



# Simplified and expanded input in a focused stimulation program for a child with expressive language delay (ELD)

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## Abstract

There is considerable debate regarding the simplification of adults' language when talking to young children with expressive language delays (ELD). While simplified input, also called telegraphic speech, is used by many parents and clinicians working with young children, its use has been discouraged in much of the clinical literature. In addition to the grammatical complexity of the input, the vocabulary presented to children with ELD must be carefully considered. A growing literature has documented the power of focused stimulation, where children hear a limited number of target words presented repeatedly. After a critical review of the language input and focused stimulation literatures, the performance of a child with ELD who completed two types of focused stimulation was reported; the child completed focused stimulation in a simplified condition where the clinician produced target words in 1–2-word phrases and in an expanded condition where the clinician produced target words in naturalistic speech. While the child mastered new vocabulary in both conditions, he acquired slightly more words in the simplified input condition. The child produced more total expressive language in the expanded input condition, revealing that modifications to examiner input also impacted the child's pragmatic language use. Clinical implications and future research directions are discussed.

## Keywords

clinician input, focused stimulation, telegraphic speech, expressive language delay

## I Introduction

Children with expressive language delays (ELD) are identified on the basis of restricted expressive language in the absence of other developmental delays. These children have an expressive vocabulary

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of less than 50 words with limited multiword combinations at two years of age (Rescorla et al., 2000). Prevalence is estimated to be approximately 10–15% of all children between the ages of 2;0 and 2;7 (Rescorla, 1989; Zubrick et al., 2007). A child with ELD presents parents, pediatricians, early childhood professionals, and speech–language pathologists with a dilemma as to whether or not to provide clinical services. On the one hand, longitudinal studies of children with ELD have identified that the majority of these children caught up and, as a group, performed within normal limits on language tests when evaluated as young school-age children (Paul et al., 1997; Rescorla, 2002; Rice et al., 2008). On the other hand, many of these children still perform significantly below their peers with histories of normal language development (Rescorla, 2002; Rice et al., 2008) despite performance within normal limits based on national norms. Differences in outcomes have led to confusion and conflicting opinions on when to treat children with ELD. Some recommend a ‘wait and see’ approach where no therapy is implemented unless children continue to have persistent delays (Whitehurst and Fischel, 1994). Others recommend a ‘watch and see’ approach that withholds immediate treatment, but more aggressively monitors children’s progress (Paul, 1996, 2000). Finally, some recommend starting intervention without substantial delay (e.g. Ellis Weismer, 2000; Girolametto et al., 2006, 2007).

While the timing for starting early language therapies for children with ELD varies, some clinicians initiate treatment immediately and those children with ELD who are monitored and continue to have language difficulties will eventually be enrolled in therapy as well. At that point, the focus switches from whether to treat to how to treat children with ELD, which is also highly contested and will be the focus of this article.

## **II Support for use of simplified language when talking to children with ELD**

One commonly used intervention approach when working with children with ELD is for adults to simplify their own language when speaking to the child. Simplified language, also called telegraphic speech or child-directed speech, naturally occurs when adults interact with young children. When using telegraphic speech, adults shorten their utterances by using simpler syntax, limited vocabulary, excluding function words, and producing only the core content words (Snow, 1977; Snow and Ferguson, 1977; Gleitman et al., 1984; Tiegerman and Siperstein, 1984; Conti-Ramsden, 1985).

Several lines of research have documented that children producing their first words learn new words more effectively if they hear them in isolation with no grammatical context, demonstrating that simplified language may benefit these early language learners (Ninio, 1993; Brent and Siskind, 2001; Plunkett, 2005). For example, in their study of children 9 to 15 months of age, Brent and Siskind identified that the majority of the first 30–50 words a child produces are from input consisting of isolated words. Ninio (1993) documented that typically developing children’s first words do not need syntactic frames to be learned, but rather the social aspect of language use and labeling is responsible for early word learning. Plunkett (2005) documented that children 17 months of age recognized novel words more effectively when they were presented in isolation. Together, these studies provide evidence that young children are better at learning new words when they do not have to identify the target word within a sentence frame.

