Condition C reconstruction in German A′-movement: experimental results

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MAJOR CONTRIBUTIONS

- The first experimental investigation of reconstruction in German A′-movement

- We propose an updated method to elicit coreference judgments

- Most important results:

  - Condition C reconstruction in German *wh*-movement is more robust than reported in recent experimental work on English (preference for non-coreference with DP-arguments)
  - There is no evidence for an argument-adjunct asymmetry
  - Asymmetry between different types of A′-movement: Reconstruction in relative clauses is much weaker than in *wh*-movement
  - The results by and large confirm introspective claims about Condition C reconstruction in German

1 Background: Reconstruction in A′-movement

1.1 Theoretical aspects

- evidence for movement (movement vs. base-generation, cf., e.g., Aoun et al. 2001)

- Principle C: reconstruction to the lowest position obligatory (but see below)

  (1)   *[Which picture of John$_i$] do you think he$_i$ likes __.

- argument-adjunct asymmetries: only R-expressions inside arguments trigger Principle C effects, R-expressions inside adjuncts don't (merged late), cf. van Riemsdijk and Williams (1981: 201–204), Freidin (1986: 179), Lebeaux (1988, 1990, 1991), Fox (1999), Safir (1999):

  (2)   a. *[Which claim that Mary had offended John$_i$]$_1$ did he$_i$ repeat __$_1$?
         b.   [Which claim that offended John$_i$]$_1$ did he$_i$ repeat __$_1$

  (3)   a. *[Which pictures of John$_i$] did he$_i$ destroy __?
         b.   [Which pictures near John$_i$] did he$_i$ destroy __?

- predicate-/argument-asymmetries: predicates obligatorily reconstruct (contain trace of local subject/are non-referential), arguments do not (always), cf. Huang (1993), Heycock (1995)

  - distance effect: Principle C effects decrease with increasing distance between R-expression and pronoun (Huang 1993: 110, or even vanish, cf. Heycock 1995: 548ff.) under embedding with arguments but not with predicates:

    (4)   a. ?*How many pictures of John$_i$ does he$_i$ think that I like __?
           b. ?How many pictures of John$_i$ do you think that he$_i$ will like __?

    (5)   a. ?*How proud of John$_i$ does he$_i$ think I should be __?
           b. *How proud of John$_i$ do you think he$_i$ should be __?

1.2 Empirical aspects

1.2.1 English

- Principle C in English: contested facts

    – Presence of Condition C effects under A$'$-movement questioned quite generally, cf. Heycock (1995), Fox (1999), Fischer (2002, 2004), Henderson (2007); cf. Safir (1999: 609)

    (6) a. [Whose criticism of Lee$_i$]$_1$ did he$_i$ choose to ignore ___$_1$?
         b. [Which picture of John$_i$]$_1$ does he$_i$ like best ___$_1$?
         c. [Most articles about Mary$_i$]$_1$ I am sure she$_i$ hates ___$_1$.
         d. [That John$_i$ had seen the movie]$_1$ he$_i$ never admitted ___$_1$.

    – Relative clauses are sometimes claimed to display weaker Condition C effects than *wh*-movement/no Condition C effects whatsoever; either because the RC-internal representation of the external head can be deleted without violating recoverability (Munn 1994, Citko 2001) or because of vehicle change (Sauerland 1998, 2003):

    (7) a. The [picture of John$_i$] [$_{CP}$ which [~~picture of John$_i$~~] he$_i$ saw [x ~~picture of John$_i$~~] in the paper] is very flattering.
         b. The [picture of John$_i$] [$_{CP}$ which [~~picture of him$_i$~~] he$_i$ saw [x picture of **him**$_i$] in the paper] is very flattering.

        ∗ Condition C effects in RCs have been argued to reappear once reconstruction is independently required (e.g. for idiom interpretation/variable binding), cf. Sauerland (2003), but see Heycock (to appear) and Salzmann (2006, 2017: 158–167) for counter-evidence

    – argument-adjunct asymmetry

        ∗ What qualifies as an argument/adjunct? Noun-complement clauses may not be complements after all (Stowell 1981); the status of PP-modifiers is contested; the clearest contrasts seem to involve event nominals, cf. Safir (1999: 589, note 1)
        ∗ asymmetry has been generally called into question, cf. Fischer (2004: 161f.) for ex. showing reconstruction with adjuncts and non-reconstruction with arguments

    – confound: implicit PRO:
    Normally, both pronouns and reflexives are possible inside picture NPs, cf. (8-a); in some semi-idiomatic expressions, however, only the reflexive is possible, (8-b); possible explanation: these NPs contain an implicit PRO that binds the reflexive, cf. (8-c) → binding can obtain in the absence of reconstruction; (9) is thus ungrammatical independently of reconstruction:

    (8) a. Lucie$_i$ saw a picture of her$_i$/herself$_i$.
         b. Lucie$_i$ told a story about *her$_i$/herself$_i$.
         c. Lucie$_i$ told [PRO$_i$ a story about *her$_i$/herself$_i$].

