

**The language status of young children with expressive
language delay following verb-focussed vocabulary
intervention.**

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Abstract

Young children with expressive language delay often present with limited vocabulary and reduced length of utterance. In consideration of the relationship between vocabulary and grammar, intervention that targets vocabulary may also result in improved syntax development. This study investigated whether a hybrid approach to verb-focused vocabulary intervention would result in improvements in increased use of target words, increased expressive vocabulary and/or increased sentence length. Four participants, aged two years nine months to three years six months participated in an intervention program that targeted vocabulary, specifically verbs. Number of target verbs, number of different words (NDW) used and mean length of utterance (MLU) were measured in baseline, intervention and post-intervention phases. Results indicated that all participants had increased use of targeted words and increased NDW. The majority of participants also had increased MLU. These findings suggest that verb-focused vocabulary intervention has the potential to have broad effects on the language skills of young children with expressive language delay. Further research is warranted to determine whether similar results would be found in a larger cohort. The study also raises questions around choice of intervention targets and intervention approaches for young children with expressive language delay.

Background

The use of first words is one of the milestones parents look forward to their children developing in the toddler and early preschool years. Although there is variation, first words typically develop at around 12 months of age (Paul, 1991). By age 18 months, many children will have approximately 50 words in their lexicon. By 2 years of age, word combinations emerge and early sentences are formed. At around four to five years of age, children may be producing a variety of simple and complex sentences (Paul, 1991). For some children however, there is a significant delay in when they produce first words and when they add new words to their lexicon (Desmarais, Sylvestre, Meyer, Bairati, & Rouleau, 2008). These children may be slow to use word combinations and have persisting difficulties in grammar as syntax develops (Olswang, Rodriguez & Timler, 1998).

Expressive Language Delay

Difficulties in acquiring spoken language may be a result of expressive language delay (ELD). ELD is a deficit in the development of spoken language compared with receptive language skills and non-verbal intelligence (Whitehurst et al., 1991). It is estimated that approximately 10-15% of young children present with expressive language delay or disorder unrelated to any other known diagnosis (Desmarais et al., 2008; Paul, Looney, & Dahm, 1991). Although ELD is a very broad term to encompass children with expressive language deficits, other terminology has been used in the literature and clinical practice. For instance, children who present with ELD are often referred to as ‘Late Talkers’ or children with Specific Language Impairment (SLI). The term ‘Late Talkers’ generally refers to two-year olds who are late to produce vocabulary despite otherwise ‘normal’ development (Desmarais et al., 2008). That is, Late Talkers are children who use fewer than 50 different words or are unable to join two words (in a sentence) by 24 months of age (Paul, 1991). The term SLI is used to describe some language difficulties in older preschool children and school-aged children. There is much debate and little consensus on a definition for SLI (Levy, 2003). For instance, Tomblin et al. (1997) define SLI as a “developmental language impairment in children who demonstrate unexpected difficulties with the acquisition of spoken language”, but noted that there is little consensus over inclusionary criteria for diagnosing SLI. In consideration of the debate around defining SLI and the similarities between terms such as ‘late talkers’ and ‘SLI’, the term ‘expressive language delay’ (ELD) will be used in the current study. Use of the term ELD in the current study will

be used as a broad term to describe children who may also be referred to as ‘late talkers’ or as having ‘SLI’. Characteristics of ELD

Children with ELD often present with difficulties beyond simply a delay in use of first words. Specifically, they may present with reduced use of imitation, reduced phonological repertoire, restricted syllable structure, errors in the productions of vowels and consonants, and/or delays in receptive language skills (Olswang et al, 1998). Although it has been argued that ELD suggests no deficit in receptive language, this idea has been challenged (Leonard, 2009, Olswang et al, 1998). Leonard (2009) proposes that delays in expressive language must be in some part due to limitations of receptive language, regardless of whether these are apparent in standardised assessment of receptive language. On these grounds he challenges the idea that language delays can be purely in expressive language. However, Leonard (2009) suggests that the term ‘expressive language delay’ may be useful as a type of “shorthand” for children whose expressive language is significantly poorer than their receptive language.

In addition to delayed linguistic abilities, ELD has been linked to short-term and long-term social and academic difficulties. For instance, short-term concerns for children with ELD include poor symbolic play skills (Irwin, Carter, & Briggs-Gowan, 2002), negative behaviour (Irwin et al., 2002), poor social skills (Fujiki, Brinton, & Todd, 1996; Paul, 1991) and high parental stress (Horwitz et al., 2003). In the long term, children who present with ELD in early childhood may have persisting difficulties in later childhood and adolescence. Specifically, studies have shown that they may be at an increased risk of later social difficulties (Horwitz et al., 2003; Wadman, Durkin, & Conti-Ramsden, 2008), emotional health problems (Conti-Ramsden & Botting, 2008) and delays in literacy skills (Catts, Fey, Tomblin, & Zhang, 2002; Rescorla, 2002, 2005; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998).

Intervention

In light of the short-term impact of ELD on communication and potential long-term impacts on social and academic development, consideration of early intervention for these children is warranted.

Olswang et al (1998) suggest that “early intervention is designed to bring about short-term change that will influence long-term progress” and focuses on bringing language skills to normal limits as quickly as possible (Olswang et al, 1998). Research into the efficacy of early intervention for young children with ELD is limited; however there have been a few studies that researchers and clinicians can draw on (Girolametto, Pearce, & Weitzman, 1997; Girolametto, Pearce, & Weitzman, 1996; Robertson & Weismer, 1999; Scherer, 1999; Whitehurst et al., 1991). These studies used a variety of approaches to target lexical development in young preschoolers. Intervention approaches included

the Hanen program (Girolametto et al., 1997; Girolametto et al., 1996), Milieu approaches (Scherer, 1999; Whitehurst et al., 1991) and general language stimulation (Robertson & Weismer, 1999).

Intervention was judged to be successful in facilitating significant lexical growth in all of the interventions studies. The variety of approaches used indicates that success is not limited to a single approach.

Given that intervention can be effective in bringing about short term-change for children with ELD, and that children with ELD present with a range of difficulties, it is important to consider what should be targeted in intervention. Due to reduced vocabulary being a hallmark of ELD in early childhood, vocabulary is a common target in intervention (Girolametto et al., 1996; Scherer, 1999; Whitehurst et al., 1991). It has also been well-established however, that children with ELD commonly present with additional delays in grammar development (Leonard, McGregor, & Allen, 1992; Rice, Tomblin, Hoffman, Richman, & Marquis, 2004; Steckol & Leonard, 1979). Despite difficulties in both vocabulary and grammar being well documented in the literature, the relationship between vocabulary and grammatical development has been the focus of few intervention studies for young preschoolers with ELD. Of relevance is a study by Robertson & Weismer (1999), where intervention specifically targeted both vocabulary and grammar in young children with ELD. The study used general language stimulation with broad goals to improve the children's use of vocabulary and grammar. Robertson & Weismer (1999) reported significant changes in measures of both vocabulary and grammar, in addition to significant changes in areas not specifically targeted, including socialisation and parental stress. Findings from this study indicated that a) there is potential for change in both the vocabulary and grammatical skills of young children with ELD, and b) there is potential for intervention to affect change in areas not specifically targeted.

Potential for changes in both vocabulary and grammar in young preschoolers is supported by findings of Girolametto (1996) and Scherer (1999), albeit less overtly. The primary focus of both intervention studies was vocabulary, however some measures of grammar were also made prior to and following intervention. Both studies reported and discussed the vocabulary intervention being effective in increasing the lexicon of the children. Additionally, both studies also reported improvements in measures of grammar. Specifically, Girolametto (1996) reported increases in the number of multi-word utterances used by participants in language sampling, and both studies found increased grammatical complexity according to parent-report measures (Girolametto et al., 1996; Scherer, 1999). Effects of vocabulary intervention on grammar was not the focus of either study however, and little discussion of the grammatical development findings was given. Findings from these studies give support to the notion that intervention can be effective in improving the use of

grammar in young children with ELD. Furthermore, the findings indicate that vocabulary-focussed intervention has the potential to impact a broader range of language skills – specifically those in grammar.

Although discussion regarding the effects of vocabulary intervention on grammar in young children with ELD is limited, the effects of vocabulary intervention on other areas of development have been the primary focus of some investigations. For example, the effect of vocabulary intervention on phonology was a primary focus in early intervention studies by both Scherer (1999) and Girolametto (1997). Both studies targeted vocabulary in young preschoolers with ELD, monitoring development in both vocabulary and phonological skills. The studies differed in their approaches to intervention, yet both found the vocabulary and phonological skills of children to be improved following intervention. Intervention resulting in broad language gains is certainly effective use of speech and language therapy resources.

The Relationship between Vocabulary and Grammar

Despite findings that vocabulary intervention has the potential to influence phonological skills, the link between vocabulary intervention and development of grammar has had little attention in intervention studies. Interestingly however, research has indicated a close relationship between early vocabulary and grammatical development in young children (Bates & Goodman, 1997). Bates & Goodman (1997) found that the development of grammar is highly dependent on vocabulary size, both in typically developing children and in atypical populations (e.g. in children with Down syndrome). Specifically, they established that in typically developing children, grammatical status and vocabulary size were highly correlated, with vocabulary size at 20 months (during the ‘vocabulary burst’) being the best estimate of grammatical status at 28 months (typical age if the ‘grammar burst’). The strong relationship between vocabulary and grammar in typical development is further supported by Devescovi et al. (2005). Their study on the relationship between grammatical and lexical development in both English and Italian speaking children found that vocabulary is a strong predictor for grammatical development. Furthermore, results of their study indicated that vocabulary is a significantly stronger predictor of grammatical status than age. The authors suggest that a reciprocal relationship exists between grammar and vocabulary, as the two are “inextricably linked, represented together and accessed together” (Devescovi et al., 2005, p. 9).

The Significance of Verbs in Vocabulary and Grammar Development

Given the strong relationship between vocabulary and grammar, and the small number of studies that have shown vocabulary intervention to have some impact on grammar, it is plausible that

intervention resulting in an increased lexicon may also influence grammatical development. It is important to consider then, whether some word classes may be more effective in influencing grammatical development than others.

Verbs are of particular interest, as they are necessary to express semantic relations and are common grammatical structures. Tomasello (1992) proposes that verbs provide a framework for organising sentences, suggesting that use of verbs “beg to be completed into sentences” (Tomasello, 1992, p. 7). For example, where the verb “take” is used, details of the ‘taker’, the object taken and perhaps the ‘giver’ are necessary. Tomasello (1992) also suggested that verbs “are responsible for much of the grammatical structure of language”(Tomasello, 1992, p. 6). The importance of verbs in grammar development is supported by a number of studies (e.g. Bates, Bretherton, & Snyder, 1988; Bates & Goodman, 1997; Gina Conti-Ramsden & Jones, 1997). Bates (1988) found strong links between children’s lexicon, particularly verbs, and the transition from one-word to two-word utterances. This is not surprising, considering that many early two-word combinations used by typically developing children require use of a verb. For example, verbs are imperative in Brown’s forms (1973) “agent-action” (e.g. “Mummy open”), ‘action-locative’ (e.g. “throw {to} me”) and ‘action-object’ (e.g. “kick ball”), as well as the form ‘agent-action-object’ (e.g. “Daddy build tower”), which is commonly used in English.

