Issues in Research on Children With Early Language Delay

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The role of evidence-based practice is becoming increasingly important. Understanding current research findings and clarifying research issues have become critical in helping speech-language pathologists (SLPs) to make important clinical decisions. In light of the urgent need to identify preschool children who are at risk for academic difficulties, and to achieve effective treatment for children with language impairments, research on early language delay tackles important and timely, yet complex, topics. A large body of literature reflecting the findings of this research has been created over the past two decades.

The purpose of the current article is to provide a synopsis of the literature that has been generated on early language delay in the past 15 years and to highlight the consistencies and inconsistencies in the literature in the following areas: (a) characteristics of children who are slow to talk, (b) terminology, (c) definitions and inclusion criteria, (d) issues of spontaneous recovery, and (e) effectiveness of intervention. The current review is restricted in scope and temporally to exclude the earlier studies of the 1980s, which were mostly epidemiological (for review of the prevalence studies, see Law, Boyle, Harris, Harkness, & Nye, 2000). We have also chosen not to include studies on the validation of assessment instruments, studies on children whose language delay continued after reaching the age of 4 years (with the exception of follow-up publications to the key studies), studies on phonological characteristics, and studies connecting early language deficits to further reading problems.

The information reviewed in this article is organized chronologically, where possible. The Appendix includes the studies that were reviewed for this article. The review begins with the “classic” studies of the early 1990s, which provided the basis for subsequent research in outlining inclusion criteria and determining definitions and most of the measures and methodology used in the field. These studies have also generated quite extensive, albeit somewhat mixed, findings on the statistics and predictors of spontaneous recovery. The information on the conversational patterns of children with language delay and their...
parents has also been provided in part by some of the studies of the 1990s. The intervention studies began mainly in the mid-1990s. Some authors of the more recent studies have approached all of these issues as well, although the authors of the “classic” studies of the 1990s are now focusing on determining academic outcomes for children who had early language delay when they were younger, because their participants have now grown up and are enrolled in school.

**CHARACTERISTICS OF CHILDREN WITH EARLY LANGUAGE DELAY**

“Late-talking” toddlers began to receive the attention of child language researchers in the mid-1970s and early 1980s. It is estimated that 10% to 15% of 2-year-olds acquire new words more slowly and start to combine words into phrases later than their typically developing peers, showing obvious delays in language in contrast to seemingly typical development of sensory and cognitive systems (Law et al., 2000). In addition, these late-talking children normally show gross and fine motor and self-help skills comparable to peers, and the perception of their affect and mood by their parents is similar to that of parents of typically developing children (Paul, Spangle-Looney, & Dahm, 1991). According to Thal and Tobias (1992), such children may use the same or a higher frequency of gestures than do typically developing children to compensate for their limited verbal abilities.

The acquisition of receptive vocabulary of most, although not all, late talkers is often comparable to that of normally functioning children, in contrast to remarkably slower rates of acquisition of expressive vocabulary. These children produce only a few words at a time, whereas their peers say hundreds of words and combine them into phrases (Whitehurst, Fischel, et al., 1991). By age 2, the expressive vocabulary size of late talkers is often in the range of 20 words, whereas their typically developing peers normally have expressive lexicons of approximately 200 words (Paul, 1996). Thus, the overall profile of late talkers’ language skills does not resemble that of the typically developing child (Paul, 2001) and is generally believed to be delayed rather than disordered (Leonard, 1989; Miller, 1991).

The syntactic difficulties of late talkers are first manifested by their limited ability to produce two-word combinations at age 2 (Paul, 1996; Rescorla, 1989; Rescorla, Roberts, & Dahlsgaard, 1997). As these children grow older, many of them continue to manifest problems with the grammaticality of their utterances that may have an inappropriate semantic focus but lack elaboration using appropriate grammatical morphemes (Rescorla & Schwartz, 1990).

Even in the absence of other significant cognitive, motor, sensory, or socioemotional disabilities, an early delay in language development that is left untreated until school age may put a child at a very substantial risk for long-term language, academic, and social difficulties (Paul, 2000; Rescorla, 2002; Thal & Katich, 1996). Such young children are at risk for persisting language problems and learning disabilities as well as emotional and behavioral disorders (Rescorla et al., 1997).

**TERMINOLOGY**

Despite the apparent wealth of literature in the field of early language delay, research on this topic has been conducted mainly by only a few groups of researchers, each working with their own group of children who were originally recruited mostly in the late 1980s and early 1990s and were followed up over the years. The Appendix provides definitions and inclusion criteria, as well as the research focus, of these groups. The studies of each group are organized chronologically starting with the earliest.

Most of these researchers have introduced their own terminology to refer to children with early language delay. These various terms appear quite similar yet are used to refer to groups of children who were recruited using somewhat different inclusion criteria: specific expressive language delay, specific expressive language impairment, delayed expressive language, early expressive delay, slow expressive language acquisition (development), late-developing language, developmental expressive language disorder, delayed onset of lexical skills, and delayed onset of expressive oral vocabulary. Almost every researcher that has proposed his or her own term also has used the term “late talker” synonymously with their term (as in, e.g., Paul’s work); some have used this term exclusively (e.g., Girolametto). Third, although acronyms are often used, it is important to note that the same acronym may stand for different terms. For example, SELD represents “specific expressive language delay” for Rescorla and her colleagues and “slow expressive language development” for Paul and her team.

In this article, we will use the term late talkers in its broadest sense to include children under the age of 3 who have been identified with language delay manifested primarily but not exclusively in the expressive domain.

**INCLUSION CRITERIA**

It is difficult to diagnose a child with a language delay before the age of 24 months because of high variability in the rate of vocabulary acquisition at early ages (Dale, Price, Bishop, & Plomin, 2003; Rescorla, 1989). Whitehurst and colleagues (Whitehurst, Fischel, et al., 1991) proposed that 24 months is the minimum age at which such a diagnosis becomes possible, because at that age, the gap between children’s receptive and expressive abilities becomes apparent. The authors contend that another reason for the validity of this age for diagnosis is that parents rarely begin to express concerns about their children’s language at earlier ages. Therefore, most of the research in the field of early language delay studied children who were between 1;6 (years;months) and 3;6 in age.

The researcher groups included in the Appendix worked with essentially the same population of late-talking children,
having the characteristics described in the first section of this article. However, the inclusion criteria of some authors were broader than others. The population must be defined by exclusion; that is, by the absence of other mental, sensory, or emotional problems in contrast to the presence of language problems. Nonverbal intelligence measures have been used quite consistently. However, the language component of the definition has not been used with the same degree of consistency. This has led in part to existing differences in inclusion criteria, language outcomes, and, consequently, variation in the reported statistics of prevalence and recovery, all of which are discussed below.

The first and main difference in the use of language criteria in defining late talkers is including children who presented with delays in both receptive and expressive language in contrast to children with expressive delay only. It is noteworthy that in many studies in the field, the groups that were referred to as “children with specific expressive language delay” included children with both types of language delays. Moreover, children with either or both types of delay constituted one group, the average outcomes of which were compared with those of typically developing children.

