Is there Condition C reconstruction?[*]

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1.   Introduction

It has often been claimed that A- and Ā-movement differ with regard to reconstruction for Condition C. Much literature takes reconstruction for Condition C to be obligatory with Ā-movement, at least for complements to adjectives and nouns (Barss 1986, Lebeaux 1988, Heycock 1995), as in examples like (1a–c).

(1)   a.   *[AP How proud of Kim_i] is she_i ___?
         b.   *[DP Which side of Kim_i] does she_i dislike ___?

The putative ungrammaticality of (1a–b) is attributed to the fact that the occurrence of the R-expression *Kim* in the lower copy is c-commanded by the coreferential pronoun (2a–b).

(2)   a.   *[AP How proud of Kim_i] is she_i [AP how proud of Kim_i]?
         b.   *[DP Which side of Kim_i] does she_i dislike [DP which side of Kim_i]?

In contrast, A-movement appears to show no such effect.

(3)   [DP That side of Kim_i] seems to her_i [___ to be her best].

    In addition to this, reconstruction for Condition C is said to show an asymmetry between complements and adjuncts to the moved phrase, for example with complement clauses and relative clauses (Freidin 1986, Lebeaux 1988):

(4)   a.   *Whose claim [CP that Jess_i is nice] does he_i believe ___?
         b.   Which story [CP that Jess_i wrote] does he_i like ___?

The contrast between the (a) and (b) examples in (4) is usually attributed to the different status afforded to the complement and relative clause by the grammar. Various theoretical mechanisms have been proposed to capture this, most notably the idea that adjuncts can Merge countercyclically, so that no copy of the relative clause material is ever present in the lower position that would give rise to a Condition C effect (Lebeaux 1990). Unlike the relative clause, the complement clause is required by the argument structure of the nominal, and is therefore obligatorily present in the lower position. In this view, examples like (4a–b) involve different representations, given in (5a–b).

(5)   a.   *Whose claim [$_{CP}$ that Jess$_i$ is nice] does he$_i$ believe [$_{DP}$ whose claim [$_{CP}$ that Jess$_i$ is nice]]?

       b.   Which story [$_{CP}$ that Jess$_i$ wrote] does he$_i$ like [$_{DP}$ which story]?

In this paper, we report the results of an experimental investigation into the question of whether there is Condition C reconstruction in these different contexts, with the aim of determining the strength of motivation for the theoretical positions the phenomenon has underpinned. We present three experiments investigating whether the non-coreferentiality predicted by a Condition C violation can be detected in examples like (1a–b) and (4a–b). We further tested whether the prediction of a Condition C account, that such effects should be impervious to structural and linear distance, is upheld.

    The takeaway results of our experiments are as follows. We confirm that speakers are able to reliably detect Condition C violations that hold under reconstruction, regardless of linear or structural distance, but only with examples involving adjectival predicates, as in (1a). When it comes to instances of argument extraction like (1b), we find a much weaker non-coreference effect with DPs, which disappears with sufficient linear distance. In addition, we found only a very weak effect of adjunct/complement status in (4a–b), with the majority of speakers permitting coreference in both cases, contrary to the reported effect in the literature. We conclude from these results that obligatory reconstruction for Condition C is limited to adjectival predicates, and that the effect seen with DP extraction should not to be attributed to Condition C.

    The significance of these findings is that they remove support for special countercyclic mechanisms and any need to posit a difference between A- and Ā-movement in this domain. Instead, for all phrasal movement, the distribution of Condition C reconstruction can be captured by allowing deletion up until interpretability at LF (Fox 1999, Takahashi & Hulsey 2009). Only in cases where there are contradictory requirements at the interface, as with predicates, which must be interpreted low for independent reasons, do we find the empirical effects expected for Condition C reconstruction. In addition, these results converge with those of Bruening & Al-Khalaf (2017), whose work independently comes to the same conclusions, based on a different set of experiments.

2. Experimental set-up

To investigate Condition C reconstruction effects, we conducted three experiments on Mechanical Turk. All three experiments used only monolingual American English speakers, and involved a forced choice task in a Latin Square design, with distractors and controls. Controls involved simple (non-reconstructed) Condition C effect sentences.

    To assess the availability of coreference, participants were presented with a sentence containing a pronoun and proper name. The pronoun and proper name were then highlighted. Participants were asked whether they could use the sentence when the two highlighted expressions referred to the same individual. They were given the option of answering Yes or No. To make sure participants understood the task, they were given a set of four practice items that involved simple Condition C judgements (i.e. without movement). We excluded anyone who failed this practice task.

