

## Language development in children at risk for language impairment: Cross-population comparisons

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### Abstract

At 3 years of age the spontaneous language of 17 typically developing children was compared to two groups of toddlers who were at risk for language delay for very different reasons. One at-risk group, late talkers, appeared normal in all respects except for their delayed language. These 20 children scored at or below the fifteenth percentile for expressive vocabulary on the MacArthur Communicative Development Inventory (Fenson et al., 1993) when originally identified at 20–27 months of age and within the normal range on the Bayley Scales of Infant Development (Bayley, 1969). The other group, 21 children with unilateral focal brain injury, suffered localized damage to their brain prenatally, perinatally, or within the first 6 months of life. Results indicated that both of the at-risk groups were still significantly lower in vocabulary diversity and grammar at 3 years of age. There was also significantly greater variability in the at-risk groups than in the control groups, and in the children with focal brain injury than in the late talkers in both areas. The importance of language comprehension to development in this period was supported by two findings. First, children with focal brain injury had significantly lower scores than late talkers on the Index of Productive Syntax, a test of emerging grammar, and had been lower in comprehension on a standardized test of language comprehension a year earlier. Second, late talkers with delay in comprehension as well as production had significantly lower scores on IPSyn than those with normal comprehension, suggesting that they are at greater risk for continued delay. Qualitative analyses indicated that the at-risk groups produced the same kinds of errors, but that late talkers produced a substantially greater proportion of errors in obligatory contexts than did children with focal brain injury.

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### 1. Introduction

In this study we compare the spontaneous language of typically developing 3-year-old children to two groups of same-aged toddlers who are at risk for language delay for very different reasons. One group, children who were late talkers (LTs), appears normal in all respects except for their delayed language. Typically, children who were LTs are late in production of first words and delayed in development of vocabulary, grammar, and discourse (Paul, 1996; Rescorla, Dahlsgaard, & Roberts, 2000, 1997; Rescorla & Schwartz, 1990; Thal & Katich, 1996). The other group, children

with unilateral focal brain injury (FL), suffered localized damage to their brain prenatally, perinatally, or within the first 6 months of life. Like children who were LTs, children with FL are typically delayed in vocabulary and grammar during the early stages of development (Bates et al., 1997; Thal et al., 1991a). By the time they are school age, the majority of children who were LTs and children with FL no longer stand out as different from children with a typical developmental course (e.g., Aram, 1988, 1992). However, a small but significant proportion of individuals in each at-risk group will still have language-learning problems. Cross-population comparisons of typically developing children (TD), and the two groups of children who are at risk for serious language learning disorders, may help us understand the nature of human language learning and the different

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levels of risk for very young children who have what are considered to be predisposing factors to language impairment.

Studies such as the one that follows are important because accurate early identification of children who have clinically significant language-learning problems continues to elude us. We are not certain, for example, how much, where, or at what age focal brain injury influences language development. Neither do we know why impaired language is found, seemingly without any other deficits, in the disorder that we have come to call specific language impairment. Early identification is important for a number of reasons. We know, for example, that children who have problems with oral language are at significant risk for later academic and social problems (Brinton & Fujiki, 1989; Catts, 1993; Rice, Hadley, & Alexander, 1993). In addition, studies show that early intervention not only is effective, but that children who are exposed to early intervention often progress more rapidly than typically developing children of the same age (Leonard, 1998). In other words, early intervention can provide the means for catching up to peers, a process that could have a huge impact on later school performance. Unfortunately, the wide range of normal variability in the early stages of language development and the fact that many toddlers with delayed language and normal cognitive and motor development have language within the normal range by school age (Paul, 1996; Rescorla, 2000, 2002) prevent us from making unequivocal diagnoses of clinically significant language impairments before children are 3 or 4 years old (see Bates et al., 1994; Leonard, 1998; Thal & Katich, 1996, for a discussion of that issue).

In addition to late onset of language, the literature suggests that the process of “catching up” to typically developing children is gradual for both children with FL and children who were LTs (Bates et al., 1997; Paul, 1996; Paul, Laszlo, McFarland, & Midford, 1993; Rescorla, 2000, 2002; Rescorla et al., 1997; Rescorla & Schwartz, 1990; Thal, 1999; Thal et al., 1991a, 1991b; Thal & Katich, 1996). By the time they are school age, half to three quarters of children who were LTs and almost all of the children with FL score in the normal range on tests of language development (Aram, 1988, 1992; Eisele & Aram, 1993, 1995; Paul, 1996; Rescorla, 2000, 2002; Whitehurst & Fischel, 1994). Many LTs, however, never really “catch up.” Although standardized test scores are often well within the normal range, they are generally significantly lower than those of the TD with whom they have been compared in longitudinal studies (Paul, 1996; Rescorla, 2000, 2002; Rescorla et al., 1997; Thal & Katich, 1996). Following this literature, our first hypothesis was that at 3 years of age the children in the two at-risk groups would continue to be behind the typically developing control group in use of language for conversational purposes. Based on the reports of normal scores on language tests by

school-age, our second hypothesis was that both children who were LTs and children with FL would score within the normal range on measures of spontaneous language when they were 3 years old, in spite of remaining significantly behind the controls. We were also interested in describing the comparability of the two at-risk groups given their somewhat different behavioral (as well as etiological) starting points (see subject description below). In addition to this general look at the broad differences between groups that are not always homogeneous, we also examined potential differences between subsets of children within each of the at-risk groups. Thus, we proposed two additional hypotheses based on literature suggesting that (1) more serious and prolonged expressive language delays occur in children with FL with lesions in the left temporal lobe (+LTEMP) (Bates et al., 1997), and (2) children with delays in both comprehension and production (RELD) are at more serious risk for continued delay than children with expressive delays and normal comprehension (ELD) (Thal, 2000; Thal et al., 1991a; Thal & Tobias, 1992). Specifically, Hypothesis 3 was that children with +LTEMP would have significantly lower expressive language scores than children with no left temporal lobe involvement (–LTEMP) and TD. Hypothesis 4 was that children who had a history of RELD would have significantly lower scores than either those who had a history of ELD or TD on measures of spontaneous language use.

## 2. Method

### 2.1. Participants

Fifty-eight 3-year-old children, 17 who were developing typically (TD), 20 late talkers (LTs), and 21 with focal brain injury (FL) participated in this study. All of the children were part of the larger longitudinal sample being followed in the Project in Cognitive and Neural Development at the University of California, San Diego (see Section 1 for more details about the project) and had participated in data collection a number of times previously. All children received neurological examinations when they were enrolled in the Project. In addition, at some point prior to the 36-month data point, usually as close as possible to enrollment into the study, the Bayley Scales of Infant Development (BSID, Bayley, 1969), the MacArthur Communicative Development Inventory (CDI, Fenson et al., 1993), and the Reynell Development Language Scales (RDLS, Reynell, 1977) were also administered.

#### 2.1.1. Late talkers

To qualify as children who were LTs, participants scored at or below the fifteenth percentile for expressive vocabulary on the CDI when originally identified at

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