PROSODIC BOUNDARIES HELP INFANTS LEARN NON-ADJACENT DEPENDENCIES IN NATURAL LANGUAGE

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This study investigates the role of prosodic boundaries in infants' learning of non-adjacent dependencies (NAD). Previous studies demonstrated pattern learning and word categorization from artificial languages by infants and adults (e.g., Marcus et al. 1999; Peña et al. 2002; Newport &Aslin 2004; Gomez 2002; Gomez &Gerken 1999; Gomez &Lakusta 2004). With regard to natural languages, Santelmann and Jusczyk (1998) showed that 18-month-old American infants recognized non-adjacent syntactic relationship (e.g., between the auxiliary *is* and the verb morpheme *–ing*). Similar sensitivity was found in German-learning 19-month-olds (Höhle, et al., 2006). Van Heugten& Shi (2010) showed that French-learning infants at 17 months, but not at 14 months, can track NAD across a phonological phrase boundary.Gerken, Wilson & Lewis (2003) found that American 17-month-olds exposed to Russian were able to abstract distributional patterns across non-adjacent elements that corresponded to gender category agreement.

Using a preferential looking procedure, we examined 11-month-old Canadian infants'ability to track non-adjacent dependencies between determiners and noun endings when the non-adjacent elements were both at phonological phrase boundariesversus when one of the elements wasnot at a phonological phrase boundary. Our hypothesis was that the former should yield better learning of NADsthan the latter.Accordingly, stimuli in two structures were created: noun phrase (NP) condition ([Det+Noun+Adj]) and sentence condition ([Det+Noun]+[V]). We used four Brazilian Portuguese determiners (nossa/essa/meu/seu, "our/this/my/your") that were divided into two sets and combined with bi-syllabic *e-* versus o-ending pseudo-nouns. For the third word in the utterances, we used pseudo-adjectives with –il ending or pseudo-verbs with –iu ending,both endings having the same pronunciation [iw] in Brazilian Portuguese. In the familiarization phase, infants were randomly assigned to one of the two conditions. In the NPcondition, one group of infants heard utterances with *nossa*and*essa* preceding o-ending pseudo-nouns and *meu* and*seu* preceding *e*-ending pseudo-nouns. In both cases, pseudo-nouns were followed by il-ending pseudo-adjectives. Another group of infants heard the reverse pattern. In the sentence condition, one group of infants heard *nossa*and*essa* preceding o-ending pseudo-nouns, and *meu*and*seu*preceding *e*-ending pseudo-nouns. In both cases, pseudo-nouns were followed by iu-ending pseudo-verbs. Another group of infants heard the reverse pattern of pairings.

In the test phase, all infants listened to new stimuli containing the familiarized determiners preceding new *o-* or *e*-ending pseudo-nouns.The pseudo-adjectives (for the NP condition) and the pseudo-verbs (for the sentence condition) were also new. For each infant, half of the test trials were grammatical and the other half ungrammatical. The two types of trials were defined according to the familiarization pattern. The grammaticality of trials was therefore crossed for the two groups of infants under each condition.

Infants in the sentence condition (n = 16) yielded significant looking time differences while listening to grammatical versus ungrammatical test trials ($p=.038$). In the NP condition (n = 16), infants showed no looking time difference between the two types of test trials ($p=.71$). Thus, after a brief exposure to a novel language, Canadian 11-month-olds learned the NAD patterns and generalize them to new stimuli, but only when the non-adjacent elements were both aligned with phonological phrase boundaries. These results demonstrate that babies under one year of age use phonological phrase boundaries to acquire syntactic regularities.

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