Predicting binding domains: Evidence from fronted auxiliaries and wh-predicates

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Online anaphoric dependency resolution has been argued to be immediately guided by structural constraints such as the Binding Theory (BT, [1,2,3,4]). In a sentence completion study and a self-paced reading (SPR) experiment, we investigate the role of predicted structures in antecedent retrieval [5]. The results suggest that structural expectations arising from fronted auxiliaries influence the retrieval of antecedents for pronouns in fronted wh-predicates.

Key Manipulation: was vs. did Pronouns in predicate wh-phrases (*how proud of **him***) are subject to BT constraints at the gap site [6]: a matrix clause gap (1a/2a, Table 1) puts the matrix subject and pronoun in the same binding domain and co-reference is precluded by Principle B [1]. When the gap is in a different binding domain (1b/2b), co-reference is possible. When presented with auxiliary *was* (1), we expect readers to pursue the simpler (1a) over (1b), eliminating *the boy* as an antecedent. Auxiliary *did* (2) does not allow a matrix gap (**How proud did John*), so we predict that a continuation introducing a new binding domain is more likely than with *was*. Consequently, the matrix subject is more likely to be retrieved as an antecedent.

Sentence Completion Study 60 participants completed sentence fragments like (1/2) ending at *the*. Of 274 grammatical continuations (of 300) provided in the *was* condition, no completions (0%) involved a new binding domain (like 1b). Of 252 grammatical continuations provided in the *did* condition, participants provided 66 completions with a new binding domain (like 1b) (26%).

SPR experiment: Using a Gender Mismatch Effect paradigm (GMME) [7], we tested whether the different expectations triggered by *was* vs. *did* have any impact on online antecedent retrieval. A SPR experiment (n=127) tested items shown in Table 2, crossing Gender (whether the pronoun in the *wh*-predicate Matches or Mismatches the matrix subject) and Auxiliary (*was* vs. *did*). Given the sentence completion results, we expect that in comparison to the *was* conditions, in the *did* conditions readers will be more likely to entertain an upcoming structure where the wh-predicate finds a gap in a new binding domain. As a result, they will be more likely to retrieve the matrix subject as a BT-compliant antecedent. We expect an interaction in which only the *did* condition gives rise to a GMME [2,7]. **Results** Analyzing residualized reading times, at the critical gendered noun region (Figure 2; “saleswoman/man”), an interaction between Gender and Auxiliary was observed (β=-61.63, SE=24.85, $p<0.05$) as was a marginal effect of Gender (β=21.86, SE=12.43, $p=0.08$). Subset analysis revealed an effect of Gender only in the *did* condition (β=53.34, SE=17.88, $p<0.05$). At spillover region 2 (Figure 1, “California”) there was a significant interaction between Auxiliary and Gender (β=-39.65, SE=17.53, $p<0.05$). Subset analysis revealed a GMME only in the *did* condition (β=24.44, SE=11.42, $p<0.05$), not in *was* (β=-15.90, SE=13.29, $p>0.05$), suggesting that the mismatched *did* conditions were read more slowly than all other conditions.

Conclusions: One interpretation of the results is that the processor is sensitive to BT constraints like Principle B even when calculated over expected, but not yet verified, structures. Further investigation, however, is needed to test another possibility: that in *did* conditions, the processor accessed BT-non-compliant antecedents indiscriminately (see [8]) in the absence of more definitive evidence for the location of the gap (evidence that *is* available in the *was* conditions, which overwhelmingly trigger the expectation for a matrix/same domain gap). We are conducting a counterpart study using reflexives, where *was/did* make opposite predictions about binding domains, to address this possibility.

Table 1: *was* vs. *did* and binding domains

	Sentence fragment:	**Possible continuation:**	**Binding domain?**
(1)	How proud of him$_1$ **was** the...	a. boy$_{*1}$ __?	same
		b. boy$_1$ saying someone was __?	different
(2)	How proud of him$_1$ **did** the...	a. boy$_{*1}$ feel/seem to be __?	same
		b. boy$_1$ say someone was __?	different

Table 2: SPR Experiment stimuli

	Match/Mismatch
WAS	How impressed with **him** **was** the tall friendly **salesman/saleswoman** from California saying that Amanda's bosses were?
DID	How impressed with **him** **did** the tall friendly **salesman/saleswoman** from California say that Amanda's bosses were?

Figure 1. Word-by-word reading times

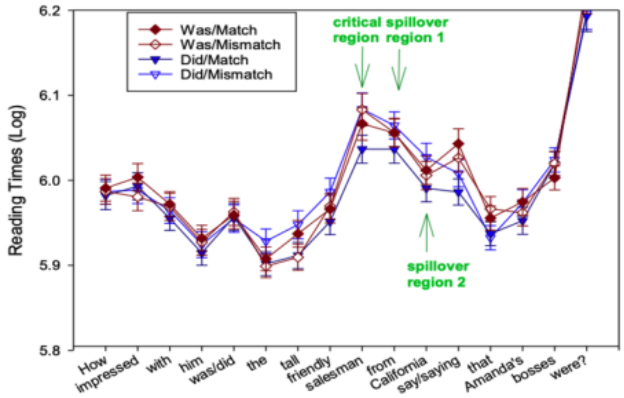
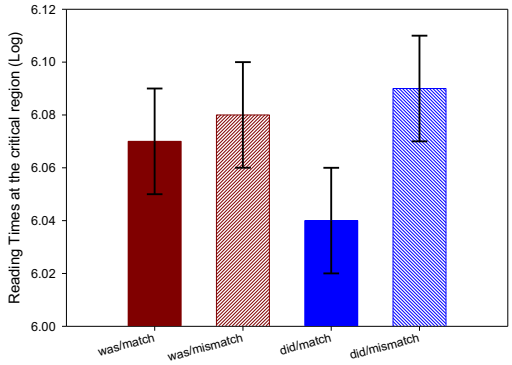


Figure 2. Reading Times at critical region



[1]Chomsky, N. (1981). *Lectures on government and binding*. **[2]**Sturt, P. (2003). The time-course of the application of binding constraints in reference resolution. *JML* 48, 542-562. **[3]**Kazanina, N., Lau, E. F., Lieberman, M., Yoshida, M., & Phillips, C. (2007). The effect of syntactic constraints on the processing of backwards anaphora. *JML*, *56*(3), 384-409. **[4]**Chow, W. Y., Lewis, S., & Phillips, C. (2014). Immediate sensitivity to structural constraints in pronoun resolution. *Frontiers in Psych 5*, 630. **[5]**Kush, D. & Dillon, B. Disjoint is off the hook: Principle B constrains predictive resolution of cataphors. CUNY 2020. **[6]**Huang. (1993). Reconstruction and the structure of. *LI* 24. **[7]**Van Gompel, R. P. G., & Liversedge, S. P. (2003). The influence of morphological information on cataphoric pronoun assignment. *J. of Experimental Psych.* 29, 128–139.**[8]**Omaki, A., Ovans, Z., Yacovone, A., & Dillon, B. (2019). Rebels without a clause: Processing reflexives in fronted wh-predicates. *JML 107*, 80-94.