While there is limited research in the role of telegraphic speech for children with language delays, it is reasonable that the use of telegraphic speech may assist children with ELD given the processes observed in typically developing children. The literature showing the benefits of simplified input in typically developing children may generalize to children with ELD, as both groups are at the same expressive language developmental level; because children with ELD have severely restricted vocabularies and are just learning their first words, their expressive language developmental level is

more like a one-year-old than a two-year-old. Furthermore, there is evidence that children with ELD may have processing limitations (Ellis Weismer and Evans, 2002; Ellis Weismer, 2007). By excluding the extraneous words and providing greater focus on the target words, children with ELD may be able to devote more processing resources to identifying and mastering the core content words that are currently not in their lexicons.

Many clinicians working with young children have used simplified language when working with children with ELD. Perhaps the most well-known treatment approach embracing telegraphic speech is the Hanen Program, which is a program that trains parents to use simplified speech similar to the child's developmental level (Girolametto and Weitzman, 2006). Efficacy research has revealed that the Hanen program was successful in modifying the way that parents talk to their children, although it did not facilitate significant gains in young children's expressive language skills (Tannock et al., 1992).

### **III Potential limitations of simplified speech**

The benefit of hearing words in isolation has not been a conclusive finding in the developmental literature. Aslin et al. (1996) demonstrated that the linguistic context had a modest impact on children's word learning abilities, while additional studies have identified that having a target word presented in a sentence assists word learning for some children (Hoff and Naigles, 2002; Fernald and Hurtado, 2006). Hoff and Naigles reported that by age 2;0, children use their language experience to build their productive vocabulary, learning a greater number of words when they are presented in sentence frames. Fernald and Hurtado (2006) also found that 18-month-old children responded more quickly and accurately to target words presented in sentence frames than in isolation and concluded that context facilitates word recognition by enabling the child to listen ahead for the target word more efficiently.

Given the benefits of hearing words in context, the use of telegraphic speech when working with children with language impairment has received criticism in the clinical literature. Fey et al. (2003) recommended that use of telegraphic speech should be avoided when working with children with language impairment and that clinicians should provide grammatical models in well-formed phrases and sentences. They cautioned against the use of telegraphic speech, suggesting that it may limit the potential for language learning for children with comprehension abilities that exceed their expressive abilities. They reported that in telegraphic speech, weak syllables are associated with content words only making it more difficult for children with language impairments to learn weakly stressed function words. Bedore and Leonard (1995) also cautioned against the use of telegraphic speech given the benefits of syntactic bootstrapping when learning new language forms.

It is also reasonable that presentation of target words using more adult-like language may better assist children with ELD than presentation in telegraphic speech for children with ELD. Most of the studies that have documented the benefit of hearing words in sentence frames have studied children with more advanced expressive language skills than most children with ELD (e.g. Hoff and Naigles, 2002; Fernald and Hurtado, 2006). However, the children in these studies and children with ELD have relatively comparable receptive language skills. That is, children with ELD, by definition, have stronger receptive language skills than expressive language skills. Thus, children with ELD may be able to draw on their receptive language to assist with the acquisition of new vocabulary by using semantic relations and syntactic bootstrapping to assist with the acquisition of new vocabulary.