    (9) *[Which PRO$_i$ picture of John$_i$] did he$_i$ take ___?

        → one should test nouns where a coreferential PRO is ruled out, either because the PRO would be disjoint or because the noun is unaccusative and thus lacks an external argument (Bianchi 1999: 118–119, Cecchetto 2005: 16–18)

- experimental work (Adger et al. 2017, Bruening and Al Khalaf to appear) provides evidence against Condition C reconstruction (with arguments) and argument-adjunct asymmetries

1.2.2 German

- Principle C effects are robust in *wh*-movement/topicalization but weak/absent in relativization, according to Salzmann (2006, 2017, to appear):

(10)   a. *[Welche Nachforschungen über Peter$_i$]$_1$ hätte   er$_i$ dir   lieber __$_1$
              which   investigations   about Peter] had.SBJV.3SG he you.DAT rather
              verschwiegen?
              conceal.PTCP
              lit.: 'Which investigations about Peter$_i$ would he$_i$ have rather concealed from you?'

        b. die [Nachforschungen über Peter$_i$], [die   er$_i$ mir lieber __ verschwiegen
              the investigations   about Peter which he me rather   conceal.PTCP
              hätte]
              have.SBJV.3SG
              'the investigations about Peter$_i$ that he$_i$ would have rather concealed from me'

- Condition C effects remain absent in relativization even if reconstruction is independently required (e.g. for idiom interpretation; lit.: break a fight off the fence = 'start a fight'; cf. Salzmann 2017: 163ff.):

(11)   Der [Streit über Peter's Kritik   an Maria$_i$], [den sie$_i$ __ vom   Zaun gebrochen
        the fight   about Peter's criticism of Mary   which she   off.the fence break.PTCP
        hat],   nervt   mich.
        have.3SG annoy.3SG me
        'The fight about Peter's criticism of Mary$_i$ that she$_i$ started annoys me.'

2 Experiments: Reconstruction in German A′-movement

2.1 Method

- We did not directly ask for coreference judgments as in Adger et al. (2017)

- We adapt the embedding method from Bruening and Al Khalaf (to appear):
  - indirect questions
  - participants are presented with two potential antecedents for a pronoun: the R-expression inside the moved *wh*-phrase and an R-expression in the matrix clause
  - a question after the item then asks for the referent of the local subject

- But we explicitly asked for each of the readings whether it is possible or not (two separate yes/no questions), as illustrated in the (translated) example below; cf. app. 1 for German ex.

> Maria tells us how proud of Anna she is.
>
> *Can this sentence be interpreted such that...*
>
> | | | |
> |---|---|---|
> | *...Mary is proud?* | ☐ Yes | ☐ No |
> | *...Anna is proud?* | ☐ Yes | ☐ No |

  - → explicit information about coreference possibilities
  - → optionality can be captured; we partly did this as we were also investigating reconstruction for Principle A (binding in final and intermediate landing sites, cf. Appendix 3)

- In the questions, we did not use pronouns in order to exclude potential Principle A or C effects there. For example, we avoided asking questions like "Is Mary proud of Mary?" (cf. Featherston 2002, who used sentences like "Martin saw Martin" to enforce the intended reading in their experiment on binding in double objects).

- The presentation order of referents (*Mary/Anna*) in the answers was balanced (50:50).

- Five experiments (32/48/36/36/32 participants, respectively), using www.soscisurvey.de.

- Participants recruited within Uni Potsdam for Exps 1–4, externally for Exp5 (prolific.ac).

- Latin Square Design, 1:1 proportion of items and fillers

- Fillers also investigated interpretation possibilities with two referents in various constructions (control, asymmetric coordination, ambiguity etc., see appendix 2). They were used to test whether subjects paid attention and understood the task as intended.

