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The puzzling degraded status of *who* free relative clauses in English

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ABSTRACT

There is a puzzling asymmetry in English with respect to free relative clauses introduced by *what* and *who*, with the former (e.g. [*What Glenn said*] *didn't make much sense*) intuitively being much more acceptable than the latter (e.g. [*Who Glenn married*] *didn't make much money*). In this squib, we explore this degraded acceptability of *who* free relative clauses, and from the results of an experimental study we identify syntactic features of the sentence that influence the level of acceptability. We discuss the difficulty in finding an independently-motivated solution to the puzzling asymmetry within current theories of syntax, semantic, and processing. Finally, we touch on a broader theoretical question relating to the robust cross-linguistic process by which elements of the set of *wh*-words in a language are able to extend their function from introducing interrogative clauses to introducing other clausal constructions.

1   THE PUZZLE

In English and many other languages, a subset of the *wh*-words that introduce interrogative clauses can also introduce embedded non-interrogative *wh*-clauses known as *free relative clauses* (FRs). Although they are clauses, FRs have the same distribution and receive the same interpretation as DPs or PPs (cf. Caponigro 2003, 2004). For instance, while the embedded *wh* clauses in (1a) and (1b) look identical, the one in (1a) occurs as the complement of an interrogative predicate and is interpreted as an embedded interrogative, whereas the one in (1b) occurs as the complement of a predicate selecting for a DP and is interpreted as the definite DP in (1c).

(1)   (a) Ana wondered **what Samir cooked**.

         (b) Ana tasted **what Samir cooked**.

         (c) Ana tasted **the stuff Samir cooked**.

In English, there is a puzzling asymmetry between the acceptability of sentences containing FRs introduced by *what* and those introduced by *who*. While *what* FRs seem to be highly productive and can appear in a wide range of syntactic positions (2a–c), the acceptability of analogous sentences containing *who* FRs in (3a–c) is degraded, often to the point of ungrammaticality.

(2)   (a) Ana tasted **what Samir cooked**.   (Direct Object)

         (b) Clarissa looked at **what was laid out on the bar**. (PP Complement)

         (c) **What Glenn said** didn't make much sense. (Subject)

(3)   (a) *? Ana consoled **who Samir fired**. (Direct Object)

         (b) *? Clarissa talked to **who was sitting at the bar**. (PP Complement)

         (c) * **Who Glenn married** didn't make much money. (Subject)

Intuitively, sentences with *who* FRs in subject position, as in (3c), appear to be less acceptable than those in direct object, as in (3a), or PP complement position, as in (3b).

The degraded acceptability of *who* FRs illustrated here is mysterious in light of the lack of a corresponding asymmetry between *whoever* and *whatever* FRs. In (4a–c), *whoever* FRs do not appear to have the same restrictions as their plain *who* FR counterparts:

(4)　　(a) Ana consoled **whoever Samir fired**.

　　　　(b) Clarissa talked to **whoever was sitting at the bar**.

　　　　(c) **Whoever Glenn married** didn't make much money.

Moreover, this asymmetry in English is odd given that cross-linguistically *who* FRs are attested in many languages, including Italian (5a), Spanish (5b), and German (5c).[1]

(5)　　(a) Hanno　premiato　　solo **chi　è　arrivato　primo**

　　　　　　have.3P award.PRF.3P only who is arrive.PRF first

　　　　　　'They gave an award only to the person who arrived first.'

　　　　(b) Le dí　　　　　las gracias a **quién me ayudó**

　　　　　　3S give.PST.1S DET thanks to who   1S help.PST.3S

　　　　　　'I thanked the person who helped me.'

　　　　(c) **Wer　　diese Tat　verübt　　　　hat**, sollte nie　　wieder frei kommen

　　　　　　who.NOM this   crime commit.PRF.3S has, should never again free get

　　　　　　'The person/people who committed this crime should never be let free.'