Verb Use in Children with ELD

Given that verbs are important in use of early grammatical structures, and the close relationship between vocabulary and grammar, consideration of targeting verbs in intervention is warranted. Further support for targeting verbs is that there is evidence to suggest some children may have more difficulty acquiring verbs, compared with other classes of vocabulary (Gina Conti-Ramsden & Jones, 1997; Hadley, 1998). From early language development, this difficulty is evident, with preschool and early-school-aged children with SLI having been shown to both use verbs less frequently and have a less diverse range of verbs than Mean length of Utterance (MLU)-matched peers (Conti-Ramsden & Jones, 1997). As children begin to join words, difficulty with verb use expands to the domain of grammar. Specifically, children with SLI have difficulty using verb morphology and verb phrases. Hadley (1998), for example, found that discrepancies between the early development of noun phrases and verb phrases for children with language impairments, not seen in typically developing children. The young children with SLI (aged 24-50 months) were found to be behind their MLU-matched peers in both the development of noun and verb phrases. While they were able to ‘close the gap’ in development of noun phrases, the gap between verb phrase development of both groups continued to widen (Hadley, 1998). Hadley (1998) found that children

with SLI also had difficulty with use of verb morphology. This was most evident in children in Brown's (1973) late stage one, who were able to use the plural '-s' with nouns, but not able to use the progressive '-ing' with verbs, despite both structures typically developing at around the same time (Hadley, 1998).

Marchman and Bates (1994) indicated a link between verb acquisition and verb use in grammar. They suggest that a "critical mass" in the lexicon is required for morphological development. More specifically, they propose that a child's verb lexicon must be sufficient for the development of verb morphology. It comes as little surprise then, that children with under-developed verbs lexicons will present with difficulty in use of verb morphology.

Although it is not clear why verbs are more difficult for children with ELD,. It has been proposed that verbs are difficult to learn as they are less salient (Conti-Ramsden & Jones, 1997). While nouns refer to concrete objects and people, verbs describe relational concepts such as activities, causal relations and changes in state. Many verb concepts are transient therefore meaning must be determined not only by observation but potentially through the additional use of other cognitive skills such as memory and reasoning (Conti-Ramsden & Jones, 1997). This theory provides some support for targeting verbs in an intervention approach such as focussed-stimulation where salience is a key component of the teaching (M. E. Fey, Long, & Finestack, 2003).

Verb Focussed Intervention

Verbs were targeted in a single-case intervention study discussed by Moran, Page & Gillon(2007). Vocabulary intervention was used with a young child who presented with ELD and repaired cleft palate. Of interest, the vocabulary targets selected in the study consisted solely of verbs. The verb-focussed vocabulary therapy resulted in significant improvements in language skills of the child, beyond the increased use of target words. Specifically, significant gains were reported in use of target words, overall vocabulary and mean length of utterance (Moran, Page & Gillon, 2007). These findings indicate that verb-focussed intervention can impact positively on verb acquisition in addition to improving other expressive language skills. Some caution in interpreting these findings is warranted however, as the study was a single subject experimental design. It is clear that further intervention studies are required to support the efficacy of verb-focussed vocabulary intervention in young children with ELD.

Intervention Approaches

In light of the need for further research into the efficacy of early intervention focussing on verb acquisition, discussion into the approach of such intervention is warranted. Fey (1986) describes three key approaches to language intervention with children. The first of these is a Clinician-Directed approach. Clinician-Directed approaches involve a high level of control by the speech language therapist (SLT), who determines the goals for each session, the type and frequency of stimuli and the type and frequency of reinforcement. Compared with other approaches, a clinician-directed approach is highly structured and sits lower on the continuum of naturalness. In contrast, child-centred approaches are less structured and higher on the continuum of naturalness. Rather than determining specific intervention goals, attempts are made to alter the communicative environment to encourage increased reciprocal communicative interactions. The clinician follows the child's lead, and when the child communicates, the clinician responses are used to facilitate language development. Responses may include use of expansions (repeating the child's utterance and adding grammatical and/or semantic details) and expatiations (repeating the child's utterance and adding new information) (Fey, 1986).

Fey (1986) suggested that intervention approaches that are higher on the continuum of naturalness are more likely to be generalised to functional settings outside of the therapy setting. He also asserts however, that having specific goals in intervention may provide focus and for some children, be beneficial. A hybrid approach may be considered as a combination of clinician-directed and child-centred approaches. Hybrid approaches employ three key elements: (i) therapy targets are selected by the clinician; (ii) the clinician maintains control over the activities/materials chosen – naturalistic activities/materials that are conducive to production of targets are selected; (iii) the clinician is highly responsive to the child's communication and highlights use of targets (Fey 1986). A hybrid approach allows for the clinician to set target specific goals whilst maintaining a somewhat naturalistic environment. Hybrid approaches have been used in a number of intervention studies with young preschoolers (e.g. Girolametto et al., 1996; Scherer, 1999; Whitehurst et al., 1991) and have been reported to be successful in bringing about change in targeted skills.

Focused stimulation is one technique that can be used within a hybrid approach (Fey 1986). In focussed stimulation, the environment (verbal and non-verbal) is manipulated to encourage the child to produce targets; however there is no explicit request to do so. Additionally, the clinician provides the child with frequent models of the target forms in meaningful contexts (Fey et al, 2003). One of the key principles in focussed stimulation is increasing salience of targets. Increasing salience may be of particular importance when targeting verbs, considering that a lack of saliency is one

theory behind the particular difficulty children with ELD have in verb acquisition (Conti-Ramsden & Jones, 1997) .

Saliency of targets is also a key principle in grammar intervention. Fey et al (2003) discussed key principles in increasing saliency of targets in grammatical intervention. Considering the close relationship between verbs and grammar, and a common principle of increasing saliency, many of the principles discussed may be applied to verb-focussed intervention. For example, Fey et al (2003) propose that the environment can be manipulated in several ways to create more opportunities for use of targets. This can include the manipulation of the social and physical context, for example by disrupting routines or intentionally disordering the physical environment. The linguistic context may also be manipulated, for example, by creating an increased number of obligatory responses. Fey, Long and Finestack (2003) also suggest taking advantage of a variety of textual genres. Use of narratives may be included, for example, if targeting the past tense. This may also include use of written language (e.g. storybook reading) where targets may appear more readily. Active participation in storybook reading with young children who have limited vocabulary has also been shown to result in vocabulary gains (Hargrave & Sénéchal, 2000). Manipulation of the discourse itself can make targets more salient in therapy (Fey et al, 2003). A simple form of manipulation is to stress target words – making their production longer and louder. Another form of manipulation is that of sentence structure, which may be altered so that target words appear more often, appear at the end of phrases or so their meanings are highlighted. Fey et al (2003) also recommend frequent use of recasts. Recasts are repetitions of a child's incomplete or incorrect phrase, in a more adult form. Recasts maintain the meaning of the child's utterance, but contrast it with a more complete or correct form. Fey et al. (2003) advocate for use of well formed sentences and avoidance of telegraphic speech. They assert that even though a child may not be using or fully comprehending grammatical markers and morphemes, there is evidence to suggest they are still sensitive to them. Excluding grammatical morphemes and markers then, may compound language-learning difficulties, rather than lighten the cognitive load (Fey et al, 2003).

In light of studies indicating hybrid approaches to be successful in increasing vocabulary in young children with ELD (Girolametto et al., 1996; Scherer, 1999; Whitehurst et al., 1991) and the increased saliency that focussed stimulation can provide, using a hybrid approach that incorporates focussed stimulation seems a sensible approach to target verb use in young children with ELD.

Summary

ELD affects approximately 10-15% of young children (Paul et al., 1991) and has been shown to be closely related to both their short-term and long-term development in other domains (e.g. Catts et al., 2002; Irwin et al., 2002; Paul, 1991). ELD in young children is characterised by a delay in first words, early word combinations, and as sentences develop, delays in grammar (Olswang et al, 1998). Early intervention for children with ELD has been shown to be effective in increasing the lexicon of this population (e.g. Girolametto et al., 1996; Scherer, 1999; e.g. Whitehurst et al., 1991). The relationship between vocabulary and grammar in typical development is well documented (e.g. Bates & Goodman, 1997; Devescovi et al., 2005), yet early intervention studies directly considering the development of skills in both areas are scarce. When considering the relationship between vocabulary and grammatical development, verbs are of particular interest. Verbs have been shown to be a word class that is closely related to the development of grammar (Tomasello, 1992). Furthermore, children with ELD have been shown to have difficulty both acquiring verbs (as vocabulary) (Conti-Ramsden & Jones, 1997) and using them effectively in sentences (as grammar) (Hadley, 1998). This considered, it is plausible that intervention that targets vocabulary, specifically verbs, may result in improvements in both measures of vocabulary and grammar in young children with ELD.

The current study aimed to address three questions. 1) Does a hybrid approach to verb-focussed vocabulary intervention result in increased use of target verbs; 2) does verb-focussed vocabulary intervention result in increased overall expressive vocabulary of young children with ELD; and 3) does verb-focussed vocabulary intervention result in increased sentence length? It was hypothesised that the intervention approach would result in increased use of target words, increased expressive vocabulary and increased MLU.

Method

Design

This study employed a single subject design. This design enables control over the experiment and the ability to observe changes occurring under treatment conditions (Portney, 2009). Measures of the participants' speech and language abilities were made prior to, during and following intervention. This study was approved by the University of Canterbury Human Ethics Committee. Copies of approval for the study, information sheets for parents and consent forms are provided in Appendix 1.

Participants

Overview

Four participants took part in this study. Participants were all male preschoolers aged two years, nine months to three years, six months. Inclusion criteria for this study required the participants to present with an expressive language delay. Diagnosis of an expressive language delay was determined by: an MLU at least two standard deviations below the mean expected for their age (Miller & Chapman, 1981) and restricted vocabulary as measured by the CDI and receptive language scores within normal limits. Participants were excluded from the study if: (a) they had a history of a neurological or developmental disorder, (b) they failed to pass a hearing screen within six months prior to participating, or (c) did not have English as a first language.

Recruitment

Recruitment of participants occurred through two modes:

- a) Referrals to the University of Canterbury's Department of Communication Disorders were screened. Any referrals to the department that fitted the criteria for participation in the study were invited to take part in the research study.
- b) Letters were sent to local early learning centres. The letters outlined the purpose of the study and the participants required. It asked the centres to pass on the researchers contact information to parents whose children may fit the criteria.

Three participants were invited to participate through referrals to the University of Canterbury's Department of Communication Disorders; one participant contacted the researcher following a letter being sent to the child's early learning centre.

Parental consent was obtained from all participants before taking part in the study.

Procedures

Assessment and intervention took place in the University of Canterbury Speech and Hearing Clinic, or at the participant's home. All assessment and intervention took place in well-lit rooms with minimal background noise. All assessment and intervention sessions were digitally recorded using an Olympus Digital Voice Recorder WS-110. Assessment and intervention sessions held at the University of Canterbury Speech and Hearing Clinic were also recorded using a Sanyo Digital Video Recorder DSR-M810. The primary investigator, a qualified Speech Language Therapist (SLT), performed all assessments and intervention.

The study consisted of an initial assessment followed by three experimental phases: a baseline testing (to determine performance prior to intervention), an intervention phase (to determine performance during intervention) and a post-intervention phase (where intervention was withdrawn and performance evaluated).

Initial Assessment

Initial assessment was conducted to provide measures of the children's speech and language status and determine eligibility in this study.

Expressive Language

The MacArthur-Bates Communication Developmental Inventory (CDI) was used to obtain information on the participants' vocabulary, particularly their use of verbs. The CDI is a parental questionnaire, requiring parents to provide information on the words and sentences understood and used by their child. The CDI has two questionnaires – 'Words and Gestures', normed for children aged eight to 18 months and 'Words and Sentences', normed for children aged 16 to 30 months. Parents completed the questionnaire that was most appropriate for the developmental level of their child. Parents of participants who were using only single words and gestures to communicate completed the 'Words and Gestures' questionnaire. Parents of participants who were joining words to form sentences completed the 'Words and Sentences' questionnaire. Information from this

assessment was used to obtain information on each of the participants' vocabulary, particularly their use of verbs.

