Tracking the time-course of agreement processing: Unagreement in Spanish

Agreement processing is here analyzed using a phenomenon available in Spanish – Unagreement in which a person mismatch between a plural subject and a verb nonetheless produces a well-formed sentence (see 1b). In these sentences, the verbal person value is superimposed onto the nominal one, thus shifting subject interpretation from “The journalists” to “We journalists” and ensuring correctness.

We initially assessed how Spanish speakers evaluated Unagreement compared to both Standard agreement and ungrammatical Person Mismatches. A delayed and an online grammaticality judgment (GJ) task were designed where participants read 120 sentences divided into three experimental conditions (see 1). In the delayed GJ task, 20 participants read the material word-by-word and gave their judgment at the end of the sentence. A main effect of condition was found ($F_{(2,38)}=10.63$, $p<.001$). Response times (RTs) for person violations were significantly shorter (465 ms) than for the Control (533 ms) and the Unagreement (532 ms) conditions. No difference emerged between Unagreement and Control. In the on-line GJ, the whole sentence was presented and participants ($n=34$) were asked to give their judgment after reading it. A main effect of condition emerged ($F_{(2,66)}=24.42$, $p<.001$), arguably due to the significantly faster rating given to person-anomalous sentences (2.9 sec) compared to both Control (3.8 sec, $p<.05$) and Unagreement (3.9 sec, $p<.01$) sentences. No difference emerged between Unagreement and Control.

A subsequent eye-movement experiment focused on more fine-grained measures to evaluate the real-time processing of the different agreement patterns. Twenty-four Spanish participants read the same sentences as in the previous experiments. Six eye-movement measures were analyzed on the verb: 1) first-fixation duration; 2) gaze duration (duration of all fixations before leaving the target); 3) total reading time (duration of all fixations, including re-reading); 4) go-past time (time from first fixating the target to first moving forward, including re-reading earlier parts); 5) probability of regression to the target; 6) number of regressions to the target. Unagreement elicited longer gaze duration ($F_{(2,46)}=8.45$, $p<.05$), total reading times ($F_{(2,46)}=24.31$, $p<.01$) and a higher probability of regression ($F_{(2,46)}=5.55$, $p<.05$) than Control. Person anomalies elicited longer gaze-duration times ($F_{(2,46)}=8.45$, $p<.001$) and more regressions ($F_{(2,46)}=3.47$, $p<.01$) compared to Control, together with greater total ($F_{(2,46)}=24.31$, $p<.001$) and go-past ($F_{(2,46)}=22.76$, $p<.001$) times. The comparison between Unagreement and Person Mismatch revealed shorter total ($F_{(2,46)}=24.31$, $p<.01$) and go-past ($F_{(2,46)}=23.82$, $p<.001$) times for the former condition.

The emergence of an incongruity effect in early measures suggests the parser’s sensitivity to feature inconsistency, regardless of whether a seeming or true person mismatch is involved (Mancini et al. in press). Later, the costly person shift required for Unagreement comprehension is reflected in the longer total reading times and the slower RTs required to assess its grammaticality. The consequences of this shift are however more short-lived compared to those of person anomalies. Overall, these findings support the hypothesis that in agreement comprehension two distinct phases can be identified: a feature-checking stage, to check feature consistency and the presence of possible anomalies (cf. Molinaro et al. 2011), and a later stage responsible for evaluating grammaticality and assigning an interpretation to the dependency.

References:


Examples:

(1) a. Los periodistas **escribieron** un artículo muy interesante  
   The journalists wrote an article very interesting  
   ‘The journalists wrote a very interesting article’  
   Control

b. Los periodistas **escribimos** un artículo muy interesante  
   The journalists wrote an article very interesting  
   ‘We journalists wrote a very interesting article’  
   Unagreement

c. *El periodista **escribiste** un artículo muy interesante  
   The journalist wrote an article very interesting  
   ‘The journalist wrote a very interesting article’  
   Person Mismatch

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**Figure 1.** Mean RTs for the three experimental conditions in the on-line GJ.

**Figure 2.** Mean RTs (in msec) for the three experimental conditions in the eye-tracking experiment (gaze duration and total reading times variables)