2.2 Design

Factors

- in situ vs. moved

- distance between pronoun and R-expression (linear and structural)

- DPs (arguments) vs. APs (predicates)

- R-expression inside argument vs. R-expression inside adjunct (DP-arguments only)

- *wh*-movement vs. relativization

→ For an example of a complete item set (in German), see appendix 1.

2.2.1 Principle C in *wh*-movement – Conditions

(12) APs (predicates)
   a. **Mary** tells (us) that she is very proud of **Anna**.   *in situ*
   b. **Mary** tells (us) [how proud of **Anna**] she is __ .   *moved*

   Principle C predicts: coreference between *she* and *Anna* impossible.

(13) DPs – R-expression inside argument
   a. **Mary** tells (us) that she saw a statue of **Anna**.   *in situ*
   b. **Mary** tells (us) [which statue of **Anna**] she saw __ .   *moved*

   Principle C predicts: coreference between *she* and *Anna* impossible

(14) DPs – R-expression inside adjunct
   a. **Mary** tells (us) that she saw a statue on the desk of **Anna**.   *in situ*
   b. **Mary** tells (us) [which statue on the desk of **Anna**] she saw __ . *moved*

   Late merger predicts: coreference between *she* and *Anna* is possible

- argument vs. adjunct: R-expression contained in PP argument or PP adjunct to N
  - PP-arguments mostly involved selected prepositions: *an* 'at/to', *über* 'about', *für* 'for' etc.
  - ~50% of the nouns were event nominals (*ung*-derivations), ~50% were underived (e.g. statue, portrait, rumor) or verb-related (anger, hate, attack) → the former are more likely to take proper arguments (*ung*-derivations vs. other nouns did not end up behaving differently in the experiments)
  - a coreferential implicit PRO was ruled out (either unacc. noun or disjoint agent, cf. rumor)

- linear distance (local extraction): by means of NP-coordination, the linear distance between the R-expression and the pronoun in the *moved* condition was increased.

  (15) a. **Mary** tells (us) [which statue of **Anna**] she saw __ .   *short*
      b. **Mary** tells (us) [which statue of **Anna** and the siblings] she saw __ . *coord*

- structural distance (another level of embedding):

  - 'embedding 1': R-expression and pronoun are not clausemates underlyingly.
  - 'embedding 2': R-expression and pronoun are clausemates underlyingly.

  (16) a. **Mary** tells (us) [which statue of **Anna**] she thinks that you saw __ .   *emb 1*
      b. **Mary** tells (us) [which statue of **Anna**] you think that she saw __ .   *emb 2*

- These conditions were adopted from Adger et al. (2017) and served to test the predictions of approaches in terms of Vehicle Change:

  - Ellipsis: R-expression in antecedent can correspond to pronoun in ellipsis site:

  (17)   John likes Mary and she thinks that I do, too ⟨ like **her** ⟩.

