What and when can you fill a gap with something?

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A substantial literature on the processing of wh-dependencies suggests that they are interpreted through "active gap-filling" mechanisms [e.g. 1,2]. Conjoined wh-questions like (a), which contain multiple independent wh-dependencies, have not yet been investigated in the psycholinguistic literature. Based on evidence from a speeded acceptability judgment study, we suggest that the left and right wh-words in such constructions in fact form different types of dependencies with the verb. Further, the different types of dependencies seem to lead to differences in filled gap effects. This finding leads to the surprising conclusion that gap-filling mechanisms may be sensitive to properties of the wh-dependency that are irrelevant for interpretation.

Although previous accounts assume that the wh-words in conjoined questions are syntactically parallel [3,4], such accounts have difficulty explaining certain asymmetries: obligatorily transitive verbs like 'fix' are often unacceptable in these configurations, as in (b). We hypothesize that the transitivity asymmetry arises because the left conjunct does not have a syntactic relationship with the verb, and thus fails to satisfy the subcategorization requirements of obligatorily transitive verbs. This leads to a novel prediction: when the left conjunct is an adjunct (e.g. 'when'), the transitivity asymmetry should disappear. We propose that the left conjunct in fact forms a purely semantic relationship with syntactically-unrealized variables associated with the verb [5,6]. If filled-gap effects reflect the perception of a violation at the syntactic level, such effects could be slower or less robust for the non-syntactic dependency between the left conjunct and the verb.

In a speeded acceptability judgment task, we manipulated VERB TRANSITIVITY (*optional* vs. *obligatory*), LEFT CONJUNCT (*what* vs. *when*), and 'WHAT'-GAP (*filled* vs. *unfilled*) in declarative sentences with embedded conjoined wh-questions (c-f). Sentences were presented word-by-word with a 400ms SOA, after which participants (n=24) gave a binary acceptability judgment. We analyzed judgments using logistic linear mixed effects models with fixed factors for experimental manipulations and all interactions and a random factor for subjects [cf. 7]

Within sentences with an *unfilled* 'WHAT'-GAP, we observed significant effects of VERB TRANSITIVITY (*optionally transitive* verbs were more acceptable) and LEFT CONJUNCT (*when*-first questions were more acceptable). Most importantly, there was a significant interaction between the two: *optionally transitive* verbs (c-d) were judged acceptable regardless of the LEFT CONJUNCT, while *obligatorily transitive* verbs were more acceptable in *when*-first (f) than *what*-first questions (e). These results support our hypothesis that the left conjunct does not form a syntactic dependency with the verb.

Sentences with a *filled* 'WHAT'-GAP were, unsurprisingly, less acceptable overall than when the gap was *unfilled.* However, there was a significant effect of LEFT CONJUNCT, such that *what*-first questions with filled gaps (c,e) were not as unacceptable. There was also a significant interaction with VERB TRANSITIVITY: the asymmetry between *what*-first and *when*-first questions with filled gaps was much larger with *optionally-transitive* verbs (c vs. d). According to our hypothesis, the filled gap is less noticeable in *what*-first questions because the relevant dependency is not syntactic. With *obligatorily transitive* verbs, the unacceptability of *what*-first questions may be decided at the verb, such that judgments are less affected by subsequent filled gaps.

(a) What and when did John eat? (b) *What and when did John fix?

			% accepted	
VERB TYPE	**Sample sentences**	'WHAT'-GAP:	*Unfilled*	*Filled*
Optionally transitive	(c) ... the actor wanted to know <u>what and when</u> he could <u>eat</u> (something)...		78%	52%
	(d) ... the actor wanted to know <u>when and what</u> he could <u>eat</u> (something)...		83%	21%
Obligatorily transitive	(e) … the mechanic decided <u>what and when</u> he would <u>fix</u> (something)...		37%	35%
	(f) ... the mechanic decided <u>when and what</u> he would <u>fix</u> (something)...		62%	23%

References

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