### **IV Choice of vocabulary during early language therapies**

While most of the debate surrounding intervention practices for young children has focused on whether or not to use telegraphic speech, there is another essential consideration when selecting

appropriate interventions: choice of vocabulary. One of the characteristics of telegraphic speech is that adults use limited and developmentally appropriate vocabulary. Simplifying vocabulary is also a characteristic of many early language therapies, including the Hanen program (Girolametto and Weitzman, 2006). However, use of developmentally appropriate vocabulary alone is not sufficient for stimulating the expressive language skills of children with ELD (Tannock et al., 1992). Rather, several lines of research have demonstrated that children with ELD make greater expressive language gains when completing focused stimulation, a therapy approach that limits the number of key vocabulary words that a child hears so that he or she can focus on the regularities of the limited word set (for a review, see Ellis Weismer and Robertson, 2006). The focused stimulation approach uses frequent and highly concentrated presentations of target words that have been preselected prior to treatment. An adult structures the environment so that the child has multiple opportunities to hear exemplars of the target words. The child is provided with selected language targets but is not required to respond. This approach has been observed to be effective in increasing vocabulary and grammar of children with ELD (Ellis Weismer et al., 1993; Girolametto et al., 1996; 1997; Ellis Weismer and Robertson, 2006).

While the use of telegraphic speech in the general Hanen program did not facilitate expressive language gains in children with language delays (Tannock et al., 1992), linguistic gains in the participants' vocabulary and syntax were documented when a focused stimulation element was added to the general language stimulation program (Girolametto et al., 1996). Incorporating this focused stimulation element resulted in an increase in productive vocabulary when the number of word types (number of different words) was reduced and the number of tokens (total number of words) was increased, resulting in an increase in the number of exposures to a limited set of target words. In addition to vocabulary gains, the children with language delays used more multiword combinations and early developing morphemes (Girolametto et al., 1996). Ellis Weismer et al. (1993) used two interactive focused stimulation approaches to increase vocabulary for children with ELD. When words were taught during both modeling and modeling-plus-evoked production treatments, children with ELD increased their vocabulary production. While each child responded differently to the treatment conditions, overall vocabulary increased for two of the three children studied.

Although there have been clear facilitative effects of focused stimulation on word learning in children with ELD, there continues to be limited evidence regarding the effect of clinician utterance length and complexity on early language interventions. Clinicians naturally simplify their input when using focused stimulation, but there are no data supporting either the use of simplified, telegraphic input or more natural input that attaches the relevant grammatical forms along with the target words. Some data suggest that presenting words in isolation should facilitate the acquisition of new expressive vocabulary for children with ELD (e.g. Brent and Siskind, 2001). Alternatively, additional data imply that hearing target words presented with linguistic context may assist in lexical acquisition of children with ELD, particularly if these children can draw on their relatively strong receptive language skills to assist with bootstrapping the meaning of the new words (e.g. Hoff and Naigles, 2002).

The use of simplified language may also impact the pragmatics of the discourse between adults and children with ELD. When using simplified language, adults produce fewer total words and reduce their overall expressive language use. Furthermore, much of the prosodic information associated with naturalistic speech is lost when using simplified language. Altering the pragmatics of adult-child discourse could be particularly problematic for children with ELD, as several studies have identified that children with ELD use less expressive language than their peers. Compared to their typically developing peers, children with ELD have been observed to initiate conversations less often (Paul and Shiffer, 1991; Rescorla and Merrin, 1998), ask fewer questions and answer

questions less often (Rescorla et al., 2000), and communicate with less assertiveness (e.g. do not request assistance, do not suggest changing activities) and responsiveness (e.g. do not provide labels when asked, do not take two or more turns; Bonifacio et al., 2007). Thus, when evaluating the effects of simplified vs. naturalistic language input for children with ELD, the associated effects on children's pragmatic language use should also be considered.

To explore the effects of grammatical complexity of clinician input for children with ELD, a young child experiencing expressive language difficulties was recruited to complete two versions of a focused stimulation program. The child first completed a focused stimulation therapy program with the target words presented with simplified input, where the target word was presented in non-grammatical utterances. He then completed additional focused stimulation sessions with the target words presented in an expanded naturalistic condition, where the clinician presented the target words in carrier phrases containing syntactic and grammatical words to serve as cues. By completing the therapy across these two conditions, the researchers were able to observe the child's relative expressive vocabulary gains when the grammatical complexity of input was decreased, allowing target words to be produced in more simplified context, or when the treatment was provided using an expanded linguistic context. In addition to documenting changes in the child's expressive vocabulary, the different treatment conditions had a substantial effect on the amount of language that he was using during the sessions.

