Priming methods in semantics and pragmatics*

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Abstract: Structural priming is a powerful method to inform linguistic theories. We argue that this method extends nicely beyond syntax, to theories of meaning. However, priming should still be seen as only one of the tools available for linguistic data collection. Specifically, because priming can occur at different, potentially conflicting levels, it cannot detect every aspect of linguistic representations.

Branigan and Pickering (henceforth, B&P) argue that structural priming is a powerful method to inform theories of linguistic structure, and they even suggest that it could supersede other methods such as acceptability judgments. We will argue that the method extends nicely beyond syntax, to theories of meaning, where priming can serve to reveal abstract interpretive operations. In doing so, however, we will see why structural priming should still be seen as one among many of the tools available for linguistic data collection. In particular, because priming can occur at different, potentially conflicting levels, it cannot detect every aspect of linguistic representations.

The primary data used in formal semantics/pragmatics are truth-value inferential judgments. These methods document the result of interpretive processes: what a sentence ends up meaning. Priming methods can be useful here just like in syntax, where, schematically, acceptability judgments target the output of a cognitive process, while priming data may offer a window into some aspects of this process. In formal semantics and pragmatics, the relevant elementary interpretive processes are often abstract "invisible" operations. Here are two prime examples:

- A silent distributivity operator whose meaning is akin to "each" has been postulated to explain why sentences involving more than one plural expression, such as "Two boys read three books", have both a cumulative interpretation (i.e. Two boys read three books in total) and a distributive interpretation (i.e. two boys read three books *each*) - see Champollion (to appear), for a survey.
- Sentences such as 'some of the students came' tend to acquire a strengthened meaning amounting to 'some but not all of the students came' (scalar implicature). On some accounts, this strengthening is a pragmatic process, while on others, it is due to the presence of a covert exhaustivity operator. In both approaches, however, the very same mechanism is responsible for the strengthening of *some* into *some but not all*, *may* into *may but does not have to*, *three* into *exactly three* (though this last case is more controversial).

Distributivity and exhaustivity operators are often thought as covert linguistic operators, which are part of syntactic representations (Chierchia, Fox & Spector, 2012; Link, 1987). Alternatively, exhaustivity operators can also be seen as pre-compiled proxies for late, postcompositional pragmatic processes (Spector, 2007; van Rooij & Schulz, 2004). In either case, the possibility of priming exhaustive or distributive interpretations across sentences featuring different trigger words would confirm the posited abstract mechanisms, beyond their mere interpretive effects. Indeed, recent studies using typical priming paradigms (e.g., Raffray & Pickering, 2010) have provided evidence in favor of an abstract mechanism for distributivity (Maldonado, Chemla & Spector, 2017) and exhaustivity (see Bott & Chemla, 2016; Chemla & Bott, 2014; Rees & Bott, submitted): schematically, the presence of a distributivity/exhaustivity operator in a sentence primes the presence of this operator in a subsequent *distinct* sentence, showing that the cognitive representations associated with both sentences share an abstract property.

Since priming can occur at different levels (e.g., syntax and semantics), it is tempting to assume that *every* aspect of linguistic representations can be primed. From there, B&P suggest that we could use the absence of priming effects triggered by certain hypothetical operations as an argument against theories which posit such operations. But this is too radical, as we will briefly argue, focusing on scope assignment in doubly-quantified sentences (B&P; Chemla & Bott, 2015; Feiman & Snedeker, 2016; Raffray &

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Pickering, 2010). First, a specific operation can be well-motivated independently of priming. Second, the absence of a particular priming effect may be due to a conflict with another potential source of priming.

The Quantifier Raising operation has been hypothesized to explain cases of mismatch between the surface ordering of quantifiers and their relative semantic scope: the sentence 'A girl invited every boy' can receive the interpretation 'for every boy x, a girl y invited x', where the universal quantifier takes scope above the existential, reversing the surface ordering at the interpretive level. Importantly, QR is not the only possible mechanism to derive inverse scope (through movement). Crucially, all frameworks, including the Parallel Architecture view (Culicover & Jackendoff, 2005) endorsed by B&P, need to characterize the mapping between syntax and semantics, and thus need *some* mechanism to account for inverse scope interpretations.

Since semantic operations can be primed (cf. above), the inverse-scope operation (whatever it is, under any account) might in principle be primed. As observed in the target article, recent studies (Chemla & Bott, 2015; Raffray & Pickering, 2010) did not observe priming of the inverse-scope operation. Instead, these studies revealed priming of the scopal relation itself: a sentence interpreted with a universal taking scope over an existential quantifier would prime a similar interpretation of a subsequent sentence, with a universal taking scope over an existential quantifier, whether or not these interpretations require inverse-scope of the prime sentence and/or of the target. Priming of the inverse scope operation was not found, but this potential priming effect was pushing in a direction opposite to that of priming of relative scope. The only conclusion we can draw then is that the latter is stronger than the former, and certainly not that an inverse scope mechanism does not exist (especially given that such a mechanism is necessary in any framework to account for interpretive judgments).

Priming can be used to reveal the existence of a (primable) aspect of linguistic representations, in syntax and in semantics as we have shown, but not so much to argue against the existence of a (less primable or potentially non-primable) feature. Linguistic theories should (a) represent the primable features, and (b) provide the means to distinguish between more or less primable features. Although (a) is consistent with B&P, one may understand B&P as implying that all aspects of linguistic representations can in principle be equally primed, thus rejecting (b). Such a radical view might lead to an unwarranted bias in favor of less expressive theoretical frameworks, by allowing researchers to ignore all aspects of linguistic phenomenology that are not detectable in priming experiments.

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