A 30-minute language sample was also taken following procedures outlined by Miller (1981). Language samples were transcribed according to the Systematic Analysis of Language Transcripts (SALT) New Zealand version protocol (Westerveld, 2008). Utterances were segmented into communication units (C-units) for analysis. A C-unit is "an independent clause and its modifiers" (Loburn, 1963). The software was used to calculate the MLU in morphemes for each child, to allow for comparison with the mean expected for each participant's age (Miller & Chapman, 1981)

Receptive Language

Measures of participants' receptive language skills were made in initial assessment. Receptive language subtests of the Clinical Evaluation of Language Fundamentals – Preschool Second Edition (CELF-P2) were used (Semel, 2004a). These subtests were 'Basic Concepts', 'Following Directions' and 'Sentence Structure'. These subtests required the participant to point to the picture according to verbal instructions given by the examiner. Subtests were administered in accordance with the examiners manual (Semel, 2004b) and were both administered and scored by the primary investigator. Raw scores from each Receptive Language subtest were combined to give a composite score for receptive language. The composite score could then be compared with norm scores. Norm scores allow comparison between the participant and typically-developing age-matched peers.

The CELF –P2 is standardised for children between ages three years, zero months and six years 11 months. Because one participant was below this age during pre-intervention assessment, several attempts at using alternative standardised assessment to measure receptive language were made. However these were unable to be administered in accordance with the test manuals due to the participant's non-compliance. The receptive subtests of the CELF-P2 were administered with this participant following the intervention phase.

Case History

A case history was conducted with the parents of each participant (see Appendix 2 for an outline). A case history was used to determine eligibility (primarily ensuring that participants did not show signs of any developmental or neurological delays). It was also used to gather information to aid planning of appropriate intervention sessions, should the child be invited to participate.

Hearing Screen

Parents of participants were asked to provide a copy of an audiologist's report if participants' hearing had been tested within the past six months. In cases where hearing had not been tested by an audiologist within the last six months, arrangements were made for participants' hearing to be tested at the University of Canterbury Speech and hearing Clinic under the supervision of a qualified audiologist.

Baseline Assessment

Two types of probes were administered as part of the baseline testing: 1) Language Sample, and 2) probes of the target words.

Language Samples

Language samples were collected across three 45 minute sessions in order to establish baseline data. Language samples were collected following procedures outlined by Miller (1981). In each session, the participants engaged in play with the SLT and a recording was made of their expressive language. Toys that represented target words were available during the elicitation of the language sample, with the SLT following the participants' lead in play. Opportunities for the child to use the target words were provided but models of the target words were not given. Target words were selected after reviewing the data from the CDI – ten verbs reported as not being used by the child were selected. A minimum of 50 utterances were recorded in each language sample.

Language samples were transcribed according to the Systematic Analysis of Language Transcripts (SALT) New Zealand version protocol (Westerveld, 2008). Utterances were segmented into communication units (C-units) for analysis. A C-unit is "an independent clause and its modifiers" (Loburn, 1963). The software was used to calculate the MLU in morphemes and Number of Different Words (NDW) used in each language sample. In addition, software counted the number of target words or gestures used in each language sample. NDW was calculated as a measure of expressive vocabulary, and MLU was calculated as a measure of sentence length.

Probes

Probes were used to evaluate production of the target verbs. Participants were shown pictures that represented the target words and were asked to name what was happening in each picture. No corrective feedback or models of the target words were given. Non-specific feedback, such as "you're doing a great job" however, was used to facilitate participation. Lists of target words for each participant are provided in Appendix 3.

Intervention Phase

The participants attended 45-minute speech language therapy sessions twice-weekly for a total of 10 weeks. Intervention was a hybrid approach based on a focussed language stimulation model, integrating grammar facilitation principles outlined by Fey (2003). It provides the child with recurrent and highly concentrated repetitions of target words in addition to providing an increased number of opportunities for the child to use targets in a play setting (Lederer, 2002). A play setting provides a naturalistic environment for therapy, with the assumption that naturalistic environments will encourage generalisation of targets. Fey et al (2003) suggest principles for grammatical intervention that can be applied to such play-based therapy targeting vocabulary. These include manipulating the social, physical and linguistic environment, providing recasts of adult-forms, giving grammatically correct models and make use of different textual genres. Intervention targeted 10 target verbs not already acquired by the child, as indicated in the CDI, baseline probes and baseline language samples.

Therapy sessions began with five minutes of structured teaching of target vocabulary. This involved showing the participant picture cards (or photos) representing the target words and initially asking the participant to describe what was happening in the picture. If the participant responded with use of the target word, reinforcing feedback was given, with further models of the target word. If the participant was unable to produce the word, the SLT provided models of the target word by describing what was happening in the picture. The SLT paused after giving the description, inviting a response from the participant; however elicited imitation was not used. Due to the severity of Participant Three's delay, target verbs were modelled using gesture in conjunction with spoken language during probes, storybook reading and focussed stimulation. Gestures for the target words were those used in New Zealand sign language (Kennedy, 1997)

The participants were then required to participate in storybook reading with the SLT for 10 minutes. Books containing the target words were selected, allowing the targets to be modelled in naturalistic forms and in a meaningful context. The participants were not required to produce the target words during this time, but were required to attend to the task.

Focussed language stimulation in play was then carried out over the final 30 minutes of each therapy session. Toys that could be used to represent the target words were available, with the SLT following the participant's lead in play. During play, the SLT gave frequent and highly concentrated models of the target words and manipulated the social and linguistic environment to create opportunities for the participants to use the target words(Fey, 1986). This included creating situations where target words were obligatory responses; however elicited imitation was not used.

Each therapy session was recorded and language samples (from the full 45 minutes) were transcribed by the SLT. Criterion-referenced assessment was then used to measure the participants' use of target words, NDW and MLU.

Post-Intervention Phase

The post-intervention phase consisted of two measures: 1) Language Sampling, and 2) Probes of the target words. Post-intervention assessment data was gathered over three consecutive sessions within two weeks for intervention concluding. Additionally, data was gathered on one occasion, one month following the conclusion of intervention.

Language samples were collected, transcribed and analysed in the same manner as in baseline assessment. Probes of target words were also administered in the same manner as in baseline assessment.

Data Analysis

Language samples from baseline testing, intervention phase and post-intervention phase were recorded and transcribed by the SLT. Transcriptions included all vocalisations/word attempts made by the participants, regardless of speech accuracy. Transcriptions were made according to Systematic Analysis of Language Transcripts (SALT) conventions, then analysed using SALT software, in accordance with SALT protocols (Westerveld, 2008). This provided information on the number of target words used, the NDW used and the MLU for each language sample of each participant.

Reliability Measures

Dependent Measures

Use of target words and calculations of NDW and MLU were taken from participants' conversational language samples. Language samples were taken at each session for each participant and transcribed according to SALT protocol. A Bachelor of Speech Language Therapy (BSLT) student was recruited to determine transcription reliability. The BSLT student received specific training in the protocols of transcription using SALT.

The BSLT student re-transcribed 20 percent of the total language samples from the intervention phase according to SALT protocol. Transcription agreement was calculated by the BSLT student and indicated an inter-rater reliability of 86.3 percent.

Treatment Fidelity

Reliability of treatment fidelity was calculated by a BSLT student who had received specific training in the intervention procedures. Procedures are outlined in Appendix 4. 20 percent of intervention sessions were assessed and scored according to use of structured teaching, structured teaching in context and focussed language stimulation in play. Treatment fidelity reliability was calculated, indicating inter-rater reliability of 100 percent.

Statistical Analysis

The two-standard-deviation –band method was used to help determine whether or not any changes were significant. In this method, variability within the baseline data is measured by calculating the mean and standard deviation. A two standard-deviation ‘band’ was established around the baseline mean. Changes in the intervention phase are considered significant if at least two consecutive data points fall outside of this ‘band’ (Portney, 2009).

Results

Results are presented for each participant individually. Background information on each participant is provided, followed by data from initial and baseline assessments. Results from baseline, intervention and post-intervention phases are presented in graph form.

The two standard deviation band method (Portney, 2009) was used to determine significance of results. Results are considered significant if two or more consecutive points fall outside of the two standard deviation band (Portney, 2009). Where identical measures were taken across the baseline however, the two standard deviation band was not used, as the standard deviation calculated would be zero, indicating any change to be significant. Alternatively, visual inspection was used to interpret these results.

Overall the results indicate increases in both measures of expressive vocabulary and sentence development. Specifically, all participants used an increased number of target verbs and a significantly increased NDW in intervention and post-intervention phases. The majority of participants also made significant gains in MLU.

Participant One

Participant One was a male aged three years, zero months. He was from a monolingual English speaking family and had passed a hearing screen three months prior to participating in the study. Participant One's parents were concerned about his expressive language, but had no concerns around any other areas of development. He was a 'late talker', having fewer than 50 words and combining no words at age 24 months. Participant One's parents reported that he had ongoing diarrhoea from age 12-19 months which resulted in very low iron levels over this period. Once changing to a gluten-free diet however, the issue resolved and iron levels have remained stable. During the case history, Participant One's parents expressed concern that the low iron levels may have had an impact on his brain development. Participant one had received no Speech Language Therapy prior to participating in this study.

The results from the initial assessment and baseline assessment are presented in Table 1. Participant One's overall receptive language score on the CELF-P2 was slightly above the mean expected for his age, indicating expressive language to be within normal limits. His expressive language was judged to be delayed, based on a small vocabulary (reported in the CDI) as well as a restricted MLU (2.97 standard deviations below the mean expected for his age).

Table 1 Language Profile of Participant One

Participant: 1	
Age in Months: 36	
CELF – P2^a	
Sentence Structure Subtest ^b	10
Concepts & Following Directions Subtest ^b	12
Basic Concepts Subtest ^b	10
Receptive Language Score ^c	103
Language Sample	
MLU ^d	1.1

Note: ^a CELF –P2 = Clinical Evaluation of Language Fundamentals Preschool Second Edition; ^b Standard score with mean = 10, standard deviation = 3; ^c Composite score with mean = 100, standard deviation = 15; ^d MLU = Mean Length of Utterance in morphemes, with for age 36 months = 3.16 and standard deviation = 0.694).

Vocabulary Targets

The primary aim of this intervention was to determine whether targeting vocabulary, specifically verbs, would increase the participant's use of target words in the probes and during play. Figure 1 illustrates that Participant One used no target verbs during baseline assessment; however visual inspection reveals a sharp increase in target production of verbs during the intervention phase. Increases were maintained in the post-intervention phase, where Participant One used all 10 target words in the session carried out one month following intervention.

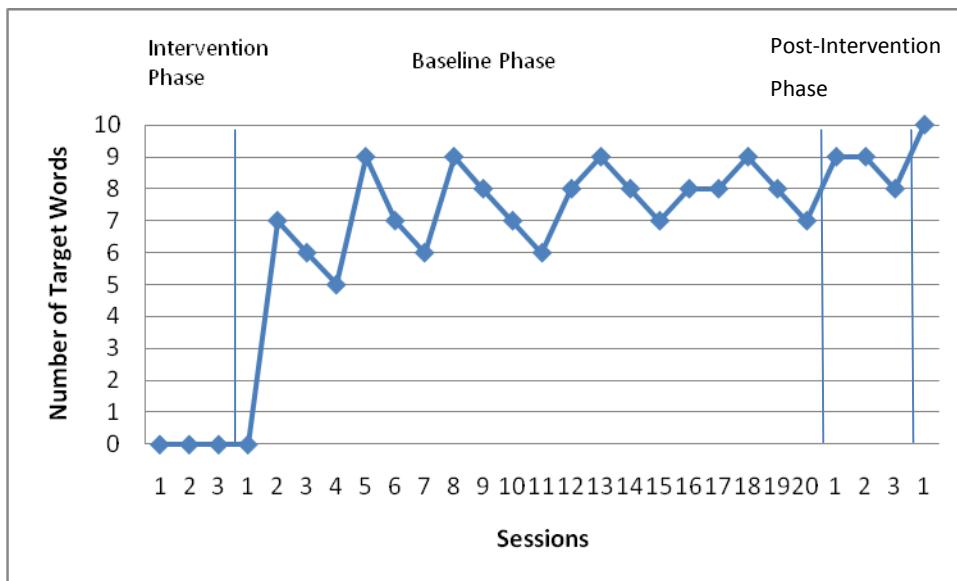


Figure 1 Number of Target Words used by Participant One

Number of Different Words

It was hypothesised that by targeting a set number of words in intervention, more general increases in the participant's vocabulary would also be observed. Specifically, it was hypothesised that the NDW used by the participant during sessions would increase. Prior to intervention (in baseline assessment), Participant One used an average of 21.3 different words. Figure 2 indicates a significant increase in the NDW used by Participant One during the intervention phase, with up to 80 different words used in a session. The increase in NDW in post-intervention remained significant. Participant One's parents kept a 'word diary' (a list of all the words Participant One used in the home environment) throughout the intervention phase. At the end of the intervention phase, they reported that the number of words Participant One used was 165 (compared with 26 prior to the intervention phase).