A second difference is in defining the expressive delay. There are two primary methods used to assess language and vocabulary development, and, consequently, two types of inclusion criteria in order for a child to be diagnosed with expressive language delay. These methods differ in stringency. The first method is based on standardized tests, several of which have been used in the field. In the early 1990s, the Peabody Picture Vocabulary Test—Revised (Dunn & Dunn, 1981) was used by Whitehurst and colleagues. Rescorla used the Reynell Expressive Language Scale (Reynell, 1977) in most of her studies, in addition to the Expressive One-Word Picture Vocabulary Test (Gardner, 1981) in Rescorla et al. (1997). The Preschool Language Scale (Zimmerman, Steiner, & Pond, 2002) was used by Robertson and Weismer (1999). A child was deemed to have expressive language deficits if the child scored below the 10th percentile on any of these tests.

The second method used to assess language and vocabulary development relies on parent report instruments. Although some groups of researchers used the MacArthur Communicative Development Inventories (MCDI; Fenson et al., 1993) as a measure of vocabulary development (e.g., Dale group, Ellis Weismer group, Girolametto group), the Language Development Survey (LDS), developed by Rescorla (1989), was used by Rescorla and Paul. The LDS has been reported to have good concurrent validity with expressive measures on the Reynell Expressive Language Scale (Reynell, 1977) and is proposed to be a reliable, sensitive, and specific indicator of language delay (Paul & Shiffer, 1991; Paul et al., 1991).

Unlike the administered tests listed above, parent reports use varying methods to determine expressive delays. Based on the norms of the MCDI (Fenson et al., 1993), a score below the 10th percentile has been used as an indicator of a delay. For example, Thal and Tobias (1992) defined children as having expressive language delay if their scores were in the lowest 10% of their age range (18 to 28 months) in expressive vocabulary development according to maternal report. In that study, this meant that late talkers produced fewer than 65 different words and only a few two-word combinations. Alternatively, when using the LDS (Rescorla, 1989), one can simply count the number of vocabulary items that children can produce, which may be more efficient than computing a score. Moreover, the LDS (Rescorla, 1989) has a section in which parents may write any words the child produces in addition to those listed. Rescorla and colleagues define children as having an expressive vocabulary delay if their vocabulary contains fewer than 50 words and/or they do not use two-word utterances at 24 months of age. This assessment is roughly equivalent to having scores within the 15th percentile on the MCDI (Paul, 1993; Rescorla, 1989). This means that studies by Rescorla and colleagues used a more stringent criterion than those of Ellis Weismer and colleagues’ (10th percentile) and Thal and Tobias’s (65 words). The criteria used by Rescorla and colleagues seems to be useful because it was found to yield the best results in terms of sensitivity (minimizing “false alarms” and “misses”), as described in Rescorla (1989), and because of its ease of use.

In summary, and taking into account the criteria used in a variety of research studies, to be identified as a late talker, children should have normal hearing, age-appropriate global development, and a lexicon below the 10th percentile for their chronological age (or fewer than 50 words). They should also produce few or no two-word combinations and may or may not have age-appropriate receptive language abilities. When the population of late talkers is defined according to these criteria, the reported prevalence of this language disability is 10% to 15% of all 2-year-olds (Hrncir, Goldfarb, Scarr, & McCartney, 1985; Rescorla, 1989) and 8% of all 3-year-olds (Silva, 1980).

Regardless of what are deemed to be the best criteria to define this group of children, it is important to consider the definitions given by the researchers when comparing the findings of the existing studies. For future research, it may be important to reach a consensus on what criteria should be used to define early language delay so as to facilitate the ease of comparisons across studies and to develop consistency in the identification of the disorder.

As for including children with receptive language delays, it may be important to consider the clinical significance of separating children with early language delays into subgroups according to the presence of both or only one type of a delay. More studies are needed to determine to what extent the receptive delay affects the outcomes of treatment and overall prognosis of these children. If these effects are limited, there may be no need for the subgroups and we may use the broad definition as it is has been proposed in clinical practice.

**Conversational Patterns**

In addition to the characteristics of late-talking children summarized above, it is important to consider their communicative patterns. However, less information is available in this area of research in contrast to that of the linguistic abilities of late talkers.
The research on the communicative patterns of late-talking children and their caregivers provides valuable information about the communication style of these children, which may impact the choice of language intervention approach. For example, an entirely child-centered approach, which may employ the provision of high frequencies of caregivers' responsive language strategies, may not be feasible for a child who talks very rarely and does not present enough opportunities to provide such verbal input. In addition, research on these issues examines the reality of having a child with this disability in the family, the nature of parent–child interaction that impacts on quality of life, and the amount of stress experienced by both the child and the parents.

The research on conversational patterns of late-talking children and their caregivers has not been extensive and has produced mixed results (Rescorla & Fechnay, 1996). Although it seems that the pragmatic skills of such children may be relatively better than their expressive skills due to the fact that their level of comprehension is similar to that of their peers (Paul, 2001), some studies have provided findings to support this assumption whereas others have generated evidence to the contrary.

Initiations (or expressions of communicative intention) are the discourse feature of late-talking children and their caregivers that has been studied most extensively. This is an important strategy for a child to acquire and use because it is believed to be the foundation for all expressive communication (Paul & Shiffer, 1991). Paul and Shiffer, Paul et al. (1991), and Rescorla, Bascome, Lampard, and Feeny (2001) examined initiations made by late talkers and their mothers.

Paul and Shiffer (1991) observed that late-talking children initiated joint attention primarily through nonverbal means, but not as often as their typical peers. The authors proposed that these children's less frequent expressions of communicative intent could be accounted for by a difference in their expression of joint attention. The activities of joint attention may be important for future language development because, through them, children may learn how adult speakers can share a topic and thus receive new information (Bruner, 1975). This could be a potentially important area for early intervention with late-talking children and merits further research.

However, according to Rescorla and Fechnay (1996), late talkers communicated as often as their peers. Similarly, according to Rescorla et al. (2001), late talkers and typically developing children did not differ in the number of topic initiations or in their willingness and desire to interact with others. It is important to note, however, that most of this communication took a nonverbal form, and these findings thus converge with those of Paul and Ellwood (1991), who observed a similar number of nonverbal initiation produced by late-talking and typically developing children.

Paul et al. (1991) also concluded that late-talking children and their peers were comparable on the number of initiations they produced, although the late-talking group had poorer socialization skills, which included such nonverbal items as playing social games, imitating complex motor routines in play, using household objects in play, and smiling appropriately. Finally, Rescorla et al. (2001) found that late-talking children and their peers produced a similar proportion of responses to their mothers' utterances and maintained the semantic relatedness of the responses equally. The only difference observed between the two groups of children was in the late talkers' less frequent use of questions.

Several studies have also examined the use of various discourse forms by the parents of late-talking children. The evidence in support of the similarity between caregiver–child interactions of such children and those of their peers seems to be substantial. Paul and Ellwood (1991) demonstrated that mothers of late talkers and mothers of typically developing children were similar in their use of a variety of discourse features such as declaratives, questions, commands, requests for information, comments, topic initiations, responses to the child's initiation, and topic continuations. Rescorla and Fechnay (1996) and, subsequently, Rescorla et al. (2001), who worked with a subset of children of the former study, also discovered that mothers and children in the two groups did not differ in maintaining topic synchrony.