While the syntax and semantics of FRs have been discussed extensively (Bresnan and Grimshaw, 1978; Jacobson, 1995; Dayal, 1997; von Fintel, 2000, van Riemsdijk, 2006, among others), in these works the focus of investigation is on *what* FRs and *-ever* FRs. It has been observed in passing that English *who* FRs are not productive (Jespersen, 1927, cited in Bresnan and Grimshaw, 1978), but to our knowledge there has been no investigation into the degraded status of this construction. The purpose of this squib, then, is twofold. First, we describe the results of an experimental study, confirming our intuitions regarding the reduced acceptability of *who* FRs, and establishing more precisely the empirical ground (Sec. 2). Second, we discuss the possibility of finding an independently-motivated solution to the puzzling asymmetry within

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[1] The data in the paper from languages other than English were collected by us and the judgments were checked with at least two native speakers for each language.

current theories of syntax, semantic, and processing, and highlight why such an attempt faces problems (Sec. 3). Our discussion in Sec. 4 aims to shed some light on a broader theoretical question relating to the robust cross-linguistic process by which elements of the set of *wh*-words in a language are able to extend their function from interrogatives into other constructions, such as free relatives. We conclude by suggesting diachronic factors may have played a role in the current distributional asymmetry of *who* FRs and a detailed historical analysis of the development of FRs in English may be needed.

2 FURTHER EMPIRICAL SUPPORT

In order to establish a description of the empirical landscape with respect to *who* FRs in English, we conducted a study to ascertain speakers' judgments of sentences containing tokens of *who* and *what* FRs in a variety of configurations within the matrix clause. Using Amazon's Mechanical Turk, we collected acceptability judgments from native speakers on a scale from 1 (completely unacceptable) to 7 (fully acceptable). The experiment manipulated three conditions: (i) the type of FR (*who*, *what*); (ii) the syntactic position of the FR clause in the matrix (*subject*, *object*, *PP complement*); and (iii) whether or not the syntactic position of the gap within the FR matches the syntactic position that the FR takes in the matrix clause. For this last factor, the two conditions were *parallel* (i.e. Subject gap / Subject FR and Object gap / Object or PP Complement FR), and *non-parallel* (i.e. Subject gap / Object or PP Complement FR and Object gap / Subject FR). There were three experimental items per condition, and for each item judgments from 25 speakers were collected. All stimulus sentences included past tense, episodic verbal predicates, in order to try to induce a specific interpretation of the FR, so avoiding the potential confounding factor of free choice readings (i.e. *who* FRs interpreted as *whoever* FRs), and thereby reducing the number of variables to be controlled in the study. The experimental stimuli for the different conditions were matched as closely as possible, with predicates adjusted accordingly to allow for animacy, selectional requirements, and semantic plausibility. A complete list of the stimuli is given in the appendix.

Our results confirmed that sentences containing *who* FRs are universally rated significantly lower than structurally similar examples with *what* FRs. Further, the results showed that this reduced acceptability is sensitive to the grammatical position of the FR within the

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matrix clause. The overall average acceptability of sentences with *who* FRs in object position (e.g. *The young woman kissed who she met at the party*) is 4.33 (out of 7), significantly lower than the average rating of 6.03 for sentences with *what* FRs in this position (t=8.41, df=270.5, p<0.001). Similarly, *who* FRs acting as PP complements (e.g. *The young woman danced with who she met at the party*) are rated significantly lower than *what* FR equivalents: 4.47 (*who*) vs. 6.33 (*what*) (t=10.24, df=240.8, p<0.001). Further, as we suspected, *who* FRs in subject position (e.g. *Who the young woman met at the party kissed her on the way home*) are deemed to be particularly unacceptable by native speakers, with an average acceptability of only 2.94, significantly lower than the average acceptability for *who* FRs in object or PP complement position (t=8.06, df=322.5, p<0.001). There is no corresponding reduction in acceptability for *what* FRs in subject position, with an average acceptability of 5.95.[2]

