilities. *Mental Retardation and Developmental Disabilities Research Reviews, 7*(2), 143-150. https://doi.org/10.1002/mrdd.1020

Kaiser A. P., & Roberts M. Y. (2011). Advances in early communication and language intervention. *Journal of Early Intervention, 33*(4), 298–309. https://doi.org/10.1177/1053815111429968

Kaiser A. P., & Roberts M. Y. (2013). Parent-implemented enhanced milieu teaching with preschool children who have intellectual disabilities. *Journal of Speech, Language, and Hearing Research, 56*(1), 295–309. https://doi.org/10.1044/1092-4388(2012/11-02311)

Kaiser, A. P., Scherer, N. J., Frey, J. R., & Roberts, M. Y. (2017). The effects of Enhanced Milieu Teaching with phonological emphasis on the speech and language skills of young children with cleft palate: A pilot study. *American Journal of Speech Language Pathology, 26*(3), 806–818. https://doi.org/10.1044/2016_AJSLP-16-0008

Kalashnikova, M., Schwarz, I., & Burnham, D. (2016). OZI: Australian English Communicative Development Inventory. *First Language, 36*(4), 407-427. https://doi.org/10.1177/0142723716648846

Kim, S. W., Kim, J. Y., Lee, S. Y., & Jeon, H. R. (2016). The comparison of M-B CDI-K short form and K-ASQ as screening test for language development. *Annals of Rehabilitation Medicine, 40*(6), 1108-1113. https://doi.org/10.5535/arm.2016.40.6.1108

Kjesbo, R. R. (n.d.). *Putting words together.* Super Duper Publications. https://www.handyhandouts.com/

Klatte, I., Harding, S., & Roulstone, S. (2019). Speech and language therapists' views on parents' engagement in parent-child interaction therapy (PCIT). *International Journal of Language and Communication Disorders*, *54*(4), 1-12. https://doi.org/10.1111/1460-6984.12459

Klatte, I., & Roulstone, S. (2016). The practical side of working with parent-child interaction therapy with preschool children with language impairments. *Child language teaching and therapy, 32,* 345-399. https://doi.org/10.1177/0265659016641999

Kuhl, P. K. (2004). Early language acquisition: Cracking the speech code. *Nature Reviews Neuroscience, 5,* 831-843. https://doi.org/10.1038/nrn1533

Kuhl, P. K., Conboy, B. T., Coffey-Corina, S., Padden, D., Rivera-Graxiola, M., & Nelson, T. (2008). Phonemic learning as a pathway to language: New data and native language magnet theory expanded (NLM-e). *Philosophical Transactions of the Royal Society B, 363*(1493), 979-1000. https://doi.org/10.1098/rstb.2007.2154

Kwok, E. Y. L., Pozniak, K., Cunningham, B. J., & Rosenbaum, P. (2022). Factors influencing the success of telepractice during the COVID-19 pandemic and preferences for post-pandemic services: An interview study with clinicians and parents. *International Journal of Language and Communication Disorders, 57*(6), 1354-1367. https://doi.org/10.1111/1460-6984.12760

Laasonen, M., Smolander, S., Lahti-Nuuttila, P., Leminen, M., Lajunen, H. R., Heinonen, K., Pesonen, A. K., Bailey, T. M., Pothos, E. M., Kujala, T., Leppanen, P. H., Bartlett, C. W., Geneid, A., Lauronen, L., Service, E., Kunnari, S., & Arkkila, E. (2018). Understanding developmental language disorder – the Helsinki longitudinal SLI study (HelSLI): A study protocol. *BMC Psychology, 6*(1), 24. https://doi.org/10.1186/s40359-018-0222-7

Lederer, S. H. (2002). First vocabulary for children with specific language impairment: A focused language stimulation approach. *Young Exceptional Children, 8*(1), 10-17. https://doi.org/10.1177/109625060200600102

Leonard, L. B., Schwartz, R. G., Folger, M. K., & Wilcox, M. J. (1977). Some aspects of child phonology in imitative and spontaneous speech. *Journal of Child Language, 5*, 403-415. https://doi.org/10.1017/S0305000900002075

Lewkowicz, D. J., & Hansen-Tift, A. M. (2012). Infants deploy selective attention to the mouth of a talking face when learning speech. P*roceedings of the National Academy of Sciences 109*(5), 1431-1436. https://doi.org/10.1073/pnas.1114783109

Lowry, L. (2015). *Gesture use in children with autism spectrum disorder.* The Hanen Centre. http://www.hanen.org/

Lowry, L. (2016a). *Do late talkers "grow out of it?"* The Hanen Centre. http://www.hanen.org/

Lowry, L. (2016b). *Imitation and communication: What's the connection?* The Hanen Centre. http://www.hanen.org/

Lowry, L. (2016c). *Verbs Pave the Way for Language Development*. The Hanen Centre. http://www.hanen.org/

Majorano, M., Vihman, M. M., & DePaolis, R. A. (2014). The relationship between infants' speech production experience and their processing of speech. *Language Learning and Development, 10*, 179-204. https://doi.org/10.1080/15475441.2013.829740

Massey University. (2017). *Code of ethical conduct for research, teaching and evaluations involving human participants.* https://www.massey.ac.nz/

McIntosh, B., & Dodd, B. J. (2008). Two-year-olds' phonological acquisition: Normative data. *International Journal of Speech-Language Pathology, 10*(6), 460-469. https://doi.org/10.1080/17549500802149683

McLeod S., & Baker, E., (2017). *Children's speech: An evidence-based approach to assessment and intervention.* Pearson Education.

