Experimental evidence for the Condition C argument-adjunct asymmetry in English questions*

Richard Stockwell, Aya Meltzer-Asscher & Dominique Sportiche

Christ Church, Oxford; Tel Aviv University; University of California, Los Angeles

1. Introduction

By Condition C of the binding theory, R-expressions must be free (Chomsky 1981). Condition C is violated in (1); *Harry* is c-commanded by the co-indexed pronoun *he*, giving rise to a Condition C effect of ungrammaticality:

(1) *He$_i$ framed [the picture of Harry$_i$] .

It is foundational for many theories (e.g. Barss 1986, Heycock 1995, Fox 1999) that Condition C effects persist despite A-bar movement. On this view that A-bar movement 'reconstructs' for Condition C, Condition C is violated in (2) just as in (1). The *wh*-phrase *which picture of Harry* is evaluated for Condition C in its base position, indicated by *t*. This yields the same binding configuration as in (1), rendering (2) ungrammatical:

(2) *[Which picture of Harry$_i$]$_j$ did he$_i$ frame t_j ?

Lebeaux (1988) observed an asymmetry in Condition C reconstruction between arguments and adjuncts. Arguments of preposed DPs obligatorily reconstruct, as demonstrated by the ungrammaticality of (2), above. Adjuncts, on the other hand, do not have to reconstruct; hence coreference of *he* with *Harry* is grammatical in (3). The reduced relative clause adjunct *arranged by Harry* does not have to be considered in the base position of A-bar movement, so there is no Condition C violation:

(3) [Which picture arranged by Harry$_i$]$_j$ did he$_i$ frame t_j ?

*Many thanks to our audience at NELS 52 and to five anonymous reviewers. Partial support for this study from a UCLA Academic Senate grant to Dominique Sportiche is gratefully acknowledged.

However, recent experimental work has questioned the existence of Condition C reconstruction in English. While there is universal agreement that (1) is bad, Adger et al. (2017) and Bruening and Al Khalaf (2019) conclude based on surveys of naïve speakers that (2) is in fact good. Accordingly, they found no asymmetry between arguments and adjuncts, with (2) being as good as (3).

In Stockwell et al. (2021), we reported an experiment which showed that there is Condition C reconstruction in English questions. That is, we found evidence in support of the traditional view that (2) is ungrammatical. In the present paper, we turn to the argument-adjunct asymmetry. We present a formal, large scale acceptability rating experiment which supports the claim that there is an argument-adjunct asymmetry in Condition C reconstruction in English questions. That is, our results will support the traditional view that (2) is bad, while (3) is good.

At stake are theories of structure building, movement, and copy interpretation. If there is an argument-adjunct asymmetry in Condition C reconstruction, then it needs accounting for. This would be achieved by structures along the lines of (4) vs. (5). A Condition C effect arises in (4) because arguments are obligatorily present in the base position of A-bar movement. Adjuncts, on the other hand, following Lebeaux (1988), are not necessarily present in the base position of A-bar movement. With only *picture* in the base position in (5), there is no Condition C violation:

(4) *[Which picture [of Harry$_i$]]$_j$ did he$_i$ frame t_j=[picture [of Harry$_i$]] ?

(5) [Which picture [arranged by Harry$_i$]$^{\text{LATE}}$]$_j$ did he$_i$ frame t_j=[picture] ?

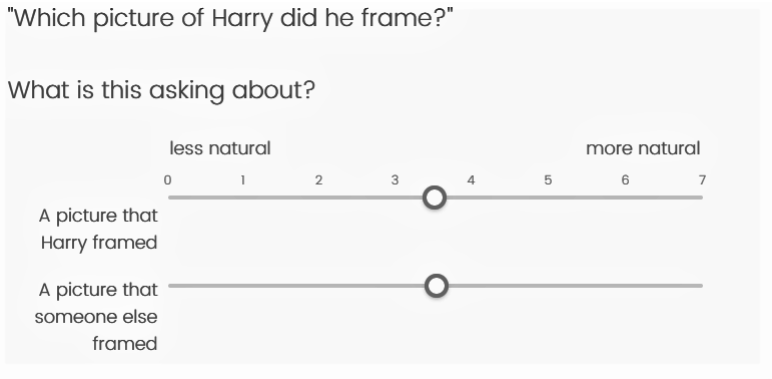
Candidate mechanisms to derive such 'late adjunction' (e.g. Neglect, Sportiche 2016; External Remerge, Thoms and Heycock 2021) may complicate the grammar. In the first place, they must be descriptively adequate. To the extent that such mechanisms are proposed directly to capture the argument-adjunct asymmetry, they can be discarded if the asymmetry does not in fact exist. Or, to the extent that candidate mechanisms are independently motivated and predict the argument-adjunct asymmetry, they would be making a good prediction if the asymmetry exists, and a bad one if it doesn't.