With respect to the effect of syntactic parallelism between the matrix and FR clauses, we found that for *who* FRs in object position the acceptability is improved if the gap within the FR clause is also in object position (e.g. *The young woman kissed [who she met __] at the party*), compared to cases of object *who* FRs without such parallelism, that is, where the gap is in subject position in the FR (e.g. *The young woman kissed [who __ met her] at the party*). This difference in acceptability is significant: 5.00 (*parallel*) vs. 3.66 (*non-parallel*) (t=4.37, df=145.8, p<0.001). However, when *who* FRs are in subject position in the matrix clause, the position of the gap does not make a difference. We compared parallel cases with the gap also in subject position (e.g. *[Who _ met the young woman at the party] kissed her on the way home*) and non-parallel cases, for which the gap is in object position (e.g. *[Who the young woman met _ at the party] kissed her on the way home*). The difference in average acceptability is not statistically significant: 2.81 (*parallel*) vs. 3.08 (*non-parallel*) (t=0.97, df=143.4, p=0.33). We interpret this result to mean that subject position *who* FRs are crashingly bad, that is, they are deprecated below a minimal level of acceptability. The ameliorating effect of the structural parallelism that tends to improve the acceptability of object *who* FRs does not have a

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[2] We also asked participants to provide ratings for identical stimuli containing *whoever* FRs and full relative clauses headed by the nominals *person*, *man*, *girl*, etc. In both subject and object conditions, the acceptability of these alternative constructions was always significantly greater than for those containing plain *who* FRs, essentially reaching similar levels of acceptability as their *what* FR counterparts.

corresponding impact on the acceptability of subject *who* FRs. With respect to *what* FRs, we found that the effect of parallelism makes no significant difference in acceptability either for object *what* FRs: 6.05 (*parallel*) vs. 6.00 (*non-parallel*) (t=0.23, df=144.8, p=0.82), or subject *what* FRs: 5.77 (*parallel*) vs. 6.12 (*non-parallel*) (t=1.45, df=140.2, p=0.15).

To recap, our findings confirm the two puzzling facts set out in the introduction. First, *who* FRs are always judged significantly less acceptable than *what* FRs, and second, the degree of unacceptability of *who* FRs can vary.[3] In particular, acceptability improves if (i) the *who* FR occurs as the direct object or PP complement rather than in subject position of the matrix clause (see Figure 1)[4]; and (ii) the gap in the relative clause is also in object position (see Figure 2).
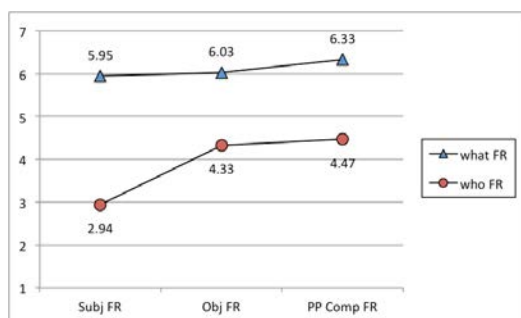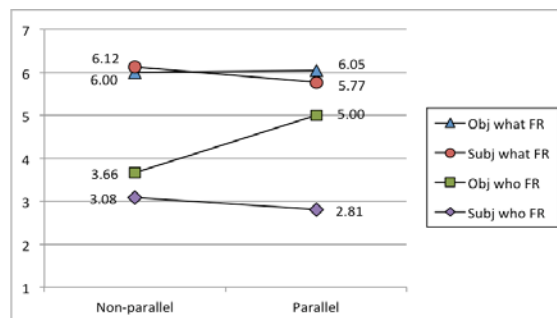

Figure 1

Position of FR in matrix clause

Figure 2

Effect of syntactic parallelism

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[3] An anonymous reviewer pointed out that D'Arcy and Tagliamonte (2010) show that the use of *who* as a relative pronoun in headed relatives is sociolinguistically restricted and in competition with the use of the complementizer *that* or the absence of any relative marker. Their findings are hard to compare with ours, though, even if we ignore the evidence showing that FRs are not just headed relatives without an overt head (cf. Caponigro 2003: Ch. 1, among others). Their study measures spontaneous production of *who* in competition with other relativizers, while we measure acceptability judgments of given *who* FRs, without competitors.

