The effect of prosodic complexity on phonological processing: evidence from acquisition and impairment

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Intuitively at least, the relative complexity of a phonological representation can be thought of in terms of the number of entities it contains: the number of segments in a string, feature specifications in a segment, daughter nodes in a constituent, etc. In feature theory, there is a long tradition of linking representational complexity with markedness, culminating in the proposal that the more marked a segment is the greater the number of feature specifications or geometric nodes it contains. The marked nature of more complex representational entities is often assumed to correlate with some notion of functional complexity or difficulty, placing an increased burden on articulatory effort, auditory perception or phonological processing.

A simple comparison shows that this take on complexity and markedness does not obviously carry over into prosodic structure. A binary branching onset is both more marked and more representationally complex than a non-branching onset. On the other hand, a binary branching foot is less marked than a degenerate foot.

Unmarked binarity can plausibly be linked to constraints on the canonical prosodic shapes of different types of morpheme. One of these constraints requires lexical heads to branch, with the result that words are minimally bimoraic or bisyllabic. In many languages (including English), this minimal structure coincides with the stress foot. What contributes to metrical complexity in these languages is any structure that augments this minimal shape, for example through the adjunction of unfooted syllables to word edges.

The paper reports the results of an English non-word repetition experiment designed to illuminate the influence of prosodic complexity on phonological processing. The subjects fall into three groups: one showing evidence of specific language impairment (SLI) and two agematched control groups of typically developing children. The SLI group had previously been identified as presenting with a deficit in processing complex morphosyntactic structures. One goal of the study was to determine whether this deficit extended to the processing of prosodic complexity.

Stimuli used in previous non-word repetition studies of SLI are constructed on a notion of complexity defined in terms of a raw count of segments or syllables. The present study employs stimuli that are systematically varied along three syllabic and two metrical parameters, each representing a binary opposition between an unmarked and a marked structure: branching vs. non-branching onset; open vs. closed rime; word-final V vs. C; presence vs. absence of a left-adjoined unfooted syllable; presence vs. absence of a rightadjoined unfooted syllable.

The main results can be summarised as follows. Unlike the two control groups, the SLI group showed an incremental decrease in the number of correct responses as the number of marked prosodic structures per non-word increased. Increasing metrical complexity had a greater negative effect on overall performance than increasing syllabic complexity, particularly for the SLI group. While some of the errors triggered by metrical complexity affected metrical structure itself (in the form of weak-syllable omission), the bulk involved inaccurate renditions of the syllabic and/or segmental content of the relevant stimuli. The results support the conclusion that prosodic complexity can affect non-word repetition accuracy independently of string length.