However, Pearce, Girolametto, and Weitzman (1996) suggested that although mothers of late-talking children and mothers of their peers seem to provide similar conversational opportunities to their children, these similarities may be artifacts of face-to-face interactions in laboratory settings versus natural settings. The only study exploring the communicative environment of late talkers that was conducted in their homes is that of Whitehurst et al. (1988). Contrary to the laboratory findings, the mothers in this study were more directive and used more noncontingent labels. If more studies demonstrate similar findings, it may be important to consider optimizing parent–child interactions in designing a family-oriented intervention program. However, at present, it is not clear whether or not it is necessary to focus early interventions on the interaction features of caregivers.

Another important issue that so far has not received much attention is the question of whether or not late talkers and their caregivers demonstrate various communicative patterns depending on their home languages. The only study that examined the communicative patterns of late talkers across cultures was that of Girolametto, Wigs, Smyth, Weitzman, and Pearce (2002). This study examined cross-cultural variation in the responsiveness of English-speaking and Italian-speaking mothers of children with early language delay. The results of the study pointed to differences in discourse patterns that may be culturally based. For example, Italian mothers used more utterances, spoke more quickly, and used more diverse vocabulary than Canadian mothers, and their children mirrored this pattern. Mothers in both language groups had interactive styles with similar responsiveness with respect to using responsive labels and expansions, although the Italian mothers used fewer imitations and interpretations of their children's utterances. Clearly, more research is needed to make cross-cultural comparisons across different language groups. Any existing differences would have significant implications for clinical practice with late-talking children.
due to the increasingly multi-cultural and multilingual modern society.

Although the findings of the research summarized above are mixed, several conclusions may be made. First, late talkers’ interactive style seems to be similar to their peers in many ways, and principally in the nonverbal domain. Second, the interactive style of late talkers’ mothers may have some implications for interventions involving parents, such as, for example, to reduce the nonresponsiveness of parental speech. However, additional research is required in order to provide enough evidence to clarify these areas and to be able to draw implications for intervention with greater certainty.

### SPONTANEOUS RECOVERY

Another controversial area in the research on early language delay concerns the statistics regarding the spontaneous recovery of these children. It is known that some late-talking children will continue to experience language impairment or learning disability later in their lives (Rescorla et al., 1997), whereas others will not. Children who continue to experience problems are referred to as “children with persisting language delay” by Rescorla et al. (1997) and Rescorla et al. (2001). Children displaying a transient language delay and whose language difficulties resolve by school age are referred to as “late bloomers” (Paul & Alforde, 1993; Thal, Tobias, & Morrison, 1991). Considerable attention has been devoted to this difference because it has important implications for the issue of the necessity of early intervention, as will be discussed later in the review.

The statistics of spontaneous recovery that are provided in the literature vary as a result of differences in definitions and inclusion criteria as noted above, as well as differences in the measures used by the researchers to assess outcome data. Moreover, there is a strong view in the literature that the proportion of children who recover spontaneously also varies with age. Thus, the concerns for younger children’s disability are suggested to have less weight than those for older children. Therefore, a child who passes the age of 30 months and is still not talking engenders more concern than that accorded to a 24-month-old child with similar difficulties (Rescorla et al., 1997).

It has been established that 2-year-old late talkers may be at risk for continuing expressive language delay up to and beyond age 3 (Rescorla et al., 1997). Of 2-year-old late talkers, Rescorla and Schwartz (1990) found only 50% of children in their study to have recovered by the age of 3 years. Whitehurst et al. (1991) found 88% of children in their study to have recovered by 3;6. In Thal and Tobias (1992), 60% of 18–32-month-old children appeared to have caught up in 1 year. Dale et al. (2003) found that 44% of children in their study had persistent language delay at 3 years of age. It should be noted, however, that in the studies reporting higher rates of recovery, the sample sizes were smaller. In all of the above studies, recovery was assessed by evaluating performance on vocabulary tests.

The proportion of children who are delayed in their vocabulary acquisition appears to decrease with age. However, it should be noted that the statistics of the recovery varied depending on the language measure chosen to determine progress. In Paul (1993), 34%–40% of children were still delayed on the Developmental Sentence Score (Lee, 1974), though they had attained age-appropriate mean length of utterances (MLUs) and receptive and expressive language. Rescorla and Schwartz (1990) suggested that late talkers show their disability in delayed vocabulary acquisition in their earlier years but may reach normal levels of lexical development long before attaining age-appropriate syntactic or morphological skills. Some children’s difficulties with syntactic development may be manifested in their tendency to construct long phrases that consist of word combinations that are lacking in grammatic morphemes (Rescorla & Schwartz, 1990). Rescorla, Dahlsgaard, and Roberts (2000) stated that late-talking children improve in vocabulary acquisition in their third year of life and may attain a lexicon similar to that of their typically developing peers by age 4. As children with early language delay age, their single-word vocabulary increases, although development of syntax does not appear to progress at the same rate. These late-talking children improve their vocabulary from age 2 to 3; however, they still show grammatic delays in the preschool years. The most recent study, Dale et al. (2003), showed that 40% of 4-year-olds maintained this delay.

In a study reported by Whitehurst, Arnold, et al. (1991), 96% of late talkers recovered by age 5;6. However, other studies reported the percentage of children who continue to have persisting language delays at age 5 to be as high as one quarter to one half of all children with the diagnosis of early language delay (Leonard, 1998; Rescorla, Mirak, & Singh, 2000). It should be noted that children who continue to exhibit delays by age 5 are likely to continue to have language and learning problems for many years (Rescorla, Mirak, & Singh, 2000). Nevertheless, it appears that most children who have recovered by roughly 3 years of age will have roughly normal vocabulary skills by 5 or 6 years of age (Paul, 1996; Rescorla & Lee, 1999).

Unfortunately, then, the findings with respect to recovery of a substantial proportion of children with early language delay may not indicate that the child’s disorder has been resolved by an early age. There is evidence that these children may perform in the normal range at some point in their development, which would be taken for recovery. Nevertheless, their skills may still be generally lower than those of their peers without a history of language disorder (Paul, 2000; Rescorla, 2002; Thal & Katich, 1996). Paul (1996) found that late talkers perform normally in school on most language measures but may nevertheless have lower scores than their peers. Furthermore, by the age of 13, the reading skills of many children who have previously been diagnosed with an early language delay may fall into the lower end of the normal range while still falling significantly lower than those of their peers (Rescorla, 2002). Similarly, Law et al. (2000) reported reading problems persisting at the age of 8 years for 41%–75% of children in their study.

In summary, at present, it is not clear what should be deemed to constitute “recovery” if, as described above,
children improve in their vocabulary scores but not in other aspects of their linguistic competence. It is probable that vocabulary tests may not be the most appropriate measures to assess the development of older children with a history of language disorders such as early language delay. Two important conclusions that can be drawn from the research are that the older the children with persisting language problems are, the more attention they should be given, and second, recovery is a relative term, and children need to be monitored throughout their school-age years when initial concerns with vocabulary, phonology, and syntax may give way to concerns with literacy and overall academic performance.