[4] An anonymous reviewer pointed out that our findings seem to go against Keenan and Comrie's (1977) Accessibility Hierarchy, which predicts subject relativization to be easier under all circumstances. This contrast could be taken as a piece of evidence against the view that FRs are (or are derived from) some kind of headed relative without a phonologically overt head (cf. Caponigro 2003: Ch.1 for further differences).

In this section we discuss why we think the puzzle cannot be solved by (what we know of) current theories of syntax, semantics, and processing. We do not aim to show that it is logically impossible for any theory of syntax, semantics, or processing to account for our puzzle. Instead, we simply illustrate the difficulty in envisioning a principled account of the puzzle within syntax, semantics, or processing that does not rely on stipulations or *ad hoc* assumptions

3.1   *Syntactic accounts*

Who and *what* FRs do not seem to exhibit any syntactic difference that would correlate with the puzzling asymmetry we have discussed. The few cases *who* FRs that do approach acceptability (e.g. *The young woman kissed <u>who she met at the party</u>*) are distributionally similar to *what* FRs, in that they always appear in argument position a sentence, including the complement of a preposition, but never as an adjunct. From a clause-internal perspective, *who* and *what* FRs are structurally identical. They exhibit the same word order, with the *wh*-word in clause initial position, licensing a DP gap in an argument position. Neither *wh*-word can be followed by the complementizer *that*, i.e. both *wh*-clauses look like FRs rather than headed relatives (cf. *The young woman kissed who (*that) she met at the party*, *The young woman bought what (*that) she found at the store*). Both *wh*-words *who* and *what* constitute a *wh*-phrase by themselves without a complement or any other material (cf. *The young woman kissed who (*person) she met at the party, The young woman bought what (*umbrella) she found at the store*). This is unlike the behavior of *wh*-words like *which* or *whose*, which must be followed at least by a nominal if used out of the blue. These *wh*-words can never introduce FRs. On the other hand, all the other *wh*-words introducing FRs in English besides *who* and *what* cannot form complex *wh*-phrases either (e.g., *I went where (*place) you went, I left when (*time) you left*, *I did it how (*quickly) you did it*). Consequently, on these grounds, it would be hard to find - absent stipulations - a principled syntactic explanation for the reduced acceptability of *who* FRs compared to their *what* counterparts.

It is true that *who* can be used as a relative pronoun in headed relative clauses (e.g., *I saw*

the guy <u>who</u> likes you), while *what* cannot (e.g., **I saw the table <u>what</u> you bought*), and it is tempting to leverage this asymmetry in order to try to explain the cause of the degradation of FRs introduced by *who*. However, such an attempt would almost certainly fail, given the observation that the *wh*-word *where* can act as a relative pronoun as well (e.g., *We just had dinner at the restaurant <u>where</u> you ate last night)* and the FRs introduced by this *wh*-word are perfectly acceptable (e.g., *I went <u>where</u> you went*).

In summary, then, although at first blush a syntactic explanation for the puzzle may seem plausible, we cannot find an obvious path that does not fairly quickly run up against some intransigent roadblocks.

3.2   *Semantic accounts*

Similarly, we have not been able to find an independently-motivated explanation of our puzzle based upon the compositional semantics of FRs. *What* FRs and *who* FRs undergo the same semantic derivation, following Caponigro (2003, 2004). The denotation of a standard FR is the maximal entity of the set of entities satisfying some property indicated by the predicate in the relative clause, and the contribution of the *wh*-word in the FR is that of a set restrictor: the *wh*-word applies to the set of entities denoted by the IP within the relative clause, and returns a subset of these entities determined by the nature of the *wh*-word (i.e. *what* returns the subset of inanimate entities; *who* returns the subset of human entities). The only difference, then, between the denotations of *who* and *what* FRs is the human/inanimate distinction of the entities in the set. It would be stipulative to simply assert that the semantic composition above is blocked just in case the entities in the given set happen to be human, rather than inanimate entities. As such, we do not see how there can be a compositional semantic explanation for the degradation of *who* FRs in English.