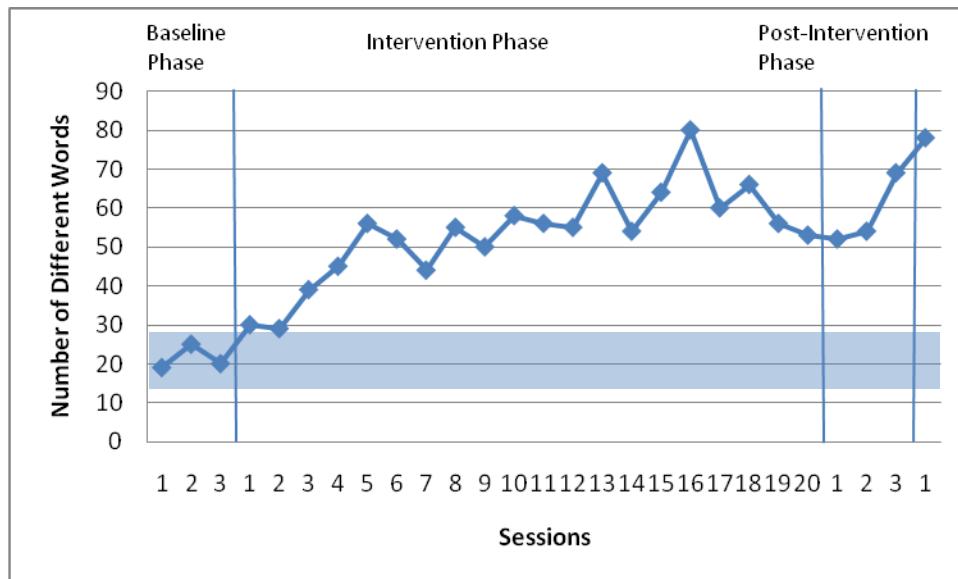


Figure 2 Number of Different Words used by Participant One

Mean Length of Utterance

As hypothesized, targeting verbs in intervention resulted in a significant increase in MLU for Participant 1. Figure 3 illustrates the increases in Participant One's MLU during intervention and that those changes remained significant in the post-intervention phase.

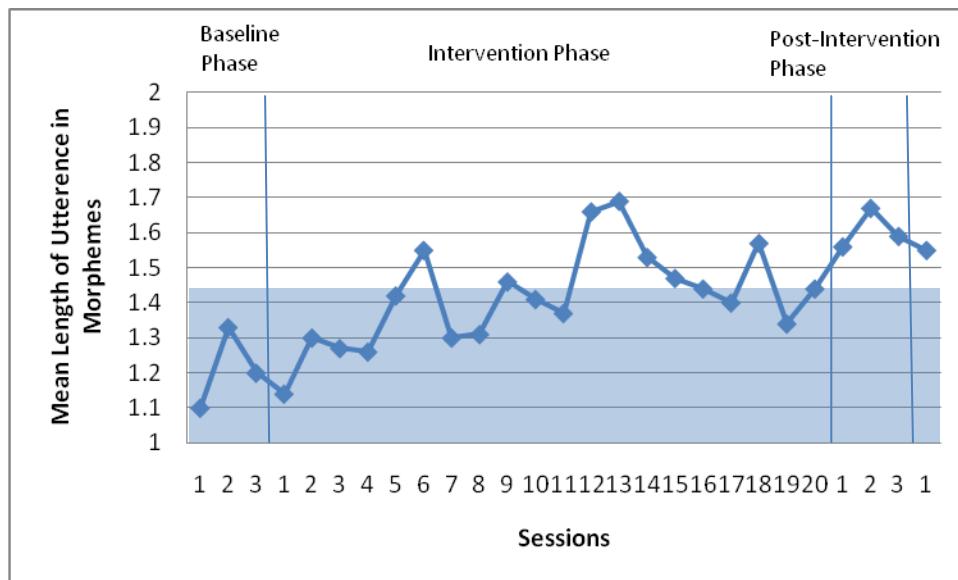


Figure 3 Mean Length of Utterance used by Participant One

Participant Two

Participant Two was a male aged three years, six months. He was from a monolingual English-speaking family and had passed a hearing screen six months prior to participating in the study. Participant Two's Mother was concerned about his expressive and receptive language and the impact this may have been having on his social development. She had no concerns around other areas of Participant Two's development. Participant Two's mother reported that he had a seizure at age 18 months that lasted around 15minutes. Testing following the seizure was unable to determine a cause. Participant Two had received a Speech Language Therapy assessment three months prior to participating in this study. No standardised assessment was used in the previous assessment of Participant Two's speech and language due to non-compliance. Suggestions for facilitating language development at home were given to Participant Two's mother; however Participant Two received no direct Speech Language Therapy prior to the intervention phase of this study.

Results from pre-intervention assessment are detailed in Table 3. Participant Two was considered to have an expressive language delay on the basis of a restricted MLU (2.79 standard deviations below the mean expected for his age) and reduced vocabulary (as indicated in the CDI). Receptive language was evaluated using the CELF-P2. Participant Two had an overall receptive language score that was 1.27 standard deviations below the mean. He scored one SD below the mean on the Concepts & Directions Subtest but 1.67 standard deviations below the mean on the Sentence Structure and Basic Concepts subtests. This indicated that unlike the other participants, receptive language was slightly below normal limits. This is consistent with Olswang's (1998) suggestion that children with ELD may present with poor receptive language as well.

Table 2 Language Profile of Participant Two

Participant: 2	
Age in Months: 42	
CELF – P2^a	
Sentence Structure Subtest ^b	5
Concepts & Following Directions Subtest ^b	7
Basic Concepts Subtest ^b	5
Receptive Language Score ^c	74
Language Sample	
MLU ^d	1.5

Note: ^a CELF –P2 = Clinical Evaluation of Language Fundamentals Preschool Second Edition; ^b Standard score with mean = 10, standard deviation = 3; ^c Composite score with mean = 100, standard deviation = 15; ^d MLU = Mean Length of Utterance in morphemes, where mean for age = 3.78 and standard deviation = 0.817).

Vocabulary Targets

Figure 4 illustrates Participant Two's use of target words in baseline, intervention and post-intervention phases. Participant Two attended to tasks involving probes for the target words in baseline assessment, but was often non-compliant during probe tasks in the intervention and post-intervention phase. Figure 4 indicates that Participant Two used no target words in the baseline, but visual inspection indicated that Participant Two's use of target words increased during the intervention and post-intervention phase. However, there was variability in use during the sessions. The variability appeared to be primarily due to non-compliance during probes.

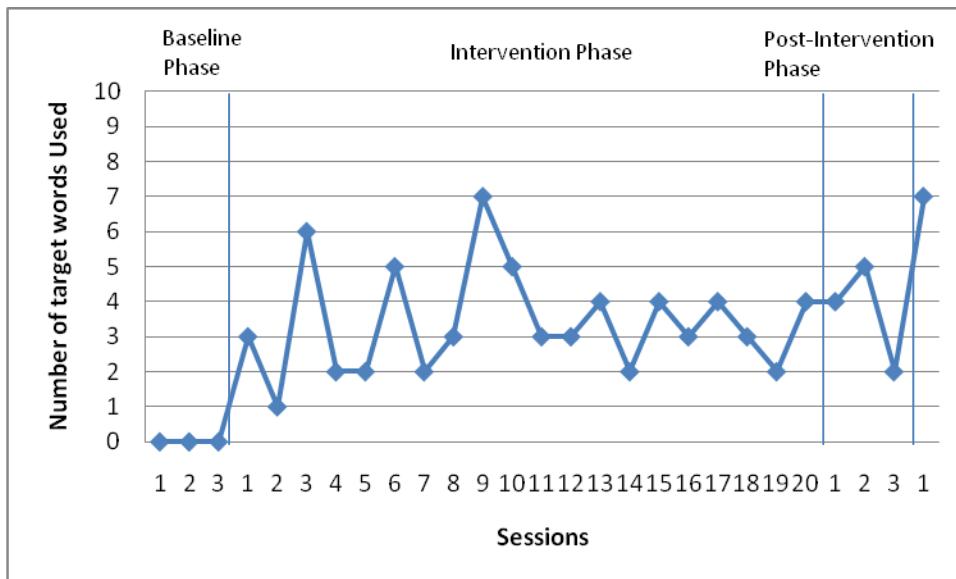


Figure 4 Number of Target Words used by Participant Two

Number of Different Words

As hypothesised, targeting vocabulary in intervention resulted in a more general increase in the participant's expressive vocabulary, specifically the NDW used by the participant. Figure 5 indicates that Participant Two significantly increased his NDW used during the intervention phase, using up to 117 different words in a session, compared with an average of 81.67 different words in baseline assessment. Increases in NDW remained significant during the post-intervention phase.

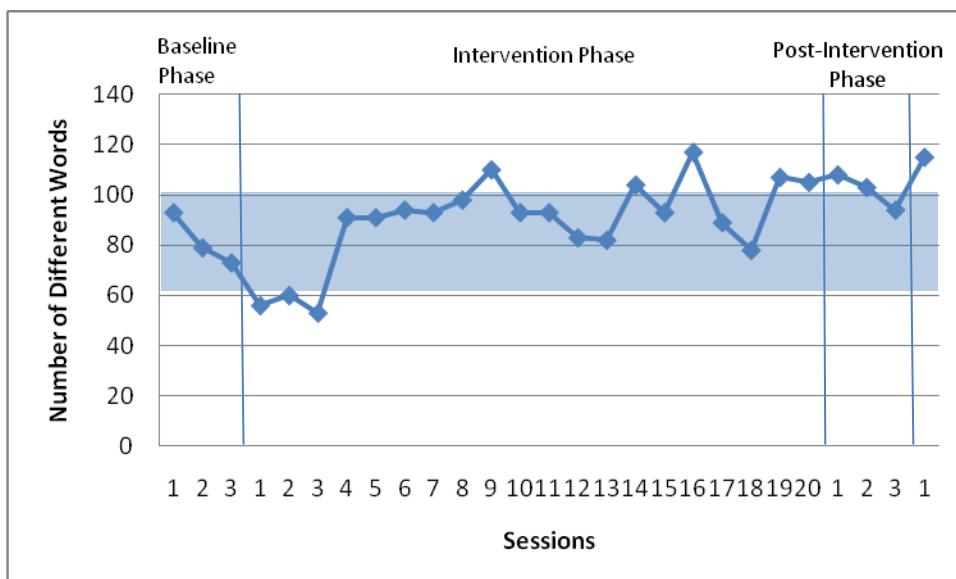


Figure 5 Number of Different Words used by Participant Two

Mean Length of Utterance

Figure 6 illustrates Participant Two's MLU during the baseline, intervention and post-intervention phases. Results indicate a significant increase in Participant Two's MLU during the intervention phase. A significant increase was also maintained in the post-intervention phase.