The next two sections present our design and results. Section 4 discusses an unexpected pattern in our results and compares our experiment with previous studies. Section 5 concludes.

2. Design

The task was presented to participants as shown in (6). The target item, a prompt, and two responses were displayed simultaneously:

(6) *Task*



Participants were asked to imagine they were joining an ongoing conversation at a party – an 'eavesdropping' scenario chosen to be neutral as to co- or disjoint reference for the pronoun in the target item. Of the two responses, one contained the same name as the question, corresponding to a coreferential reading for the pronoun. The other response contained *someone else*, corresponding to disjoint reference. Participants were asked to rate the naturalness of each response independently on separate 0-7 Likert scales.

The design of our experiment was 2x2x2. The table in (7) lays out our design, accompanied by an example set of items in (8)-(11):

(7) *Design*

	I. Condition C	II. Relation	III. Response
(8)	Yes	Argument	Name, Else
(9)	Yes	Adjunct	Name, Else
(10)	No	Argument	Name, Else
(11)	No	Adjunct	Name, Else

(8) Yes, Argument
[Which picture of Harry] did he frame *t* ?
A picture that { Harry, someone else } framed.

(9) Yes, Adjunct
[Which picture arranged by Harry] did he frame *t*?
A picture that { Harry, someone else } framed.

(10) No, Argument
[Which picture of Harry] *t* made him laugh?
A picture that made { Harry, someone else } laugh.

(11) No, Adjunct
[Which picture arranged by Harry] *t* made him laugh?
A picture that made { Harry, someone else } laugh.

The first factor in our design was CONDITION C, probing reconstruction. We alternated the potential for a Condition C effect to arise by manipulating the base position of A-bar movement. In the YES items (8) and (9), A-bar movement launches from object position. Reconstruction to this position, below the pronoun, would result in a Condition C effect. In the NO items (10) and (11), on the other hand, A-bar movement launches from subject position. Reconstruction to this position, above the pronoun, would not result in a Condition C effect.[1]

The second factor was RELATION, probing the argument-adjunct asymmetry. ARGUMENT items (8) and (10) housed the name in a prepositional phrase complement to a noun. ADJUNCT items (9) and (11), by contrast, housed the name in a reduced relative clause. On the traditional view of the asymmetry, arguments but not adjuncts obligatorily reconstruct. We therefore expect a Condition C effect in YES with ARGUMENT (8), but not ADJUNCT (9).

The third factor was RESPONSE, probing the presence of Condition C effects. NAME corresponded to a coreferential reading for the pronoun, with low ratings signalling a Condition C effect. ELSE corresponded to disjoint reference, raising this possibility to salience. While ELSE is always grammatically possible, it may be dispreferred compared to NAME when co-reference is available, since experimental participants are biased towards resolving pronominal reference (Gordon and Hendrick 1998). Participants were asked to rate the naturalness of the NAME and ELSE responses independently.

We created twelve sets of items of the pattern in (8)-(11) and distributed them in a Latin square design across four lists. In constructing the items, we controlled for two things. Regarding distance, the name and pronoun were always separated by just one monosyllabic word: *did* in YES, *made* in NO. Second, on the suspicion that intensionality may play a role in alleviating Condition C effects, we ensured that all DP-taking verbs failed Moltmann's (1997) tests. The target sentence was always a *wh*-question, with each item accompanied by both the NAME and ELSE responses, presented simultaneously. The order of presentation of the two responses was consistent for a given participant, but balanced across lists; i.e., NAME above ELSE in two lists, ELSE above NAME in the other two lists.[2]

In addition to twelve critical items, each participant saw six fillers comprising an unrelated experiment, and eight baseline items. The same eight baselines were seen by every participant. All were *wh*-questions, so as to blend in with the critical items. However, they were designed to be uncontroversially good or bad with coreference, regardless of A-bar movement. The four BAD items were straightforward Condition C violations; in (12), *he* c-commands *Gary*:

(12) BAD
[Which statue] did **he** sell *t* to **Gary**?
A statue that { Gary, someone else } sold.