More fundamentally, though, the prospects for a purely semantic explanation of the asymmetry are dim given the productive use of *who* FRs cross-linguistically. If an account for the unacceptability of *who* FRs in English relies on contrasts between the semantics of *who* and *what* (and assuming that these generalizations are based on universal semantic principles and are not language-specific) then we would predict that *who* FRs would not be found in any language. However, we have already shown in (5a–c) that many languages with FRs freely allow for the

equivalents of *who* FRs.

3.3 *Processing accounts*

Next we consider how feasible a processing account would be to explain the asymmetry. Uncontroversially, FRs may be harder to process in general than simple noun phrases, given their complex syntactic structure, the filler-gap dependency, the introduction of additional discourse referents, and, in some cases, non-canonical word order. This additional processing load might be thought of a contributing factor in the reduced acceptability of *who* FRs. Further, with respect to the even more greatly reduced acceptability of subject *who* FRs, one might wish to appeal to the fact that complex sentence subjects are generally costly to working memory and represent a processing bottleneck (Kluender 2004). However, one can quickly notice that these two factors do not have the same deleterious effect on the acceptability of fully headed relative clauses (even in subject position), nor explain why *what* FRs are not equally degraded. To find an orthogonal processing explanation for the *who/what* contrast, one would need to pursue an explanation based on the animacy of the referents of the referring expressions in the sentence. One possibility might be that relative clauses containing two human discourse referents are more difficult to process, owing to the marked nature of having a direct object that refers to a human rather than a more typical inanimate referent in the thematic role of patient. In such cases, potentially there is a temporary ambiguity at the level of discourse (meaning that either referent could be the agent acting upon the other), requiring an appeal to the syntax to disambiguate, and thus additional processing demands on the parser. However, it is not at all clear that this would be sufficient to account for the general large contrast in acceptability we see between *who* and *what* FRs, and again we quickly run into the intractable issue of the cross-linguistic data, which would be incorrectly predicted by this theory.

Another possible processing explanation of the reduced acceptability of subject versus object *who* FRs might be the former's temporary surface similarity to interrogative clauses. A subject *who* FR (e.g. *Who met the young woman at the party...*) can very naturally be parsed as an interrogative until the matrix predicate is encountered, at which time a reinterpretation is forced. The significant propensity for such garden-pathing, given the relative frequency of interrogatives in the language, may serve to strongly disfavor subject *who* FRs. For object *who*

FRs, on the other hand, since a matrix predicate selecting for an individual-denoting object would automatically trigger the expectation for its *wh*-clause complement to be a FR and would exclude its analysis as an interrogative clause. But again, this line of argumentation is quickly derailed when one considers that subject *what* FRs - as well as subject *who* FRs in Spanish and Italian - are not deprecated for this same reason. Consequently, a processing account along these lines does not look promising.

A processing explanation, however, might be able to account for the contrast we see between the parallel and non-parallel conditions for *who* FRs. Recall the contrast in acceptability between (i) *The young woman kissed who she met at the party*, and (ii) *The young woman kissed who met her at the party*. For the parallel cases, the gap inside the FR and the relative clause itself are both in object position with respect to the verb in their clause. Moreover, the discourse referent is consistently a thematic patient in the two clauses. This contrasts with the non-parallel cases, in which a single discourse referent is both a thematic agent and a thematic patient within the scope of the same sentence. Possibly, the difficulty of simultaneously assigning incompatible syntactic and thematic roles to a single constituent accounts for the increased processing difficulty for the non-parallel cases. There is some evidence for this to be found in the processing literature. For example, Sheldon (1974) proposed the Parallel Function Hypothesis to account for why subject gap relative clauses modifying subject NPs and object gap relative clauses modifying direct objects NPs were acquired sooner and are easier to process than the non-parallel cases. The additional burden of processing of headed relatives clauses that are not in parallel configuration with the matrix clause would naturally carry over to the FR cases. This line of argument may go towards accounting for the relatively higher acceptability of object *who* FRs with an object gap, compared to object *who* FRs with a subject gap. The parallelism would not be expected to have a comparable effect on object *what* FRs with object versus subject gaps, since both of these are already deemed to be fully acceptable. However, a further explanation would still be needed for why such parallelism does not ameliorate the acceptability of subject *who* FRs with a subject gap. Maybe this is because they are already below a minimum threshold level of acceptability below which no rescue is available.