Melvin, K., Meyer, C., & Scarinci, N. (2019). What does "engagement" mean in early speech pathology intervention? A qualitative systematised review. *Disability and Rehabilitation, 42*(18), 2665-2678. https://doi.org/10.1080/09638288.2018.1563640

Mundy, P., Block, J., Delgado, C., Pomares, Y., Van Hecke, A. V., & Parlade, M. V. (2007). Individual Differences and the Development of Joint Attention in Infancy. *Child Development, 78*(3), 938-954. https://doi.org/10.1111/j.1467-8624.2007.01042.x

National Disability Insurance Agency. (2022). *Do you need early intervention?* https://ourguidelines.ndis.gov.au/

New Zealand Speech-Language Therapists' Association. (2008). *Code of ethics.* http://www.speechtherapy.org.nz/

Newbury, J. M. (2014). *Early language variation and working memory: A longitudinal study of late talkers and typically developing children.* [Thesis: University of Canterbury]. UC Research Repository. https://ir.canterbury.ac.nz/

Nowell, L. S., Norris, J. M., White, D. G., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*, 1-13. https://doi.org/10.1177/1609406917733847

NSW Health. (2020). *Guidance for the Statewide Infant Screening – Hearing (SWISH) program.* https://www.health.nsw.gov.au/

Paul, R., & Jennings, P. (1992). Phonological behaviors in toddlers with slow expressive language development. *Journal of Speech and Hearing Research, 35*, 99-107. https://doi.org/10.1044/jshr.3501.99

Paul, R., Norbury, C., & Goose, C. (2017). *Language disorders from infancy through adolescence: Listening, speaking, reading, writing, and communicating* (5th ed.). Elsevier.

Petersen, D. B. (2011). A systematic review of narrative-based language intervention with children who have language impairment. *Communication Disorders Quarterly, 32*(4), 207-220. https://doi.org/10.1177/1525740109353937

Philp, J., Ellis, P. K., Scherer, N. J., & Lien, K. M. (2021). Enhanced Milieu Teaching with phonological emphasis: A pilot telepractice parent training study for toddlers with clefts. *Children, 8*(9), 736. https://doi.org/10.3390/children8090736

Piaget, J. (1957). *Construction of reality in the child*. Routledge & Kegan Paul.

Reilly, S., Bavin, E. L., Bretherton, L., & Conway, L. J., (2009). The Early Language in Victoria Study (ELVS): A prospective, longitudinal study of communication skills and expressive vocabulary development at 8, 12 and 24 months. *International Journal of Speech-Language Pathology, 11*(5), 344-357. https://doi.org/10.1080/17549500903147560

Reilly, S., McKean, C., Levickis, P. (2014) *Late talking: Can it predict later language difficulties?* Centre for Research Excellence in Child Language.

Reilly, S., Wake, M., Ukoumunne, O., Bavin, E., Prior, M., Cini, E., Conway, L., Eadie, P., & Bretherton, L. (2010). Predicting language outcomes at 4 years of age: Findings from the Early Language in Victoria Study. *Pediatrics*, *126*(6), E1530-E1537. https://doi.org/10.1542/peds.2010-0254

Rescorla, L. A., & Ratner, N. (1996). Phonemic profiles of toddlers with specific expressive language impairment (SLI-E). *Journal of Speech and Hearing Research, 39*(1), 153-65. https://doi.org/10.1044/jshr.3901.153

Roberts M. Y., & Kaiser A. P. (2012). Assessing the effects of a parent-implemented language intervention for children with language impairments using empirical benchmarks: A pilot study. *Journal of Speech, Language, and Hearing Research, 55*, 1655-1670. https://doi.org/10.1044/1092-4388(2012/11-0236)

Roberts M. Y., & Kaiser A. P. (2015). Early intervention for toddlers with language delays: A randomized controlled trial. *Pediatrics, 135*(4), 686-693. https://doi.org/10.1542/peds.2014-2134

Roberts, M. Y., Kaiser, A. P., Wolfe, C. E., Bryant, J. D., & Spidalieri, A. M. (2014). Effects of the teach-model-coach-review instructional approach on caregiver use of language support strategies and children's expressive language skills. *Journal of Speech, Language, and Hearing Research, 57*(5), 1851-1869. https://doi.org/10.1044/2014_JSLHR-L-13-0113

Rossetti, L. (2016). *Rossetti Infant-Toddler Language Scale: A measure of communication and interaction.* Pro-Ed.

Rudolph, J. M. & Leonard, L. B. (2016). Early language milestones and specific language impairment. *Journal of Early Intervention, 38*(1) 41 –58. https://doi.org/10.1177/1053815116633861

Salkind, N. J. (2010). *Encyclopedia of research design.* Sage Publications.