**Predictors of Spontaneous Recovery**

Predictors of spontaneous recovery are one of the most controversial issues in the literature on early language delay. The predictors of spontaneous recovery that have received the most attention in the literature include the severity of the initial language impairment, the degree of impairment in gestural communication, consonant repertoire, family history, gender, age of diagnosis, and a history of presenting with otitis media (Dale et al., 2003; Kelly, 1998; Rescorla et al., 1997). The conflicting findings regarding each of these predictors are discussed below.

The first category of predictors of eventual recovery includes intake language measures. Capirci, Iverson, Pizzuto, and Volterra (1996) and Thal and Tobias (1992) suggested that the lack of sequenced gestures can predict poorer outcomes of early language delay. Thal and Tobias suggested that reduced receptive language and gesture production were both predictive of persistent language delay; however, neither vocabulary at intake nor MLU were significant predictors. Ellis Weismer, Murray-Branch, and Miller (1994) agreed that the latter two were not good predictors of outcome, but questioned the use of receptive language as a predictor because in their study, the child with the poorest outcome manifested the largest vocabulary and the best receptive language at intake. Olswang and Bain (1996) share this viewpoint.

Pharr, Bernstein Ratner, and Rescorla (2000) suggested that vocabulary at the age of 3 can be predicted by earlier vocabulary abilities, and Rescorla and Schwartz (1990) established that the magnitude of the expressive language delay rather than an absolute language level at intake was a predictor of continued language delay. That is, a child who has a vocabulary of 30 words at the age of 2 years has a higher chance of recovery than does a 3-year-old child with the same vocabulary size because relative to the expectations for the age of 3, this vocabulary size is substantially smaller. It has also been suggested that, in addition to vocabulary size, vocabulary composition may be an important predictor. For example, Rice and Bode (1993) suggested that poor outcomes are likely for children who have a small number of verbs in their receptive vocabulary. As for the consonant repertoire, a low proportion of consonants to vowels and a small consonant inventory in the children’s babble are reported to be predictors by Mirak and Rescorla (1998) and Pharr et al. (2000).

In addition, consistent with the perspective of many other researchers (Rescorla & Schwartz, 1990; Rice, Hadley, & Wexler, 1998), Bishop, Price, Dale, and Plomin (2003) and Lyytinen, Poikkeus, Laakso, Eklund, and Lyytinen (2001) suggested that a late-talking 2-year-old with no accompanying internal or environmental risk factors should not be an immediate concern for speech-language pathologist attention, but if the child has a family history of the disorder, there is a greater likelihood of persisting difficulties. Furthermore, Paul (1993) suggested that females had a lower probability of moving into the normal range in syntactic development following a diagnosis of a late talker, whereas Rescorla et al. (1997) concluded that gender was not a predictor. As for the age of diagnosis, Paul (1993) suggested that the older children are at the time of diagnosis, the less positive the prospect of recovery. This finding is supported by Rescorla and Schwartz (1990).

Another group of researchers (Cashy, 2001; Lonigan, Fischel, Whitehurst, Arnold, & Valdez-Menchaca, 1992; Shriberg, Friel-Patti, Flipsen, & Brown, 2000) hypothesized that a subgroup of late talkers may have this diagnosis subsequent to early and persistent middle ear infections, but not all researchers concur with this hypothesis (Paul et al., 1991).

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**INTERVENTION**

As a result of the lack of clear predictors of spontaneous recovery, as well as the uncertainty with respect to how different the communicative environments of late-talking children are from those of their peers, there remains considerable controversy with respect to the appropriate clinical management of late talkers (e.g., Olswang & Bain, 1996; Paul, 1996, 1997; Whitehurst & Fischel, 1994). It is still debated whether late-talking children should be provided with treatment once a possible language delay becomes apparent, and, if so, which components of their language delay should be treated, using which approaches to language intervention, and in which settings. The studies below summarize the research findings pertaining to each of these questions.

**To Intervene or Not To Intervene**

It has been generally agreed that, if a child is diagnosed with specific language impairment at the age of 4 years or older, he or she should be provided with treatment. However, an important question remains regarding what should be done with younger children.

Paul (1996) advocated for a “watch and see” approach, in which identified children’s development is monitored closely instead of direct intervention being provided. In her study, intervention was administered only if the child’s condition worsened over time. Under this approach, children were evaluated at different intervals depending on their age: every 3 to 6 months for 2-year-olds and subsequently every 6 to 12 months until the age of 5. Paul (1997) argued that clinical intervention comes at a high
cost in both financial and emotional terms, especially because, she claims, the majority of children attain age-appropriate norms by preschool age without any intervention. Similarly, Dale et al. (2003) considered it inefficient to target young children because a high proportion of them will eventually achieve normal language without treatment. Others, including van Kleeck, Gillam, and Davis (1997), advocated for early intervention because employing a watch and see approach requires predicting with certainty which children will improve spontaneously versus those for whom the language delay will persist. This may not be feasible because, as mentioned above, no concrete evidence with respect to the predictors of spontaneous recovery is currently available.

Moreover, waiting until a child is old enough to rule out the possibility of a spontaneous recovery may deprive him or her of intervention at a time when it might be the most effective (Rescorla, 1989). Unfortunately, the age when intervention is most effective has not yet been determined, and is yet another facet of the problem of when and how to intervene, and whether or not it is necessary. Furthermore, children who do recover do not necessarily attain the desired age norms in all aspects of the linguistic competence, as described above. For example, in Rescorla et al. (1997), children with no expressive speech at 2 years of age performed significantly lower than their peers up to 8 years of age in almost every area of expressive language, even though for these children, factors such as family status, receptive language, and nonverbal ability warranted no concern (Rescorla et al., 1997).

Another important argument in support of early intervention is that, even though the child’s language skills may eventually improve, in the meantime, other skills that depend on language proficiency may be delayed as a consequence. For example, skills central to literacy, such as metalinguistic and phonological awareness, depend on vocabulary knowledge, as do social skills, self-esteem, and psychosocial attitudes (Adams, 1990). These skills may be negatively affected by the watch and see approach.

Furthermore, social and language deficiencies may interact with each other because a child with low communicative abilities may be rejected by peers and may therefore have fewer opportunities to practice their language skills, as suggested by Rice (1993). Paul and Shiffer (1991) argued that late talkers’ utterances may not be sufficiently intelligible, presumably due to lack of practice, which decreases their chance of receiving parent and peer reinforcement in response to their production. A scarcity of reinforcement may in turn decrease these children’s motivation to practice, resulting in slow improvement of their speech intelligibility.

**Intervention Targets**

Researchers have proposed various domains of focus of early intervention with late-talking children. Olswang and Bain (1996) suggested targeting single words, word combinations, early grammatic morphemes, and simple syntactic constructions. They stated, however, that intervention would not cure the disorder, but rather would make the children more proficient in certain linguistic behaviors at a certain point in time. Paul et al. (1991) emphasized the need to improve socialization skills. Rescorla, Mirak, and Singh (2000) suggested that intervention involving labeling can help to initiate the acquisition of new words. Rescorla et al. (2001) suggested that, for a late-talking child, it is difficult to learn to formulate questions.