To sum up, in this section we provided several arguments supporting the view that our puzzle cannot receive a straightforward principled account within current syntactic, semantic, or

processing approaches.

4   BROADER CONSIDERATIONS AND CONCLUSION

In this squib, we have presented evidence of a puzzling asymmetry between the acceptability of *what* FRs and the degraded status and restricted distribution of *who* FRs in English. We have also argued that it is not trivial to imagine a plain, independently-motivated, syntactic, semantic, or processing explanation for the asymmetry.

Taking a broader perspective, we believe that the puzzle of *who* FRs in English provides insight into the more general cross-linguistic process by which languages have extended the function of the *wh*-words in the lexicon from interrogatives to other functions such as free relatives, relative pronouns in headed relative clauses, exclamatives, indefinites, polarity items, and so on. This is a fairly robust phenomenon across languages, and so there must be something inherent in the meaning of *wh*-words that allows for this. However, not every language uses its *wh*-words for all of these functions, and even for the functions where it does, the subset of *wh*-words employed can vary. In other words, different *wh*-words behave differently with respect to the same construction in a language, and also behave differently across languages. Indeed, in the case of FRs there is clear evidence that not all languages with this construction automatically allow them with every *wh*-word. An asymmetry between *who* and *what* FRs is attested in Italian and Spanish as well, except that in those languages the exact reverse is true: while *who* FRs are fully productive, *what* FRs are not allowed, and speakers must instead make use of a headed relative clause construction with a light head, as in (6a) and (6b) respectively. The picture if further enriched by German, which does allow for both *who* FRs, as in (5c) above, and *what* FRs, as in (6c) below.

(6)   (a) Daniel ha mangiato di buon gusto ***che cosa/ciò che ha preparato   mia mamma**
              Daniel has eat.PRF   of good taste what / it REL   has prepare.PRF my mother
              'Daniel has enjoyed what my mother prepared.'
         (b) Paloma siempre come ***qué / lo que prepara   su madre**
              Paloma always eat.3S what / it REL prepare.3S her mother
              'Paloma always eats what her mother prepares.'

(c) Ich habe probiert **was du gekocht hast**

    1S   have try.PRF   what 2S prepare.PRF have

    'I tasted what you cooked.'

The extension of the use of *wh*-words from interrogatives into a newer construction like a free relative thus appears to result from at least two different mechanisms: some general grammatically-driven strategy imposing syntactic and semantic constraints, and some form of lexical licensing that allows specific *wh*-words to participate in the more general mechanism. For instance, whenever a *wh*-word is used in a FR, it always occurs in clause initial position and licenses a gap. Semantically, it behaves like a non-quantificational expression, contributing to build the meaning of a definite description (Caponigro 2003, 2004). These are all general features that occur stably in FRs within a language and across languages. Still, within this general strategy, the extension of the use of a specific *wh*-word has to be licensed by an individual language on a case-by-case basis, as our puzzling asymmetry for English and the cross-linguistic data we just discussed show.

Lexical licensing may depend on many factors, including diachronic ones. For instance, a very preliminary non-systematic look at the occurrence of *who* FRs vs. *what* FRs in the history of English seems to show that while the *what* FRs we are familiar with today are attested early on, *who* FRs appear much more rarely, replaced, instead, with constructions that look like light headed relatives (introduced by *he who* or *he that*) or correlatives (with a resumptive pronoun in the matrix clause). The availability of competing forms may have served to inhibit the new construction from taking hold in the language. With this in mind, it is possible that a satisfactory explanation for the puzzling phenomenon of the limited distribution of *who* FRs in contemporary English may only be available after taking account of the state of the language at the time when this construction first began to emerge. We leave such a detailed diachronic investigation to future research.

