



# The Advantage of the Ungrammatical: processing 'extra THAT'

Laura Staum and Ivan A. Sag (Stanford University)

Contact: lstaum@stanford.edu



## Can extra complementizers help readers understand difficult complement clauses despite their ungrammaticality?

Sentences containing THAT-trace violations are famously ungrammatical: **Anna heard who the professor decided THAT (after the term) \_\_ would fail.** Unacceptability of these sentences is known to be ameliorated by the presence of an adverbial, but there is no satisfying explanation for this difference in purely grammatical terms (Culicover, 1993). Although the two versions of the sentence equally violate the constraint (e.g. the Empty Category Principle), the violation is non-local in the version that contains an adverbial. We predicted that if non-local violations are easier to process than local violations, then longer adverbials should yield shorter reading times in the complement clause (CC). As predicted, in Experiment 1, extra THAT incurred lower processing costs when the violation was non-local, thus explaining the increased acceptability of these examples.

Does the effect of non-locality extend beyond reducing the penalty from a violation? In Experiment 2, we investigated another extra THAT phenomenon, Multiple THAT (Staum and Sag, 2007): **I told him THAT for sure THAT I would go.** Although no extra THATs are licensed by the grammar, we reasoned again that non-local violations should yield faster reading times in the CC than local ones. In addition, because the extra THAT makes the subject of the CC more predictable, we predicted that ungrammatical extra THAT could actually reduce reading times compared to a grammatical single THAT. Experiment 2 validated these predictions: the extra THAT provided a processing advantage in the non-local condition but not in the local condition, suggesting that the predictive power of the complementizer can outweigh the penalty from a non-local grammaticality violation.

### Experiment 1: THAT-trace violations

In a masked, self-paced reading study with 22 participants, we measured reading times in the embedded VP. Each sentence contained an adverbial between the complementizer and the beginning of the complement clause that ranged in length from 0 to 8 words long; in addition, each sentence contained one THAT (a THAT-trace violation) or zero THATs.

- (0) Robin is someone who I think (that) likes ice cream more than other sweets.
- (2) This is a demographic the editors believe (that) most likely would have been put off by the original working title of the magazine.
- (5) My mother ignored the sound my dad said (that) when the car makes it is the most important thing to tell the mechanic about.
- (8) The doctor told the nurse which patient he had decided (that) given how many medications he was already on should not be given any more unless absolutely necessary.

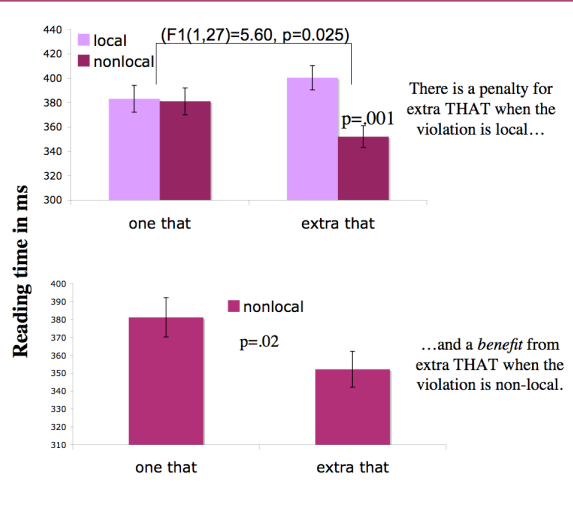
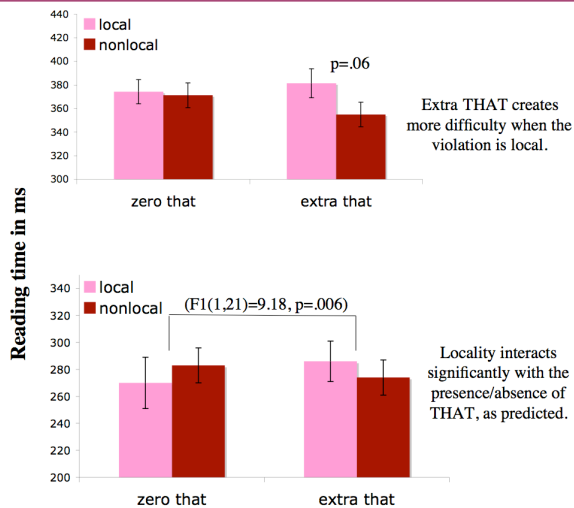
↑ length of intervening material    ↑ intervening material    ↓ extra that

### Experiment 2: Multiple THATs

In a masked, self-paced reading study with 28 participants, we measured reading times on the head noun of the subject of the complement clause (always the second word in the subject NP). Each sentence contained an adverbial between the complementizer and the beginning of the complement clause that was either short (one word long) or long (seven words long); in addition, each sentence contained one THAT (before the adverbial) or two THATs (before and after the adverbial).

one that { John reminded Mary that soon his brother would be ready to leave.  
 that { John reminded Mary that soon that his brother would be ready to leave.  
 two that { John reminded Mary that after he was finished with his meeting his brother would be ready to leave.  
 that { John reminded Mary that after he was finished with his meeting that his brother would be ready to leave.

↑ first that    ↑ intervening material    ↓ second that    ↓ subject of CC



### Conclusions

Grammaticality violations make structures harder to process, and when the violation is more local, it may be more noticeable, producing more difficulty. This is supported by the interaction in the reading times for both phenomena (Multiple THAT and THAT-Trace sentences). However, despite the grammaticality violation, the extra THAT in Multiple THAT sentences can cause the embedded subject to be read **faster** than the subject in the single-THAT version, possibly because it appears closer to this subject than the previous complementizer; this may not be the case for THAT-trace violations because the extra THAT in these sentences does not decrease the distance between the verb of the embedded clause and an item that predicts it. Thus, these results suggest that in addition to modulating the strength of the grammaticality violation, locality can influence the degree of difficulty involved in integrating material in the complement clause, and at least when extra THAT appears close to this material, it can alleviate some of this difficulty.

**Despite violating grammatical constraints, when 'extra THAT' appears close to the embedded clause, it can help readers process difficult complement clauses.**