

# Word Reversing By A Person With Williams Syndrome: More Evidence For The Mora As Structural Unit

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Hockett (1955) proposed that the mora could be conceivable only in the presence of the syllable. It is since Hyman (1985) that the question of whether moras constitute structural units distinct from syllables has been frequently addressed. Persuasive evidence for this issue, together with evidence bearing on the internal structure of the mora, is hard to come by, though, in the case of Japanese, some arguments for the construct mora have been provided from speech errors (Kubozono 1989), a language game (Katada 1990), and speech segmentation experiments (Otake et al 1993), among others. Kohno (1992, 1993, 2001) has shown that there are two types of rhythm that accord to the holistic sound processing organization of the human being: stress-timed/syllable-timed on the one hand and mora-timed on the other. He argued mora and syllable are fundamentally distinct in nature, though the two types of rhythm are both regulated within 330ms, a fundamental neural clock unit, called ‘beat’. It is shown 2 moras count 1 beat, 2 light syllables 1 beat, and 1 heavy syllable 1 beat.

In this paper, I examine linguistic behavior evident on a Japanese television show entitled *Science Mystery* broadcast by Fuji TV in Japan on May 17, 2003. This program was intended for the general public with no linguistic analysis involved. Nonetheless, it attracted my attention as a linguist when the show presented the word reversing abilities of a person with Williams syndrome. I analyze his language production as clear evidence for the mora as a distinct structural unit. I propose four distinct tiers of the sound structure: beat, mora, skeleton, and melody, among which the mora is shown to be the operating grammatical unit in his word reversing.

Despite their cognitive difficulties (their average IQ = 58), people with Williams syndrome demonstrate exceptional talent in absolute pitch perception (Lenhoff et al 2001); they also demonstrate normal linguistic competence with no deficit of grammar, vocabulary choice, or fluency (Bellugi et al 1988). The subject here (henceforth called Taro, a pseudonym) is a 15-year-old Japanese-native, male, diagnosed as having the syndrome. Taro demonstrates exceptionally superior auditory working memory. As soon as he hears a Japanese word, he can instantly reproduce the word backward. Examples involving bimorphemic words are given in (1). It is clear that the units Taro manipulates have hierarchical structure beyond that of the melodic tier.

- (1) a. [toriwasa] → [sawarito] ‘sliced chicken breast served with wasabi and soy sauce’  
 b. [yakitori] → [ritokiya] ‘grilled skewered chicken’  
 c. [sunagimo] → [moginašu] ‘gizzard’

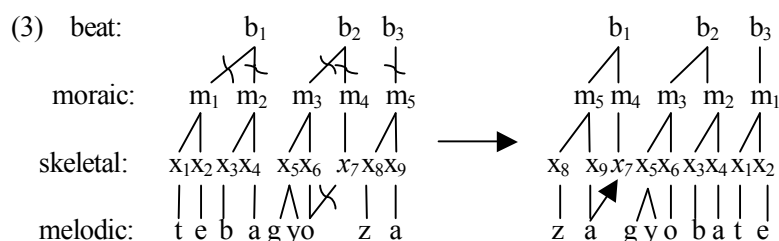
Now the question is: What units is he reversing, ‘syllables’ or ‘moras’?

Evidence in favor of ‘mora’ is his performance in (2), which involves a glide followed by a long vowel.

- (2) [tebagyooza] → [zaagyobate] ‘chicken-wing with gyoza-dampling’

The input consists of 4 syllables [te.ba.gyoo.za] but 5 moras [te.ba.gyo.o.za]. If the operating units are syllables, the output should have been [za.gyoo.ba.te]; if moras, the output should have been [za.o.gyo.ba.te].

Although neither hypothesized output matches his actual performance in (2), I propose that in fact the operating units are necessarily ‘moras’. The analysis that would yield the correct output is as in (3), in which four tiers (beat, mora, skeleton, and melody) are postulated, and [o] is doubly linked to  $x_6$  and  $x_7$ .



As soon as he perceives the input structure, Taro delinks the mora tier from the beat tier, as well as [o] from  $x_7$ , leaving  $x_7$  empty. Taro, then, reverses five moras straightward. Finally, the rightward spread of [a] fills in  $x_7$ . It should be the case that delinking the moras from the beat tier is his general strategy before reversing the moras, and reorganization of beats takes place newly as a final process of generating the output. I will compare the analysis with McCarthy’s (1982) treatment of a long vowel in a Bakwiri language game (e.g. lùngá → ngáálù), where, despite the reversal of segmental materials, the skeletal tier is kept intact.

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