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The two-word stage: Motivated by linguistic or cognitive constraints?

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ABSTRACT

Child development researchers often discuss a "two-word" stage during language acquisition. However, there is still debate over whether the existence of this stage reflects primarily cognitive or linguistic constraints. Analyses of longitudinal data from two Deaf children, Mei and Cal, not exposed to an accessible first language (American Sign Language – ASL) until the age of 6 years, suggest that a linguistic constraint is observed when cognition is relatively spared. These older children acquiring a first language after delayed exposure exhibit aspects of a two-word stage of language development. Results from intelligence assessments, achievement tests, drawing tasks, and qualitative cognitive analyses show that Mei and Cal are at least of average intelligence and ability. However, results from language analyses clearly show differences from both age peers and younger native signers in the early two-word stage, providing new insights into the nature of this phase of language development.

1. Introduction

One of the most robust findings in the study of first language acquisition in children is the existence of a two-word stage at about the age of 2 years. The two-word stage typically occurs within the age range of 19–26 months, and is characterized by a mean length of utterance (MLU) of two morphemes, with a range of 1.75–2.25. For many languages, the utterances of children in this stage include a predominance of nouns, and a lack of grammatical markers (DeVilliers & DeVilliers, 1979); for this

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reason, these aspects have also become part of the linguistic characteristics typically associated with the two-word stage. Over the past five decades other criteria have been added to the definition of the two-word stage, based on what has been described as part of 2-year old language, e.g. the typical semantic relations expressed.

Since the 1970s, some authors have emphasized the ties between linguistic and cognitive development with the two-word stage hypothesized to inextricably link maturation, linguistic, and/or cognitive development (Bloom, Lightbown, & Hood, 1975; Casasola, Bhagwat, & Ferguson, 2006; Clark, 1973; Ervin-Tripp, 1973; Papafragou, Cassidy, & Gleitman, 2007; Piaget, 1980; Schlesinger, 1971, among others). Other authors, however, point out the evidence from linguistically and/or cognitively delayed populations which indicates that dissociations between development of cognitive ability and linguistic ability are possible (Bellugi, Lai, & Wang, 1997; Bellugi, Marks, Bihrle, & Sabo, 1993; Capirici, Sabbadini, & Volterra, 1996; Coggins, 1979; Curtiss, 1982; Landau et al., 2005; Levy, 2004; Mervis, Morris, Bertrand, & Robinson, 1999; Miller, 1988; Oliver & Buckley, 1994; Thomas & Karmiloff-Smith, 2005; Yamada, 1981, 1990, among others). While there is considerable debate over how closely cognitive and linguistic development are linked, one of the current, tempered views is that cognitive and linguistic development can occur at separate paces.

The search for a way to dissociate the development of cognitive and linguistic ability in both the fields of Cognitive Psychology and Linguistics is an on-going goal, and has branched out in several directions. In addition to looking at special medical populations, social populations, and language isolates, various cognitive capacities of typically-developing prelinguistic infants are currently being studied.

Since prelinguistic children, e.g. infants, do not yet use language productively, their knowledge might be considered cognitive or core (Diesendruck, 2003; Gelman & Butterworth, 2005; Spelke, 2011, among others). One of the aims of the above-mentioned line of study is to investigate cognitive development before the convergence of linguistic development. There are many topics of interest in prelingual cognitive development, two of which are children's development of the concept of number, and children's development of categorization.

The concept of number as separate from language is currently under intense debate (Gelman & Butterworth, 2005; Gordon, 2004; Mix, Huttenlocher, & Levine, 2002; Spaepen, Coppola, Spelke, Carey, & Goldin-Meadow, 2011; Wynn, 1992; Zosh & Feigenson, 2009; among others; see Spelke, 2011 for review). Gelman and Butterworth (2005) suggest at least four arguments for a dissociation between numerical cognition and language. One is that children and adults can have problems, due to dementia or brain injury, with language but not with number calculation and vice versa. A second is that neuroimaging studies show different places of activation for numerical processing and for language processing. A third is that speakers of languages such as Munduruku and Pirahã, with limited, and inconsistent use of numbers, are still able to compare sets of up to as many as 80 dots, saying which set has more. Their fourth argument revolves around a study that analyzed the results of an experiment with children ages 5;0–8;6, examining what children think and say when asked about number relationships. From their evidence, Gelman and Butterworth (2005) propose that neural organization separates language from number, as reflected by cognitive development. Further, they suggest that while language most likely has an effect on numerical cognition, it does not cause its development.

Spelke (2011) alternatively suggests that the development of abstract numerical and geometric concepts hinges on the role that acquisition and use of natural language plays in linking information from distinct systems of core knowledge, like natural number and natural geometry. As evidence for the important role of language, she presents a study by Spaepen et al. (2011), of homesigners in Nicaragua. The participants lack a formal education but nonetheless hold jobs, and deal with money. However, despite having a good communication system, when these homesigners try to convey numerical information on their fingers, they do so inaccurately. They also perform non-symbolic matching tasks with number at less than accurate performance, suggesting a special role for language in the use of natural number. As more evidence, Spelke (2011) discusses studies of educated adults with language impairment, who show a dissociation of quantity and number words. Further, she presents evidence from bilingual adults suggesting that learning new number facts in one language elicits a cost when produced in the language opposed to the one the fact was originally learned in. These and other pieces of evidence support Spelke's (2011) assertion that there cannot be a complete dissociation between language and the cognitive concept of number.