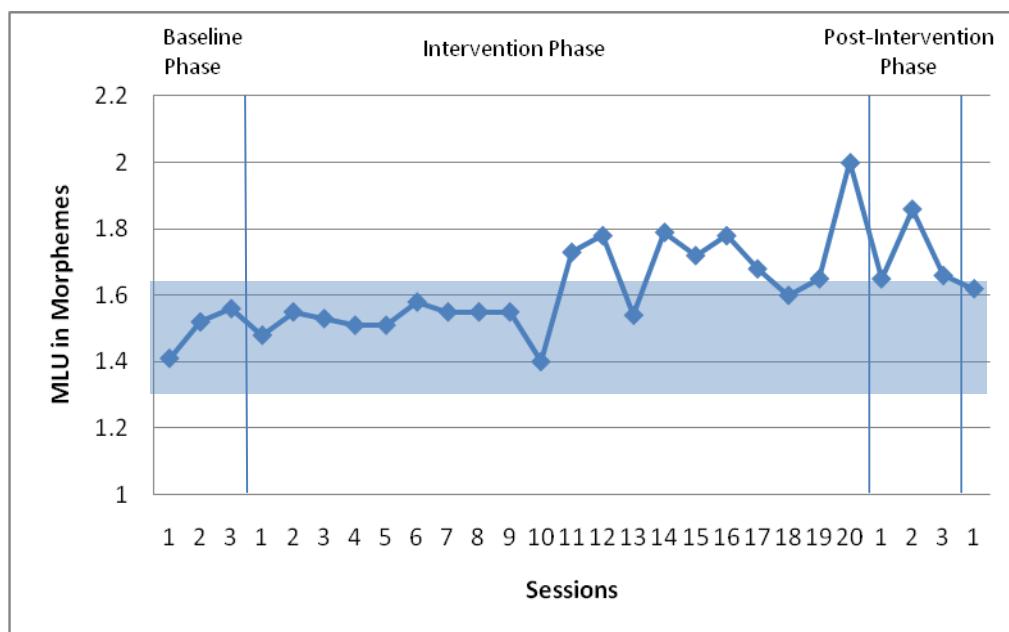


Figure 6 Mean Length of Utterance used by Participant Two

Participant Three

Participant Three was a male aged two years, nine months and was from a monolingual English-speaking family. He passed a hearing screen three months before participating in this study. Participant Three's mother was concerned about his small vocabulary and the impact this was having on his ability to communicate with others. She had no concerns around Participant Three's physical development or feeding. Participant Three's mother reported that he was born by emergency caesarean after becoming distressed during delivery. Participant Three's expressive language delay was severe and his mother reported that he was showing signs of frustration in the home environment when unable to communicate needs and wants. As with other participants, it was hypothesised that Participant Three would increase his use of target words, NDW and MLU. However, due to his poor expressive language, words communicated by either gestures or verbally were included as appropriate responses.

Participant Three was below the age that CELF-P2 is standardised for, therefore, use of the Preschool Language Scales was attempted to assess his receptive language prior to the intervention phase.

However, limited attention to the task meant that the assessment could not be administered according the assessment manual. Alternatively, the CELF P2 was administered when Participant Three turned 36months. At that stage, Participant Three had completed all sessions in the intervention phase. Participant Three's receptive language score on the CEL-P2 was within one standard deviation of the mean, indicating receptive language within normal limits. Participant Three's low expressive vocabulary (as indicated in the CDI) and reduced MLU (2.92 standard deviations below the mean) indicate a delay in expressive language.

Table 3 Language Profile of Participant Three

Participant: 3

Age in Months: 33 at time of Language

Sample, 36 when CELF-P2 was completed.

CELF – P2^a

Sentence Structure Subtest ^b	9
Concepts & Following Directions Subtest ^b	8
Basic Concepts Subtest ^b	9
Receptive Language Score ^c	90

Language Sample

MLU ^d	1.0
------------------	-----

Note: ^a CELF –P2 = *Clinical Evaluation of Language Fundamentals Preschool Second Edition*; ^b Standard score with mean = 10, standard deviation = 3; ^c Composite score with mean = 100, standard deviation = 15; ^d MLU = Mean Length of Utterance in morphemes, where expected mean for age = 2.85 and standard deviation = 0.633).

Vocabulary Targets

Participant Three used none of the target words in language samples taken in baseline assessment. Additionally, the CDI indicated that none of the target words were used by Participant Three in the

home environment. Figures 7 and 8 illustrate Participant Three's use of the target verbs both using spoken language and gesture. In Figure 7, it can be seen that up to eight target words were used during intervention/post-intervention sessions. However there was a large drop off of use at post-intervention sessions two and three, followed by a large increase at one-month post. It was thought that the poor performance in post-intervention sessions two and three was largely related to non-compliance during the probes of target words and reduced interest in play with the therapist, resulting in fewer requests (which would have likely required use of the targets). Figure 8 illustrates Participant Three's performance on spoken language targets. Comparing the two figures, it can be seen that target words were primarily communicated through use of gesture rather than spoken language.

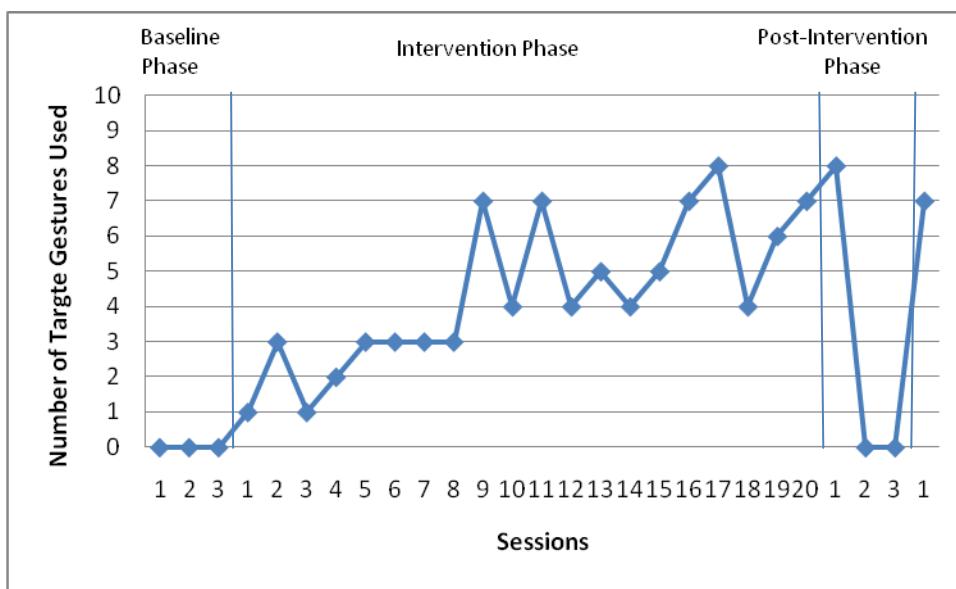


Figure 7 Number of Target Words communicated with Gesture by Participant Three

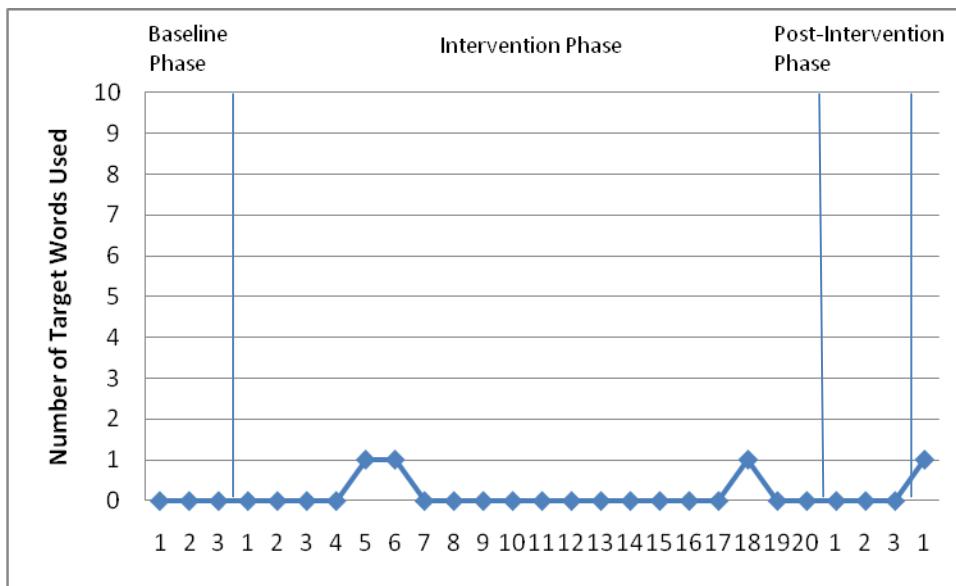


Figure 8 Number of Target Words communicated with Spoken Language by Participant Three

Number of Different Words

It was hypothesised that intervention targeting specific vocabulary would result in an increased number of different words used. Figures 9 and 10 illustrate the NDW used by Participant Three using gesture and using spoken language respectively. Figure 11 illustrates the total NDW used by Participant Three (including gesture and spoken language). Visual inspection of Figure 9 indicates increases in NDW using gesture, particularly between the ninth and twentieth intervention sessions. Significant increases in NDW using spoken language can also be seen in Figure 10, with differences remaining significant in the post-intervention phase, despite a downward trend. Figure 11 shows a significant increase in total NDW used by Participant Three during the intervention phase.

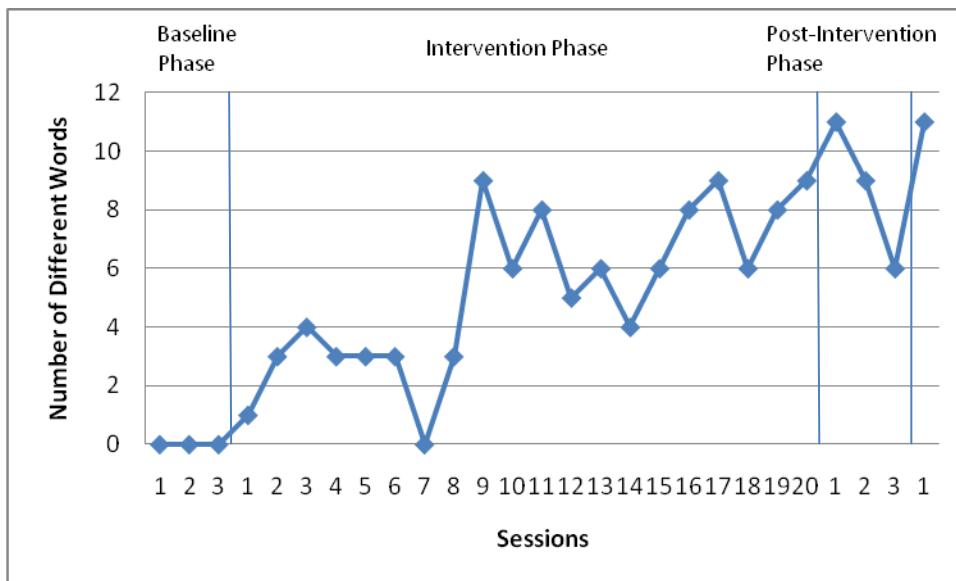


Figure 9 Number of Different Words communicated with Gesture by Participant Three