Sansavini, A., Favilla, M. E., Guasti, M. T., Marini, A., Millepiedi, S., Di Martino, M. V., Vecchi, S., Battajon, N., Bertolo, L, Capirci, O., Carretti, B., Colatei, M. P., Frioni, C., Marotta, L., Massa, S., Michelazzo, L., Pecini, C., Piazzalunga, S., Pieretti, M., … Lorusso, M. L. (2021). Developmental language disorder: Early predictors, age for the diagnosis, and diagnostic tools. A scoping review. *Brain Sciences, 11*(5), 654. https://doi.org/10.3390/brainsci11050654

Scherer, N. J. (1999). The speech and language status of toddlers with cleft lip and/or palate following early vocabulary intervention. *American Journal of Speech-Language Pathology, 8*, 81-93. https://doi.org/10.1044/1058-0360.0801.81

Schwartz, R. G., & Leonard, L. B. (1982). Do children pick and choose? An examination of phonological selection and avoidance in early lexical acquisition. *Journal of Child Language, 9*(2), 319-336. https://doi.org/10.1017/S0305000900004748

Shriberg, L. D. (1993). Four new speech and prosody-voice measures for genetics research and other studies in developmental phonological disorders. *Journal of Speech and Hearing Research, 36*(1), 105–140. https://doi.org/10.1044/jshr.3601.105

Smith, K. (2014). *PLS-5 validity study: A comparison of test scores* [Blog]. ASHA Community. https://community.asha.org/blogs/

South Eastern Sydney Local Health District. (2022). *Children's speech pathology.* https://www.seslhd.health.nsw.gov.au/

Speech Pathology Australia. (2020). *Code of ethics 2020.* https://www.speechpathologyaustralia.org.au/

Speech Pathology Australia. (2022). *Covid-19 information for Speech Pathology Australia members.* The Speech Pathology Association of Australia Limited.

Speech Pathology Australia. (n.d.). *Medicare and NDIS.* https://www.speechpathologyaustralia.org.au/

Stagnetti, K. (n.d.). *The development of pretend play* [Handout].

Stoel-Gammon, C. (1989). Prespeech and early speech development of two late talkers. *First Language, 9*, 207-224. https://doi.org/10.1177/014272378900900607

Stoel-Gammon, C. (1991). Normal and disordered phonology in two-year-olds. *Topics in Language Disorders, 11*(4), 21-32. https://doi.org/10.1097/00011363-199111040-00005

Stoel-Gammon, C., & Dunn, C. (1985). *Normal and disordered phonology in children.* Pro Ed.

Stoel-Gammon, C., & Williams, L. (2013). Early phonological development: Creating an assessment test. *Clinical Linguistics and Phonemics, 27(*4), 278-286. https://doi.org/10.3109/02699206.2013.766764

Squires, J., & Bricker, D. (1993). *Infant/Child Monitoring Questionnaires procedures manual* (Rev. ed.). University of Oregon.

Tosh, R., Arnott, W., & Scarinci, N. (2017). Parent-implemented home therapy programmes for speech and language: A systematic review. *International Journal of Language and Communication Disorders, 52*(3), 253–269. https://doi.org/10.1111/1460-6984.12280

Vance, M., & Clegg, J. (2012). Use of single case study research in child speech, language and communication interventions. *Child Language Teaching and Therapy, 28*(3), 255-258. https://doi.org/10.1177/02656590124577

Vogel Sosa, A., & Stoel-Gammon, C. (2006). Patterns of intra-word phonological variability during the second year of life. *Journal of Child Language, 33*, 31-50. https://doi.org/:10.1017/S0305000905007166

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Washington, K. N., Thomas-Stonell, N., McLeod, S., & Warr-Leeper, G. (2012). Parents' perspectives on the professional-child relationship and children's functional communication following speech-language intervention. *Canadian Journal of Speech-Language Pathology and Audiology, 36*(3), 220-233.

Watson, M. M., & Scukanec, G. P. (1997). Profiling the phonological abilities of 2-year-olds: A longitudinal investigation. *Child Language Teaching and Therapy, 12*(1), 3-14. https://doi.org/10.1177/026565909701300102

Weismer, S. E., Murray-Branch, J., & Miller, J. F. (1993). Comparison of two methods for promoting productive vocabulary in late talkers. *Journal of Speech, Language, and Hearing Research, 36*(5), 1037-1050. https://doi.org/10.1044/jshr.3605.1037

Weismer, S. E., Venker, C., E., & Robertson, S. (2017). Focused stimulation approach to language intervention. In R. J. McCauley, M. E. Fey, & R. B. Gillam (Eds), *Treatment of language disorders in children* (2nd ed., pp. 175-202). Brookes.

Weitzman, E. (2017). *It Takes Two to Talk: A practical guide for parents of children with language delays* (5th ed.). The Hanen Centre.

Weitzman, E., Girolametto, L., & Drake, L. (2017). Hanen programs for parents: Parent implemented early language intervention. In McCauley, R. J., Fey, M. E. & Gillam, R. B. (Eds.), *Treatment of language disorders in children* (2nd ed., pp. 27-56). Paul H. Brookes Publishing Co.

