Plural attraction in attachment ambiguity

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In English, subjects and verbs agree in number. However, speakers sometimes erroneously produce a plural verb that agrees in number with some other noun in the sentence rather than the subject noun, as in *" The key to the cabinets were…"* (*e.g.,* Bock & Eberhard, 1993; Bock & Miller, 1991). These are called "attraction" errors. Wagers et al. (2009) argue that the confusion that leads to plural attraction arises at the point of trying to identify the verb's subject in the memory representation of the sentence so far. However, it remains unclear whether a search for the subject is triggered whenever a verb is encountered, or only when features of the verb do not match those predicted for it based on the features of the subject noun. This study examines mechanisms underlying agreement processing using temporarily ambiguous structures such as *The reporter shocked the advisor of the politicians who was at the meeting*.

Four different versions of each critical sentence (see (1) below) were generated by manipulating whether it was disambiguated toward a low (1a,b) or high (1c,d) attachment interpretation and whether the attractor noun was plural (1a,c) or singular (1b,d). Sentences were presented in word-by-word fashion in the center of the screen while event-related brain potentials (ERPs) were recorded. After each sentence, participants judged its acceptability.

Most previous studies have shown a preference for low attachment in English sentences like (1) (e.g., Cuetos & Mitchell, 1988), with the relative clause modifying the low noun. If retrieval of the subject's number occurs only when the prediction about the verb's number is contradicted, there should be no attraction effects in the low attachment structure because the verb agrees with the low noun as expected. In contrast, if subject retrieval occurs whenever verbs are encountered, there should be plural attraction effects in sentences with both kinds of attachment. Because two nouns that are both syntactically legal subjects strongly compete to control agreement, features like plurality have a better chance to interfere with agreement processing in both kinds of attachment structures.

Consistent with the low attachment preference for English, we found a P600 effect 500-900ms after the onset of the relative clause verb when it disambiguated toward the high attachment structure. The effect of attractor number appeared as a frontal negativity 300-900ms after verb onset, with greater negativity at prefrontal electrode sites when the attractor noun was plural than when it was singular. This pattern suggests that the plural attractor noun increased the demands imposed by having to select among multiple candidates for subject status (van Berkum et al., 1999). However, this effect did not interact with attachment type, ruling out the prediction-based account.

The results support the view that agreement processing always involves a cue-retrieval process in which the features of the subject are re-accessed at the verb. In temporarily ambiguous structures like (1), the retrieval mechanism results in interference from a plural attractor, which leads to confusion about which noun is the subject, even though verb number fully disambiguates attachment.

(1)   a. Low attachment, <u>plural attractor</u>
          *The reporter shocked the <u>advisors</u> of the **politician** who **was** at the meeting.*
        b. Low attachment, <u>singular attractor</u>
          *The reporter shocked the <u>advisor</u> of the **politicians** who **were** at the meeting.*
        c. High attachment, <u>plural attractor</u>
          *The reporter shocked the **advisor** of the <u>politicians</u> who **was** at the meeting.*
        d. High attachment, <u>singular attractor</u>
          *The reporter shocked the **advisors** of the <u>politician</u> who **were** at the meeting.*

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