  - Vehicle Change extended to A′-movement chains (Safir 1999): R-expression in higher copy can correspond to pronoun in lower copy.
  - Under Vehicle Change, the Principle C effect should vanish with nouns and adjectives, but in the 'embedding 2' structure, a Principle B effect should arise with adjectives (not with nouns):
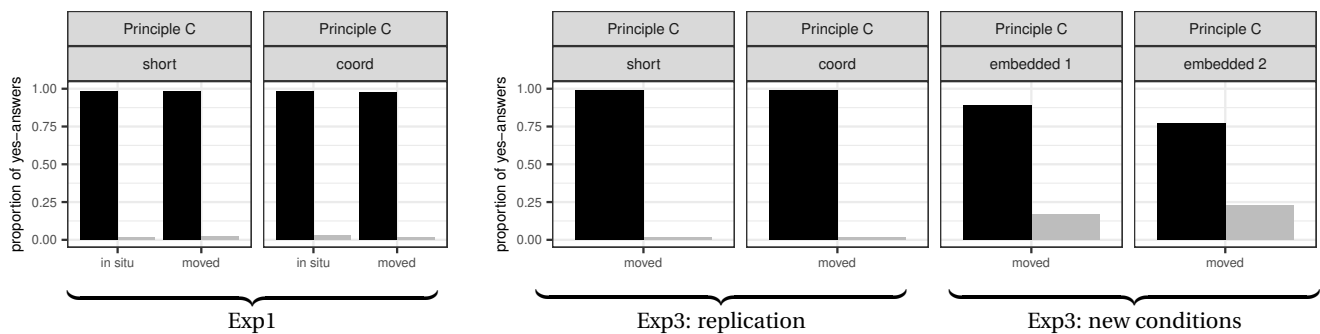
  (18) a. How proud of Anna does she think that you are ⟨ how proud of her ⟩.   *emb 1*
      b. *How proud of Anna do you think that she is ⟨ how proud of her ⟩.   *emb 2*
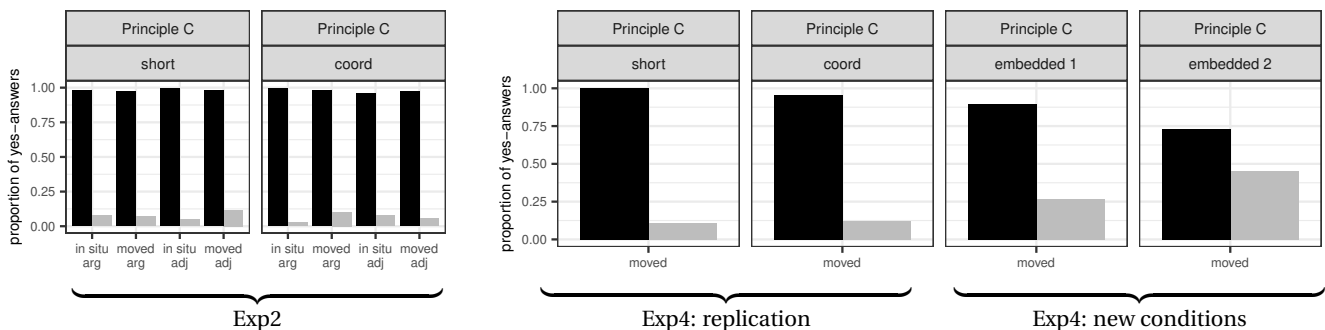
2.2.2 Principle C in *wh*-movement – Results

PRINCIPLE C IN *wh*-MOVEMENT – APS ■ Q1 (matrix subject), ■ Q2 (local subject)

PRINCIPLE C IN *wh*-MOVEMENT – DPS

2.2.3 Principle C in *wh*-movement – Main findings[1]

- Reconstruction is very robust across conditions, and with both DP-arguments and adjectival predicates[2]

- No support for the predicted argument-adjunct asymmetry (argues against a late-merger approach)[3]

- Significant effect of embedding (but not of linear distance),[4]
  but unlike in Adger et al. (2017), there remains a clear preference for non-coreference

- No evidence for Vehicle Change (reverse pattern: more acceptance of coreference with the lower R-expression for embedding 2 than embedding 1)

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[1]All statistical results reported in this section are based on univariate GLMMs with yes-answers to Q2 (main indicator of Principle C violations) as the dependent variable. They were fit following the recommendations for identifying parsimonious models by Bates, Kliegl, Vasishth and Baayen (2015) using the R packages lme4 and lmerTest (R Core Team 2016, Bates, Mächler, Bolker and Walker 2015, Kuznetsova et al. 2017).

[2]No significant effect of/interaction with movement in the Principle C conditions of exp 1 (linear distance: z = 0.96, p = 0.33; movement: z = 0.52, p = 0.60; dist:mov: z = -1.04, p = 0.30; all binary factors sum-coded). See next footnote for a qualification concerning exp 2.

[3]In exp 2, there is a numerically small but significant three-way interaction between distance, movement, and arg./adj. (z = 2.83, p = 0.005): there is less reconstruction with adjuncts in the short conditions; in the coord. conditions, the opposite holds. But it is not the case that there is generally less reconstruction with adjuncts.

[4]In comparison to the short, local baseline increasing linear distance via coordination does not make a significant difference in exps 3 + 4, but embedding does (exp3: coord: z = -0.009, p = 0.99; emb1: z = 3.30, p < 0.001; emb2: z = 3.92, p < 0.001; exp 4: coord: z = 0.23, p = 0.81; emb1: z = 3.17, p = 0.002; emb2: z = 5.65, p < 0.001).

2.2.4   Principle C in relativization – Conditions

Peter mentioned every statue of Robert which he saw.

Can this sentence be interpreted such that...

...Peter saw the statues?	☐ Yes	☐ No
...Robert saw the statues?	☐ Yes	☐ No

- A universal quantifier was used to ensure a restrictive reading of the relative clause.