In terms of optimizing the children’s communicative environment, Whitaker et al. (1988) proposed that caregivers of late-talking children become less directive and reduce their use of noncontingent labeling. Similarly, Paul and Ellwood (1991) emphasized optimizing the children’s communicative environment through the use of expansions and imitations. Although these authors also found that the speech of late talkers and their mothers had a greater MLU gap than that of typically developing children and mothers, they did not consider this finding to merit equal clinical importance.

These findings raise the question of whether or not it is possible for the caregivers of late-talking children to alter their interactional style. It may not, in fact, be an easily achieved goal if, as suggested by Whitehurst et al. (1988), the parents’ directive interactive style is a maladaptive strategy of relying on children’s receptive rather than expressive abilities. To date, only one study has addressed this question. In Pearce et al. (1996), 16 mothers and their children with early language delay were randomly assigned to treatment and control groups. The treatment adhered to a focused stimulation approach, which will be discussed in more detail below. Pearce et al. found that, in the course of intervention, mothers could learn to use shorter, less complex utterances; repeat target words more often; and become less directive with their children. However, the mothers did not become more responsive. The authors provided two competing explanations for this finding. First, late talkers may not provide enough opportunities to increase contingent input due to the paucity of their talk. Alternately, mothers could have already reached an optimal level of responsiveness before the intervention. The objective of reducing mothers’ talkativeness was also not achieved, possibly due to the fact that the children used fewer interpretable verbal social utterances and the mothers needed to maintain a certain level of child-directed talk to continue the social exchange.

**Intervention Approaches**

Different approaches have been proposed with respect to the types of intervention to be used with late-talking toddlers, including clinical versus home based. We will first review the techniques used with late talkers in clinical settings and then turn to the extensions of these methods to other models.

**Clinical methods.** Some methods assumed to be successful in clinical settings are used frequently; however, there are no experimental studies demonstrating their efficacy. Among such techniques are milieu teaching, joint action routines, and inductive teaching (Olswang & Bain, 1996). *Milieu teaching* involves shaping behavior by arranging the setting to elicit certain communication behaviors (Hart &
Joint attention routines involve an interaction unified by a theme or goal, following a logical sequence, and in which each participant plays a role from which a certain response is expected (Snyder-McLean, Salomonson, McLean, & Sack, 1984). Finally, during inductive teaching, input is structured during meaningful interactions (Connell, 1989), which involves creating a pattern of stimuli to highlight specific linguistic features for a child.

Other approaches to language intervention in clinical settings have been documented in experimental studies. Ellis Weismer, Murray-Branch, and Miller (1993) compared the effectiveness of the techniques used in milieu teaching (modeling plus evoked production) in combination with modeling alone, as administered by clinicians, to a group of 3 children. One of 3 children participating in the study responded to the first type of treatment (that is, had overall improvements in vocabulary use and language development after intervention by 3 years of age), but another child responded better to the second type of treatment. The third child did not respond differentially to either condition. Results of the study seem to indicate that modeling and evoked production may have similar effectiveness; however, the findings are inconclusive. Thus, children may require different approaches to treatment based on their individual learning styles. However, the sample size of this study was too small to make any definite conclusions. As this study used a single-subject design, more studies are needed in order to assess the relative effectiveness of the various treatment options, employing a group design with randomized assignment of the participants to groups.

The final clinically based study to be discussed is that of Robertson and Weismer (1999). These researchers employed an interactive model of language intervention, a model that has been commonly used with children with language delay since the early 1980s (Girolametto, Weitzman, Wiigs, & Pearce, 1999). It focuses on training parents to use naturally occurring strategies that have been shown to be associated with language gains in typically developing children (Girolametto, Pearce, & Weitzman, 1996a, 1996b). There are two types of interactive language intervention: focused stimulation and general stimulation. Although both versions of the approach train parents to provide contingent responsive input to child’s talk, in focused stimulation, parents use frequent presentations of the preselected targets that have been individually chosen for each child, taking into consideration his or her phonetic and lexical repertoire (Girolametto et al., 1996b). These are economical approaches that require few centralized resources and include three main techniques: fostering joint activity around the child’s interests, promoting interactions, and language modeling (Girolametto et al., 1996a, 1996b). The use of this type of intervention may be warranted given the assumption of Paul and Shiffer (1991) that late-talking children have less of a developed drive for interaction for its own sake, preventing them from interacting for the sake of interaction and hence practicing initiating conversations.

Robertson and Weismer (1999) employed general stimulation emphasizing vocabulary development and the use of two- to three-word combinations in a social context of twenty-one 21–30-month-old late talkers. A script encouraging communicative attempts was used, which included scaffolding by adults. Children’s speech improved in complexity and verbal output in the intervention group but not in the control group. Children’s socialization scores improved as well, whereas parent stress scores decreased, even though this was not specifically targeted.

Caregiver-administered intervention. Taking into account various arguments against formally providing early intervention for late-talking toddlers, it has been proposed that the techniques described above for use by clinicians may also be adopted effectively by parents or educators as a preventative measure for toddlers who are at risk for language delays. This would increase the cost effectiveness and naturalness of early intervention. For example, Whitehurst, Fischel, et al. (1991) investigated the effectiveness of intervention derived from milieu teaching (Warren & Keiser, 1986) but implemented by parents in a home setting. The home setting for intervention was chosen because in such environments, the intervention is constant, takes advantage of the child’s natural interests, and minimizes conflicts between the goals and the child’s everyday environment. Whitehurst et al. concluded that their intervention was effective based on the finding that children increased their production of specified targets from 8% to 50% during mealtime interactions. However, Girolametto and colleagues (1996b) criticized this study for its quasi-experimental design, the lack of randomization, and the lack of a control group, and therefore suggested cautious interpretation of its findings.

The studies of Girolametto’s group have used stronger experimental design in using focused stimulation. In a pilot study (Girolametto et al., 1996a), 16 late-talking children and their mothers were randomly assigned to a treatment group and a delayed treatment group. Following the focused stimulation intervention, which was provided by the mothers in the course of 11 weeks, children in the experimental group started to use more target words and learned more symbolic play gestures, although their overall vocabulary size was not affected. In a subsequent study, Girolametto et al. (1996b) employed a similar design with some important adjustments such as recruiting 9 more children and using more stringent measures of vocabulary and language development including parent report, direct observations, and semistructured probes. This study examined mothers’ use of language modeling strategies (e.g., talkativeness, linguistic complexity, and labeling) in addition to documenting children’s outcomes. Results showed that, following treatment, the mothers’ input decreased in complexity and speed as compared to mothers’ input in the control group. Children in the experimental group used more target words in probes and in free-play interactions, had larger vocabulary sizes overall, and used more multiword utterances and early morphemes than those in the control group, which could be attributed directly to the effects of the intervention.

With respect to the question of what exactly is the component of focused stimulation that seems to have facilitatory effects on language acquisition, Girolametto et al. (1999) tested the validity of both responsivity and
structural hypotheses. According to the responsivity hypothesis, it is the semantic contingency of the input that is facilitative to language acquisition; according to the structural hypothesis, providing language models within the child’s zone of proximal development (Vygotsky, 1978) is important. The results of the study provide support for the responsivity hypothesis and, more importantly, demonstrate a direct link between children’s language gains at posttest and maternal language variables (such as imitations and expansions), which have previously been shown to be facilitative with typically developing children (Baker & Nelson, 1984). Thus, Paul and Ellwood’s (1991) initial conclusion that providing more contingent feedback may be more important than making structural changes appears to be supported.