Whitehurst, G., Smith, M., Fischel, J., Arnold, D., & Lonigan, C. (1991). The continuity of babble and speech in children with specific expressive language delay. *Journal of Speech and Hearing Research, 34*, 1121-1129. https://doi.org/10.1044/jshr.3405.1121

Wilcox, M. (1992). Enhancing initial communication skills in young children with developmental disabilities through partner programming. *Seminars in Speech and Language, 13*(3), 194-212. https://doi.org/10.1055/s-2008-1064197

Wilcox, M. J., Kouri, T., & Caswell, S. B. (1991). Early language intervention: A comparison of classroom and individual treatment. *American Journal of Speech-Language Pathology, 1*(1), 49-62. https://doi.org/10.1044/1058-0360.0101.49

Williams, A. L., & Elbert, M. (2003). A prospective longitudinal study of phonological development in late talkers. *Language, Speech, and Hearing Services in Schools, 34*(2), 138-153. https://doi.org/10.1044/0161-1461(2003/012)

Wolfe, D. L., & Heilmann, J. (2010). Simplified and expanded input in a focused stimulation program for a child with expressive language delay (ELD). *Child Language Teaching and Therapy, 26*(3), 335–346. https://doi.org/10.1177/0265659010369286

Yin, R. K. (2014). *Case study research: Design and methods.* Sage Publications.

Yin, R. K., & Davis, D. (2007). Adding new dimensions to case study evaluations: The case of evaluating comprehensive reforms. *New Directions for Evaluation,* (113), 75-93. https://doi.org/10.1002/ev.216

Yoder, P. J., & Warren, S. F. (2001). Intentional communication elicits language-facilitating maternal responses in dyads with children who have developmental disabilities. *American Journal of Mental Retardation, 106*(4), 327-335. https://doi.org/10.1352/0895-8017(2001)106%3C0327:ICELFM%3E2.0.CO;2

Zimmerman, I. L., Steiner, V. G., & Pond, R. E. (2011). *Preschool Language Scales* (5th ed.). Pearson.

Zubrick, S. R., Taylor, C. L., Rice, M. L., Slegers, D. W. (2007). Late language emergence at 24 months: An epidemiological study of prevalence, predictors, and covariates. *Journal of Speech Language and Hearing Research 50*(6), 1562-1592. https://doi.org/10.1044/1092-4388(2007/106)

Appendix A.

Clinic Director Letter

MASSEY UNIVERSITY
INSTITUTE OF EDUCATION
TE KURA O TE MATĀURANGA

What are the Outcomes of the Toddler Talk Intervention Program?

CLINIC DIRECTOR LETTER

---

7 November, 2021

Dear [redacted],

As you know, I am completing research as part of my Masters of Speech and Language Therapy degree with Massey University (New Zealand) under the supervision of Dr Elizabeth Doell (PhD) and Dr Sally Clendon (PhD). I am proposing a study which explores the effectiveness of the Toddler Talk intervention program which is currently used in my clinical practice to support the verbal expressive vocabulary and speech development of toddlers with Late Language Emergence (LLE).

The research project aims to explore the verbal expressive vocabulary and speech outcomes when the phonological characteristics of target words are considered. I would like to recruit two parent-child dyads who have recently had an assessment at [redacted]. I would like to select children who present with LLE based on their initial assessment results as this is the target population for the Toddler Talk intervention approach. I would ask [redacted], Client Services Coordinator, to provide suitable families with the information sheet about the project and consent form following the initial assessment, if they are suitable.

I will be carrying out the intervention sessions and follow-up assessment session. I would ask for your assistance to conduct post-intervention interviews with the parents, estimated to take an hour to complete in total.

My plan is to begin the study in February 2022, as soon as parental consent has been received. Parent-child dyads will be asked to attend the following appointments:

- 8 weekly intervention sessions, as per standard clinical practice with regular fees applied
  - Discussion with the parent about their child's communication development at home over the previous week
  - Discussion with the parent about the clarity of their child's emerging words
  - Introduction of target words and evidence-based strategies
  - Modelling and coaching
- Follow-up assessment session (45-minutes), no fee and in my own time
  - Clinical observations of the child's speech and language development during child-centred, play-based activities
  - Australian English Communicative Development Inventory (OZI) checklist to be completed by the parent
- Post-intervention interview with the parent only, in person or online (30-minutes), no fee

The intervention sessions and review assessment will be video recorded. The interview will be audio recorded and transcribed by myself.

I will not name the clinic or any of the participants in my thesis and in any publications that arise from my research. There is a possibility, however, that [redacted] could be identified if people are familiar with me and my workplace.

Thank you for your assistance with this project and considering my request for access to [redacted]. If you consent to the study being completed at [redacted] your participation, and the participation of the Client Services Team, please sign the approval form.

Please let me know if you would like to discuss this in more detail. You can also contact my Massey University Supervisors using the contact details below.

Kind regards,

Samantha Court

Masters of Speech and Language Therapy Student

Massey University

Project contacts:

Samantha Court	E: [redacted]
Researcher	P: [redacted]
Dr Elizabeth Doell	E: e.h.doell@massey.ac.nz
Supervisor	P: +64 (09) 414 0800 ext. 43531
Dr Sally Clendon	E: s.clendon@massey.ac.nz
Supervisor	P: +64 (09) 414 0800 ext. 43537

Appendix B.

Clinic Director Approval Form

MASSEY UNIVERSITY
INSTITUTE OF EDUCATION
TE KURA O TE MATAURANGA

What are the Outcomes of the Toddler Talk Intervention Program?

CLINIC DIRECTOR APPROVAL FORM

I, _____ *[full name - printed]*, have read the information in the Clinic Director Letter. My questions have been answered to my satisfaction and I understand that I may ask further questions at any time.

I agree to the study being completed at [redacted].

I agree to the participation of _____ *[full name - printed]*

Signature: _____

Date: _____

Appendix C.