## 3. Experiment 1: PP complements to A and N

In Experiment 1 (number of participants=53), we looked for the presence of Condition C reconstruction with PP complements to adjectives and nouns in both local and long-distance extraction contexts.

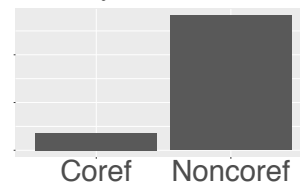   Let us look first at the controls, which were our test items without movement:

(6)   *Controls, no movement:*

        a. He_i saw that enemy of $Superman_i$'s partner.
        b. He_i thinks [Lois saw that enemy of $Superman_i$].

The results for these were as expected, with the vast majority of participants reporting a lack of coreference.
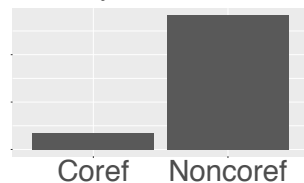
(7)   *Results for (6a):*   (8)   *Results for (6b):*

	Coreference	No coreference
(7)	6 (11.1%)	48 (88.9%)
(8)	10 (18.5%)	44 (81.5%)

    The first set of test items examined whether there is a Condition C reconstruction effect for PP complements to adjectives, with which the Condition C judgements are often reported to be the strongest (9a–c) (e.g. Heycock 1995).

(9)   *Condition 1: PP complement to A:*

a. [$_{AP}$ How proud of Elizabeth$_i$] is she$_i$ ___?
b. [$_{AP}$ How proud of Elizabeth$_i$] does she$_i$ think [Philip is ___]?
c. [$_{AP}$ How proud of Elizabeth$_i$] does Philip think [she$_i$ is ___]?

Examples like (9a) test for a simple Condition C effect under reconstruction. To see whether there is an effect of distance to the gap site or of distance to the pronoun, we included the examples in (b) and (c) as well. In addition to allowing us to test for the effect of distance, such examples allow us to assess whether Condition C reconstruction judgements may be ameliorated through Vehicle Change. Vehicle Change of the R-expression into a pronoun would render acceptable cases of long-distance extraction in which the pronoun is not clausemate to the gap site, like (b). However, coreference should still be unavailable in the (a) and (c) examples, because of the presence of a Condition B effect. Compare the non-extraction counterparts:

(10) a. *She$_i$ is very proud of Elizabeth$_i$. (Condition C)
   b. *She$_i$ thinks Philip is very proud of Elizabeth$_i$. (Condition C)
   c. She$_i$ thinks Philip is very proud of her$_i$. (No violation)
   d. *Philip thinks she$_i$ is very proud of Elizabeth$_i$. (Condition C)
   e. *Philip thinks she$_i$ is very proud of her$_i$. (Condition B)
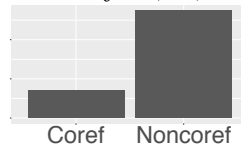
If reconstruction is forced, and the R-expression survives in the lower copy, the prediction is that participants will report co-reference in (9a–c) as bad. If Vehicle Change converts the R-expression in the copy to a pronoun, then co-reference should be reported as bad in all cases except for (9b), since under Vehicle change neither a Condition C or B effect should rule out coreference in that example.

    Our results are consistent with an account involving obligatory reconstruction for Condition C with complements to adjectives, and no Vehicle Change (Heycock 1995). Non-coreference effects are strongly found across the configurations we examined, regardless of proximity of the putative reconstructed elements to the pronoun or gap site. Note that this result also suggests that an explanation of the obligatory reconstruction effect with predicates that relies on a trace of the subject internal to the predicate is on the wrong track (e.g. Huang 1983). Such an approach predicts that examples like (9b) should be much better than examples like (9a) and (9c), contrary to what we find.
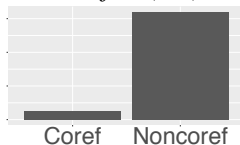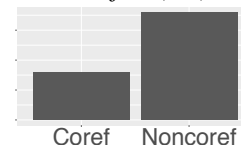
(11) *Results for (9a):*   (12) *Results for (9b):*   (13) *Results for (9c):*

	Coref	Noncoref

	Coreference	No coreference
(11)	6 (8.6%)	64 (91.4%)
(12)	15 (22.4%)	55 (78.6%)
(13)	24 (36.4%)	42 (63.6%)

There does appear to be an effect of distance at play here. In the long distance extraction cases, coreference in the examples becomes slightly more acceptable, but speakers still overwhelmingly report non-coreference. In addition, note that the effect does not go in the direction of a Vehicle Change account.