**Long-Term Implications**

The results of the studies discussed above indicate short-term effectiveness of intervention with late-talking toddlers. However, there is not much evidence available with respect to their long-term effectiveness. A group of studies by Rescorla and Paul (see Appendix) examined the outcomes of cohorts of late talkers. However, their samples were mixed, including children who were not provided intervention in addition to children who were provided various types of intervention. The only study that explored the long-term effect of a consistent intervention model was Girolametto, Wiigs, Smyth, Weitzman, and Pearce (2001). The authors followed up the outcomes of children who were provided with the focused stimulation approach, the short-term effects of which were demonstrated in their earlier studies. In this study, parents were trained to administer preventive intervention when the children were between 2 and 3 years of age. Subsequently, direct treatment on aspects of phonology and language was provided to half of the children whose gains in these abilities continued to be slow. As indicated by standardized measures, 86% of children in the experimental group reached age-appropriate levels in expressive language and grammar. However, the children’s abilities remained weaker in teacher–child discourse, the use of pragmatic cues for anaphora resolution of ambiguous sentences, and narrative tasks. These findings are consistent with previous studies that indicated that late-talking children continue to have difficulties with higher level linguistic tasks that increase their risk for learning and academic difficulties during the early school years (Kelly, 1998; Paul, 1996; Whitehurst, Arnold, et al., 1991; Whitehurst, Fischel, et al., 1991). Girolametto and colleagues (2001) concluded that close monitoring and intervention in these key areas of weakness is necessary for late talkers as they reach school age.

In summary, the findings of the intervention studies indicate that both clinician- and caregiver-administered types of treatment may be effective in achieving the short-term goal of improving the vocabulary and grammar of late-talking children. In addition, as suggested by Girolametto et al. (1996b), parent-administered programs may at the very least improve parent–child interaction and give children practice in using words and structures.

Socialization gains and the reduction of parent stress and anxiety are also evident (Robertson & Weismier, 1999), as are long-term gains in expressive grammar and vocabulary (Girolametto et al., 2001). However, continued monitoring and intervention for higher level linguistic abilities may still be necessary as the children mature (Girolametto et al., 2001). Therefore, it may be important to emphasize early literacy in addition to learning vocabulary and improving socialization skills in the course of early intervention. Finally, it is also important to note that the participants in the studies discussed above were parents of middle-class socioeconomic status who may have been highly educated and more motivated to participate in parent programs than parents from lower socioeconomic status. Research investigating the efficacy of interventions for families from lower socioeconomic status and other cultural and linguistics backgrounds is still needed.

**FUTURE DIRECTIONS**

The research in the area of early childhood language disorders is important because children with delayed expressive language development have been shown to be affected later in their life in their language, social, emotional, and academic performance, regardless of whether or not they have spontaneously recovered. The scope of this research has grown notably in the past two decades. The research has been quite extensive in some more established areas of the field, such as defining the population of children with expressive language delay, establishing assessment measures, determining inclusion criteria and prevalence, and determining the statistics and predictors of spontaneous recovery. Cohort studies examining the outcomes for these children at various ages constitute the bulk of this research.

Although this research has not always led to concurring evidence, or used consistent definitions and measures, it appears to have provided a wealth of evidence for these domains. Additional research may or may not clarify issues such as how it may be determined which among the late-talking children are most at risk for persisting language delay, or what outcome measures should be used to indicate spontaneous recovery. However, it seems that the field may benefit more from research in other directions.

One direction that the field may take is to examine in more detail the characteristics of effective interventions with late talkers. It will be important to follow children who have been provided with preventative intervention longitudinally to determine their long-term prognoses and outcomes. In general, well-designed studies employing group designs with as much randomization as possible, larger sample sizes, and clear-cut selection criteria are needed to provide higher quality evidence.

It would also be beneficial to generate additional evidence to support methods that are currently believed to be clinically effective using well-designed experimental studies. Their effectiveness should be compared, and existing models should be taken to new contexts, including home and preschool settings. By exploring the combined effects of intervention that is provided at home, preschool,
and clinic, the benefits of increasing the amount of intervention and providing it in several contexts for one child may be established. Finally, given older children’s difficulties with higher level linguistic skills, it is likely to be important to include early literacy components in these intervention programs in addition to targeting vocabulary and syntax development.

Other areas of the field are less well developed and may warrant more attention in future research. Interactions of late talkers and their caregivers in general have not been investigated thoroughly. In addition, there is a paucity of research with late talkers who speak languages other than English or come from nonmainstream cultural backgrounds or low socioeconomic status families. Such research is important and is urgently needed in the increasingly multicultural North American society. Because early language delay has been found to affect children speaking first languages other than English, clinicians will find a great number of such children among their clients. Intervention with these children may be challenging because many important questions remain unanswered. For example, it is still not clear whether intervention should be carried out in the language in which the child is more proficient or in the majority language only (for review, see Gutierrez-Clellen, 1999). Moreover, cultural differences may be present in the conversational patterns of bilingual late talkers and their caregivers (van Kleeck, 1994). Therefore, the interactive language stimulation approaches that are used in clinical and home settings, as well as other clinical methods found to be efficacious for monolingual English-speaking late talkers, may not be viable for children from other cultural backgrounds. Furthermore, more research is needed with children from low socioeconomic status families because, unfortunately, language difficulties often go hand in hand with poverty (Paul, 2001). The intervention models that benefit these children may or may not prove to be different from those that have been demonstrated to be effective with their monolingual peers and children from families with higher socioeconomic status.

As illustrated through this review, there continue to be many issues surrounding research involving children with early language delay. Areas of inconsistency include differences in terminology, differences in definitions and criteria for inclusion, questions regarding eventual outcomes for these children, and essential characteristics of therapy approaches. The future research directions outlined above may assist in answering some of these unresolved questions and in creating appropriate and effective intervention models that will permit these children to develop to the best of their potential.