[1] This means that, at least at first appearances, there is no potential for a Condition C effect to arise in (10) and (11). See section 4.1 for further discussion, however.

[2] We would be happy to supply a full list of stimuli on request.

The four GOOD items, by contrast, straightforwardly allowed coreference by using possessive pronouns. In (13), the possessive *her* does not c-command *Sarah*, so there is no potential for a Condition C effect to arise:

(13) GOOD
[Which portrait] did **her** friend return *t* to **Sarah**?
A portrait that { Sarah, someone else }'s friend returned.

We included in the analysis data from 275 native English speaking undergraduate participants who took the survey online on their own laptops via Qualtrics.[3] We analysed the data in the R programming environment (R Core Team 2013) and created models using mixed effects linear regression in the lmerTest package (Kuznetsova et al. 2017). The next section presents our findings.

3. Results

This section presents the results of our experiment in four steps. First, the results for our baseline items confirm that our experimental design is sensitive to Condition C effects. Second, we present evidence for Condition C reconstruction by considering differences in RESPONSE for our YES, ARGUMENT items (8). Third, we present evidence for the argument-adjunct asymmetry by adding in the results for YES, ADJUNCT (9). Finally, we present our overall results, including the NO items, whose behaviour will merit further discussion in section 4.

3.1 Condition C

In our baseline items, the ratings for NAME were as expected. On BAD, NAME received appropriately low ratings, as in (14):

(14) [Which statue] did **he** sell *t* to **Gary**? NAME = 0.72 ELSE = 6.50

We interpret this very low rating for NAME as evidence of a Condition C effect. Thus the BAD baselines confirm that our experiment was sensitive to Condition C effects, and that our participants understood the task. On GOOD, meanwhile, NAME received appropriately high ratings, as in (15):

(15) [Which portrait] did **her** friend return *t* to **Sarah**? NAME = 5.55 ELSE = 2.78

[3] There were 293 native English speaking undergraduate participants. Participants were excluded on two grounds. The first was taking a time to complete the survey above the 97.5 percentile (2781 seconds ≈ 46 minutes) or below the 2.5 percentile (301.5 seconds ≈ 5 minutes). This resulted in the exclusion of 16 participants. The second ground for exclusion was having an average rating of the BAD baselines like (12) above one's mean rating across the experiment overall. This resulted in the exclusion of two further participants. The remaining 275 participants were not evenly distributed across lists. List 1 had 59 participants, list 2 had 71, list 3 had 75, and list 4 had 70.

Less expected is the relatively low rating for ELSE in GOOD. Disjoint reference is certainly a grammatical possibility in (15) just as much as in (14); yet the availability of co-reference in (15) depresses ELSE's rating. We interpret this behaviour as revealing a bias for co-reference, as established independently by Gordon and Hendrick (1998): when NAME is good, a preference for co-reference depresses the ratings for ELSE. This co-reference bias will be important for interpreting the results of our critical items in the rest of this section.

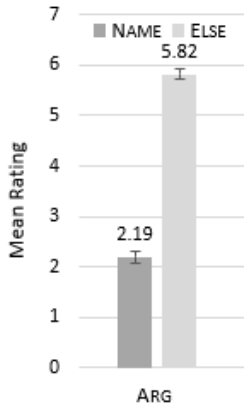
3.2 Reconstruction

The results for our YES, ARGUMENT items (8) provide evidence for Condition C reconstruction:

(8) [Which picture of Harry] did he frame *t* ?
A picture that { Harry, someone else } framed.

The mean ratings for each RESPONSE are plotted in (16). The darker bars represent NAME responses, the lighter bars ELSE responses. Here and throughout, the error bars indicate +/-1 standard error of the mean by participants:

(16) YES, ARGUMENT x RESPONSE



ELSE (5.82) was rated much higher than NAME (2.19). This stark numerical difference was statistically significant ($p < .001$, after Bonferroni correction for multiple comparisons). Moreover, the results here overcome the co-reference bias established by the baseline items in the previous subsection. Where co-reference was possible, participants strongly preferred NAME over ELSE; here, that preference is completely reversed.

We interpret these results for our YES, ARGUMENT items as providing strong evidence that there is reconstruction for Condition C in English questions. This replicates our finding in Stockwell et al. (2021). The next subsection turns to the argument-adjunct asymmetry.

