Unheralded pronouns and discourse referents

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Establishing reference for the entities in a discourse situation is crucial for building a *discourse model* DM [3]. There are different ways in which we can establish this reference. We can use referring expressions, such as definite noun phrases or proper names to introduce new referents. We can also use pronouns to refer back to previously introduced referents. In an EEG experiment on Swedish, we investigated to what extent pronouns and definite NPs are processed as introducing new referents, or as anaphoric expressions that retrieve their referents from the established DM. Pronouns without agreeing antecedents, so called *unheralded* pronouns [2], have either been taken to introduce a new discourse referent in the DM[4], or have been treated as a grammatical agreement error [4, 5]. What has not been investigated before, to the best of our knowledge (but see [1] for an eyetracking study on cataphoric pronouns), is how definite NPs (NP in (1)) are processed when they have an unheralded pronoun preceding them; will they by default introduce a new discourse entity in the DM, or will they be coreferential with the pronoun? The experimental set-up also allows us to compare the processing of pronouns that lack any preceding antecedent and cannot be interpreted as gender mismatches (P1 in (1)), and pronouns with possible antecedents (P2 in (1)).

(1) Innan hon/han$_{P1}$ gick sa flickan$_{NP}$ att hon/han$_{P2}$ hade väldigt bråttom.
Before she/he$_{P1}$ left said the-girl$_{NP}$ that she/he$_{P1}$ had a lot of hurry
'*Before she/he left the girl said that she/he was in a hurry*.'

Forty-eight self-reported native speakers of Swedish, right-handed and without any neurological diagnoses, read sentences where NPs and pronouns were introduced without a possible gender-matching antecedent, or with a gender-matching antecedent. Each item (160 in total, 80 with a female gendered NP and 80 with a male gendered NP) contained four sentences where P1 and P2 either agreed or disagreed in gender with the NP (see (2) on p2. for a full item). The sentences were distributed across four lists in a Latin Square design and pseudorandomized with 160 filler sentences. EEG was registered with 32 scalp electrodes in a 10-20 setup. ERPs on P1, NP, P2 and the last word in the sentence were extracted. The data were fitted linear mixed effects model to regions of interest and time windows based on previous studies. The ROI and time windows corresponded to early and late left anterior effects, P600, Nref and N400 effects.
Results on the second pronoun, P2, show that there is a significant P600 effect when there are no matching antecedents and a marginally significant early left anterior effect (see table 1). In contrast to e.g. [4] we do not find any late LAN, Nref or N400 effects on the pronoun. We interpret the P600 effect as related to introduction of a new discourse referent in the DM, and not an agreement error. In the presentation we will elaborate on these results and discuss how they compare to those of pronoun 1, the definite NP and the last word in the sentence.

Figures and Tables

(2) Example item

context sentence: Klockan var redan åtta på morgonen. *It was already eight o'clock in the morning.*

a. Innan hon gick sa flickan att hon hade väldigt bråttom.
Before she left said the-girl that she had a lot of hurry
'*Before she left the girl said that she was in a hurry*'

b. Innan han gick sa flickan att hon hade väldigt bråttom.
Before he left said the-girl that she had a lot of hurry
'*Before he left the girl said that she was in a hurry*'

c. Innan hon gick sa flickan att han hade väldigt bråttom.
Before she left said the-girl that he had a lot of hurry
'*Before she left the girl said that he was in a hurry*'

d. Innan han gick sa flickan att han hade väldigt bråttom.
Before he left said the-girl that he had a lot of hurry
'*Before he left the girl said that he was in a hurry*'

Table 1: Pronoun2 match and mismatch with pron1 and NP

P600	Est.	Std. E	df	t-value	Pr($>\|t\|$)	
MATCH-P1–MATCH-NP (Int.)	-0.20	0.112	62.069	-1.77	0.0807	.
MISMATCH-NP	-0.08	0.110	340.114	-0.75	0.4516	
MISMATCH-P1	-0.09	0.106	363.484	-0.83	0.4037	
MISMATCH-NP–MISMATCH-NP	0.39	0.164	79.852	2.37	0.0198	*
ELAN	Est.	Std. E	df	t-value	Pr($>\|t\|$)	
MATCH-P1–MATCH-NP (Int.)	0.25	0.10	95.19	2.417	0.0176	
MISMATCH-NP	-0.18	0.11	7252	-1.670	0.0949	.
MISMATCH-P1	0.00	0.13	116.1	0.022	0.9822	
MISMATCH-NP–MISMATCH-NP	0.22	0.15	7250	1.401	0.1613	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'

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