REFERENCES


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# APPENDIX. CHRONOLOGICAL SUMMARIZED REVIEW OF STUDIES

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Focus</th>
<th>Number, age of children</th>
<th>Inclusion criteria, instrument, ELD or E/R-LD?</th>
<th>Terminology</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rescorla &amp; Schwartz</td>
<td>1990</td>
<td>Outcomes after 8m</td>
<td>24–31 months at intake (as for all studies in this group): 25 boys of the original 40 late talkers (36 boys and 4 girls)</td>
<td>Expressive criterion for all studies of this author: minimum 6m delay on Reynell (except for 1 child, 5m delay) Receptive criterion: within 4m of CA on Reynell, but based on children included in various follow-ups, the average was sometimes better LDS: 2 of 25 &gt; 50 words but no combinations</td>
<td>SELD – specific expressive language delay</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Rescorla &amp; Fechnay</td>
<td>1996</td>
<td>Communicative synchrony reciprocity</td>
<td>18 boys of the original 40 late talkers</td>
<td>Receptive within 3m LDS: none &gt; 45 words</td>
<td>Late talkers</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Rescorla, Roberts, &amp; Dahlsgaard</td>
<td>1997</td>
<td>Outcomes at age 3</td>
<td>33 boys and 1 girl of the original 40 late talkers</td>
<td>Receptive within 4m LDS: 1 child &gt; 50 words and no combinations</td>
<td>SLI-E</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Mirak &amp; Rescorla</td>
<td>1998</td>
<td>Phonetic skills and vocabulary size</td>
<td>33 boys and 4 girls of the original 40 late talkers</td>
<td>Receptive within 3m LDS: 1 of 33 &gt; 50 words but no combinations</td>
<td>Specific expressive language impairment</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Rescorla &amp; Merrin</td>
<td>1998</td>
<td>Communicative intent</td>
<td>29 late-talking boys and 2 girls</td>
<td>Receptive within 3m, except for 2 children with 4m delay</td>
<td>Delayed expressive language, early expressive delay</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Rescorla, Mirak, &amp; Singh</td>
<td>2000</td>
<td>Patterns of vocabulary growth from 2–3 years</td>
<td>28 of 40 late talkers</td>
<td>Receptive within 3m LDS: none &gt; 50</td>
<td>Using “late talkers” from this study on to mean “children identified under the age of 3 with expressive language delay; though some may have receptive language delay, language delay should be primary”</td>
<td>Philadelphia</td>
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<tr>
<td>Rescorla, Dahlsgaard, &amp; Roberts</td>
<td>2000</td>
<td>Outcomes at 3 and 4</td>
<td>33 boys and 1 girl of the original 40 late talkers</td>
<td>Receptive within 3m LDS: none &gt; 50</td>
<td>Late talkers</td>
<td>Philadelphia</td>
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<tr>
<td>Rescorla, Bascome, Lampard, &amp; Feeny</td>
<td>2001</td>
<td>Conversational patterns</td>
<td>30 boys and 2 girls of the original 40 late talkers</td>
<td>Receptive within 3m</td>
<td>Late talkers</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Rescorla</td>
<td>2002</td>
<td>Reading at age 9</td>
<td>34 of 40 late talkers</td>
<td>Receptive within 3m</td>
<td>Late talkers</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Manhardt &amp; Rescorla</td>
<td>2002</td>
<td>Oral narrative</td>
<td>31 of 40 late talkers</td>
<td>Receptive within 3m</td>
<td>Late talkers</td>
<td>Philadelphia</td>
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<tr>
<td>Rescorla &amp; Roberts</td>
<td>2002</td>
<td>Nominal vs. verbal morpheme use</td>
<td>38 of 40</td>
<td>Receptive within 3m</td>
<td>Late talkers</td>
<td>Philadelphia</td>
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<tr>
<td><strong>Author</strong></td>
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<td><strong>Focus</strong></td>
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<td><strong>Terminology</strong></td>
<td><strong>Sample</strong></td>
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<tr>
<td>Rescorla</td>
<td>2005</td>
<td>Reading at age 13</td>
<td>28 of 40 late talkers</td>
<td>Receptive within 3–4m</td>
<td>Late talkers</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Paul</td>
<td>1991</td>
<td>Profiles</td>
<td>18–34 at intake, 30 of the original 37 late-talking children</td>
<td>LDS: Fewer than 10 intelligible words produced at 18–23, &lt; 50 or no two-word phrases by 24–34 (for all studies in this group, using the same group selected using this criterion at intake) 71% within 6m on receptive, 29% worse</td>
<td>Late talkers; Slow expressive language acquisition (development) SELD (note the same acronym standing for different terms)</td>
<td>Portland</td>
</tr>
<tr>
<td>Paul &amp; Ellwood</td>
<td>1991</td>
<td>Maternal input</td>
<td>At 20–34m, 28 of the original group of 37</td>
<td>Receptive with approximately 3m (Reynell)</td>
<td>Slow expressive language development</td>
<td>Portland</td>
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<tr>
<td>Paul &amp; Shiffer</td>
<td>1991</td>
<td>Communicative initiations</td>
<td>22 of the original 37 at 24–34 m</td>
<td>1/4 of LT sample had receptive delays (Vineland Adaptive Behavior Scales)</td>
<td>Late talkers</td>
<td>Portland</td>
</tr>
<tr>
<td>Paul, Spangle, Looney, &amp; Dahm</td>
<td>1991</td>
<td>Communication and socialization</td>
<td>21 of the original group of 37, also at 18–34 months</td>
<td>18–21 m &lt; 10 words produced on LDS, or &lt; 50 for 24–34m and/or no word combinations</td>
<td>Late talkers</td>
<td>Portland</td>
</tr>
<tr>
<td>Paul</td>
<td>1993</td>
<td>Outcomes at age 3, 4, 5</td>
<td>As intake</td>
<td></td>
<td>Late talkers</td>
<td>Portland</td>
</tr>
<tr>
<td>Paul &amp; Alfonde</td>
<td>1993</td>
<td>Use of grammatic morphemes</td>
<td>34 of 37, at age 4</td>
<td>As intake</td>
<td>Slow expressive language development Late-developing language</td>
<td>Portland</td>
</tr>
<tr>
<td>Paul &amp; Smith</td>
<td>1993</td>
<td>Narrative at age 4</td>
<td>23 of the original group of 37, 70% male, 10 of these had moved into normal range for DSS (above 10th percentile)</td>
<td>Below 10th percentile on DSS</td>
<td>Slow expressive language development</td>
<td>Portland</td>
</tr>
<tr>
<td>Paul, Hernandez, Taylor, &amp; Johnson</td>
<td>1996</td>
<td>Narrative: early school age Reevaluations at kindergarten, first and second grade</td>
<td>17 moved into normal (76% boys) and 10 (80% boys) were ELD at kindergarten, 22 (73%) vs. 8 (75%) at 1st grade 24 (79%) vs. 4 (50%) at 2nd grade</td>
<td>Below 10th percentile on DSS</td>
<td>History of expressive language delay vs. chronic expressive language delay</td>
<td>Portland</td>
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<tr>
<td>Paul, Murray, Clancy, &amp; Andrews</td>
<td>1997</td>
<td>Reading and metaphonological skills</td>
<td>27 with a history of ELD and 5 with chronic</td>
<td>Below 10th percentile on DSS</td>
<td>History of expressive language delay vs. chronic expressive language delay</td>
<td>Portland</td>
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<tr>
<td>Paul &amp; Kellogg</td>
<td>1997</td>
<td>Temperament (at age 6)</td>
<td>6 of 28 who remained in the study till age 6 were still ELD, plus 22 with a history of ELD</td>
<td>Below 10th percentile on DSS</td>
<td>History of expressive language delay vs. chronic expressive language delay</td>