## **V Focused stimulation using simplified and expanded Input: The case of Carl**

Carl was a 25-month old African American child who was referred to the East Carolina Speech, Language, and Hearing clinic for concerns regarding his expressive language skills. To confirm that Carl was in fact a child with ELD, his mother completed the MacArthur-Bates Communication Development Inventory: Words and Sentences (CDI; Fenson et al., 1993), which is a valid and sensitive measure for identification of children with ELD (Heilmann et al., 2005). As reported on the CDI, Carl produced 20 words, putting his expressive language skills in the fifth percentile based on age and gender norms. Prior to beginning the treatment, Carl completed a 15-minute conversational language sample (described below) and the receptive language subtest of the Preschool Language Scale-4 (PLS-4; Zimmerman et al., 2002). Carl produced 38 different words and had an MLU of 1.4. He had a standard score of 94 on the receptive section of the PLS-4. Together, this testing confirmed that Carl had significantly delayed expressive language skills, while his receptive language skills were within normal limits.

Carl was enrolled in a 16 session focused stimulation program. During each treatment session, the clinician provided focused stimulation on a set of 10 developmentally appropriate target words. The target words were:

- not reported as being produced on the CDI;
- object nouns that could be used during play;
- in his phonological repertoire; and
- comprehended by Carl.

During the focused stimulation sessions, Carl was encouraged to play with the target toys while the clinician followed his lead. When he was engaged with one of the target objects, the clinician clearly produced the name of the object so that the child could have the opportunity to map the word with its referent. Each target word was produced between five and seven times per session

(protocol was adapted from Girolametto et al., 1996). Each session also was video-recorded and audio-recorded so that the session could be reviewed to ensure treatment fidelity.

To document the effect of clinician utterance length on the child's language learning, the target words in the focused stimulation sessions were presented in two separate types of carrier phrases. The first half of the focused stimulation sessions were completed in a simplified input condition, in which the target words were presented in utterances consisting of no more than three words. The simplified utterances contained only the target word and social words that had no grammatical relationship to the target words (e.g. 'Look, *ball!*'; 'Yes, look *ball!*'). The second half of the focused stimulation sessions were completed in the expanded input condition, where the clinician produced the target words in utterances containing a minimum of four words that had grammatical information presented along with the target word. The grammatical structures employed were article + noun + *is* + verb-*ing* (e.g. 'The *ball* is bouncing') and article + noun + *is* + adjective ('The *ball* is blue'). Carl completed treatment in the simplified input condition for the first eight sessions and then the expanded input condition for the second eight sessions.

To contrast the effects of the two treatment conditions, two separate word lists were generated. In each treatment condition, half of the words were targeted and the other half of the words served as controls. Ten target words were used for the simplified condition (sessions 1–8) along with 10 control words. The 10 control words from the simplified condition were used as target words for the expanded condition (sessions 9–16) while the previous 10 target words were used as control words. At the end of each session, the clinician held up each of the 20 objects one at a time and cued Carl to name the object. To ensure that Carl was capable of completing the naming task, he was required to reliably name several known words as reported by the parents on the CDI during pre-treatment testing. All of the words were probed at the end of each session to document whether word learning was due to the intervention (acquisition of targets only) or if he was experiencing general language growth (acquisition of control words as well). When Carl changed to the second treatment condition, the control words from condition one were utilized as target words in the second treatment condition. Carl did, on occasion, use the target words spontaneously during the treatment sessions. However, the majority of the spontaneous productions were direct imitations of the clinician's utterances. Therefore, the production probes were used as a more stringent criterion of ability to produce the target vocabulary.