- Proper names and head nouns were chosen in such a way (with respect to number and gender) that the interpretation of the relative pronoun was unambiguous (was only compatible with the head noun).

(19)   Factor distance in relativization
  a.   **Peter** mentioned [every statue of **Robert**] which he saw ___.   *short*
  b.   **Peter** mentioned [every statue of **Robert** and the deer] which he saw ___.   *coord*
  c.   **Peter** mentioned [every statue of **Robert**] which he thinks that you saw ___.   *emb1*
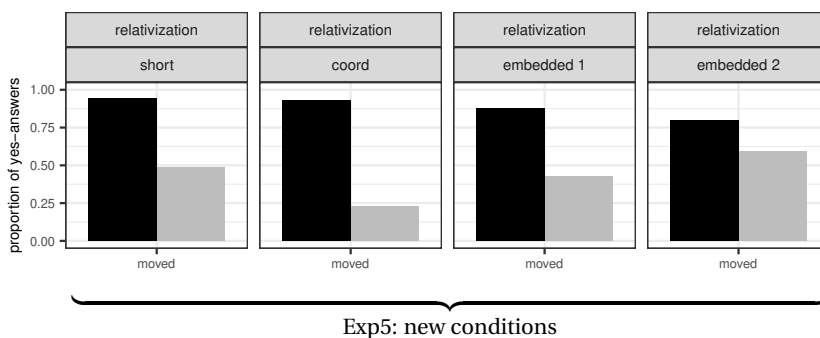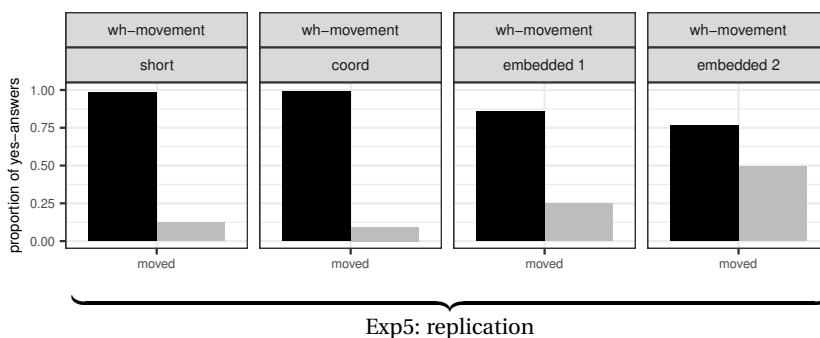 d.   **Peter** mentioned [every statue of **Robert**] which you think that he saw ___.   *emb2*

(20)   *wh*-movement vs. relativization:
  a.   **Peter** mentioned [which statue of **Robert**] he saw ___.   *wh-movement*
  b.   **Peter** mentioned [every statue of **Robert**] which he saw ___.   *relativization*

2.2.5   Principle C in relativization – Results

PRINCIPLE C IN *wh*-MOVEMENT VS. RELATIVIZATION   ■ Q1 (matrix subject), ■ Q2 (local subject)

Exp5: replication

Exp5: new conditions

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2.2.6   Principle C in relativization – Main findings

- In the short condition, there is less reconstruction in relativization than in *wh*-movement.[5]

- In all other conditions, the difference between *wh*-movement and relativization is less pronounced.[6]

- *Wh*-movement differs significantly from relativization in the following conditions: short, coordination, and embedded 1.[7]

- possible theoretical interpretations

  - the findings argue against a full representation of the external head in the RC-internal bottom position as under the head raising analysis

  - a recoverability-based account can motivate the higher acceptance of coreference (but not why it is lower than non-coreference), but cannot explain the difference between the distance conditions

  - A vehicle change account can motivate the higher acceptance of coreference (but not why it is lower than non-coreference), but cannot explain the difference between the distance conditions if speakers accept coreferential pronouns within NPs:

    (21)   a. He_i likes the statue of him_i (and the deer)   *short/coord*
           b. He_i thinks that you like the statue of him_i.   *emb1*
           c.   You think that he_i likes the statue of him_i.   *emb2*

  - A vehicle change account fails completely if speakers do not accept coreferential pronouns within NPs: emb1 should be much better than short/coord and emb2

3   Methodological insights

- The basic findings from experiments 1–2 were replicated in experiments 3–5, supporting the reliability of our method.