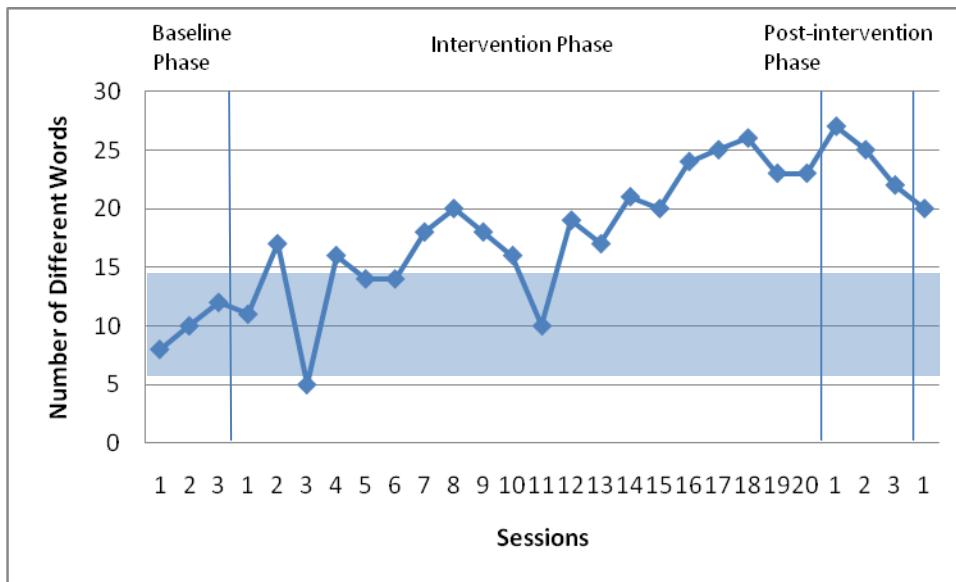


Figure 10 Number of Different Words communicated with Spoken Language by Participant Three

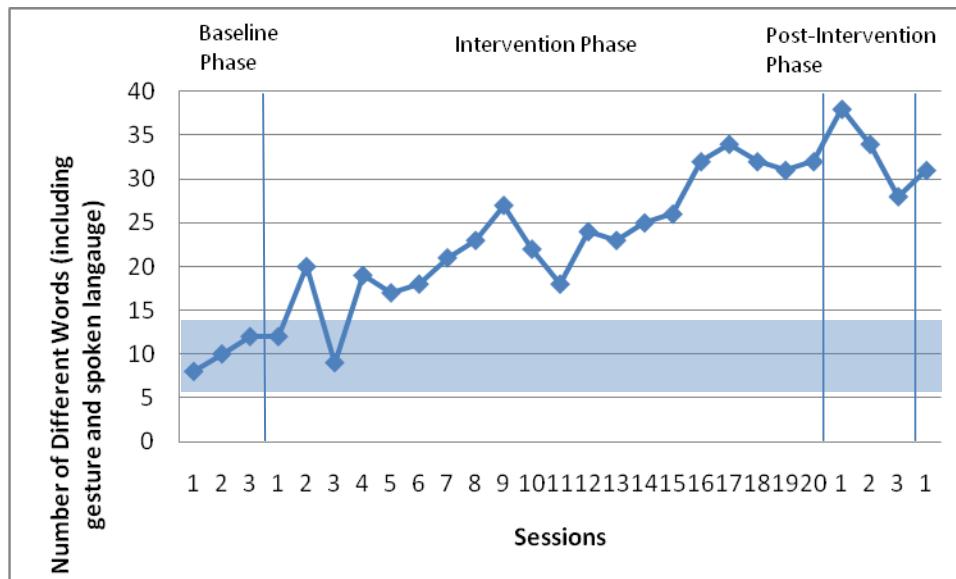


Figure 11 Total Number of Different Words used by Participant Three, including words communicated by Gesture and Spoken Language

Mean Length of Utterance

Figure 12 illustrates Participant Three's MLU over the baseline, intervention and post-intervention phase. Visual inspection indicates that Participant Three's MLU increased only slightly in the intervention and post-intervention phases. In the baseline phase, Participant Three made no two-word combinations – a finding consistent with parent report. Small increases in MLU during the intervention and post-intervention phase indicate that Participant Three did begin to use two-word combinations during this time. This was observed in the form of two spoken words, two gestures and a combination of the two.

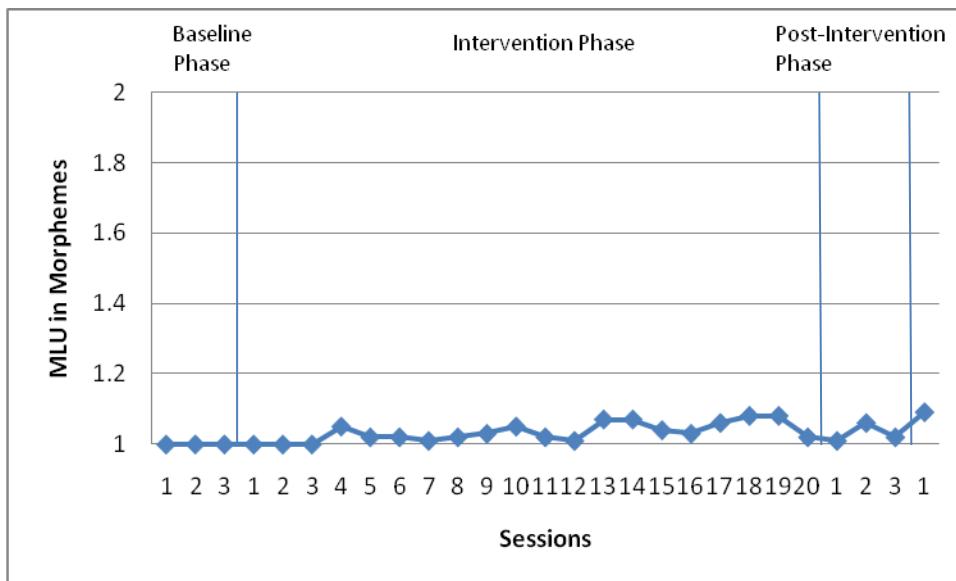


Figure 12 Mean Length of Utterance in Morphemes used by Participant Three, including words communicated by gesture and Spoken Language.

Participant Four

Participant Four was a male aged three years, three months from a monolingual English-speaking family and passed a hearing screen three months before participating in this study. Participant Four's mother contacted the primary investigator following a letter sent to Participant Four's Early Learning Centre. She reported that she had had concerns about his speech and language development since he was two years, zero months. Participant Four's mother reported that there were no complications in his birth or early infancy. She had no concerns around his physical development or feeding. However she reported that six months prior to participating, Participant Four had an absent seizure after taking some medication meant for an epileptic (Participant Four is not epileptic). He spent two nights in the Intensive Care Unit following the seizure. Baseline assessment, intervention and post-intervention took place at Participant Four's home, due to the family's transport restrictions.

Pre-intervention assessment results are detailed in Table 7. Participant Three's overall receptive language score was within one standard deviation of the mean on the CELF-P2, indicating that receptive language was within normal limits. However Participant Three did score below normal limits in one of the three receptive language subtests (Basic Concepts). Participant Three presented with a low MLU for his age (2.18 standard deviations below the mean expected for his age) and a restricted vocabulary (as reported in the CDI), indicating a delay in expressive language.

Table 4 Language Profile of Participant Four

Participant: 4	
Age in Months: 39	
CELF – P2^a	
Sentence Structure Subtest ^b	10
Concepts & Following Directions Subtest ^b	8
Basic Concepts Subtest ^b	6
Receptive Language Score ^c	86
Language Sample	
MLU ^d	1.82

Note: ^a CELF –P2 = *Clinical Evaluation of Language Fundamentals Preschool Second Edition*; ^b Standard score with mean = 10, standard deviation = 3; ^c Composite score with mean = 100, standard deviation = 15; ^d MLU = Mean Length of Utterance in morphemes (where mean expected for age = 3.47 and standard deviation = 0.756).

Vocabulary Targets

Participant Four used none of the target words during baseline assessment. The CDI indicated that he was using one of the target words in the home environment (target word ‘eat’), however this was only being used as a noun (not as a verb, which was targeted in intervention). Participant Four’s use of target words during baseline assessment, intervention and post-intervention phases are illustrated in Figure 13. Figure 13 illustrates an overall increase in use of target words, with variability across the intervention phase. It was thought that variability in use of target words was primarily due to variation in compliance of probes of target words. A sharp decrease in use of target words is shown in intervention session 15. Participant Four was non-compliant in all therapy tasks during session fifteen and it was thought that this impacted on his use of target words during that session.

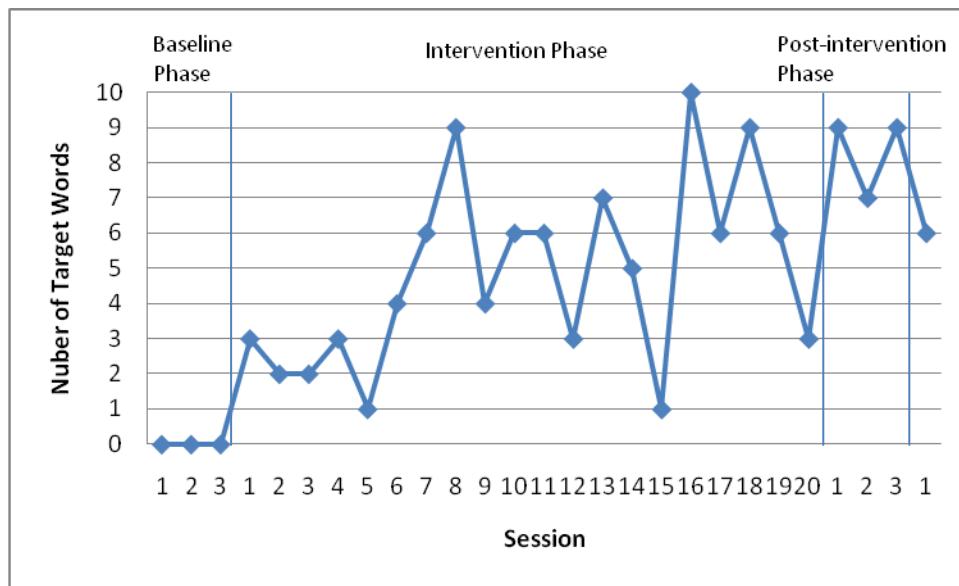


Figure 13 Number of Target Words used by Participant Four

Number of Different Words

The NDW used by Participant Four was calculated as a measure of expressive vocabulary. Figure 14 illustrates the NDW used by Participant Four in baseline assessment, intervention and post-intervention phase sessions. Visual inspection of Figure 14 indicates significant increases in the NDW used by Participant Four during the intervention phase, which were maintained in the post-intervention phase. The NDW used by Participant Four dropped sharply in session 15. It was thought that this was due to non-compliance in all tasks during this session.

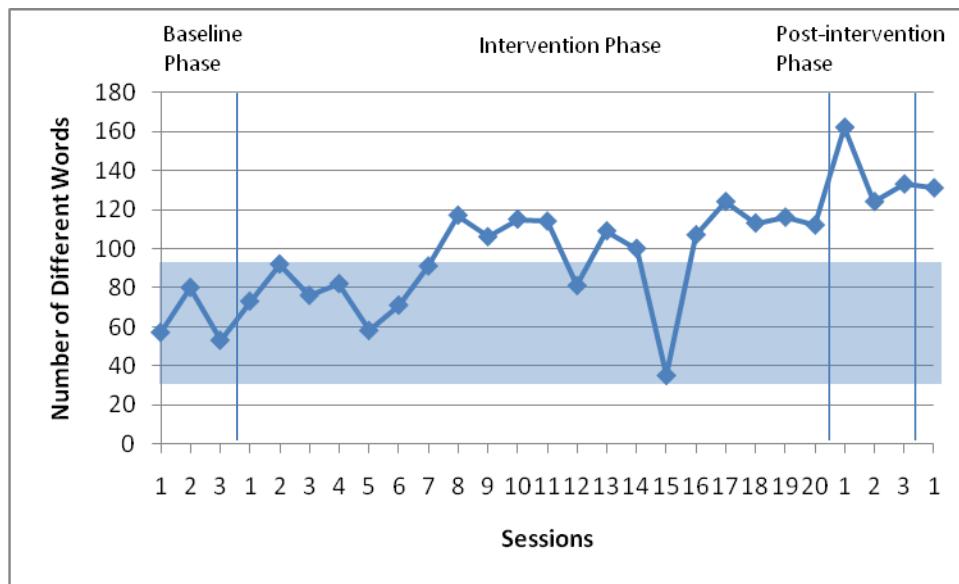


Figure 14 Number of Different Words used by Participant Four

Mean Length of Utterance

It was hypothesised that the participant's MLU would increase during intervention aimed at increasing vocabulary. As shown in Figure 15, Measures of MLU during the three phases indicated that Participant Four's MLU significantly decreased early in the intervention phase, before increasing significantly. Significant increases remained significant during post-intervention phase.

