Can Infant Event Representations Give the Boot to Bootstrapping?

In this talk, I outline the basic assumptions and motivations behind bootstrapping proposals in language acquisition theory. I focus on semantic bootstrapping which was proposed by Pinker (1981) to solve the learnability problem of how the child identifies which words in the language are Nouns, which are Verbs, Adjectives, Prepositions, and so on. Pinker's answer to this problem was to propose that children initially assume a semantic correspondence between prototypical semantic types and syntactic categories: NOUN = person, place or thing; VERB = action; ADJECTIVE = description; PREPOSITION = location and so on. From these innate semantically based mappings, children then store distributional regularities associated with the category prototypes, and then generalize category membership based on distributional regularities associated with these semantic types.

I argue that such accounts treat the child language learner as a kind of code breaker. This is because it essentially treats language learning as trying to figure out how to map a set of preconceived categories on to form-meaning mappings arising from the language that children encounter in the linguistic input around them. This code-breaking approach assumes that children are not so much acquiring a grammar, but more or less mapping sounds onto some preconceived grammar specified within the genome. Unfortunately the genome does not look like something that could encode such specific knowledge, and strategies. On the other hand, theories of language acquisition do need to take seriously the problems of underdetermination and complexity that have been the hallmarks of arguments for nativist approaches to language acquisition.

My approach in this paper is to propose that the infant develops a rich set of representations that encode objects, events, spatial relations etc. in a highly structured manner. For example, their representation of events within the first year of life, prior to the onset of language production, includes the elements of argument structure that will serve as a basis for verb-argument structure when mapped onto language. The difference of this approach is that the infant is not trying to figure out the syntax of the linguistic input, but to map the syntax of the external language onto the syntax of the internal language, or what Fodor called the "language of thought." In this way, language learning is envisioned not as code breaking but, borrowing from Piaget, a process of assimilation (mapping the external language to the internal language), and accommodation (extending the internal representation to the wider conceptual scope of the external language.)

This proposal is accompanied by several kinds of evidence. The first is a summary of experiments I conducted with 6-12 month old infants in the prelinguistic stages of development. I briefly describe a series of experiments that provide evidence for argument structure in event representations of 6-12 month old pre-linguistic infants. Employing looking-

time habituation and eye tracking methods, these experiments show that, for 8-10 month olds, objects that are relevant to the meaning of an event (e.g., the transferred object in a GIVE event) lead to increased looking time when they are deleted from the event (GIVING with no object being transferred). However, when the same object does not play an argument role (HUGGING someone whilst carrying a toy), there is no increased looking time when the object is deleted. In numerous experiments using this paradigm, I demonstrate that infants only show dishabituation in situations where they have argument-structure representations, and that they have a conceptual understanding of the event itself. For example, at 10 months, while they appear to understand the act of GIVING, they do not understand the act of SHOWING, perhaps because the latter requires aspects of theory of mind that are not yet developed.

I argue that the initial mapping of internal to external language in raw form produces a core language that includes the basics of what is seen in home-sign systems and certain aspects of pidgin-like languages. Missing in this core language are the fragile properties of linguistic encoding that are language specific such as temporal and aspectual coding of events, incorporation of theory of mind elements in language (e.g., structures encoding mental states and propositional attitudes.) In addition, core language offers only primitive elements of domain knowledge like number (small number exact knowledge plus large number estimation), and color (discrimination but not conceptual representation.) In such cases, it is the external linguistic system that drives development of the internal language (i.e., accommodation).

Within this framework, the goal of language learning is not to figure out which words are nouns and verbs etc., since this would simply emerge from the process of mapping the internal language to the external language. Giving a label to a category is not necessary because the assimilation process is itself an embodiment of those categories within the basic event representations that the infant brings to language learning.