- The responses to the fillers were consistent and mostly in line with the expectations (see appendix 2), confirming that subjects understood the task as intended and were paying attention.

- In experiment 3–5, we additionally collected acceptability ratings for the sentences (on a 1–7 scale), because the acceptability of long-distance movement varies between speakers. A first inspection of the data suggests that the coreference judgment patterns are robust even for speakers who gave long-distance movement items low acceptability ratings.

- We did not find support for speaker groups with clearly distinct grammars: a by-subject analysis did not reveal a split between participants with respect to reconstruction possibilities, but rather a gradient pattern (unimodal distribution, at least in the short + coord conditions).

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[5]Significant effect of movement type at the short baseline level of distance: $z = 6.67$, $p < 0.001$.

[6]Significant interaction between movement type and distance at all other levels in comparison to the short baseline condition: coord: $z = 2.07$, $p = 0.04$, emb1: $z = 2.92$, $p = 0.004$, emb2: $z = 4.12$, $p < 0.001$.

[7]According to a post-hoc Tukey test with $\alpha = 0.05$.

4 Conclusion

- *wh*-movement
  - reconstruction is very robust across conditions, with both DP-arguments and adjectival predicates
  - no argument-adjunct asymmetry; the type of noun (unaccusative vs. transitive, event nominal vs. underived) had no influence
  - small effect of embedding, but (unlike in experiments on English) there remains a strong preference for non-coreference

- Relativization
  - reconstruction is less robust than in *wh*-movement: significant difference in short, co-ord, and embedding 1 conditions
  - the difference is most pronounced in the short condition

- theoretical implications
  - robust reconstruction in *wh*-movement suggests the presence of a full representation of the antecedent in the bottom position, especially with predicates
  - absence of an argument-adjunct asymmetry argues against Late Merger
  - reduced reconstruction in relativization argues against analyses that posit a full representation of the external head inside the RC; alternatives such as the matching analysis with vehicle change or optional deletion of the lower copy seem descriptively more adequate but cannot do justice to the full paradigm
  - Some of the facts, especially the embedding effect, suggest that non-syntactic factors play an important role

- further observations
  - the results for long-distance relativization, which is quite degraded in Standard German, are similar to those for prolepsis (part of the fillers), the unmarked strategy for long-distance relativization; this is in line with claims in Salzmann (2006, 2017):

    (22) die Statue von Peter$_i$, von der   du denkst, dass er$_i$ sie gesehen hat
          the statue of Peter of which he thinks that you it   seen   have.2SG
          'the statue of Peter$_i$ of which he$_i$ thinks that you saw it'

  - RC-extraposition (part of the fillers) slightly increases the possibility of coreference ($\approx$ 43% vs. 52%)

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5   Appendix 1: Items: original German version

Experiment 1: adjectival predicates (local movement)

(23)   Principle A

    a.   **Maria** erzählt, dass **Anna** sehr stolz auf $\boxed{\text{sich}}$ (und die Mannschaften) ist.   *in situ*

    b.   **Maria** erzählt, [wie stolz auf $\boxed{\text{sich}}$ (und die Mannschaften)] **Anna** ___ ist.   *moved*

    →   Q1: Kann man den Satz so verstehen, dass jmd stolz auf **Maria** (und die Mannsch.) ist?

    →   Q2: Kann man den Satz so verstehen, dass jmd stolz auf **Anna** (und die Mannsch.) ist?

(24)   Principle C

    a.   **Maria** erzählt, dass $\boxed{\text{sie}}$ sehr stolz auf **Anna** (und die Mannschaften) ist.   *in situ*

    b.   **Maria** erzählt, [wie stolz auf **Anna** (und die Mannschaften)] $\boxed{\text{sie}}$ ___ ist.   *moved*

    →   Q1: Kann man den Satz so verstehen, dass **Maria** stolz ist?

    →   Q2: Kann man den Satz so verstehen, dass **Anna** stolz ist?

Experiment 2: nominal arguments (local movement)

(25)   Principle A

    a.   **Maria** erzählt, dass **Anna** die Statue von $\boxed{\text{sich}}$ (und den Geschwistern) gesehen hat.   *in situ*

    b.   **Maria** erzählt, [welche Statue von $\boxed{\text{sich}}$ (und den Geschw.)] **Anna** ___ gesehen hat.   *moved*

    →   Q1: ...so verstehen, dass jmd eine Statue von **Maria** (und den Geschw.) gesehen hat?

