Evidence for prosodic recursion from pseudo noun incorporation in Niuean
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Overview: This paper presents a systematic investigation into the prosody of Niuean pseudo noun incorporation (PNI). Only by distinguishing between minimal and non-minimal projections in prosodic structure (Elfner 2012, Ito and Mester 2010), is it possible to account for the distribution of pauses in the data. As such, the phonological phrasing of Niuean PNI provides positive evidence in support of the idea that prosodic structure is recursive (Selkirk 2011, Wagner 2005, 2010, a.o.).

Niuean PNI: Niuean (Polynesian) is a VSO language, in which VOS arises when the object is incorporated into the verb (Seiter 1980, Massam 2001). A canonical VSO sentence (1) and a corresponding PNI construction (2) are shown below:

(1) Kua kai he tama e niu magalo aki e tau lima haana.
   pst eat erg child abs coconut fresh obl art pl hand poss
   ‘The child ate fresh coconut with his/her hands.’

(2) Kua kai niu magalo e tama aki e tau lima haana.
   pst eat coconut fresh abs child obl art pl hand poss
   ‘The child ate fresh coconut with his/her hands.’

Massam (2001) demonstrates that the structure of the incorporated element in examples like the one above is phrasal, specifically, of the category NP. It is necessarily larger than N⁰, because it can be modified (see example (1)), yet it is smaller than DP, because it does not surface with a case marker (compare examples (1) and (2)).

The incorporated element forms a syntactic constituent with the verb, as evidenced by the fact that particles such as the locative mai are positioned immediately after the verb in canonical VSO examples, but immediately after the incorporated element in PNI examples.

The Prosody of PNI in Niuean

Data collection: Prosodic data from 5 native speakers living in Auckland, NZ were collected for this study. 30 canonical VSO examples, 30 corresponding PNI examples, and 40 fillers were recorded for each speaker. Speakers recorded a mixture of VSO and PNI examples in a single session; but minimal pairs were not recorded in the same session. The data were coded by an undergraduate trained in Praat (Boersma & Weenink 2013) and naive to the purposes of this study. If the coder determined that an example was hesitant, contained disruptive background noise, or was otherwise unusable, the corresponding VSO or PNI example was later excluded from the analysis as well.

Results and Analysis: The data show that phonological phrases (PPh) are produced with a H*L- tune. The H* is achieved on the most prominent syllable of the rightmost prosodic word (PWd) in the PPh, and the pitch falls immediately thereafter (see DeLacy 2003 for similar findings for Māori). The verb and the incorporated element in PNI examples form a prosodic constituent of the sort that is delimited by a H*L- tune. Evidence supporting this claim comes from phrase-final lengthening and pitch maxima.

Two pieces of evidence support the claim that the verb is at the right-edge of a PPh in the VSO examples, but not in the PNI examples. First, the maximum pitch on the verb is significantly

1Examples in this paper are based on ones found in Seiter (1980) and Massam (2001), but they were amended for the purpose of this study in collaboration with a native speaker.
higher in the VSO examples than it is in the PNI examples \( (p < .0001) \). This demonstrates that in VSO, but not PNI, the verb is the rightmost PWd in the relevant phrase. Second, the duration of the verb in the VSO examples is significantly longer than it is in the PNI examples \( (p < .005) \), suggesting that there is phrase-final lengthening on the verb in the VSO examples, but not in PNI examples.

The final finding pertains to the distribution of pauses in the data. Participants are approximately 3 times more likely to pause after the verb in VSO examples than in PNI examples. Furthermore, in all of the PNI examples where speakers pause after the verb, the incorporated element is modified. In order to account for the distribution of the pauses, I propose that these pauses optionally marks the left-edge of non-minimal projections (Elfner 2012, Ito and Mester 2010). Non-minimal projections are those which dominate another PPh of the same category. Unmodified NPs are minimal projections, while modified NPs are non-minimal, because they dominate another PPh formed on the basis of the AP, as illustrated in (3).

\[
\text{(3) Minimal and Non-minimal projections of } \varphi \\
\text{NP} \rightarrow \varphi(\text{min}) \\
\text{NP} \rightarrow \varphi(\text{non-min}) \\
\text{N} \quad \text{N} \\
\text{N} \quad \text{AP} \\
\text{N} \quad \text{Adj} \\
\text{Adj} \\
\text{Adj}
\]

The fact that only modified NPs are proceeded by pauses in PNI structures cannot be explained by the weight of the NP. Some of the unmodified NPs, such as *magafaoa* ‘family’ and *faiaoga* ‘teacher,’ are as heavy or heavier than some of the modified NPs that are proceeded by pauses, such as *ika lahi* ‘big fish’ and *lologo foou* ‘new songs.’

**Conclusions**

This paper contributes new data on the prosodic phrasing in Niuean and specific data on the phrasing of PNI. The data show that PPhs are generally produced with a H*L- tune, where the H* is reached on the most prominent syllable of the rightmost PWd in the PPh. This paper also defends the conclusions that (i) the verb and the incorporated element in PNI structures form a prosodic constituent and (ii) the peculiar distribution of pauses in modified and unmodified PNI structures is best accounted for with a recursive prosodic structure.

**Works Cited**