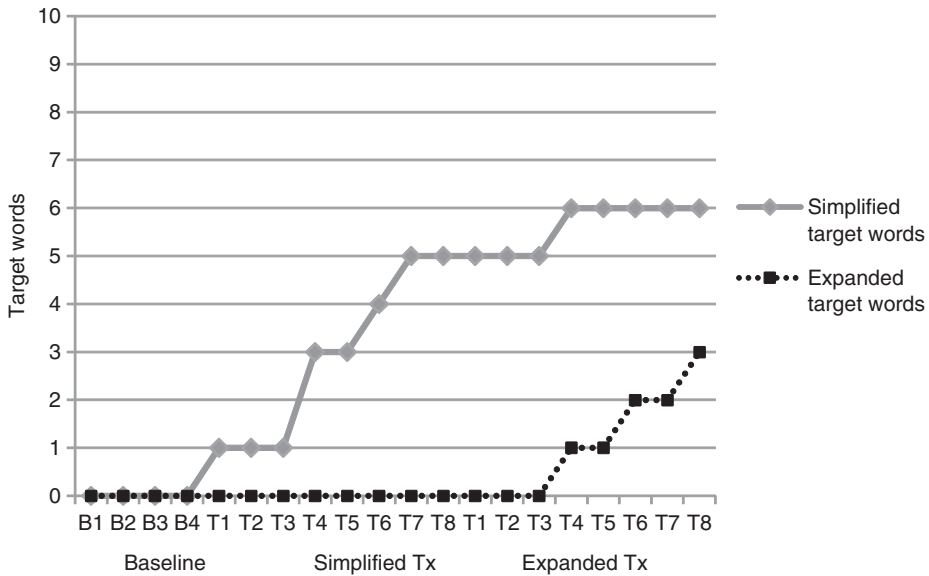
## 1 Treatment fidelity

The clinician tallied the number of times that target words were presented during each session in real time. The clinician produced each target word an average of six times per session. The clinician's language use was recorded for six sessions to confirm that she was adhering to the study's protocol. Her mean length of utterance in words was 1.6 in the simplified condition and 4.3 in the expanded condition, demonstrating that she was using one to two word combinations in the simplified input condition and longer phrases (i.e. > 4 word utterances) in the expanded input condition.

## 2 Carl's response to the intervention

Carl was eager to begin the treatment sessions and interacted well with the clinician. Figure 1 summarizes Carl's performance on the production probe task. When he successfully named a target or control word during the production probe, it was considered mastered and excluded from further analysis. Thus, the line graphs in Figure 1 document the cumulative mastery of target and control





**Figure 1** Carl's mastery of target words in simplified vs. expanded conditions

words over the eight weeks of intervention. Target words continued to be used by the clinician throughout the treatment sessions even if production was considered mastered. Prior to initiating the treatment, Carl completed four baseline sessions in which the clinician interacted with him and the target toys without saying any of the target words; he did not demonstrate mastery of any of the target words during the baseline sessions. He produced five new target words during the simplified input condition and no control words. After switching to the expanded condition, he produced three new target words and one new control word.

While Carl acquired new words across both conditions, he produced slightly more target words in the simplified input condition when compared to the expanded condition. Because none of the respective target words had been mastered before each new treatment condition, the researchers could clearly document his language learning in each treatment condition. Upon comparing his response to the two treatment conditions, it appears that the simplified treatment condition had a slight advantage in facilitating acquisition of new expressive vocabulary.

### 3 Carl's language use during the treatment sessions

While learning new vocabulary is one of the key outcomes of interest for children with ELD, an additional goal was to document the amount of language produced by Carl in the simplified vs. expanded input condition. To explore differences in Carl's language use across the conditions, a series of language samples were collected and analysed. Prior to beginning the treatment, a 15-minute play-based language sample was collected from Carl. The clinician collected a play-based language sample and attempted to elicit substantial expressive language by asking open-ended questions, modeling productions associated with the play, and allowing sufficient time for him to respond, as outlined in Miller (1981). The toys used during the language samples included the target objects used in the treatment session as well as an additional 20 developmentally appropriate

objects, including animals, foods, and kitchen items. While the clinician used naturalistic speech during the language samples, she did not use any of the target words. Six additional 10-minute language samples were collected during the treatment sessions; three samples were collected during the simplified treatment (sessions 1, 3 and 5) and three samples were collected during the expanded treatment condition (sessions 9, 11 and 13).

