Elicited imitation in search of the influence of linguistic rhythm on child L2 acquisition

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ABSTRACT

Rhythmic input is frequently employed in second language (L2) instruction. Empirically, however, the link between L2 rhythm and acquisition has not been established. This paper investigated the influence of L2 prosody on child language learning in a controlled study. Theoretical framework for the study was provided by 'prosodic bootstrapping hypothesis', proposed for first language acquisition. Eighty Polish children with the mean age of 8 years and 4 months were randomly assigned to either treatment, comparison and control groups. Treatment and comparison groups were taught using specially designed materials with the treatment group exposed to salient linguistic rhythm. The findings established a clear link between implicit L2 acquisition and prosody demonstrating that 'prosodic bootstrapping hypothesis' has a role to play in L2. The findings suggest that more class-room focus on continuous speech, rich in salient prosodic L2 features and delivered at whole-text level is important in developing child L2 knowledge.

1. Introduction

This paper reports on an investigation into the role of prosody in child second language learning (L2). The aim was to demonstrate and evaluate the influence of linguistic rhythm on developing children's linguistic competence and efficacy in language teaching. The theoretical framework was the '*prosodic bootstrapping hypothesis*' for first language acquisition (L1) which states that properties of the speech wave allow English infants to acquire lexis and syntax of their native language. Literature review revealed little empirical evidence demonstrating a link between such input and L2 learning, although L2 teachers instinctively use rhythmic input in teaching (Rixon, 1999). This study aimed to establish such a link for L2.

2. Literature review

A large body of research demonstrated that attention to speech rhythm plays an important role in L1 acquisition (Bijeljac-Babic, Bertoncini, & Mehler, 1993; Christophe, Dupoux, Bertoncini, & Mehler, 1994; Gleitman & Wanner, 1984; Thierry, Bertoncini, & Mehler, 1998) and processing (Christophe, Guasti, Nespor, Dupoux, & Van Ooyen, 1997; Cutler, Mehler, Norris, & Segui, 1992; Cutler & Norris, 1988; Mehler, Dommergues, Fraudenfelder, & Segui, 1981). Christophe et al. (1997) proposed a model of phonological bootstrapping aimed to explain lexical and syntactic acquisition in infants and lexical segmentation and syntactic processing in adults. The model exploits linguistic rhythm to postulate construction of a pre-

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lexical prosodic representation of the speech signal as the first step in continuous speech processing. Linguistic rhythm is a prosodic cue characterised by pauses, i.e., silence in the speech signal, and pre-pausal lengthening of the final syllable (Chafe, 1994; Cooper & Paccia-Cooper, 1980), and in English, by the distinction between stressed and unstressed syllables. The stressed syllables tend to be mapped onto content and the unstressed syllables onto function words (Gleitman & Wanner, 1984). In the model, prosodic phrase boundaries and function words are the main sources of information for lexical access in adults and acquisition in babies initiating further bootstrapping mechanisms based on distributional regularities of language, phonotactics and typical word shape.

The model emphasises the important role of pauses in the speech signal which are marked by a decrease in pitch and in speech rate (Chafe, 1994) breaking the signal into prosodic units. These units correspond to phonological phrases (Christophe et al., 1997). Attending to these pauses helps infants segment the signal into prosodic units that correspond to phonological phrases. Research indicates that phonological phrase boundaries are salient to L1-acquiring children (Christophe et al., 1994; Gerken, Jusczyk, & Madel, 1994; Hirsh-Pasek et al., 1987). Attending to stressed syllables within those prosodic units helps infants locate the formatives of words i.e., the smallest meaningful units used to form words, identify content words and start constructing a lexicon. Research shows that stressed syllables are salient to infants. Newsome and Jusczyk (1995) and Morgan (1996) demonstrated that infants find it easier to extract words that follow the strong–weak pattern than those following the weak–strong pattern.[1] For adults, attempting lexical access at strong syllables enables English listeners to identify 90% of content words (Cutler & Carter, 1987).

In addition to prosodic phrase boundaries, function words are also exploited in lexical access and acquisition. Function words share similar acoustic characteristics (Jakobson & Waugh, 1987) and are, therefore, stored together in the mental lexicon (Bradley, 1978). This grouped storage is useful in speech processing since it allows their quick retrieval. A study of lexical segmentation with adult participants (Christophe et al., 1997) demonstrated that function words are accessed first and are used to signal content words. This process is referred to as the function-word-stripping hypothesis (p. 607). Once unstressed syllables encountered at prosodic phrase boundaries are compared to those in the list of acoustically similar function words and a match is found they are 'stripped off' and listeners attempt lexical access at the next syllable.

The model of phonological bootstrapping allows for function-word-stripping to also play a role in acquisition. Christophe et al. (1997) argue that since prosodic phrase boundaries are salient to infants and since unstressed syllables, mapped onto function words, appear at the beginning and end of prosodic units they may be compiled into a list and stored together. Identifying a match would allow infants to concentrate on what is left and categorise the next syllable as a content word. Ideas of the meaning of the words would be transferred by clues present in pictures and other recognisable representations in the surroundings which are the referent world. Being provided with a referent world, such analysis made possible by prosody facilitates lexical acquisition. Of course, function-word-stripping does not imply their acquisition. It is the stressed syllables, and therefore content words, that are acquired first (Gleitman & Wanner, 1984). Function words are acquired later and different input is necessary for their acquisition, as opposed to content words (Newport, Gleitman, & Gleitman, 1977).

Attention to unstressed syllables, often mapped onto function words, may help infants identify content words within prosodic units, whilst attending to prosodic boundaries, in conjunction with function words, may allow them to perform syntactic bracketing and labelling. This is because children's innate knowledge of the actor-action structure of utterances may help them identify which of the prosodic units is a noun and which a verb phrase (Gleitman & Wanner, 1984) whilst attention to strong syllables within those units, supported by memory of their sequence (Gleitman & Wanner, 1984; Mandel, Kemler Nelson, & Jusczyk, 1996), would help them identify content words. There is, indeed, evidence to demonstrate that infants possess knowledge of the English word order (Hirsh-Pasek & Golinkoff, 1996). Christophe et al. (1997) support this suggesting that because the head-direction parameter possesses a prosodic correlate '… the location of the prominence within phonological phrases may indicate to babies how a phrase structure is to be built' (p. 593). Therefore, a purely phonological analysis of the speech signal may help infants acquire knowledge of the phrase structure enabling them to engage in rudimentary syntactic analysis of the speech signal even in the absence of full lexical knowledge.

3. Research questions

Clearly, if L2-acquiring children were able to exploit richness of prosodic cues in L2 input this might facilitate L2 development. Attention to rhythm of L2 may help learners (a) bootstrap into grammar by seeing how known words are formed into phrases and full utterances, (b) reinforce words and structures that are being acquired, (c) initiate the process of construction of new mental representations of L2 and (d) possibly bootstrap subsequent decoding and analysis of input based on those representations.

The intention of the present research was not to deny the important role of explicit learning for young children (Vanderplank, 2008). On the contrary, the authors believe that young learners' experiences should be more challenging intellectually than often the case (Cameron, 2001) and '… include more explicit teaching and learning, more emphasis on memory, conscious effort, rehearsal and reflection…' (Vanderplank, 2008, p. 721). The aim was to investigate a possible

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[1] Gleitman and Wanner (1984) argued that '… the contrast stressed syllable/unstressed syllable leaps out of the sound wave at the human learner in a way analogous to the distinction between figure and ground in the child's analysis of visual space …' (p. 235).