3.3 Asymmetry

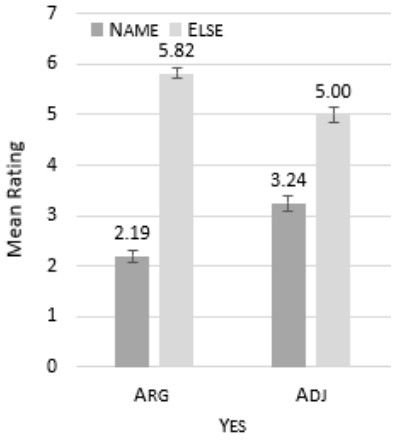
Adding in the results for our YES, ADJUNCT items like (9) provides evidence for the argument-adjunct asymmetry. Across our YES items, collated in (17), the base position of A-bar

movement starts from object position, below the pronoun. This allows us to compare the reconstruction behaviour of ARGUMENT vs. ADJUNCT:

(17) [Which picture { of Harry, arranged by Harry }] did he frame *t* ?
A picture that { Harry, someone else } framed.

The mean RESPONSE ratings for our YES items are plotted in (18). The two bars for ARGUMENT on the left are the same as before. The bars on the right add in the results for ADJUNCT:

(18) YES x RELATION x RESPONSE



There was a main effect of RESPONSE (Est. = -1.81, SE = .466, p = .002), with ELSE (5.42) generally preferred to NAME (2.71). Moreover, see how the gap between ELSE and NAME narrows from ARGUMENT to ADJUNCT. Statistically, this narrowing manifests as a significant interaction between RELATION x RESPONSE (Est. = -1.84, SE = .574, p = .007). That is, the difference between ELSE and NAME is significantly larger in ARGUMENT (5.82 vs. 2.19, Δ = 3.63) than in ADJUNCT (5.00 vs. 3.24, Δ = 1.76).

We interpret these results for our YES items as providing strong evidence that there is an argument-adjunct asymmetry in reconstruction for Condition C in English questions. There is a strong penalty against coreference for arguments, which is significantly reduced for adjuncts. The next subsection presents our overall results, including our NO items.

3.4 No

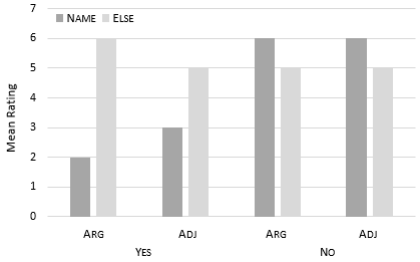
This subsection adds in our NO items to present our results overall. Our NO items from (10) and (11) are collected together in (19):

(19) [Which picture { of Harry, arranged by Harry }] *t* made him laugh?
A picture that made { Harry, someone else } laugh.

Our predicted overall results are sketched in (20). The argument-adjunct asymmetry predicts a three-way interaction between all of our three factors. In the previous subsection,

we saw that there was a two-way interaction between RELATION x RESPONSE in YES. Thus, as predicted, our results had the shape of the four leftmost bars here:

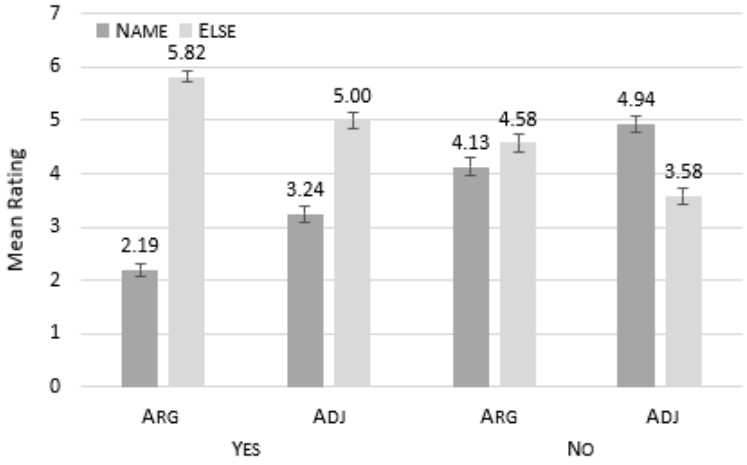
(20) *Predicted results*



For NO, on the other hand, we predict that there should be no interaction between RELATION x RESPONSE. Recall that in our NO items, A-bar movement launches from subject position, above the pronoun. As such, there is no possibility for a Condition C effect to arise based on A-bar reconstruction. Hence ELSE and NAME should each be rated the same across ARGUMENT and ADJUNCT in NO. We suspect that NAME might be rated slightly higher than ELSE, based on the co-reference bias established by our baseline items. Still, any such difference between NAME and ELSE should be consistent across ARGUMENT and ADJUNCT.