Information Sheet for Parents or Caregivers

MASSEY UNIVERSITY
INSTITUTE OF EDUCATION
TE KURA O TE MATĀURANGA

What are the Outcomes of the Toddler Talk Intervention Program?

INFORMATION SHEET

I would like to invite you and your child to participate in a study to investigate the benefits of the Toddler Talk intervention program.

Invitation to Participate in a Research Study:

My name is Samantha Court and I am a Certified Practicing Speech Pathologist at [redacted]. I have worked in the field of early intervention for 9 years, and I have been working with the team at [redacted] for the last year. I am completing this research project as part of a Masters of Speech and Language Therapy, through Massey University (Auckland, New Zealand), under the supervision of Dr Elizabeth Doell (PhD) and Dr Sally Clendon (PhD).

You are receiving this invitation to participate in my research study as your child has just had an assessment at [redacted] and they may benefit from the Toddler Talk Intervention Program. I would appreciate you considering being involved in my research study.

<u>You will continue to receive the usual [redacted] services and the same intervention program regardless of your decision to participate in this research study.</u>

If you would like to learn more about my research study evaluating the effectiveness of the Toddler Talk intervention program, which is used in my clinical practice, please read the information below.

What is the purpose of this research?

This project aims to investigate the benefits of the Toddler Talk intervention program which considers the sounds and syllables your child can produce in a selection of target words. These target words are embedded into child-centred, play-based activities using evidence-based strategies.

This intervention program has been developed based on current research evidence and is designed to support the verbal expressive vocabulary and speech development of children who are late to acquire their first words.

Why have you received this invitation?

You are receiving this information as your child has just had an initial assessment at [redacted]. Based on the information obtained from the assessment, I feel that you and your child would be suitable for participation in this study. If your child is not yet using words or only has a small number or words in their verbal expressive vocabulary, they may benefit from the Toddler Talk intervention program.

What is involved in participating?

If you choose to participate in this study, you will attend the usual Toddler Talk Intervention Program which includes 8-weekly individualised speech therapy sessions where I will support you to learn strategies that facilitate your child's speech and language development. Each appointment will include 45-minutes face-to-face time.

As part of the research study, I will ask you and your child to attend a review assessment to identify your child's progress over the course of the intervention. This appointment will include 45-minutes face-to-face time. At the end of the review assessment, you will be asked to sign an Information Release form which gives your consent for me to use information from your child's initial intake questionnaire, their assessments and intervention data, and any audio and video recordings taken during the study for my research analysis.

You will also be invited to attend an in-person or telehealth interview, without your child present. The Clinic Director, [redacted], will ask you about your thoughts on the intervention, your child's progress, and your learnings from the sessions. You can expect this appointment to take 30-minutes. You will have the opportunity to provide feedback on the transcript of the interview.

I recognise that my dual role of Speech Pathologist and researcher may present as a conflict of interest. To minimise the risk and ensure your comfort throughout, the following steps have been taken:

- Your child will receive the usual [redacted] services and the same Toddler Talk intervention program regardless of whether you decide to withdraw from the research study at any stage of the program.
- The Client Services Team of [redacted] and the Clinic Director will be your primary contacts throughout this research study. They will be available to assist with questions, concerns, or your withdrawal from the study.
- The interview will be conducted with the Clinic Director, rather than the myself.

Your participation in this study will provide feedback about how you and your child experience the Toddler Talk intervention program which will help to develop my practice and share information about the program with other Speech Pathologists.

Time Required:

The regular clinic fees will apply for standard clinical practice tasks. **You will not pay fees for any additional activities completed for research purposes.** This is summarised below:

Standard clinical practice – regular clinic fees:	Research purposes – no fees:
• 8-week block of speech therapy sessions (60-minutes, with 45-minutes face-to-face)	• Review assessment (45-minutes) • In-person or telehealth interview (30-minutes) *We recognise that you have time and travel costs for the review assessment and interview. To thank you for your contribution to this research study you will receive a $50 petrol voucher.*

Are there any potential risks involved in this research?

Sessions will be child-centred, meaning I will follow your child's lead and focus of attention. However, if your child indicates at any time that they do not wish to participate in an activity, the activity will be discontinued immediately. The session can also be discontinued at any time.

Audio and Video Recordings:

The intervention sessions will be video recorded so I can review your child's communication and monitor the implementation of the intervention. A 10-minute audio recording will be collected while you play with your child during the session so that we can evaluate changes in your child's speech clarity.

I will be sensitive to any behaviour that indicates you or your child are uncomfortable about the recordings and discontinue the recording immediately if your child becomes upset or if there is a conversation about any sensitive information.

Information Management:

Consent forms and de-identified research data pertaining to you and your child will be stored securely in a Massey University password protected OneDrive folder.

When the project has finished, the findings may be presented at professional learning and development workshops at [redacted] in journal articles, or at conferences. Your information and your child's information will be de-identified in any reports or publications of the findings. This means that you and your child identities cannot be reasonably ascertained from the information presented in the publication, thus maintaining your confidentiality. You will be provided with a summary of the research project once the study has been completed.

Withdrawal:

You will have the right to withdraw from the study at any time up until you have signed the Information Release form at the conclusion of the review assessment.

To help you feel comfortable to withdraw from the study, you will be asked to contact the Client Services Team of [redacted] the Clinic Director, [redacted], to withdraw. The services offered by [redacted] will continue to be provided even if you choose to withdraw from the study.