<td>Portland</td>
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<tr>
<td>Paul &amp; Fountain</td>
<td>1999</td>
<td>Predicting outcomes at second grade</td>
<td>16% of 37 original who still had ELD</td>
<td>Below 10th percentile on DSS</td>
<td>SELD</td>
<td>Portland</td>
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<tr>
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<th>Year</th>
<th>Focus</th>
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<th>Inclusion criteria, instrument, ELD or E/R-LD?</th>
<th>Terminology</th>
<th>Sample</th>
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<tbody>
<tr>
<td>Whitehurst, Fischel,</td>
<td>1988</td>
<td>Verbal interactions in families</td>
<td>17 late talkers, 15 boys and 2 girls</td>
<td>EOWPVT: 2.5 SD below; PPVT: no more than 1 SD below</td>
<td>Developmental expressive language disorder (ELD, an acronym that stands for different terms: does not mean &quot;expressive language delay&quot; because delay and disorder are different terms)</td>
<td>New York</td>
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<td>Lonigan, Valdez-Menchaca,</td>
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<td>DeBaryshe, &amp; Caulfield</td>
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<tr>
<td>Whitehurst, Arnold, Smith,</td>
<td>1991</td>
<td>Family history</td>
<td>62 late talkers (85% boys)</td>
<td>EOWPVT 2.33 below norms PPVT–R 85 or higher (no more than 1 SD below)</td>
<td>Developmental expressive language disorder</td>
<td>New York</td>
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<td>Fischel, Lonigan, &amp; Valdez-</td>
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<td>Menchaca</td>
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<td>Lonigan, Fischel, Whitehurst,</td>
<td>1992</td>
<td>The role of otitis media in outcomes</td>
<td>65 late-talkers</td>
<td>EOWPVT 2.33 below norms PPVT–R 85 or higher (no more than 1 SD below)</td>
<td>Developmental expressive language disorder</td>
<td>New York</td>
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<td>Arnold, &amp; Valdez-Menchaca</td>
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<tr>
<td>Thal, Tobias, &amp; Morrison</td>
<td>1991</td>
<td>Language and gestures 1 year follow-up Reevaluation of Thal &amp; Bates 1988, same data, so not really a &quot;follow up&quot; as the title suggests</td>
<td>19 children, 18–29 m</td>
<td>Lowest 10% on Language and Gesture Inventory (both receptive and expressive), late talkers understood more than language-matched and comparable to age-matched</td>
<td>Children with delayed onset of lexical skills</td>
<td>San Diego</td>
</tr>
<tr>
<td>Thal &amp; Tobias</td>
<td>1992</td>
<td>Gestures of truly late-talkers &amp; late bloomers</td>
<td>10 children, 18–28 m</td>
<td>Lowest 10% on the Language and gesture inventory for expressive, late bloomers age-appropriate comprehension vs. truly delayed poorer comprehension at posttest</td>
<td>Delayed onset of expressive oral vocabulary, late talkers</td>
<td>San Diego</td>
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<tr>
<td>Thal &amp; Flores</td>
<td>2001</td>
<td>Development of sentence interpretation of the original group</td>
<td>17 2.5 year old late talkers of the original group</td>
<td>Below 10th percentile on the MCDI, confirmed by Reynell</td>
<td>Specific expressive language delay</td>
<td>San Diego</td>
</tr>
<tr>
<td>Thal, Reilly, Seibert, Jeffries, &amp; Fenson</td>
<td>2004</td>
<td>Language development in children at risk, at age 3</td>
<td>20 late talkers</td>
<td>Below 15th percentile on the MCDI</td>
<td>Late talkers</td>
<td>San Diego</td>
</tr>
<tr>
<td>Thal, Miller, Carlson, &amp; Vega</td>
<td>2005</td>
<td>At 4 years of age, nonword repetitions</td>
<td>11 males, 9 females, late talkers</td>
<td>Below 10th percentile on the MCDI; originally 4 of them had receptive below 10th percentile on the MCDI</td>
<td>Delayed at early stages of language development</td>
<td>San Diego</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
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<td>Number, age of children</td>
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<td>Terminology</td>
<td>Sample</td>
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<td>Ellis, Weismer, Murray-Branch, &amp; Miller</td>
<td>1993</td>
<td>Two methods of intervention</td>
<td>3 late talkers, 27-28m</td>
<td>Expressive: 25–87 words on Early Language Inventory (Bates et al., 1986) – now called MCDI, would be below 10th; speech samples with SALT for word combinations (had some), one had normal receptive, one 5m delay and one 6m delay</td>
<td>Late talkers</td>
<td>Wisconsin</td>
</tr>
<tr>
<td>Ellis, Weismer, Murray-Branch, &amp; Miller</td>
<td>1994</td>
<td>Longitudinal, profiles – main for this group</td>
<td>4 late talkers, from 2 years onwards</td>
<td>SICD receptive 5m below comparison group, expressive early language inventory below 10th percentile</td>
<td>Late talkers</td>
<td>Wisconsin</td>
</tr>
<tr>
<td>Robertson &amp; Weismer</td>
<td>1999</td>
<td>Intervention</td>
<td>21 late talkers, 21–30m</td>
<td>Some only expressive, some receptive/expressive; below 10th percentile on MCDI for expressive –1.25 SD,</td>
<td>Late talkers, delayed language development</td>
<td>Wisconsin</td>
</tr>
<tr>
<td>Girolametto, Pearce, &amp; Weitzman</td>
<td>1996b</td>
<td>Focused stimulation intervention</td>
<td>25, 23–33m</td>
<td>Below 5th on MCDI on expressive, 4 children had receptive more than 6m below (SICD)</td>
<td>Toddlers with ELD (expressive language delay)</td>
<td>Toronto</td>
</tr>
<tr>
<td>Girolametto, Pearce, &amp; Weitzman</td>
<td>1996a</td>
<td>Focused stimulation intervention</td>
<td>16, 2;0–3;6</td>
<td>Below 5th on MCDI on expressive, 4 children had receptive more than 6m below (SICD)</td>
<td>Toddlers with ELD</td>
<td>Toronto</td>
</tr>
<tr>
<td>Girolametto, Weitzman, Wiigs, &amp; Pearce</td>
<td>1999</td>
<td>Maternal language and children's language development</td>
<td>12, 25–35m</td>
<td>Vocabulary size below 5th percentile for their age on MCDI, 4 of 12 children had receptive 6m below age (SICD)</td>
<td>Toddlers with expressive vocabulary delays</td>
<td>Toronto</td>
</tr>
<tr>
<td>Girolametto, Wiigs, Smyth, Weitzman, &amp; Pearce</td>
<td>2001</td>
<td>Outcomes assessment and intervention had receptive more than 6 m below (SICD)</td>
<td>21, 3 years after the original</td>
<td>Below 5th on MCDI on expressive, 4 children</td>
<td>Toddlers with expressive vocabulary delays</td>
<td>Toronto</td>
</tr>
</tbody>
</table>

Note. CA = chronological age, DSS = developmental sentence score (Lee, 1974), EOWPVT = Expressive One-Word Picture Vocabulary Test (Gardner, 1981), (E/R) LD = (expressive/receptive) language delay, LDS = Language Development Survey (Rescorla, 1989), LT = Late talker, MCDI = MacArthur-Bates Communicative Development Inventory (Fenson et al., 1993), PPVT = Peabody Picture Vocabulary Test (Dunn & Dunn, 1981), SALT = Systematic Analysis of Language Transcripts (Miller, 1983), SELD = specific expressive language delay (Rescorla’s group) or slow expressive language development (Paul’s group), SD = standard deviation, SICD = Sequenced Inventory of Communication Development (Hendrick, Prather, & Tobin, 1984), SLI (-E) = specific language impairment (– expressive).