Acceptable but Ungrammatical in Comparison: Overriding Principle C Violations in Comparatives*

Vera Gor

Rutgers University – New Brunswick

1. Introduction

This paper reports the findings of two complementary experiments illustrating a so-called 'acceptable ungrammaticality' in English comparatives with a Principle C violation. Previewing our results we find that while object comparatives with a Principle C violation pattern largely as predicted, given the c-command relation between a pronoun in the matrix clause and R-expression in the standard (especially when prosodic prominence favors disjoint reference), subject comparatives with a Principle C violation often (and unexpectedly) license co-reference – a finding in line with independently-observed grammatical illusions in subject comparatives reported elsewhere. We argue that such judgments of apparent grammaticality in the case of a structural violation arise because of a combination of factors: the upfront processing load inherent to a sentence-initial comparative, the presence of ellipsis in the standard clause, and the comparison of conceptually plausible alternatives.

2. Theoretical Background

Language is frequently used to make reference to individuals. In fact, in the discourse, within one sentence two nominal elements can often refer to one and the same person: in such cases those two nominals are considered co-referential (Evans 1980; Reinhart 1983). Most typically the pronoun follows the co-referential R-expression. In fewer cases, the pronoun may come first, establishing a relationship referred to as "backwards anaphora".

As is well known, backwards anaphora is not always licensed (Carden 1982). While in certain syntactic environments co-reference between the pronoun and the R-expression that follows can be established naturally, as in (1), in others it turns out to be deviant, as in (2).

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(1) When **he$_i$** turned four, **Danny$_i$** got a toy car.

(2) **He$_i$** got a toy car when **Danny**$_{*i/j}$ turned four.

Principle C of the Binding Theory provides an account of such cases by introducing the requirement that the R-expression must be free, i.e must not have a c-commanding c-indexed antecedent (Chomsky 1981/1993). This explains the contrast between (1) and (2): in the former, the pronoun is embedded in the temporal clause and does not c-command outside of it, while in the latter the pronoun is the matrix subject and c-commands the co-indexed R-expression in the VP-adjoined temporal clause, thus causing a Principle C violation.

Judgments of Principle C effects are typically robust and even persist under ellipsis. In (3), the second coordinate clause has a gap, where [*wanted her to speak*] is deleted under identity with the overt material in the first clause (Bresnan 1973). It is the elided pronoun that c-commands the R-expression: when reconstructed, it creates a Principle C violation.

(3) James wanted her to drive the Lexus$_i$, and John [~~wanted **her**$_i$ to drive~~] **Mary**$_{*i/j}$'s car.

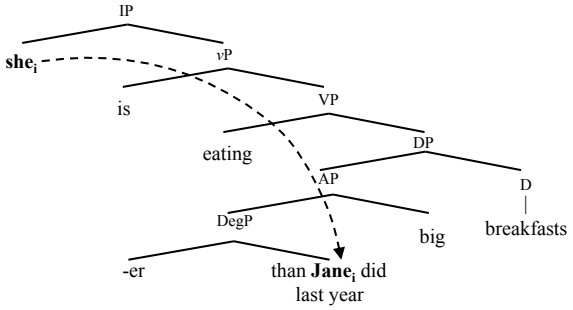
The same holds for comparative constructions, which also involve ellipsis in the standard *than*-clause. Following Lechner (2001) and Bhatt and Takahashi (2011), a.o., we assume that English phrasal comparatives are underlyingly clausal and require an obligatory syntactic reduction operation in the standard, as shown in (4).

(4) Mary is taller than Jane [~~is *d*-tall~~].
P, Q are degree predicates (e.g., *tall*) -er(P)(Q)↔∃d [Q(d)∧¬P(d)]

In the underlying form, the degree head (*-er*) and the standard *than*-clause form a degree quantifier that is a syntactic specifier of a gradable predicate (e.g., *tall*) (Chomsky 1965; Bresnan 1973; Kennedy 1999). Consequently, at LF the standard *than*-clause is a sister to degree head *–er*, and is therefore c-commanded by the same linguistic material that c-commands the degree head. This analysis makes specific predictions about binding properties, and therefore grammaticality, as illustrated for the comparative (5) in Figure 1. Note that in (5) the degree head *–er* is merged under the complement of the matrix verb: we will further refer to such structures as object comparatives.

(5) **She$_i$** is eating bigger breakfasts than **Jane**$_{*i/j}$ did last year.