Your Rights:

You are under no obligation to accept this invitation. The services offered by [redacted] will continue to be provided even if you choose to withdraw from the study. If you decide to participate in this research study, you have the right to:

- Decline to answer any particular question;
- Withdraw from the study at any time up until you have signed consent for releasing the data collected - to help you feel comfortable to withdraw from the study, you can contact the Client Services Team of [redacted] or the Clinic Director, [redacted], to request your withdrawal from the study;
- Ask any questions about the research study at any time during participation;
- Provide information on the understanding your information and your child's information will be de-identified; and
- Be given access to a summary of the research project when the study is completed

Contact information:

Thank you for taking the time to consider being part of this study. This project is under the supervision of Massey University. Should you have any questions about this project, please contact me or my supervisor:

Samantha Court **Speech-Language Pathologist & Masters Student** Massey University E: [redacted] P: [redacted]	**Dr Elizabeth Doell** (Albany Campus) **Senior Lecturer** Institute of Education E: e.h.doell@massey.ac.nz P: +64 (09) 414 0800 ext. 43531

Compulsory Statements:

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application NOR 21/85. If you have any concerns about the conduct of this research, please contact A/Prof Fiona Te Momo, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 43347, email humanethicsnorth@massey.ac.nz.

Appendix D.

Participant Consent Form

MASSEY UNIVERSITY
INSTITUTE OF EDUCATION
TE KURA O TE MATĀURANGA

What are the Outcomes of the Toddler Talk Intervention Program?

PARTICIPANT CONSENT FORM

On behalf of myself and my child, I have read or have had the details of the study explained to me. Any questions I had have been answered to my satisfaction and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and I can withdraw from the study at any time up until I sign the data release form.

- I agree to participate in the research study under the conditions that have be en set out in the information sheet
- I consent to my child's assessment data and initial intake questionnaire being used in the analysis
- I give consent for video and audio recordings to be made during the research study (these will remain confidential). All recordings are optional and I can withdraw consent at any time up until I sign the data release form
- I give consent to telehealth sessions using secure video conferencing technology when scheduled

I, _____ *[parent's name],* hereby consent to take part in this study.

I, _____ *[parent's name]*, as the parent of _____ *[child's name],* give consent for my child _____ *[child's name]* to participate in this study.

Child's name: _____

Parent's name: _____

Parent's signature: _____

Date: _____

Appendix E.

Interview Schedule

What are the Outcomes of the Toddler Talk Intervention Program?

INTERVIEW SCHEDULE

Introduction guide:

- Greeting and welcome
- Reminder of the purpose of the interview
- Reminder of their right to not answer any question or discontinue the interview at any time
- Reminder of the audio recording and their right to discontinue the recording at any time

Interview questions guide:

- **Topic 1:** The intervention program:
  - Tell me about your experience with the Toddler Talk intervention program
    - What did you like most about the program?
    - What did you like least about the program?
    - Was there anything that could have improved the program or experience for you and your family?
    - Would you recommend this program to other parents of children who are late to acquire their first words? Why or why not?
- **Topic 2:** Their child's progress over the course of the intervention:
  - Tell me about your child's progress over the last 8-weeks
    - How has your child progressed with their verbal expressive vocabulary development?
    - How has your child progressed with their speech development?
    - Have you noticed any other changes in their development over the last 8-weeks?
- **Topic 3:** Their key learnings from the intervention program:
  - Tell me how the intervention program has changed the way you interact and communicate with you child
    - What are your top three take-aways from the intervention program?

Conclusion guide:

- Ask for any additional comments or any questions
- Confirm that they would like to receive a copy of the transcript to check and edit
- Reminder to contact the Clinic Director or researcher if they have any questions or concerns following the interview
- Thank them for their participation and farewell

Appendix F.

Consent for Information Release Form

What are the Outcomes of the Toddler Talk Intervention Program?

CONSENT FOR INFORMATION RELEASE FORM

I, _____ *[parent's name],* consent to the collection of my child's initial intake questionnaire and their assessment and intervention data.

I, _____ *[parent's name],* confirm that I have had the opportunity to review and request the deletion of any audio and video recordings.

Child's name: _____

Parent's name: _____

Parent's signature: _____

Date: _____

Appendix G.

Consent for Transcript Release Form

What are the Outcomes of the Toddler Talk Intervention Program?

CONSENT FOR TRANSCRIPT RELEASE FORM

I, _____ *[parent's name],* confirm that I have had the opportunity to read and amend the transcript of the interview conducted with [redacted], Director of [redacted]. I agree that the edited transcript and extracts from this will be used in reports and publications arising from this research.

Child's name: _____

Parent's name: _____

Parent's signature: _____

Date: _____

Appendix H.

Ethics Approval Letter

Link to the application

HoU Review Group:

ReviewerGroup:
Dr Elizabeth Doell, Dr Sally Clendon, and Ms Hannah Foreman

Researcher: Sam Court
Title: What are the outcomes of the Toddler Talk intervention program?