Turning to cases where a nominal is extracted, we examined the same basic paradigm as for adjectives:

(14)　　*Condition 2: PP complement to N*

　　　　a.　[DP Which side of Elizabeth$_i$] does she$_i$ prefer ___?
　　　　b.　[DP Which side of Elizabeth$_i$] does she$_i$ say [Philip prefers ___]?
　　　　c.　[DP Which side of Elizabeth$_i$] did Philip say [she$_i$ prefers ___]?

Here we found an interesting difference. Participants report a non-coreference effect in local extraction examples like (14a), just as we saw for adjectives. However, with complements to nouns, the effect of long-distance extraction is much more pronounced, and the majority of speakers indicate that co-reference is possible in both conditions (see also Bruening & Al-Khalaf 2017).
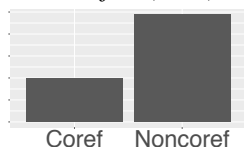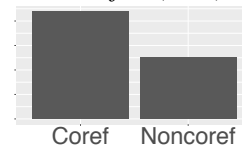
(15)　*Results for (14a):*　　(16)　*Results for (14b):*　　(17)　*Results for (14c):*

	Coreference	No coreference
(15)	21 (30%)	49 (70%)
(16)	34 (53.1%)	30 (46.9%)
(17)	45 (64.3%)	25 (35.7%)

Two effects appear to emerge from the comparison of Condition 1 and Condition 2: (i) Condition C reconstruction is weaker with complements to nouns, and (ii) Condition C reconstruction with complements to nouns is sensitive to distance. To assess this statistically, we ran a binomial GMLER with random intercepts for subject and item to compare conditions. The purported non-coreference effect is much weaker with complements to N (z=4.37) in the local case, and diminishes with distance in a significant fashion (z=2.59).

A key lesson of this experiment is that we can confirm the existence of obligatory reconstruction for Condition C with adjectives. Participants report a Condition C effect in the adjective condition that is similar to what is found with simple controls. These results demonstrate that speakers access underlying representations, as predicted by a movement approach to long-distance dependencies. A surprising result of this experiment, however, is that a clear Condition C effect is not found with complements to nouns. Instead, we find a non-coreference effect only in the most local case, with speakers permitting coreference with sufficient distance. Importantly, this cannot just be an effect of processing, since speakers are able to recover Condition C violations over the same distance with adjectives.

4.   Experiment 2: The effect of proximity on Condition C

To test the nature of the effect of distance on coreference under reconstruction of extracted nominals, we ran a second experiment that examined whether linear or structural distance is responsible for the effect.

In Experiment 2 (n=91), we looked at the effect of linear and structural distance on coreference possibilities under reconstruction of extracted DPs. The experimental set-up was identical, but in this experiment we examined cases in which there is a contrast in whether intervening material c-commands or merely precedes the copy. Conditions 1 and 2 in this experiment were intended to replicate the kinds of example (9a–b) tested in experiment 1, while a new third condition involved a PP that linearly intervenes between the surface position of the R-expression and the pronoun but does not c-command the extraction position.

(18)   *Condition 1: Baseline*
         [$_{DP}$ Which statue of Barack$_i$] does he$_i$ dislike ___?

(19)   *Condition 2: Structural distance*
         [$_{DP}$ Which statue of Barack$_i$] does Michelle think [he$_i$ dislikes ___]?

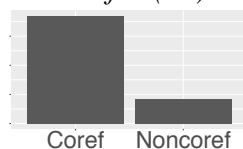(20)   *Condition 3: Linear distance*
         [$_{DP}$ Which statue of Barack$_i$ in Michelle's study] does he$_i$ dislike ___?

The results of experiment 2 replicate experiment 1 for the long-distance extraction case in which the intervening DP c-commands the extraction site. As can be seen in the graph below, (19), which is directly analogous to (9c), displays a comparable result. More strikingly, there was no difference between whether the 'interfering' DP intervened structurally between the extractee and the pronoun, or linearly. The judgments of possible coreference are close to identical in (19) and (20).
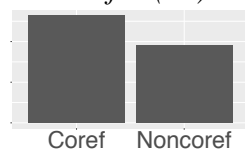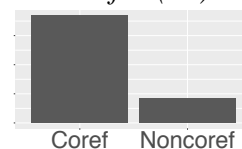
(21)   *Results for (18):*   (22)   *Results for (19):*   (23)   *Results for (20):*

	Coreference	No coreference
(21)	54 (58.7%)	38 (41.3%)
(22)	75 (81.5%)	17 (18.5%)
(23)	76 (82.6%)	16 (17.4%)

We did actually detect a difference between identical conditions in experiment 1 and 2 for the *local* extraction case. Examples (18) and (9a) are structurally identical, but in Experiment 1 a majority reported that coreference was not possible for them, while in experiment

2 a majority reported that co-reference was possible. However, what is important for the issue under consideration in both experiments is that there is still a clear contrast between the local and long-distance cases.