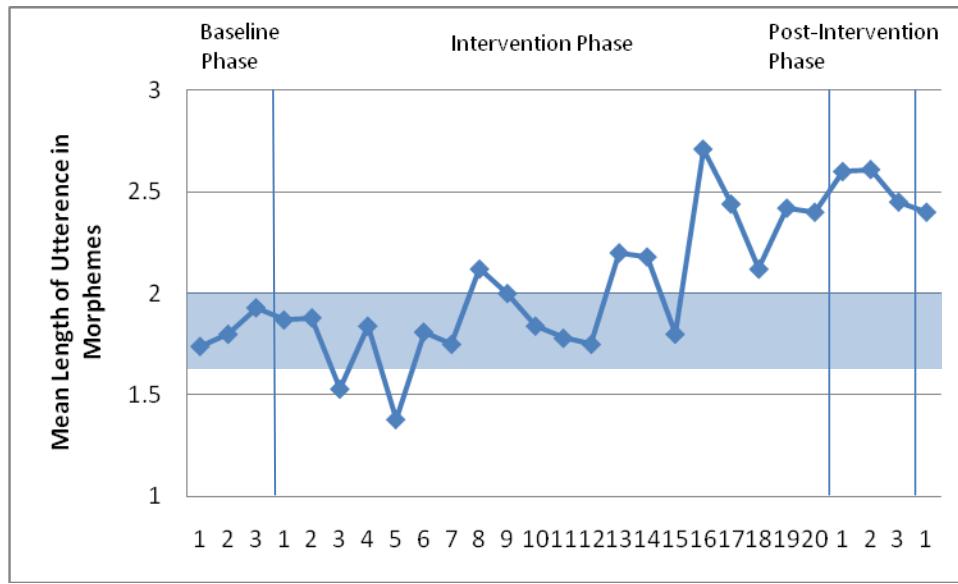


Figure 15 Mean Length of Utterance in Morphemes used by Participant Four

Summary of Results

The current study set out to answer three questions. First, is verb-focussed vocabulary intervention using a hybrid approach effective in increasing the use of targeted verbs; second, is the hybrid approach effective in increasing expressive vocabulary of young children with ELD; and third, is it effective in facilitating development of sentences of young children with ELD? The results indicate that intervention was effective in increasing the use of target words in all participants. Expressive vocabulary, as measured by NDW, significantly increased in all participants during the intervention phase. Significant increases were also seen in sentence length, as measured by MLU, in the majority of participants. One Participant (of four) made only small gains in MLU, which could not be judged significant.

Discussion

Preschool-aged children with expressive language delay (ELD) present with a smaller vocabulary than typically developing children. There is evidence to suggest that children with language difficulties have particular difficulty acquiring the use of verbs (Hadley, 1998). Children with ELD may also present with smaller MLUs and less complex words structures, compared with typically developing children (L.B. Olswang et al., 1998). The purpose of this study was to determine whether intervention aimed at increasing vocabulary, specifically verbs, would result in an increase in use of target words. Furthermore, this study examined whether such an approach would have broader impacts on the participant's expressive language. Specifically, the study aimed to establish whether the therapy would result in increased use of target verbs, improved expressive vocabulary (as measured by NDW), and increased sentence length (as measured by MLU) in participants' language. It was hypothesised that young children with ELD would demonstrate improvement in use of target verbs, NDW and MLU following intervention. As hypothesized, all participants demonstrated increased use of target verbs, NDW during intervention. The majority of participants also demonstrated significant increases in MLU. These findings are in agreement with those by Page & Moran (Moran, 2007) who studied the effects of similar intervention in a child who had language delay and a cleft palate and found significant increases in MLU and NDW in addition to increased use of target words.

Impact of Language Intervention

The results of this study indicated that the verb-focussed vocabulary intervention was effective in increasing the participants' use of target words. The participants showed increases in use of target words during the intervention phase, with the majority (three of the four) continuing to show increased use throughout the post-intervention phase, when therapy was withdrawn.

As hypothesised, intervention targeting a set of verbs was also effective in increasing the total NDW used by participants. Increases in the NDW used by participants indicated that although only a set of 10 vocabulary words were targeted, significant increases in measures of total vocabulary were seen. These results lend support to the findings in intervention studies by Girolametto et al (1996), Scherer (1999) and Whitehurst et al (1991), who also found that vocabulary intervention using a 'set' of target words can result in broad vocabulary gains for children with ELD.

Due to the close relationship between vocabulary and grammar development (Bates & Goodman, 1997) and in particular verbs and grammar, it was also hypothesised that intervention targeting vocabulary, specifically verbs, would result in changes to participants' MLU (a measure of grammar). During the intervention phase, the majority of participants showed significant gains in MLU, compared with baseline measures. This finding cannot be reported for one of the four participants, as a stable baseline meant significance was not calculated using the two standard deviation band method. However measures of MLU for this participant did indicate that he began combining two words in the intervention phase, which he was not demonstrating an ability to do prior to intervention. The overall finding that the verb-focussed vocabulary intervention resulted in changes to grammatical measures lends support to the findings of Girolametto et al (1996) and Scherer (1999). Both intervention studies targeted vocabulary in children with ELD and made some measures of grammatical status before and after intervention. The intervention approaches used by Girolametto (1996) and Scherer (1999) were less structured than the hybrid approach used in the current study and included use of the Hanen program (Girolametto et al., 1996) and Milieu intervention (Scherer, 1999). The population in the group study by Girolametto (1996) was similar to that of the current study. Scherer's (1999) study however, used a participant with both ELD and cleft palate. Similarly to the current study, both Girolametto (1996) and Scherer (1999) found measures of grammar to be improved following vocabulary intervention. In both studies, grammatical complexity was measured according to parent report (using the McArthur Bates CDI). Girolametto's (1996) study also included a measure of the number of multi-word utterances used in a 30-minute interaction. Measures of MLU across baseline, intervention and post-intervention phases used in the current study give further support to previous findings that vocabulary intervention can facilitate grammatical development. These findings also lend support to the single-case study discussed by Moran et al (Moran, 2007), which used verb-focussed vocabulary intervention with a child who presented with ELD and cleft palate. The grammatical skills of the participant were measured using calculations of MLU over baseline, intervention and post-intervention phases. Results of the study indicated significant increases in the participant's MLU.

When examining the extent of the gains following intervention, it was noted that Participant Two appeared to make smaller gains compared with the other participants. Interestingly, assessment of Participant Two's receptive language indicated that receptive language was below normal for his age (almost two standard deviations below the mean for his age on the CELF-P2). This is in contrast with the remaining participants, whose receptive language scores were judged within normal limits for their age. Research has indicated that children with ELD who also present with a delay in receptive language are considered to be more 'at risk' than those who present with a delay in expressive

language alone (Olswang & Bain, 1996). It is hypothesised that Participant Two's smaller gains are due to his additional delay in receptive language. Issues around compliance during intervention sessions may have also played a part in lower results. This may be particularly relevant in use of target words. Participant Two's mother reported that by the tenth intervention session he was using nine of the ten target words in the home environment, and using all ten target verbs by the one-month post-assessment.

Differences in performance were also noted for Participant Three. Due to the severity of Participant Three's expressive language delay, use of gesture was modelled in intervention in conjunction with spoken expressive language. Parent report in pre-intervention assessment indicated that Participant Three had an expressive vocabulary of less than 15 words and no word combinations, which was also supported in baseline assessment. Parent report also indicated that Participant Three was becoming increasingly frustrated in the home environment when unable to communicate effectively. The decision to incorporate use of gesture was made in consideration of these factors, and in light of the research that indicates gesture is used by typically-developing toddlers to aid expressive language and, it is hypothesised, to lessen the load on developing symbolic skills (Iverson, Capirci, & Caselli, 1994). Significant gains in both use of gesture and spoken language to communicate indicate that this form of intervention was effective in increasing Participant Three's expressive vocabulary.

Clinical Implications

This study gives way to a number of clinical implications. Primarily, it indicates that verb-focussed vocabulary intervention can result in broad gains for children with expressive language delay. It has the potential to increase not only use of the verbs targeted, but also the child's NDW and MLU. Due to service constraints, it is essential that clinicians choose targets that are likely to increase language to its maximum potential.

While results indicated significant change in these measures for all participants, some participants showed greater growth than others. Of interest, increases in measures of Participant Two's expressive language were lower than those of the other participants'. As discussed, his progress may have been impacted by (a) Lack of compliance during intervention and post-intervention sessions, and (b) Receptive language judged to be below normal limits. Lack of compliance during intervention resulted in therapy Participant Two received differing from other participants. Refusal to participate in the probe tasks and story-book reading in the majority of sessions meant that sessions often consisted of only focussed language stimulation in play. During focussed language stimulation,

Participant Two often did not use target words in the opportunities provided, although he was reported to be using 90% of them in other environments. Therapists working with young children who are not compliant in interventions sessions may consider an approach that does not require set responses from the child. For example, this could reflect the therapy that Participant Two received (focussed language stimulation in play), but remove the need to attempt more structured tasks (such as probes for target words). If consistently futile, therapists' attempts to engage the child in structured tasks can be time-consuming and set a tone for non-compliance throughout the session. These results also highlight the importance of assessing both receptive and expressive language when a child appears to present with an ELD. Awareness of the child's receptive language skills will aid in recommending intensity of therapy and setting appropriate goals for the child. Specifically, more time to reach goals in expressive language may be warranted for those children who present with delays in both expressive and receptive language and/or more intensive therapy recommended.

Use of gesture was incorporated into intervention for Participant Three. Following therapy, he was able to use more target words than before therapy (communicating them with gesture), had significantly increased the NDW he was using in therapy (both in spoken language and using gesture), and was beginning to use two-word utterances (reflected in an increase in MLU). Incorporating use of gesture into therapy for young children who have a particularly severe delay or who are slow to make progress using more traditional approaches, may be considered by SLTs working with children with expressive language delay. Further research into this area is warranted.

Theoretical Implications

Findings from the current study give way to a number of theoretical implications, including definitions of ELD, choice of targets in therapy for young children with ELD and intervention approaches used.

Although ELD is typically associated with unknown cause, in this study all participants had a remarkable history, with two children having seizures, one traumatic birth and one an iron deficiency at a very young age. It has been suggested (Paul, 1991) that especially when it comes to young children with slow expressive language development, clinicians must also consider any histories. Although a percentage of children will go on to have typical language development, those who are at risk for reasons such as birth trauma may require early intervention. This should be considered in future research examining predictors of late talkers.