Dear Sam,

Thank you for the above application that was considered by the Massey University Human Ethics Northern Committee at their meeting held on 12/01/2022.
On behalf of the Committee I am pleased to advise you that ethical approval has been granted for your research.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested by contacting the Research Ethics Office at humanethics@massey.ac.nz.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

If you wish to print an official copy of this letter:

1. Please login to the RIMS system (https://rme.massey.ac.nz).
2. In the Ethics menu, select Ethics Applications.
3. Using the Advanced search with appropriate criteria to find only this application.
4. With the application on the Results tab, select Reports from the toolbar.
5. Select the "Human Ethics - Full Application Letter" link, this will open the report viewer.
6. Select the application code from the Report Parameters dropdown and submit. You can then select an export option from the top toolbar (Print, Save).

Yours sincerely
Professor Craig Johnson
Chair, Human Ethics Chairs' Committee and
Director (Research Ethics)

Appendix I.

Target Words Selected Over the Course of the Intervention

Table I1

Targets Selected, Rationale, and Home Practise Suggestions

Target	Rationale	Home Practise Suggestions
Session 1		
Go	• Is able to produce the stopped, velar /k/ sound. The /g/ sound shares the same manner and place, differing in the voicing • Is able to produce CV syllables	• To model during 'ready, set, go' games at home (e.g., bubbles) and at the playground (e.g., swings and slide)
My	• Is able to produce the /m/ sound • Is imitating CV syllables • Provides a word for self	• To model when sharing toys during play
Moo	• Is able to produce the /m/ sound • Is able to produce CV syllables • Increases imitation of symbolic noises	• To model when looking at animals in books • To model when playing with animal toys • To provide opportunities for imitation in the bath
Baa	• Is able to produce the /b/ sound • Is able to produce CV syllables • Increases imitation of symbolic noises	• To model when looking at animals in books

		• To model when playing with animal toys • To provide opportunities for imitation in the bath
Session 2		
up	• Is able to produce the /p/ sound • Is imitating VC syllables, but often produces these as CV syllables	• To model when playing with cars and driving them up • To model when climbing up playground equipment • To model when being picked up
eat	• Is able to produce the /t/ sound • Is imitating VC syllables, but often produces these as CV syllables	• To model during meal times • To model when feeding dolls during play
tiger	• Is able to produce the /t/ sound • Is able to produce reduplicated CVCV syllables, but is not yet using variegated CVCV syllables	• To model when looking at animals in books • To model when playing with animal toys
nappy	• Is able to produce the /n/ and /p/ sounds	• To model during nappy change time

	• Is able to produce reduplicated CVCV syllables, but is not yet using variegated CVCV syllables	
Session 3		
In	• Is able to produce the /n/ sound • Is imitating VC syllables, but continues to produce these as CV syllables • Increases vocabulary of prepositions	• To model when putting toys in something (e.g., in a box)
Out	• Is able to produce the /t/ sound • Is imitating VC syllables, but continues to produce these as CV syllables • Increases vocabulary of prepositions	• To model when taking toys out of something (e.g., out of a box)
Big	• Is able to produce the /b/ sound • Is imitating CVC syllables, but often produces these as CV syllables • Increases vocabulary of adjectives	• To make comparisons between the size of objects (e.g., big balls and small balls)
Hot	• Is able to produce the /h/ sound in isolation, but omits this sound in word initial • Is imitating CVC syllables, but often produces these as CV syllables • Increases vocabulary of adjectives	• To model during kitchen play • To talk about things that are hot (e.g., the stove, the bath water, etc.)
Session 4		

Hot	• The target was not achieved	• Continuation of the activities from the previous week
More + object	• Is saying 'more' • Is imitating 'more' phrases as 'more more'	• To model when requesting more food • To model when requesting more toys or turns
No + object	• Is saying 'no'	• To model when refusing something
Bye + person	• Is using people's names	• To model when saying bye to someone
Session 5		
No + object	• The target was not achieved	• Continuation of the activities from the previous week
Night-night + person	• Is saying 'night-night' • Is using people's names	• To model when saying goodnight to family members • To model when putting dolls to bed during play
Person + eat	• Is using people's names	• To model during meal times • To model when feeding dolls during play
Person + walk	• Is using people's names • Is saying 'walk'	• To model when walking

		• To model when requesting people walk with her
Session 7		
Hi + person	• Is using people's names • Will say 'bye' to people, but not 'hi'	• To model when saying hi to someone
Dirty + object	• Is saying dirty	• To talk about things that are dirty (e.g., dirty hands)
Hot + object	• Is saying hot	• To talk about things that are hot (e.g., hot drink)
Sound play for /s/	• Is able to produce the /s/ sound in isolation, but omits this sound in words • Increases exposure to the /s/ sound to support her phonological development	• To model the /s/ sound in play (e.g., snake says 'sss') • To provide focused modelling of /s/ words in play (e.g., see, sit, horse, mouse, etc.)

Appendix J.

Codes for the Thematic Analysis

Table J1

Codes and Sub-Codes, Descriptions, and Examples

Themes/Codes	Sub-themes/Sub-Codes	Description	Example
Amelia's outcomes	Language outcomes	Shows the speech and language therapist-researcher (SLT-R) and parent's perception of the child's language outcomes	"... I think she went in with 36 words on the fill in and she came out with over 200"
	Phonological outcomes	Shows the SLT-R and parent's perception of the child's phonological outcomes	"She had more words, but the percentage of those that I understood stayed the same"
	Other outcomes	Identifies any other outcomes observed by the researcher and parent	"Her day-care teacher reported that she is speaking more"
Emily's outcomes	-	Identifies any parent specific outcomes	"... pretty straight on what we need to do now"
Intervention process	Engagement	Shows the parent and child's participation in the intervention	"Walked in independently" "... quick to explore the toys"

			"... initial responses were head nods"
	Implementation	Identifies changes to the intervention implementation	"I could understand the tools and tips..."
	Contextual influences	Identifies contextual influences which may have impacted the intervention implementation	"... attended a telehealth session with..."
	Emily's experience	Shows the parent's experience participating in the Toddler Talk intervention program	"... feeling very positive about how it all went" "... would recommend it to other people"

Appendix K.