All language samples were initially transcribed by the first author using the systematic analysis of language transcripts (SALT; Miller and Iglesias, 2008). The transcriber followed the language sample conventions described in the SALT training manual. Carl had limited intelligibility during portions of his language samples, which was not surprising given his expressive language delay; many children with ELD have delayed phonological skills (Paul and Jennings, 1992; Rescorla and Ratner, 1996) and thus can have limited intelligibility. The transcriber had the opportunity to listen to each utterance up to three times to identify what the child had said. If the transcriber was unable to comprehend the word(s) the Carl used, a code was inserted into the transcript to document that the child produced a word that was unintelligible. To document the accuracy of the transcription, a certified and licensed speech–language pathologist with expertise in language development independently transcribed three of the language samples to determine percentage of agreement. Inter-rater agreement was 86% at the word level. Most of the discrepancies occurred when trying to determine unintelligible words and phrases.

Several measures were generated from the first 10 minutes of the baseline sample and the first 10 minutes of the six selected treatment sessions. Three measures that documented the amount of talking Carl produced were analysed. Number of total intelligible words (NTW) documented the words that could successfully be understood by the transcriber. All unintelligible words were excluded when generating NTW values in these transcripts. Total productive words (TPW) documented all words (both intelligible and unintelligible) that Carl produced during the sample. Analysing TPW allowed compensation for any intelligibility deficits and may provide a more accurate estimate of Carl's total amount of talking. Between-utterance pauses (BUP) summarized the total pause time that occurred between the clinician and the child, as well as pauses that occurred between Carl's successive utterances. When there was a pause of 3 seconds or greater between utterances, the total length of the pause was timed and coded. The BUP measure provided a summary of the total amount time where no expressive language was used.

Measures from the baseline language sample, three simplified treatment samples, and three expanded treatment samples are summarized in Table 1. It is notable that Carl was the most verbal during the baseline session. These data demonstrate that the language elicitation procedures from Miller (1981) were generally more effective than focused stimulation for eliciting expressive language from this child with ELD. These data also demonstrate that a substantial warm up period was not needed for Carl to feel comfortable with the clinician and perform in the therapy environment. Carl had attended day-care prior to his enrollment in the treatment program and was very comfortable interacting with the clinician from the first session. If a more dramatic increase in productivity were observed throughout the program, the differences across conditions may have simply been attributed to a warm up effect. While this cannot be ruled out, the language sample data and our clinical impressions demonstrated that there was no striking warm up effect.

Within the two types of focused stimulation, NTW and TPW were higher in the expanded input conditions. These data show that Carl produced more words and was talking more during the expanded condition. Furthermore, there BUP values were substantially lower in the expanded condition when compared to the simplified condition. There were fewer and shorter pauses in the expanded condition because there was more talking taking place.



**Table 1** Carl's expressive language use over the course of his treatment program

	Number of total intelligible words	Total productive words	Between-utterance pauses (minutes)
Baseline	85	107	1.2
<i>Simplified:</i>			
Session 1	33	51	3.9
Session 3	21	61	4.6
Session 5	35	58	4.9
<i>Expanded:</i>			
Session 9	38	68	1.8
Session 11	46	78	1.3
Session 13	44	115	1.0

Note: Total productive words included both intelligible and unintelligible words. Between-utterance pauses were calculated by summing all pauses  $\geq 3$  seconds that occurred between utterances for the entire 10-minute transcript.