Findings from this study also highlight the importance of considering the receptive language of children who appear to present with ELD. There has been some debate around the inclusion of children with receptive language delays in the term 'ELD'. Some authors have suggested that ELD should include those with solely delays in expressive language. However this idea has been challenged by Leonard (2009) who proposes that all children with ELD will have some co-occurring deficits in receptive language, despite outcomes of standardised testing. The current study included one child with obvious reduced receptive language (as measured by standardised assessment). While the current study indicated that this child made gains in lexical and grammatical development, improvement was notably less than the participants who had typical receptive language skills (as judged by standardised assessment). Although the sample is too small to make definitive statements, it supports suggestions that children with ELD who also present with obvious delays in receptive language are more 'at risk' than children who present with delays in expressive language alone (L. B. Olswang & Bain, 1996).

While vocabulary is a common target in intervention for young children with ELD, there is little discussion round the choice of vocabulary targets in the literature. Despite the importance of verbs in language domains outside of vocabulary, specifically grammar (Tomasello, 1992), verbs have been the focus of few intervention studies. The literature suggests that children with ELD have increased difficulty both acquiring verbs in their lexicon and difficulty in as grammar develops, using them appropriately in sentences (e.g. use of morphological verb endings) (Hadley, 1998). It is surprising then, that use of verbs has been seldom explored in vocabulary intervention. The current study used verbs as target words in vocabulary intervention, finding that all participants made gains in measures of their use of target verbs, expressive vocabulary (as measured by NDW) and in development of sentences (as measured by MLU). Further research into the use of verbs as targets in vocabulary intervention in the current study is warranted, considering the small number of participants ($n=4$) used in the current study.

The intervention approach used when targeting vocabulary must also be considered. The current study used a hybrid approach, which included structured teaching of target words, use of target words in the context of story-book reading, and focussed stimulation in play. Other approaches that have been shown to be successful in facilitating vocabulary growth with this population include Milieu approaches (Scherer, 1999; Whitehurst et al., 1991) and general language stimulation approaches (Girolametto et al., 1997; Girolametto et al., 1996; Robertson & Weismer, 1999). Studies comparing the relative effectiveness of different intervention approaches have been undertaken with school-aged children with SLI (Fey, Cleave, Long & Hughes, 1993; Nelson, Camarata, Welsh,

Butkovsky, & Camarata, 1996), however are scarce in ELD with toddlers/ young preschoolers.

Research into the relative effectiveness of approaches in vocabulary intervention is needed.

It is plausible too, that the way in which target words were presented may have influenced the outcomes of vocabulary intervention. There is little discussion around this in the literature. Of relevance however, is a recommendation by Fey et al (2003), that telegraphic speech in grammatical intervention should be avoided, and models of language should be given in well-formed, complete sentences. This may be applied to the use of verbs in vocabulary-focussed intervention, by ensuring use of verbs with their context-appropriate morphological endings. In the current study, target verbs were presented in grammatically-complete forms for the context. This meant that target verbs were presented using all tenses. Further research to determine the most effective way of presenting target verbs in intervention is necessary.

Limitations

A primary limitation in this study was the sample size. A larger sample size would have given stronger validity to the findings of this study. Furthermore, a larger sample size may have provided further information on the profiles of children who make stronger gains than others during intervention.

A more homogenous participant group may have resulted in stronger statistical significance across the group. Specifically, participants could have been selected to be closer in age, severity of expressive language delay and absence/presence of receptive language delay. Selecting participants in this manner however, would restrict the clinical applications that could be taken from the study.

During the intervention phase, parents were encouraged to participate in therapy sessions. The degree to which parents were involved in therapy and/or purposefully facilitated their child's language development outside of the clinic environment may have impacted on the progress made by the participants. Attempts to measure these factors would be desirable.

The two standard deviation band method was used in this study to indicate the significance of the changes observed in measures of language. However, because a single-subject design was used, it cannot be said with certainty that the intervention caused the changes observed. Due to the design of this study, it cannot be concluded that intervention caused the changes observed. However use of a randomised control design or other form of experimental measure would be useful in determining a cause-effect relationship in further studies.

Future Research

This study raises a number of questions requiring further research. Firstly, it is of importance to determine whether similar results would be found when studying a larger pool of participants. Results from this study indicated increases in the use of all participants' use of target words as well as their use of NDW and MLU. A similar study with an increased number of participants would increase validity and strengthen clinical applications.

Parental involvement was encouraged during the intervention phase of this study, however level of parental involvement was not monitored. Further studies in this area may consider incorporating a more structured home programme with close monitoring of its use. This may encourage increased conscious facilitation of participants' language development in the home environment, and if so, may lead to greater improvements in their expressive language.

Combining use of spoken language and gesture in intervention with Participant Three resulted in an increase in communication of target words, NDW and MLU. Further research is warranted to investigate whether this approach results in significant improvements for a larger number of children with ELD. Determining the characteristics of a child's ELD that make this type of therapy more suitable than therapy using solely spoken language would also be of benefit.

As discussed, there are a number of variables in vocabulary intervention with this population that would benefit from further research. Specifically, the relative effectiveness of approaches to intervention targeting vocabulary is an area requiring further study. A number of approaches have been shown to be successful in bringing about lexical gains for young children with ELD, yet there are no findings indicating which approach may be most effective. Selection of target words in vocabulary intervention is also of interest. There is little discussion in the literature regarding choice of targets, yet the current study has indicated that selecting from one word class, specifically verbs, may be effective in facilitating broad language gains. Specific to verb-focussed vocabulary intervention, research into the way in which verbs are presented in intervention is required.

Appendices

Appendix I

New Zealand Human Ethics Committee approval letter, information sheet for parents and consent form for participants.

Ref: HEC 2009/42

15 April 2009

Brooke Moore

Department of Communication Disorders

UNIVERSITY OF CANTERBURY

Dear Brooke

The Human Ethics Committee advises that your research proposal “The effects of a focused vocabulary approach to speech language therapy on the speech and language of children who are ‘late talkers’” has been considered and approved.

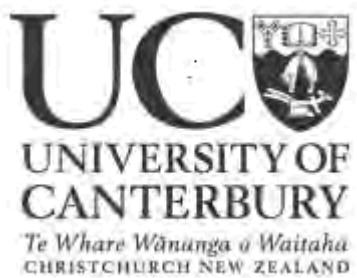
However the Committee ask that participants be offered a summary of the results at the end of the project. Please ensure this is indicated in the information sheet to participants.

Best wishes for your project.

Yours sincerely

Dr Michael Grimshaw

Chair, Human Ethics Committee



INFORMATION

Your child is invited to participate as a subject in the research project 'The effects of a focused vocabulary approach to Speech Language Therapy on the speech and language of children who are 'Late Talkers'.

The project aims to examine the effects of a focused vocabulary approach to Speech Language Therapy on the speech and language of children who are 'Late Talkers'. Specifically, it will focus on the vocabulary, length of utterance and phonological inventory (the number of sounds in the participants' repertoire).

Your child's involvement in this project will be participation in twice-weekly 45-minute Speech Language therapy sessions over a 10-week period. The therapy will focus on the acquisition of target words through structured teaching, storybook reading and play.

Additionally your child will be required to participate in three one-hour sessions both before and after the block of therapy. A qualified speech language therapist will assess your child's vocabulary, mean length of utterance and phonological inventory (the number of sounds your child uses) during these sessions. Assessment will be conducted through play and by providing your child with opportunities to use target words (or potential target words). During this time, you will also be asked to complete a form regarding background information relating your child's speech and language as well as a form that will provide information about your child's current use of gesture and words to communicate. Additionally your child will be asked to undergo a hearing test to eliminate hearing impairment as a factor in his/her language delay.

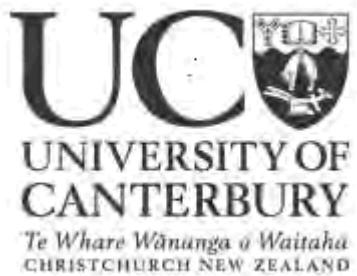
You have the right to withdraw your child from the project at any time, including withdrawal of any information provided.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: the identity of participants will not be made public without their consent. To ensure anonymity and confidentiality, all identifying information will be stored in a locked filing cabinet within a secure research laboratory. Only those involved with speech research projects have keyed access to this room. Brooke Moore and supervisors Dr Catherine Moran and Prof. Thomas Klee are the only persons with authorised access to identifying information. Pseudonyms or codes will be used in place of identifying names any material made available to unauthorized persons.

You will be offered a summary of findings upon this study being completed.

The project is being carried out as a requirement for Master of Speech Language Therapy by Brooke Moore under the supervision of Dr Catherine Moran who can be contacted at 364 2401 extension 6401. She will be pleased to discuss any concerns you may have about participation in the project.

The project has been reviewed ***and approved*** by the University of Canterbury Human Ethics Committee.



Brooke Moore

C/o Communication Disorders
University of Canterbury
Private Bag 4800
Christchurch

10.7.09

CONSENT FORM

'The effect of a focussed vocabulary approach to Speech Language Therapy on the speech and language of children who are 'Late Talkers'.

I have read and understood the description of the above-named project. On this basis I agree for my child to participate as a subject in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved.

I consent to the results of these assessments being made available for future studies if required.

I understand also that I may at any time withdraw my child from the project, including withdrawal of any information my child or I have provided.

I note that the project has been reviewed **and approved** by the University of Canterbury Human Ethics Committee.

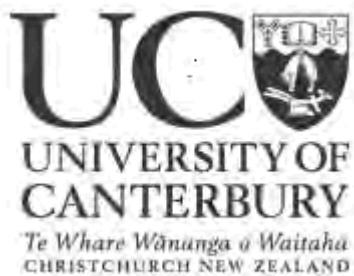
NAME (please print):

NAME OF CHILD:

Signature: Date:

Appendix 2

Case History Outline



Case History

Please give a description of your child's history of difficulty with speech/language.

As the child's parent (or legal guardian) what are *your* primary concerns regarding your child's speech and language development?

Please note any complications in the birth and/or early infancy of your child.

Have you had any concerns around your child's feeding – in infancy and/or as a toddler? If so, please describe.

Have you or other professionals had concerns about your child's physical development (e.g. toileting or reaching motor milestones such as crawling and walking)? If so, please describe.

Has your child had any illnesses and accidents that may have impacted on his/her speech and language development? If so, please describe.

Please give a brief description the social environment/s your child spends most time in.

Please describe your child's interests, attention span and play skills.

Appendix 3

Target Word Lists

Participant One
Build
Climb
Cut
Eat
Kick
Paint
Pull
Push
Sleep
Wash

Participant Two
Build
Climb
Cut
Draw
Dry
Fall
Hide
Pull
Throw
Wash

Participant
Three
Build
Climb
Cut
Drink
Eat
Mix
Open
Paint
Push
Wash

Participant
Four
Build
Draw
Drive
Eat
Fall
Jump
Mix
Pour
Pull
Throw

Appendix 4

Procedures of Intervention – Adapted from Gillon, Moran & Page (2007).

Structured Teaching

A five-minute period of structured teaching took place at the beginning of each session. Pictures representing the target words were shown to the child, and the child was asked to describe them, e.g. “what’s happening here?” Responses using the target word were reinforced (e.g. “that’s right, the boy is *eating*”). If the child did not respond using the target word, models of the target word were given (e.g. “The boy is kicking. He’s kicking the ball. What a big kick!”).

Structured Teaching in Storybook Reading

A ten-minute period of story-book reading followed the structured teaching. Storybooks that used the target words were chosen. The therapist highlighted target words by using intonation/stress and using repetitions of the target words. The therapist made comments and asked the participant questions throughout the story to ensure an interactive experience. The child was expected to attend to the task but was not required to use the target words.

Focussed Stimulation Play

Toys were chosen by the therapist to allow for natural opportunities for use of target words. The SLT gave frequent and highly concentrated models of the target words and manipulated the social and linguistic environment to create opportunities for the participants to use the target words(Fey, 1986). This included creating situations where target words were obligatory responses; however elicited imitation was not used. The SLT used grammatically-correct sentences throughout intervention, resulting in target words being modelled in a variety of tenses.

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