In fact, our NO items patterned rather differently. The mean ratings for RESPONSE across all our items are plotted in (21):

(21) CONDITION C x RELATION x RESPONSE



Looking to the right-hand side of the graph, we found a switch in RESPONSE preferences within RELATION in NO. In ARGUMENT, ELSE (4.58) was rated higher than NAME (4.13). In ADJUNCT, on the other hand, NAME (4.94) was rated higher than ELSE (3.58).

Honing in on NAME, in the YES items we expected NAME to be rated lower in ARGUMENT than ADJUNCT, due to an asymmetry in reconstruction for Condition C. We did not expect this difference to persist in our NO items, where the higher base position of A-bar movement means there is no potential for A-bar reconstruction to cause Condition C effects. This lingering difference between ARGUMENT and ADJUNCT in NO means we did not find the predicted significant three-way interaction between all of our factors, CONDITION C x RELATION x RESPONSE.

To summarise our results overall, the baseline items established that our experimental design could detect Condition C effects. With reference to (21), the difference between the leftmost two bars shows that there is reconstruction for Condition C in English questions. Adding in the next pair of bars shows there is an asymmetry, whereby reconstruction is stronger for arguments than adjuncts. However, our NO items did not behave as expected. There looks to be a lingering effect of Condition C reconstruction keeping NAME rated lower in ARGUMENT than ADJUNCT, even in NO. In fact, this is exactly what we think is happening. As discussed in the next section, the behaviour of our NO items follows from the A-movement properties of *make*-causatives and associated reconstruction possibilities.

4. Discussion

The results for our YES items provide strong evidence that there is an argument-adjunct asymmetry in reconstruction for Condition C in English questions. This section first discusses the behaviour of our NO items, which did not come out as predicted. Still, we think their behaviour is not unexpected once all reconstruction possibilities are taken into account. In addition, our findings differ from previous experimental work on English, which did not find robust evidence for Condition C reconstruction, let alone an argument-adjunct asymmetry. The second subsection sets our different findings in the context of differences in statistical power and methodology, and compares our study with more similar work on German.

4.1 More reconstruction

The results for our CONDITION C, NO items are explained once the possibility of reconstructing A-movement is taken into account. Observe that our NO items are *make*-causatives (22):

(22) [Which picture { of Harry, arranged by Harry }] *t* **made** him laugh?

A-bar movement launches from subject position. Since this position is above the pronoun, there is no potential for a Condition C effect to arise from A-bar reconstruction. On closer inspection, however, we see that the ultimate base position of the subject in *make*-causatives is below the causee. In each case in (23), the causee binds a pronominal in the causer subject (cf. Pesetsky 1995: 43f.; we control away from a possible logophoricity confound by using inanimates). This shows that the subject has moved from a position below the causee, to which it can reconstruct for binding. Such reconstruction is possible for pronominals housed in both arguments (a, b) and adjuncts (c, d):[4]

(23) a. [The picture of itself$_i$]$_j$ made the room$_i$ t_j feel quirky.
b. [Her$_i$ first film]$_j$ makes every actress$_i$ t_j smile.
c. [Shortcomings uncovered in its$_i$ own design]$_j$ made the bridge$_i$ t_j collapse.
d. [Articles tailored to their$_i$ subscribers]$_j$ make every newspaper$_i$ t_j grow siloed.

[4]Thanks to an anonymous NELS 51 reviewer who first brought this matter to our attention. The discussion in this subsection supersedes that in Stockwell et al. (2021: 207, note 1).

The movement step implicated in (23) is A-, not A-bar. By hypothesis, A-bar movement must reconstruct. A-movement, on the other hand, can reconstruct for purposes like binding, but does not have to. Thus A-movement can bleed Condition C, as shown by the grammaticality of (24) with the raising verb *seem*:

(24) [John$_i$'s mother]$_j$ seems to him$_i$ t_j to be lovely.

Significantly, (25) with *make* is likewise grammatical. The lack of a Condition C effect shows that the *j* step is A-movement, which takes the option not to reconstruct; as opposed to A-bar movement, which would have had to reconstruct:

(25) [John$_i$'s mother]$_j$ made him$_i$ t_j feel at home.

