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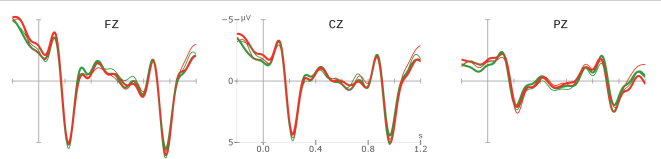
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Introduction

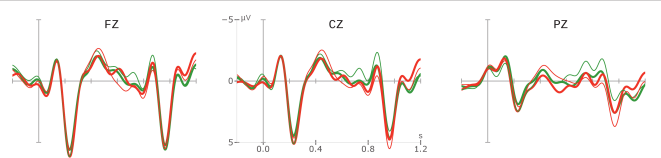
Arabic verbs generally agree with their subject in Person, Number and Gender. For plural subjects, the verb agrees fully in the subject-verb (SV) order, whereas in the verb-subject (VS) order, verb agreement should be partial (only Person and Gender) if the subject is overt, and full if it is dropped. In other words, for a VS structure with an overt subject to be grammatical, the sentence-initial verb must show singular agreement regardless of whether the overt subject is singular or plural. Note that a sentence-initial plural verb per se does not constitute a violation, insofar as the subject is dropped in the unfolding utterance. In the present ERP study, we investigated whether the processing system is sensitive to this idiosyncratic behaviour of plural subjects in verb-initial intransitive structures with an overt subject. Our hypotheses were: First, there should be no differences in the ERPs for singular versus plural verbs sentence-initially. Second, at the position of the subject, plural subjects must show qualitatively different ERPs as opposed to singular subjects that follow a singular verb. It remains to be seen what this difference will be. Third, if the processing system initially adopts a non-anomalous reading for plural subjects, effects related to the violation must be observed at the position of the following material that conclusively signifies the anomaly.

Results

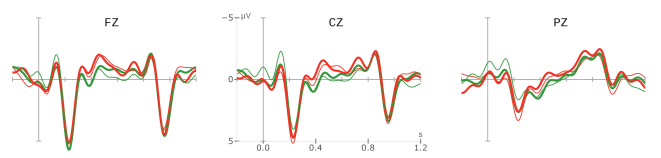
ERPs at the Verb



ERPs at the Subject



ERPs at the Adverb



N = 34 — SVPS — PVPS — SVSS — PVSS

Results

- At the Verb: No effects.
- At the Subject: -
 - Negativity for singular subjects, regardless of condition-type
 - Early Positivity for PVPS as opposed to PVSS
 - Late Positivity for all conditions except SVSS
- At the Adverb: Negativity for violation conditions

Methods

Participants:

- 34 right-handed native speakers of Arabic

EEG Data:

- Recorded using ActiCap fixed at the scalp; 25 Ag / AgCl electrodes
- Reference: Left-mastoid, re-referenced to linked mastoids offline
- Ground electrode: AFZ; Offline filter: 0.3 – 20 Hz band-pass

Procedure:

- Rapid serial visual presentation of stimulus sentence
- Tasks: Acceptability judgement followed by Probe detection

Materials:

- Sentences of the form: Verb – Subject – Adverb of time – PP.
- Adverb was identical ('Yesterday') in all sentences
- Subject noun : masculine / feminine animate common noun
- 4 Critical Conditions (36 sentences in each condition per participant)
 - 2 Condition-Types: Singular-marked Verb or Plural-marked Verb
 - 2 Subject-Types: Singular or Plural

Acceptability	من النوم.	بالأمس	البنات	استيقظتُ	SVSS
93 %	'al-nawm min	bi-l-'ams	'al-binat	'istayqaDH-at	
	[DEF-sleep]	[from]	[in-DEF-yesterday]	[DEF-girls]3sg.F	[wake-up]Past-3sg.F
	'Yesterday, the girl woke-up from sleep'.				

Acceptability	من النوم.	بالأمس	البنات	استيقظتُ	SVPS
92 %	'al-nawm min	bi-l-'ams	'al-banaat	'istayqaDH-at	
	[DEF-sleep]	[from]	[in-DEF-yesterday]	[DEF-girls]3pl.F	[wake-up]Past-3sg.F
	'Yesterday, the girls woke-up from sleep'.				

Acceptability	من النوم.	بالأمس	البنات	استيقظنُ *	PVSS
29 %	'al-nawm min	bi-l-'ams	'al-binat	'istayqaDH-na	
	[DEF-sleep]	[from]	[in-DEF-yesterday]	[DEF-girls]3sg.F	[wake-up]Past-3pl.F
	**Yesterday, the girl woke-up from sleep'.				

Acceptability	من النوم.	بالأمس	البنات	استيقظنُ *	PVPS
76 %	'al-nawm min	bi-l-'ams	'al-banaat	'istayqaDH-na	
	[DEF-sleep]	[from]	[in-DEF-yesterday]	[DEF-girls]3pl.F	[wake-up]Past-3pl.F
	**Yesterday, the girls woke-up from sleep'.				

Discussion

Whilst singular subjects elicited a negativity regardless of condition-type, those following a plural-marked verb additionally engendered a late-positivity, suggesting perhaps to interpret the negativity differently for singular subjects in the acceptable versus violation condition^{F1}. By contrast, plural subjects did not elicit a negativity, but only a late-positivity, regardless of condition-type, which can be plausibly interpreted as reflecting the syntactic integration difficulty [1] and the predictions the processing system must make about the forthcoming material [2]. On encountering the subject following a sentence-initial plural verb, it appears that the processing system did not conclude it to be globally anomalous until the end of the clause (adverb), at which point both anomalous conditions elicited a negativity effect. These results suggest that the processing system is sensitive to the idiosyncrasy of plural subjects in Arabic, and prefers to analyse them at first as syntactically difficult but nevertheless not conclusively anomalous in intransitive verb-initial structures. However, in view of the intriguing acceptability ratings, a self-paced reading study with judgements at each word, as well as a sentence completion study to deduce possible acceptable continuations given a plural intransitive verb that precedes a noun are under way in order to evaluate our current interpretation. Possible influences of widespread usage of subject-drop in Arabic likewise needs to be examined further.

[1] Kaan et al. (2000). The P600 as an index of syntactic integration difficulty. *Language and Cognitive Processes*, 15, 159–201.

[2] Frisch et al. (2002). The P600 as an indicator of syntactic ambiguity. *Cognition*, 85, B83–B92.

Footnote 1. This negativity for singular subjects, regardless of condition-type, cannot be accounted for by possible differences in word frequencies, because, the same nouns occurred in their plural form in the plural conditions, which did not elicit a similar negativity. And if anything, the plural forms would have been less frequent than their singular counterparts, given all our critical nouns are animate human nouns in Arabic. Rather, it appears that a reasonable point to consider in this regard is the widespread usage of subject-drop in Arabic. Further examination, possibly using subject-dropped transitive and intransitive structures, is inevitable to address this.

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