    →   Q2: ...so verstehen, dass jmd eine Statue von **Anna** (und den Geschw.) gesehen hat?

(26)   Principle C (argument)

    a.   **Maria** erzählt, dass $\boxed{\text{sie}}$ die Statue von **Anna** (und den Geschwistern) gesehen hat.   *in situ*

    b.   **Maria** erzählt, [welche Statue von $\boxed{\text{Anna}}$ (und den Geschw.)] $\boxed{\text{sie}}$ ___ gesehen hat.   *moved*

    →   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?

(27)   Principle C (adjunct)

    a.   **Maria** erzählt, dass $\boxed{\text{sie}}$ die Statue auf dem Tisch von **Anna** (und...) gesehen hat.   *in situ*

    b.   **Maria** erzählt, [welche Statue auf dem Tisch von $\boxed{\text{Anna}}$ (und...)] $\boxed{\text{sie}}$ ___ gesehen hat.   *moved*

    →   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?

Experiment 3: adjectival predicates (local and long-distance movement)

(28)   Principle A (only additional conditions):

a.   **Maria** erzählt, dass **Anna** denkt, dass du sehr stolz auf ⟦sich⟧ bist.   *in situ, emb 1*

b.   **Maria** erzählt, [wie stolz auf ⟦sich⟧] **Anna** denkt, dass du ___ bist.   *moved, emb 1*

→   Q1: Kann man den Satz so verstehen, dass du stolz auf **Maria** bist?

→   Q2: Kann man den Satz so verstehen, dass du stolz auf **Anna** bist?

c.   **Maria** erzählt, dass du denkst, dass **Anna** sehr stolz auf ⟦sich⟧ ist.   *in situ, emb 2*

d.   **Maria** erzählt, [wie stolz auf ⟦sich⟧] du denkst, dass **Anna** ___ ist.   *moved, emb 2*

→   Q1: Kann man den Satz so verstehen, dass du denkst, dass jemand stolz auf **Maria** ist?

→   Q2: Kann man den Satz so verstehen, dass du denkst, dass jemand stolz auf **Anna** ist?

(29)   Principle C (only additional conditions):

a.   **Maria** erzählt, [wie stolz auf **Anna**] ⟦sie⟧ denkt, dass du ___ bist.   *moved, emb 1*

→   Q1: Kann man den Satz so verstehen, dass **Maria** denkt, dass du stolz bist?

→   Q2: Kann man den Satz so verstehen, dass **Anna** denkt, dass du stolz bist?

b.   **Maria** erzählt, [wie stolz auf **Anna**] du denkst, dass ⟦sie⟧ ___ ist.   *moved, emb 2*

→   Q1: Kann man den Satz so verstehen, dass du denkst, dass **Maria** stolz ist?

→   Q2: Kann man den Satz so verstehen, dass du denkst, dass **Anna** stolz ist?

Experiment 4: nominal arguments (local and long-distance movement)

(30)   Principle A (only additional conditions):

a.   **Maria** erzählt, dass **Anna** denkt, dass du die Statue von ⟦sich⟧ gesehen hast.   *in situ, emb 1*

b.   **Maria** erzählt, [welche Statue von ⟦sich⟧] **Anna** denkt, dass du ___ gesehen hast.   *mvd, emb 1*

→   Q1: Kann man den Satz so verstehen, dass du eine Statue von **Maria** gesehen hat?

→   Q2: Kann man den Satz so verstehen, dass du eine Statue von **Anna** gesehen hast?

c.   **Maria** erzählt, dass du denkst, dass **Anna** eine Statue von ⟦sich⟧ gesehen hat.   *in situ, emb 2*

d.   **Maria** erzählt, [welche Statue von ⟦sich⟧] du denkst, dass **Anna** ___ gesehen hat.   *mvd, emb 2*

→   Q1: ...so verstehen, dass du denkst, dass jmd eine Statue von **Maria** gesehen hat?

→   Q2: ...so verstehen, dass du denkst, dass jmd eine Statue von **Anna** gesehen hat?

(31)   Principle C (only additional conditions):

a.   **Maria** erzählt, [welche Statue von **Anna**] ⟦sie⟧ denkt, dass du ___ gesehen hast.   *mvd, emb 1*

→   Q1: Kann man den Satz so verstehen, dass **Maria** denkt, dass du eine Statue gesehen hast?