Overall, therefore, our *make*-causative No items are derived via two movement steps, as summarised in (26). The *wh*-phrase A-bar moves from the subject position t_1 to the left periphery; but only after A-moving from a position t_2 below the causee:

(26) [Which picture { of Harry, arranged by Harry }] t_1 made **him t_2** laugh?

By hypothesis, reconstruction of A-bar movement to t_1 is obligatory. The binding facts in (23), meanwhile, showed that reconstructing A-movement to t_2 is a grammatical possibility. Thus the ultimate base position of movement in our "No" items is below the causee, with the potential to give rise to Condition C effects. We believe our experimental results are explained if participants sometimes reconstruct to t_2.

Consider our No, Argument item from this perspective in (27) ('+' indicates inclusion of the name in reconstruction):

(27)	[Which picture of Harry] t_1 made **him t_2** laugh?	*argument*
	a. t_1=[picture of Harry] made him t_2 laugh	t_1+
	b. *t_1 made **him** t_2=[picture of **Harry**] laugh	t_2+

Since arguments obligatorily reconstruct by hypothesis, *of Harry* will be included in any reconstruction. That means there are two available parses. In (a), A-bar movement reconstructs to t_1. No Condition C effect arises, since *Harry* remains above *him*. In (b), however, *picture of Harry* additionally A-reconstructs to t_2. On this parse, there is a Condition C violation. Thus one of the two possible reconstruction parses for (27) gives rise to a Condition C effect.

Consider in the same light our No, Adjunct item in (28):

(28)	[Which picture arranged by Harry] t_1 made **him t_2** laugh?	*adjunct*
	a. t_1=[picture] made him t_2 laugh	t_1
	b. t_1=[picture arranged by Harry] made him t_2 laugh	t_1+
	c. t_1 made him t_2=[picture] laugh	t_2
	d. *t_1 made **him** t_2=[picture arranged by **Harry**] laugh	t_2+

This time there are four available parses. As before, there is the choice between reconstructing just A-bar movement to t_1 (a, b), or also A-movement to t_2 (c, d). Additionally here, there is a choice between reconstructing only the NP (a, c), or also the adjunct (b, d). While the parses in (a)-(c) are unproblematic, (d) is a Condition C violation.

Our "No" results are explained if experimental participants pick some well-formed parse and respond accordingly. When presented with (27), participants pick either (a) or (b). When they pick (a), they give a high rating for NAME. When they pick (b), the Condition C violation results in a low rating for NAME. This explains the lower than expected ratings for NAME on our NO, ARGUMENT items. When presented with (28), participants pick one of (a)-(d); (a)-(c) yield high ratings for NAME, the Condition C violating (d) a low rating. This explains the slightly lower than expected ratings for NAME on NO, ADJUNCT.

This interpretation of our findings makes a strong claim about the behaviour of experimental participants: participants pick a parse and stick with it. This accords with much evidence from the sentence processing literature, which shows that readers opt for one analysis of an ambiguous string and do not consider other analyses unless they are forced to (e.g. Frazier 1987, van Gompel et al. 2001). In our case, even though other reconstruction possibilities are available, participants pick one and respond according to its grammaticality with respect to Condition C. This selectivity results in NAME receiving less than perfect ratings, even in "NO".[5] Low ratings for NAME derive from reconstruction of *Harry* to t_2. The argument-adjunct asymmetry persists, since arguments but not adjuncts obligatorily reconstruct. There is more scope for a Condition C effect to arise with arguments than adjuncts – viz. 1/2 parses in (27) vs. 1/4 parses in (28). If participants were entertaining all possibilities, both (27) and (28) would come out as grammatical, as initially predicted. Thus naïve participants behave very differently from trained linguists.

4.2 Comparison with previous studies

Our experimental results provide strong evidence for Condition C reconstruction and the argument-adjunct symmetry in English questions. These findings contrast with previous experimental work on English by Adger et al. (2017) and Bruening and Al Khalaf (2019), who found no evidence for reconstruction, let alone the asymmetry. The prevailing reason for this difference might be that our number of participants provided greater statistical power (Brysbaert 2019). We had 275 participants, as compared with 53/91/89 across the three experiments in Adger et al. (2017), and 75/75/70 in Bruening and Al Khalaf (2019).

