

Predicting The Transition to Language: Productive Skills in a Dynamic System

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Abstract

Is language a unique and isolated ability or is it an imbedded outcome of a variety of developmental components? I began to address this question by examining the symbolic abilities of children making the transition to language. My research and others' demonstrated that mental representation as assessed by observing early pretend play was predictive of language milestones. However, while children did not tend to exhibit the language milestone without the associated representational play skill, there could be lags of several months between the accomplishment of play milestones and the structurally equivalent language. Working from a dynamic systems perspective I proposed that additional skills other than mental representation might contribute to the language transitions and that when all other skills were in place, a transition to the given language milestone should occur. With the advantage of rich collaborations I have worked at predicting the transition to referential language based on children's productivity in mental representation, phonetic skill and communicative ability. In this talk I will report on the extent to which this project has met with success. A key component has been attention to the productivity of various naturally occurring behaviors that children exhibit spontaneously in the course of interaction. The theoretical antecedents of this approach include Jean Piaget (e.g., 1962), Heinz Werner & Bernard Kaplan (1963), and Esther Thelen (e.g., Thelen & Smith, 1994). Although the emphasis in the talk is on children's productive behavior I would like also to discuss the meaning of the underlying notion of "representation" both as a psychological construct and as a descriptor of internal information in the brain.

Following predictions dating to the 1980's, McCune (1995) found that children development of representational play follows a sequence of five developmental levels: Pre-symbolic (functional), Self-pretend, De-centered pretend incorporating animates other than the self, Combinations of several acts, and finally Hierarchical or planned pretend, including substitution and active animation as well as planning. First referential words occurred at the same time as or following pretend onset. Language combinations began at the same time as or following combinations in play. Following hierarchical pretend those children who were speaking showed a sharp increase in frequency of speech and in mean length of utterance (MLU). These findings demonstrated the relevance of mental representation for language, but some children were not speaking by 24 months of age, others showed various lags between pretend and language.

Subsequent study demonstrated that gestural communication, the use of communicative grunts (McCune, Vihman, Roug-Hellichius & Delery, 1996), and a sufficient phonetic repertoire (McCune & Vihman, 2001) were also required prior to the emergence of the language milestones. These skills need not emerge in a given order, but rather vary in onset order across children. The transitions of note are predicted by the availability of all skills in the onset session or the prior month. Such variability is a major characteristic of dynamic systems models. Furthermore, I demonstrate the role of each of these variables in the online production of words and early sentences as well as in their longitudinal development.

What is the brain basis of these performances? Is the cognitivist metaphor of the computational mind appropriately explanatory or would more dynamically variable brain states as proposed by Edelman (e.g. Edelman & Tononi, 2000) and Rosch (1999) provide more fruitful and heuristic approaches to such embodied findings as those following from a dynamic systems analysis?

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