We conclude then that the influence of distance on coreference judgements with Ā-movement of DPs can be attributed just to linear proximity, unlike true Condition C effects, bolstering the proposal that non-coreference effects under reconstruction in DP-extractions are due to some other factor. This suggests that there is no obligatory reconstruction for Condition C in Ā-movement of DPs.[1]

5. Experiment 3: Relative and complement clauses

Our third experiment (n=89) examined the complement/adjunct asymmetry, which has been reported in the literature as impacting on coreference possibilities under reconstruction. Again, the experiment followed the same basic design. We tested the classical Lebeaux effects, both with local and long distance extractions:

(24)   *Condition 1: Relative clause*

    a.   Which allegation [that shocked Elizabeth$_i$] did she$_i$ deny ___?

    b.   Which allegation [that shocked Elizabeth$_i$] does Philip think [she$_i$'s denied ___]?

(25)   *Condition 2: Complement clause to N*

    a.   Whose claim [that Elizabeth$_i$ is too old] did she$_i$ overhear ___?

   b.   Whose claim [that Elizabeth$_i$ is too old] did Philip say [she$_i$ overheard ___]?

We also included cases of complement clauses to adjectives, so we could compare the behavior of clausal and PP complements across both nominal and adjectival extraction.

(26)   *Condition 3: Complement clause to A*

    a.   How proud [that Elizabeth$_i$ is still queen] does she$_i$ feel ___?

    b.   How proud [that Elizabeth$_i$ is still queen] did Philip say [she$_i$ feels ___]?

Focussing first on the DP extraction cases, as expected from experiment 2, the majority of participants found coreference to be possible with complement clauses, suggesting no effect of Condition C under reconstruction. The results for complement clauses to nouns look similar to those for PP complements to nouns in experiment 2.

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[1]An open question that remains is why some speakers do appear to get a Condition C effect in the local cases when no PP adjunct is attached, such as in (14a) and (18). We hope to address this in follow-up experiments.
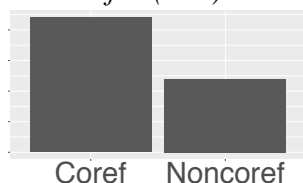
(27)   *Results for (25a):*   (28)   *Results for (25b):*
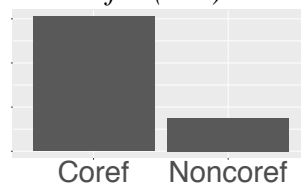
	Coreference	No coreference
(27)	44 (64.7%)	24 (35.3%)
(28)	61 (80.7%)	15 (19.3%)

We again see that there is little evidence for a Condition C effect and that there is an effect of distance, reinforcing the conclusions reached in our discussion of experiments 1 and 2.

There is a difference between the relative clause and complement clause results, which goes in the same direction as the reported Lebeaux effects. There were more judgements that allowed coreference in the relative clause cases than in the complement clause cases and this is significant when tested with GMLER (z=2.56). However, this effect is extremely weak, as by far the majority of speakers across the two conditions tolerate coreference.
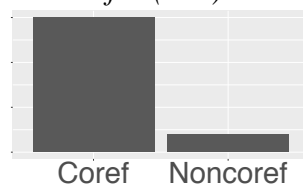
(29)   *Results for (24a):*   (30)   *Results for (24b):*
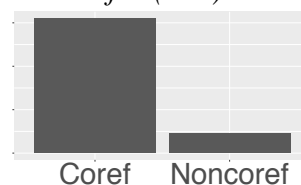
	Coreference	No coreference
(29)	60 (88.2%)	8 (11.8%)
(30)	62 (87.3%)	9 (12.7%)

We observe a similar drop-off in coreference answers just in our control items for complement clauses and relative clauses. In these, we reversed the positions of the pronouns and the proper names, so that coreference is always allowed.

(31)   a.   Which allegation [that shocked her$_i$] did Elizabeth$_i$ deny ___?
        b.   Which allegation [that shocked her $_i$] does Philip think [Elizabeth$_i$'s denied ___]?

(32)   a.   Whose claim [that she$_i$ is too old] did Elizabeth$_i$ overhear ___?
        b.   Whose claim [that she$_i$ is too old] did Philip say [Elizabeth$_i$ overheard ___]?