There were also differences in our methodologies. Adger et al. (2017) forced a Yes/No response as to whether participants could use a sentence like (29) when the highlighted name and pronoun referred to the same individual:

(29) Which side of **Elizabeth** does **she** prefer?

We suspect that this task may have led to an over-representation of Yes responses, concealing the effects of Condition C reconstruction. For one, experimental participants are generally

[5] We believe this explanation extends to the "No" pattern we reported previously in Stockwell et al. (2021).

biased to answering Yes rather than No (Bentler et al. 1971, Ray 1983). More substantively, participants are biased towards resolving pronominal reference (Gordon and Hendrick 1998). In the absence of any other salient reference options for *she* beyond *Elizabeth*, participants may have been biased to answering Yes. In our task, by contrast, the ELSE response raised the possibility of disjoint reference to salience. In addition, and biasing in the same direction, the task in (29) is very direct. Asking explicitly about coreference may have encouraged shallow processing of phi-feature match, with participants disregarding the c-command configurations crucial to Condition C. Compare our task, which probed referential possibilities indirectly by asking about the naturalness of interpretations of *wh*-questions.

Bruening and Al Khalaf (2019), meanwhile, forced a choice between two intra-sentential referents for the pronoun in items like (30):

(30) A female staffer told everyone [which of the announcements that Hillary Clinton was running for president]$_j$ she had actually authorized t_j.
Who authorized the announcement? A: the staffer B: Hillary Clinton.

Where reconstruction of *Hilary Clinton* as part of the *wh*-phrase should rule out answer B as a Condition C violation, Bruening and Al Khalaf (2019) found otherwise. However, the target items are very complicated, with clausal complements and clausal embedding to house two potential antecedents for the pronoun. More substantively, forcing a choice between A and B probes referential preferences rather than possibilities. Compare our task, which asked participants to rate the NAME and ELSE responses separately. Such pairwise presentation has been found to be more sensitive and statistically powerful than gathering ratings for sentences in isolation (Sprouse et al. 2013: 225, 228; Marty et al. 2020).[6]

Our task was more similar the one reported by Georgi, Salzmann, and Wierzba (Georgi et al. 2018, 2021, Wierzba et al. to appear). 'GSW' found robust Condition C reconstruction in German by posing separate questions about referential possibilities with items like (31):

(31) Maria erzählt, [welche Statue von Anna]$_j$ sie t_j gesehen hat.
'Mary tells (of) which statue of Anna she saw.'
Q1: Kann man den Satz so verstehen, dass Maria eine Statue gesehen hat?
Q2: Kann man den Satz so verstehen, dass Anna eine Statue gesehen hat?
'Can the sentence be interpreted such that Mary/Anna saw a statue?'

Reconstruction of *Anna* as part of the *wh*-phrase should result in 'No' answers to Q2, due to Condition C. GSW found that this prediction was borne out. According with our similar findings, the differences between our task and theirs are more minor. First, they used forced choice Yes/No responses, whereas we gathered naturalness ratings on Likert scales. Second, their items were indirect *wh*-questions, where matrix subject position housed a second referential option. Our items were direct *wh*-questions, with the ELSE response suggesting a second possibility of disjoint reference to someone else not mentioned in the sentence.

[6]That said, while our task aimed to probe referential possibilities, participants seem to have responded, at least in aggregate, with preferences – each pair of bars in the graph in (21) adds up to just over 8.

However, GSW did not find an argument-adjunct asymmetry. Rather, they found that both arguments and adjuncts reconstruct for Condition C in German. This may be due to a cross-linguistic difference between English and German that awaits explanation. Alternatively, the reason may be methodological. Recall the relative unacceptability of YES-ADJUNCT-NAME (3.24) in our experiment, which we interpreted as reflecting the general availability of reconstructing adjuncts. Distinguishing between obligatory reconstruction of arguments and optional reconstruction of adjuncts might require high statistical power. Where GSW had between 32 and 48 participants across their experiments, our 275 may have allowed us to see past optional adjunct reconstruction and observe the argument-adjunct asymmetry.

5. Conclusion

This paper presented evidence for the Condition C argument-adjunct asymmetry in English questions. With sufficient statistical power and a task that probes referential possibilities, the asymmetry is experimentally observable. Consequently, it must be accounted for, urging careful consideration of candidate theories for doing so. While arguments must reconstruct, adjuncts still can, and do. Experimental participants pick a parse and respond accordingly, even when other parses are available.