In conclusion, we believe that the asymmetry between *who* FRs and *what* FRs in English we have discussed in this paper is a non-trivial puzzle whose solution may require bringing together syntax, semantics, processing, historical development, and cross-linguistic investigation.

EXPERIMENTAL DESIGN AND STIMULI

The experiment manipulated three conditions: (i) the type of the FR (*who*, *what*); (ii) the syntactic position of the FR clause in the matrix (*subject, object, PP complement*); and (iii) whether the syntactic position of the gap within the FR matches the syntactic position that the FR takes in the matrix clause. For this last factor, the two conditions were *parallel* (i.e. Subject-Subject and Object-Object/PP Complement), and *non-parallel* (i.e. Subject-Object/PP Complement and Object-Subject). The experiment included three test items for each condition, resulting in a total of 36 experimental items. The stimuli were informally matched for length and plausibility. However, formal norming studies to determine these effects, or the effects of the frequencies of the lexical items used in the stimuli, were not carried out. A list of the stimuli in each condition is shown below.

Object *who* FR, parallel
1.   The young woman kissed who she met at the party
2.   The skilled sniper hit who he was targeting
3.   The music teacher married who he dated at college

Object *what* FR, parallel
4.   The librarian ate what he cooked that morning
5.   The fitness buff bought what he had seen on TV
6.   The booklover read what she had purchased that morning

Object *who* FR, non-parallel
7.   The young woman kissed who met her at the party
8.   The angry teenager hit who insulted him
9.   The music teacher married who dated him at college

Object *what* FR, non-parallel
10.   The hungry mailman ate what looked good to him
11.   The antique collector bought what appealed to her
12.   The college professor read what interested her

PP comp *who* FR, parallel
13.   The young woman danced with who she met at the party
14.   The tourist took a picture of who he saw in the plaza
15.   The sales manager flirted with who he recently hired

PP comp *what* FR, parallel
16.   The artist looked at what he had just painted
17.   The journalist took a picture of what he saw in the subway
18.   The executive dealt with what he previously ignored

PP comp *who* FR, non-parallel
19.   The young woman danced with who met her at the party
20.   The concert pianist took a picture of who had sent her flowers
21.   The new employee flirted with who had recently hired him

PP comp *what* FR, non-parallel
22.   The security guard looked at what had surprised him
23.   The social worker took a picture of what was concerning her
24.   The waiter was pleased with what happened to him

Subject *who* FR, non-parallel
25.   Who the young woman met at the party kissed her on the way home
26.   Who the angry teenager insulted at the party hit him back
27.   Who the music teacher dated in college married her yesterday

Subject *what* FR, non-parallel
28.   What the timid girl scout heard scared her
29.   What the locker room attendant saw embarrassed him
30.   What the shareholder heard at the meeting annoyed him

Subject *who* FR, parallel
31.   Who met the young woman at the party kissed her on the way home
32.   Who insulted the angry teenager at the party hit him afterwards
33.   Who dated the music teacher in college married him yesterday

Subject *what* FR, parallel
34.   What excited the horror film fan also scared him a little
35.   What embarrassed the freshman student also titillated her a little
36.   What annoyed the impatient worker also depressed her

        Related stimuli were created containing *whoever* and *whatever* FRs in place of the plain
FR counterparts in the sentences above, as were stimulus sentences containing full relative
clauses headed by the nominals *person*, *man*, *girl*, *thing*, etc, as appropriate. An equal number of
unrelated filler sentences were included in the study (around one-third of which were
uncontroversially grammatical simple clauses, one-third were ungrammatical due to word order
violations, and one-third were created to be of marginal acceptability, with referents not meeting
the selectional restrictions in the subcategorizations of the predicates). The experimental and
filler items were divided and counterbalanced into four lists.

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