→   Q2: Kann man den Satz so verstehen, dass **Anna** denkt, dass du eine Statue gesehen hast?

b.   **Maria** erzählt, [welche Statue von **Anna**] du denkst, dass ⟦sie⟧ ___ gesehen hat.   *mvd, emb 2*

→   Q1: Kann man den Satz so verstehen, dass du denkst, dass **Maria** eine Statue gesehen hat?

→   Q2: Kann man den Satz so verstehen, dass du denkst, dass **Anna** eine Statue gesehen hat?

Experiment 5: *wh*-movement vs. relativization

(32)   Relativization in Principle C (only additional conditions)

a.   **Hans** erwähnte jede Statue von **Peter** (und dem Team), die ⟦er⟧ gesehen hat.

→   Q1: Kann man den Satz so verstehen, dass **Hans** die Statuen gesehen hat?

→   Q2: Kann man den Satz so verstehen, dass **Peter** die Statuen gesehen hat?

b.   **Hans** erwähnte jede Statue von **Peter**, die ⟦er⟧ denkt, dass du gesehen hast.   *emb1*

→   Q1: Kann man den Satz so verstehen, dass **Hans** denkt, dass du die Statuen gesehen hast?

→   Q2: Kann man den Satz so verstehen, dass **Peter** denkt, dass du die Statuen gesehen hast?

c.   **Hans** erwähnte jede Statue von **Peter**, die du denkst, dass ⟦er⟧ gesehen hat.   *emb2*

→   Q1: Kann man den Satz so verstehen, dass du denkst, dass **Hans** die Statuen gesehen hat?

→   Q2: Kann man den Satz so verstehen, dass du denkst, dass **Peter** die Statuen gesehen hat?

6 Appendix 2: Fillers

- (Almost) the same filler materials were included in all experiments.

- They were all constructed in such a way that two yes/no questions could be asked about their interpretation, to keep the task constant.

- Description of the filler groups:

  1. Subject/object control

     Anja hat Markus versprochen, in der WG die Möbel umzustellen.
     'Anja promised Markus to rearrange the furniture in the shared apartment.'
     → Will Anja/Markus rearrange the furniture?

  2. VP coordination (1/3: SVO, 2/4: OVS)

     Die Chefin rief den Assistenten an und machte sich Notizen.   *SVO*
     'The boss[NOM] called the assistant[ACC] and took some notes.'
     → Did the boss/assistant take notes?

     Den Kollegen kritisierte die Ingenieurin und ging nach draußen.   *OVS*
     'The colleague[ACC] criticized the engineer[NOM] and left.'
     → Did the colleague/engineer leave?

  3. Relative clauses (1/3: non-ambiguous, 2/4: ambiguous)

     P. hat erzählt, dass der Schüler, den er geärgert hat, eine Strafarbeit bekommen hat.   *non-amb*
     'Peter told us that the student who he teased got a punishment.'
     → Did Peter/the student tease someone?

     Leyla hat erzählt, dass die Verwandte, die sie besucht hat, in Budapest wohnt.   *amb*
     'Leyla told us that the relative {who she visited | who visited her} lives in Budapest.'
     → Did Leyla/the relative visit someone?

  4. Case ambiguity

     Die Königin hat die Herzogin eingeladen.
     'The queen[ACC/NOM] invited the duchess[ACC/NOM].'
     → Did the queen invite someone?

  5. PP attachment ambiguity

     Linus hat erzählt, dass er den Nachbarn mit dem Teleskop beobachtet.
     'Linus told us that he observes the neighbor with a telescope.'
     → Does the neighbor/Linus have/use a telescope?

  6. Long movement

     Welches Bild von sich denkt Paula, dass Isabell hochgeladen hat?
     'Which picture of herself does Paula think that Isabell uploaded?'
     → Is the sentence about a picture of Paula/Isabell?

  7. ECM

     Gustav hat erzählt, dass Karl und Jonas ihn Bücher einscannen ließen.
     'Gustav told us that Karl and Jonas had him scan books.'
     → Did Karl/Jonas scan books?

  8. Coordinated dative

     Gabriel hat Egon und Lars erzählt, dass er nach München ziehen will.
     'Gabriel told Egon and Lars that he wants to move to Munich.'
     → Did Egon/Lars move to Munich?

FILLER RESULTS (FROM EXPERIMENT 1) ■ Q1 (matrix subject), ■ Q2 (local subject)