References

Adger, David, Alex Drummond, David Hall, and Coppe van Urk. 2017. Is there Condition C reconstruction? In *Proceedings of NELS 47*, ed. by Andrew Lamont and Katerina Tetzloff, 21–31. Amherst, MA: GLSA.

Barss, Andrew. 1986. Chains and anaphoric dependencies. Doctoral dissertation, MIT, Cambridge, MA.

Bentler, P. M., Douglas N. Jackson, and Samuel Messick. 1971. Identification of content and style: A two-dimensional interpretation of acquiescence. *Psychological Bulletin* 76:186–204.

Bruening, Benjamin, and Eman Al Khalaf. 2019. No argument-adjunct asymmetry in reconstruction for Binding Condition C. *Journal of Linguistics* 55:247–276.

Brysbaert, Marc. 2019. How many participants do we have to include in properly powered experiments? A tutorial of power analysis with reference tables. *Journal of Cognition* 2:16.

Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.

Fox, Danny. 1999. Reconstruction, binding theory, and the interpretation of chains. *Linguistic Inquiry* 30:157–196.

Frazier, Lyn. 1987. Sentence processing: A tutorial review. In *Attention and performance XII: The psychology of reading*, ed. by Max Coltheart, 559–586. Lawrence Erlbaum Associates, Inc.

Georgi, Doreen, Martin Salzmann, and Marta Wierzba. 2018. Condition C reconstruction in German A'-movement: Methodological insights and theoretical implications. Condition C Workshop, Queen Mary University of London.

Georgi, Doreen, Martin Salzmann, and Marta Wierzba. 2021. Challenges of investigating Condition C reconstruction experimentally. Talk at NELS 52, Rutgers, 29-31 October.

van Gompel, Roger P. G., Martin J. Pickering, and Matthew J. Traxler. 2001. Reanalysis in sentence processing: Evidence against current constraint-based and two-stage models. *Journal of Memory & Language* 45:225–258.

Gordon, Peter C, and Randall Hendrick. 1998. The representation and processing of coreference in discourse. *Cognitive Science* 22:389–424.

Heycock, Caroline. 1995. Asymmetries in reconstruction. *Linguistic Inquiry* 26:547–570.

Kuznetsova, Alexandra, Per B. Brockhoff, and Rune H. B. Christensen. 2017. lmertest package: Tests in linear mixed effects models. *Journal of Statistical Software* 82:1–26.

Lebeaux, David. 1988. Language acquisition and the form of the grammar. Doctoral dissertation, University of Massachusetts, Amherst.

Marty, Paul, Emmanuel Chemla, and Jon Sprouse. 2020. The effect of three basic task features on the sensitivity of acceptability judgment tasks. *Glossa: a journal of general linguistics* 5:72.

Moltmann, Friederike. 1997. Intensional verbs and quantifiers. *Natural Language Semantics* 5:1–52.

Pesetsky, David. 1995. *Zero syntax*. Cambridge, MA: MIT Press.

R Core Team. 2013. *R: A language and environment for statistical computing*. Vienna: R Foundation for Statistical Computing.

Ray, John J. 1983. Reviving the problem of acquiescent response bias. *The Journal of Social Psychology* 121:81–96.

Sportiche, Dominique. 2016. Neglect. Ms., University of California, Los Angeles.

Sprouse, Jon, Carson T. Schütze, and Diogo Almeida. 2013. A comparison of informal and formal acceptability judgments using a random sample from Linguistic Inquiry 2001-2010. *Lingua* 134:219–248.

Stockwell, Richard, Aya Meltzer-Asscher, and Dominique Sportiche. 2021. There is reconstruction for Condition C in English questions. In *NELS 51: Proceedings of the Fifty-First Annual Meeting of the North East Linguistic Society, Volume Two*, ed. by Alessa Farinella and Angelica Hill, 205–214. GLSA.

Thoms, Gary, and Caroline Heycock. 2021. Deriving 'late merge' with external remerge. Talk at NELS 52, Rutgers, 29-31 October.

Wierzba, Marta, Doreen Georgi, and Martin Salzmann. to appear. An experimental investigation of reconstruction for Condition C in German A'-movement. In *Proceedings of CLS 56*.

Richard Stockwell, Aya Meltzer-Asscher, Dominique Sportiche
richard.stockwell@chch.ox.ac.uk, ameltzer@tauex.tau.ac.il, sportich@g.ucla.edu