Processing and Grammar constraints in Extraction from Weak Islands

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According to featural Relativized Minimality (henceforth, fRM), the relation between an extracted element and its trace is disrupted as a function of the degree of feature overlap between that element and the intervening one: interference is (i) maximal when the relevant featural specification of the intervener completely overlaps that of the extracted element (feature Identity), and (ii) moderate when the relevant featural specification of the intervener only partially overlaps that of the extracted element (feature Inclusion) [1]-[2]. Relevant features are defined in terms of their potential to trigger movement. However, not all cases of Identity are equally degraded, and some configurations of Identity are even more acceptable than Inclusion [3]-[4]. In particular, Complex Identity in which both wh-elements are lexically restricted (e.g., *Which problem* do you wonder *which student* solved?) were found to be rated higher than both Bare Identity (in which both wh-elements are bare, e.g., *What* do you wonder *who* solved?) and Inclusion (in which the extractee is more richly specified than the intervener, e.g., *Which problem* do you wonder *who* solved?). The high acceptability of Complex Identity cannot be accounted for by fRM, and calls for an explanation.

Under the hypothesis that long-distance dependencies are not only constrained by grammatical principles but also by processing limitations, one may entertain the possibility that characteristics of the memory mechanisms underlying object retrieval in these sentences also influence their acceptability. The literature on memory retrieval in sentence processing has shown that retrieving a long-distance element involves a cue-based retrieval mechanism sensitive to similarity-based interference both at the syntactic and at the semantic levels [5]-[6]. In this view, Complex Identity is expected to be more acceptable than any other configuration involving feature overlap due to the semantic richness of the two lexically restricted wh-elements, which renders them maximally distinct and therefore less sensitive to similarity-based interference. Indeed, although in Complex Identity both wh-elements are identical regarding their syntactic features [+Q,+N], they are endowed with rich bundles of semantic features (e.g., animacy, imageability, humanness, etc.). If we consider a sentence like *Which problem do you wonder which student solved?*, retrieval of the extracted wh-element may be eased by the fact that *problems* can be solved, therefore providing a good semantic cue to the object retrieval process triggered by the verb, whereas *students* cannot be solved, therefore providing a poor cue [7]. None of this applies to Bare Identity in which both wh-elements are semantically underspecified. In order to investigate the role of semantic cues in modulating the acceptability of such sentences, we ran two acceptability judgments experiments in French extraction from weak islands testing respectively the role of the specificity of the semantic relation between the verb and its arguments, and the role of animacy. If the ease of memory retrieval is a significant source of the overall acceptability of sentences involving long-distance dependencies, semantic cues contributing to reduce the overlap between the featural specification of the extractee and that of the intervener are expected to increase acceptability. None of these two factors is expected to play a role under fRM since they play no role in triggering movement.

Experiment 1 manipulated the type of Structure (Bare Identity *vs.* Complex Identity) and the Specificity of the Verb with respect to its arguments (Specific *vs.* Non-specific), as illustrated in (1).

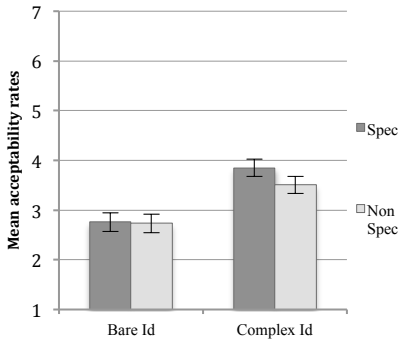
(1) a. Who do you wonder who saw?
b. Who do you wonder who rejected?
c. Which student do you wonder which professor saw?
d. Which student do you wonder which professor rejected?

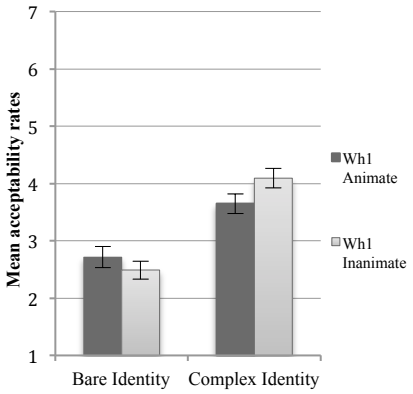
Experiment 2 manipulated the type of Structure (Bare Identity *vs.* Complex Identity) and the Animacy of the extracted wh-element Wh1 (Animate *vs.* Inanimate), as illustrated in (2).

(2) a. Who do you wonder who painted?
b. What do you wonder who painted?

c. Which model do you wonder which artist painted?
d. Which landscape do you wonder which artist painted?

Forty-two participants were asked to judge the 32 experimental items of each experiment on a 7-points Likert scale as well as 144 fillers. Data were analysed with mixed-effects models. Results from Experiment 1 revealed an effect of Structure, attesting to higher scores for Complex Identity (M=3.7) than for Bare Identity (M=2.7), as well as an effect of the Specificity of the Verb, attesting to higher rates when the embedded verb is specific than when it is not. A significant interaction between Structure and Verb Specificity revealed that Verb specificity only affected Complex Identity, with higher acceptability judgments for the condition with a specific verb (1d) than for the condition with a non-specific verb (1c). This shows that the effect does not lie in the specificity of the verb itself but rather in the specificity of the relationship between the verb and its arguments: the richer specificity of the dependency involving restricted wh-elements reduces interference improving retrieval. Results from Experiment 2 showed an effect of Structure with higher scores for Complex Identity (M=3.8) than Bare Identity (M=2.6). We also found an effect of Animacy, attesting to higher rates when Wh1 is inanimate than when it is animate. A significant interaction between Structure and Animacy revealed that whereas for Complex Identity higher scores were found with inanimate Wh1, the opposite was found for Bare Identity. The finding for Complex Identity is in line with the memory retrieval hypothesis, according to which a mismatch in animacy increases distinctiveness between the to-be-retrieved wh-element and the intervening one. As for the increasing acceptability observed for two animate wh-elements in Bare Identity, we suggest that this lies in the greater syntactic weakness of *what* with respect to *who* which may contribute to reduce its extractability as compared to *who* (e.g., only *what* is used as scope marker in partial wh-movement constructions in German, *what* being the most unmarked wh-phrase [8]).





Results from the two experiments show that fine-grained semantic constraints play a role in modulating the acceptability of weak islands: greater semantic distinctiveness improves acceptability judgments by reducing interference between units in memory. However, conditions with maximal semantic distinctiveness remain extremely low, with scores that do not exceed 4 over 7. All in all, the data suggest that whereas the grammatical constraint bearing on intervention as defined by fRM provides a powerful tool to account for the strong degradation of structures such as weak islands, processing constraints lying in the cue-based nature of memory retrieval may account for the fine-grained modulation of their acceptability, paving the way for a framework taking into account the interplay of grammar and processing.

References

[1]Rizzi (2001). Relativized Minimality Effects. [2]Friedmann et al. (2009). Relativized relatives. Types of intervention in the acquisition of A-bar dependencies. [3]Atkinson et al. (2013). Wh-island amelioration at the interfaces: syntax, processing, and semantic distinctness. NELS. [4]Villata et al. (2013). Relativized Minimality and parsing: new insights on the role of similarity. AMLaP. [5]McElree (2006). Accessing recent events. [6]Van Dyke 2007. Interference effects from grammatically unavailable constituents during sentence processing. [7]Hofmeister et al. (2013). The source ambiguity problem: distinguishing effects of grammar and processing on acceptability judgments. [8] Fanselow (2006). Partial wh-movement.