## VI Discussion

Upon completing two versions of a focused stimulation program, a young child with ELD made substantial expressive language gains over the period of 16 treatment sessions. The expressive language gains across the entire intervention program was not surprising given the numerous previous studies that have documented the effectiveness of focused stimulation for children with ELD (see Ellis Weismer and Robertson, 2006). In addition to contrasting mastery of new vocabulary during two different conditions, changes in language use across the conditions could be observed. Because this was a single case study, interpretation of the results does not provide closure on the telegraphic speech debate. However, there was an interesting pattern of results that may be relevant to clinicians working with children who have ELD and may help to guide further research.

The first major finding of this study was that new vocabulary was mastered during the focused stimulation program regardless of the type of utterances that the clinician was using. While there was a slight preference for the simplified condition, Carl demonstrated mastery of new words in both conditions. Because he learned a few more words in the simplified condition compared to the expanded condition, his word learning may have been facilitated by the reduced processing constraints associated with the simplified production. However, he continued to demonstrate success in the focused stimulation program when words were presented in the expanded condition. While he did not learn as many words as he did in the simplified condition, he still mastered three new target words in the span of eight sessions. Because he did not learn more words in the expanded condition than the simplified condition, the data suggest that contextual cues did not facilitate greater growth in the productive vocabulary for Carl. The literature demonstrating the benefits of hearing words in context (e.g. Hoff and Naigles, 2002) would have predicted that he would have benefited from the expanded input, as his receptive language skills were within normal limits. However, he benefited from the focused stimulation program in both the simplified and expanded input conditions. These results demonstrated that presenting a limited set of target vocabulary words (i.e. focused stimulation) may have more of an influence on learning new vocabulary than manipulating the types of sentence frames that the words are presented in.

While there were relatively modest differences in new words mastered across conditions, there were more striking differences in the amount of language that Carl was using across the two conditions. In the expanded condition, he used more words and had less total pause time than in the simplified

condition. By being able to talk more, Carl was able to demonstrate more developmentally appropriate pragmatic skills when participating in the expanded input treatment sessions. Furthermore, because he was producing greater amounts of language, the clinician would have had more opportunities to provide additional language stimulation. In this particular study, the clinician was consistent in adhering to the protocol and did not provide any additional stimulation. However, if expanded input does elicit a greater amount of language from a child with ELD, the clinician would have more opportunities to recast and expand on the child's utterances, which is a highly effective technique for stimulating additional language growth in young children (e.g. Proctor-Williams et al., 2001; Camarata et al., 2009).

Although the overall effects of clinician utterance length on language learning in children with ELD requires further study, the present investigation does provide an opportunity for discussing issues surrounding early language therapies. Two separate literatures have influenced the way that practitioners interact with children with ELD. Clinicians have altered the complexity with which they talk to their clients (i.e. telegraphic speech literature) and have also carefully considered the most appropriate lexical targets to incorporate into early language therapies (i.e. focused stimulation literature). While these literatures have been influential on their own, practitioners and researchers should consider both aspects of input when working with young children.

For Carl, the complexity of the input seemed to be less important than focusing on a limited set of target words when examining his mastery of new vocabulary items. While simplified vs. expanded input did not appear to have a dramatic effect on his target word learning, it did have a noticeable effect on his discourse skills during the treatment sessions. This pattern of results is a reminder to clinicians for the need to consider both competence-based outcomes (e.g. vocabulary knowledge) as well as performance-based outcomes (e.g. discourse/pragmatics) during comprehensive treatment of young children experiencing language difficulties.

The issues raised in this article and pattern of results in this case study also motivate additional research studying the efficacy of early language intervention programs. The only way the relative effects of the complexity of adult input can be clarified is through the completion of rigorous, well-controlled experimental examination of children's response to different types of intervention. Future studies should consider the effect of both grammatical and lexical factors when comparing different types of input for young children with delays. In addition, examination of different populations, such as children with both expressive and receptive language delays, will provide a better understanding of the mechanisms of early language development and informed specific recommendations for the children served.

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