Coding Example: SLT Field Notes

Session 2: 30 March 2022, 10am

Intervention context:
Amelia attended an in-clinic session with her mother, Emily. Emily and SLT-R wearing masks for the duration of the session.

Observations - Amelia:

- Walked in independently
- Separated quickly from her mother
- Quick to explore the toys and played with cars and dolls
- Requested, "baby," as this was not in the clinic room today. SLT-R responded to Amelia's request and went and found a baby doll for Amelia to play with
- Expressed frustration (vocalisation) when the baby would not stay under the blanket
  Interested in a Lightning McQueen car (carrying it around with her through different activities). She did not want to pack the car away at the end of the session (shaking her head 'no'). Happily packed away the car when Emily told her she was told she was going to see Nanny
- The SLT-R's impression was that there was an Increase in Amelia's use of vocalisations and babble in play

Updates from Emily:

- Heard Amelia say 'my' and 'go' this week
- Emily shared a video of Amelia saying 'go'
- Amelia is not interested in animals which made modelling 'moo' and 'baa' challenging. SLT-R and Emily discussed incorporating targets into preferred activities
- Amelia is speaking more at home
- Amelia's grandmother has also noticed Amelia speaking more
- Amelia was observed imitating her grandfather, which she has not done before

Language stimulation strategies:

- Being face-to-face during interactions,
- Bringing objects to the face when speaking with Amelia,
- Pausing and waiting to encourage Amelia to take a turn
- Modelling single words to Amelia during play and daily activities,
- Adding on a word to what Amelia has said (expansion), and
- Slowing down when modelling two-syllable words, maintaining usual stress patterns (*new*)

Amelia's outcomes – Language outcomes

Amelia's outcomes – other outcomes

Intervention – Engagement

Intervention – Implementation

Intervention – Contextual influences

Appendix L.

Coding Example: Researcher Journal Notes

Session 3: 6 April 2022, 10am	
• Amelia appears to be increasing her confidence in the clinic setting indicated by her independently exploring the toys in the clinic room on arrival. Her engagement and participation were subsequently increased in the session. • Emily was engaged in discussions about the week. She provided updates on Amelia's use of target words, but she did not provide specific information on her use of the language stimulation strategies at home. She provided additional information about Amelia's progress at day-care which was not initiated by the SLT-R • No new strategies were introduced this week. This allowed for consolidation. Emily participated in coaching and feedback with the SLT-R and showed competence with the language stimulation strategies that have been introduced. • Amelia is progressing towards two-word phrases, as indicated by her expressive vocabulary size, and two-word phrase targets would now be more suitable for Amelia to extend her expressive language development. Action: Add in two-word phrase targets next week. • Amelia is continuing to repeat one word in a two-word phrase twice (e.g., "more more"). However, this appears to be reducing. Action: Continue with the expansion strategy. • Amelia is continuing to experience persistent difficulties producing the /h/ sound (e.g., 'hat' --> "at") • Amelia is experiencing ongoing difficulties producing CV syllables (e.g., 'up' --> "pə")	Amelia's outcomes – Language outcomes Amelia's outcomes – Phonological outcomes Amelia's outcomes – other outcomes Intervention – Engagement Intervention – Implementation

Appendix M.

Coding Example: Emily's Interview

Would you recommend this program to other parents of children who are late to acquire their first words? Why or why not?	
Well I said to somebody recently, because apparently, I was a late talker, and my mum was sort of saying we didn't do anything for you and you eventually caught up, and I was saying to her like maybe Amelia would have been in that situation, I'll never know but the gains that I saw over the last 8 weeks were massive. Like I think she went in with 36 of the words on the fill in and she came out with over 200.	Amelia's outcomes – Language outcomes
Yeah, which is amazing. And I think, like, she's a second child, I don't get much, if any one-on-one time with her, so even just the fact that it was an hour of the week that was just about her and we could focus specifically on her speech and that development I think was really valuable. And yeah, I learnt a lot from [the SLT-R] that for any future children now I can start to see what I can be doing a little bit earlier, not to say I could have changed Amelia's outcome, but just those little tools like holding it up and not putting pressure on them but exposing them to lots of different sounds and words and all that was really, really helpful. So, yes, I would recommend it to people and I do, I have a lot of friends whose kids are similarly second children in a similar position to Amelia who have been told to wait or they're on really long waiting lists that I've said, if you can find somewhere to get in early, it's probably worth doing.	Emily's outcomes Intervention – Engagement Intervention - Implementation Intervention – Emily's experience
Tell me about Amelia's progress over the last 8 weeks?	
I was just so excited to hear her start to put words together. The two words and now sometimes three words, which just helps her get less frustrated and she can communicate.	Amelia's outcomes – Language outcomes Amelia's outcomes – other outcomes Intervention – Emily's experience