But these sentences never involve a Condition C configuration. This tells us that the drop off in acceptability of coreference in the complement clause case, compared to the relative clause case, has nothing to do with Condition C, and could represent an effect of the difficulty of *wh*-questions with complement clauses to nouns, as suggested by Lasnik (1998). These results again converge with those of Bruening & Al-Khalaf (2017).

The final condition of experiment 3 gave a somewhat surprising result. In contrast to our findings about PP complements to adjectives, which appear to undergo forced reconstruction and lead to a Condition C effect, complement clauses to AP behave in the same way as complement clauses to nominals. Coreference is allowed, and gets better with distance, as we have seen in all previous cases:

(33)   *Results for (26a):*
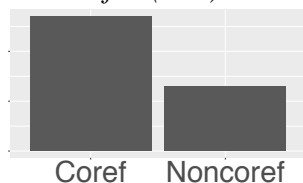
(34)   *Results for (26b):*
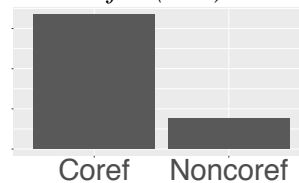
	Coreference	No coreference
(33)	54 (67.5%)	26 (32.5%)
(34)	67 (81.7%)	15 (18.3%)

6.   A copy deletion approach

Our results are consistent with a simple approach to copy interpretation: distributed deletion (*cf.* Takahashi & Hulsey 2009). In particular, we propose that subparts of copies may freely be deleted, as long as each syntactic object is interpretable at LF. Let us first show how this works out with DP extraction. Assuming the Copy Theory of Movement, we end up with a configuration like (35).

(35)   [which statue of Barack] does he dislike [which statue of Barack]?

Following Fox (1999), we take such structures to be interpreted using the operation of Trace Conversion. Trace Conversion replaces *which* in the lower copy with the definite article THE and adds a predicate $\lambda y.y = x$ which combines with the NP through Predicate Modification (36).

(36)   *LF of (35), with Trace Conversion:*
        [which statue of Barack] does he dislike [THE [statue of Barack] $\lambda y.y = x$]?

As Takahashi & Hulsey (2009) point out, structures like (36) remain interpretable if the NP *statue of Barack* is deleted in the lower copy, because the inserted predicate can serve as the argument of THE. Since we take distributed deletion to be possible up to interpretability, we propose that this subdeletion is available. The result is the LF in (37).

(37)   *LF of (35), with Trace Conversion and subdeletion:*
        [which statue of Barack$_i$] λx. does he$_i$ dislike [THE [~~statue of Barack~~] $\lambda y.y = x$]

This approach predicts the absence of a Condition C effect in Ā-movement of DPs that emerges from our experimental results, since the R-expression can be deleted from lower copies.

Let us now turn to extracted APs with PP complements like (38), which we showed *do* show Condition C reconstruction.

(38)   [how proud of Kim] is she [proud of Kim]

As usually suggested, we assume that reconstruction is obligatory with predicates (e.g. Barss 1986, Heycock 1995), so that the lower copy of the adjectival predicate must be interpreted. One way of fleshing out is to say that abstraction is limited to natural types, like type *e* or *d*. If we treat *wh*-phrases like *how* in *how proud* as an existential quantifier over degrees, this means that an example like (38) has an LF like (39).

(39)   [how ~~proud of Kim~~] λd. is she$_i$ [d-proud of Kim$_i$]

Because the abstraction associated with movement of the predicate is over degrees, distributed deletion must apply in the higher copy (to allow *how* to compose with the predicate of degrees). This forces obligatory reconstruction of the material in the adjectival predicate, since it otherwise will not be interpreted anywhere.

This proposal then provides an account of the difference between nouns and adjectival predicates. One question that is left open is why material inside complement clauses to adjectives can escape Condition C reconstruction. This is not accounted for under the analysis sketched above. A similar problem arises with relative clauses adjoined inside an adjectival predicate, as noted by Heycock (1995).

7.   Conclusion

In this paper, we argue that there is no non-coreference effect that is attributable to Condition C reconstruction in cases of DP extraction, and so no clear difference between A- and Ā-movement in this domain. The non-coreference effects that we do find with DP extraction are ameliorate significantly with linear distance, unlike classic Condition C effect. In addition, we confirm obligatory reconstruction for Condition C with adjectival predicates, showing that native speakers can reliably detect Condition C violations in reconstructed environments. These results undermine the postulation of complex derivational types, such as Late Merge, as explanations, and suggest that the simplest approach to Copy Interpretation (distributed LF deletion) is the correct one.

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