

Processing Switch Reference Marking in Nungon: Comprehension & Production Measures

Adam Morgan¹, Jenny Yu², Ismael Dono³, Lyn Ögate³, Hannah Sarvasy²

¹NYU School of Medicine, ²Western Sydney University, ³Nungon Community Member

Our knowledge of syntactic processing largely stems from languages like English [1], with grammars that allow for incremental sentence planning and comprehension. But hundreds of languages around the world have morphemes called ‘Switch-Reference (SR) Markers’ [2], which flag whether the subject of the next clause will be the same (‘SAME’) or different (‘SWITCH’) from the subject of the current clause, forcing speakers to plan speech at least two clauses at a time [3]. These are illustrated in a four-clause sentence from the Papuan language Nungon:

1. Oesit ongo-nga, tanak yo-una, ketket e-una, koreng togomorok.
Girl going-SAME, food carrying-SWITCH, boy coming-SWITCH, they played.

In the present study, 32 Nungon native speakers participated in a battery of production and comprehension experiments using eye-tracking and behavioral methods. Data coding and analysis are ongoing, but final results will be presented at HSP 2025. Here, we report preliminary findings from two experiments:

Comprehension. Participants listened to five-clause Nungon sentences with SR marking while we tracked their gaze to corresponding figures on a laptop screen. In a previous comprehension study [3], we failed to detect an effect of SR marking on gaze patterns. However, a number of features of this study complicated its interpretation, including the use of naturalistic stimuli (i.e., without an experimentally controlled manipulation). Here, we experimentally manipulated the SR morpheme at the end of the second clause by splicing recordings so that auditory stimuli were otherwise identical across conditions. In contrast to [3], our results show a robust effect (Fig. 1): SWITCH morphemes led to increased looks to the subject of the third clause relative to SAME morphemes prior to the onset of the third clause. This indicates that comprehenders do use SR-marking for prediction, aligning with broader evidence for morphology-based prediction [4].

Production. SR marking requires that the speaker compute whether the current subject and upcoming subjects differ, potentially introducing opportunities for interference akin to agreement attraction errors (**The key to the cabinets are on the table*). In production, one possible account is that such errors derive from misidentification of the subject [5]. If so, then similar misidentification should result in SR attraction errors, where the production system mistakenly chooses the SAME morpheme in sentences like (2) (the translation of a Nungon stimulus), where a relative clause (RC) on the root noun introduces a competitor noun:

2. As the girl [whose aunt bathed]_{RC} was singing-SWITCH/*SAME, her aunt watched for snakes.

We instructed participants to listen to Nungon sentences like (2) and repeat them verbatim. Auditory stimuli were presented error-free; we expected that this would not prevent participants from producing speech errors given previous findings that sentence recall relies on reconstructing a sentence from a meaning representation rather than a recall of acoustic or lexical information [6]. Stimuli appeared in a 2x2 design (Table 1), intended to induce SR and/or agreement attraction errors. Of 183 transcribed and coded trials (10% of the dataset), we identified 6 agreement attraction errors but no SR marking errors, suggesting distinct retrieval and/or maintenance processes for number and reference. If this finding holds, it would imply a remarkable degree of complexity in Nungon production, involving simultaneous, distinct mechanisms for accessing different kinds of information about the subject. We will report results from a mixed effects logistic regression modeling errors as a function of the two conditions, *reference competitor* and *number competitor*, with random intercepts for items and participants and slopes for both manipulations.

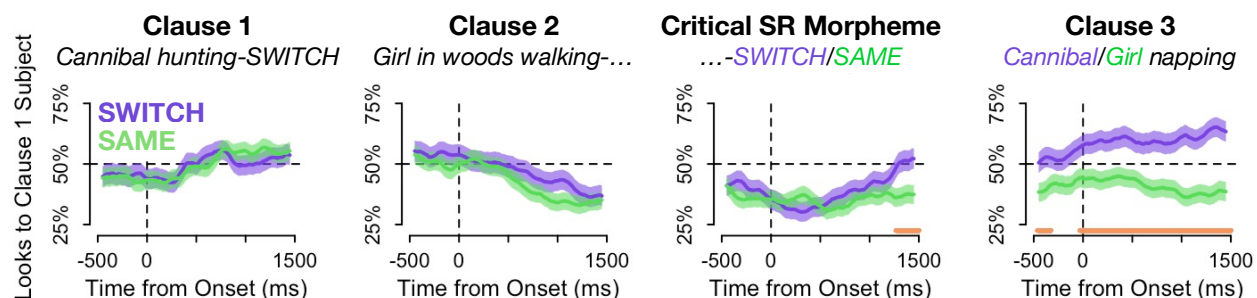


Figure 1. Gaze results from comprehension study. Proportion of looks to the subject of Clause 1 over time, locked to the onset of each of the first three clauses (Panels 1, 2, and 4) and to the critical SR morpheme at the end of Clause 2 (Panel 3). The SR morpheme was either SWITCH (purple) or SAME (green). Orange bars denote times when SWITCH and SAME conditions differed significantly, based on a preliminary fixed-effects logistic regression. (The planned final analysis will include random intercepts for participants and items and random slopes for the SR manipulation.) We followed [6] in establishing a conservative criterion for significance to account for multiple comparisons in time series data. Italics in titles provide an example stimulus. The Clause 1 and 2 stimuli were acoustically identical until the critical morpheme. A significant difference first appeared ~1250ms after the critical morpheme (Panel 3). Critically, this difference was also observed prior to the onset of Clause 3 (Panel 4), confirming that increased looks to the Clause 3 subject were driven by the SR morpheme.

	Clause 1 Subject	Relative Clause	Clause 1 Verb	Correct SR Morpheme	Target Errors	Clause 2
Control	Dog	who its-3SG child-SG was sleeping-3SG	running away	SWITCH.3SG	N/A	Its-3SG owner-SG cried-3SG.
SR Competition	Dog	who its-3SG child-SG was sleeping-3SG	running away	SWITCH.3SG	SAME <i>Switch Reference Attraction</i>	Its-3SG child cried-3SG.
Number Competition	Dog	who its-3SG children-PL were sleeping-3PL	running away	SWITCH.3SG	SWITCH.3PL <i>Agreement Attraction</i>	Its-3SG owner cried-3SG.
SR & Number Competition	Dog	who its-3SG children-PL were sleeping-3PL	running away	SWITCH.3SG	SAME or SWITCH.3PL	Its-3SG children-PL cried-3PL.

Table 1. English pseudo-glosses for the Nungon stimuli in the production experiment. Relative clauses introduced competitor nouns. Stimuli were recorded with the correct SR morpheme (blue), and the dependent variable in analysis will be whether or not the produced morpheme matched the correct form or one of the target errors (red). (3SG = 3rd person singular; 3PL = 3rd person plural)

References

[1] Rad et al., 2018 [2] Haiman & Munro, 1983 [3] Sarvasy et al., 2022 [4] Pizarro-Guevara & Wagers, 2020 [5] Pappé et al., 2021 [6] Potter & Lombardi, 1990 [7] Maris & Oostenveld, 2007