(6) *Figure 1. Syntactic structure for an object comparative in (5).*



While in (5) the R-expression is c-commanded by an overt pronoun, in other cases Principle C violation may be caused by a covert pronoun elided within the standard *than*-clause. Assuming that ellipsis requires deletion under identity, (7) is ungrammatical, since *him* c-commands *Peter* in the elided material, just as *him* c-commands the associate *Jo* in the matrix clause. By contrast, (8) is grammatical, since the sequence is reversed (Bhatt and Takahashi 2011). Note that in (7) and (8) the degree head *–er* is merged under the matrix subject: we will further refer to such structures as subject comparatives.

(7) *More people expect **him**$_i$ to call **Jo** than **Peter**$_i$'s sister.
= *More people expect **him**$_i$ to call **Jo**
[$_{CP}$ than ~~*d* many people expect~~ [$_{TP}$ ~~**him**$_i$~~ [$_{T'}$ ~~to call~~ **Peter**$_i$'s sister]]]

(8) More people expect **Jo** to call **him**$_i$ than **Peter**$_i$'s sister.
= More people expect **Jo** to call **him**$_i$
[$_{CP}$ than ~~*d* many people expect~~ [$_{TP}$ **Peter**$_i$'s sister [$_{T'}$ ~~to call~~ ~~**him**$_i$~~]]]

Despite the fact that c-command and binding principles conspire to make clear predictions about the grammaticality of such comparatives, experimental data reported for adult controls in an act-out acquisition study by Gor & Syrett (2015) and casually-elicited native speaker intuitions for such (admittedly complex) examples have not yielded crisp judgments of (un)grammaticality. We therefore carried out two controlled experiments to collect systematic judgments on such examples in order to test for the degree of influence of binding relations in assessments of acceptability of comparative constructions.

3. Experiment 1: Forced-Choice Task

3.1 Participants

45 undergraduate students from Rutgers University – New Brunswick (all native speakers of American English) receiving course credit participated. 5 additional non-native speakers were excluded.

3.2 Experimental Design and Procedure

The aim of this experiment was to elicit acceptability judgments of particular co-reference relations in English comparative constructions with the purpose of assessing influence of Principle C effects on acceptability. We additionally manipulated such extra-syntactic factor as prosodic prominence (accenting vs. distressing the pronoun), since focus is known to influence co-reference acceptability judgments (Safir 2004). Test items were object and subject comparatives with backwards anaphora, contrastive in terms of the overt vs. covert pronoun causing a Principle C violation.

All target object comparatives had the pronoun in the matrix clause c-commanding the R-expression in the standard *than*-clause, yielding a violation of Principle C, thus leading to prediction of ungrammaticality. Object comparatives varied in terms of the structural position of the pronoun: matrix subject (9) vs. matrix indirect object (10), both of which were expected to create the same Principle C effect.

(9) **She$_i$** is eating bigger breakfasts that **Jane**$_{*i/j}$ did last year.

(10) The travel agent offered **her$_i$** a better deal than he offered **Mary**$_{*i/j}$ last year.

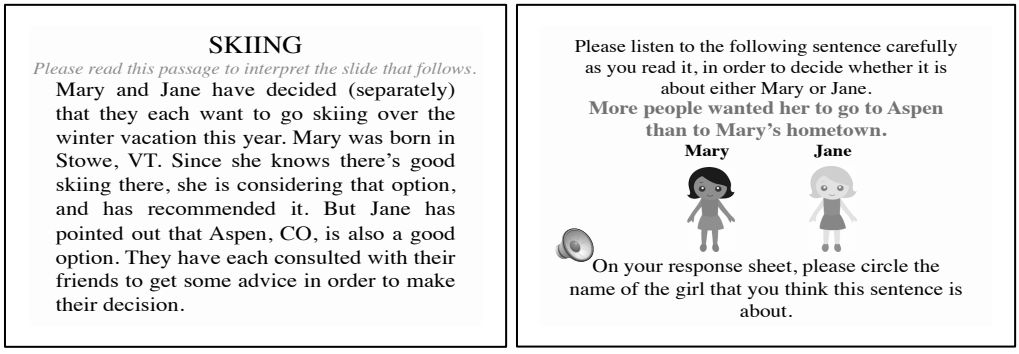
Target subject comparatives contrasted in terms of the order and c-command relation between a pronoun and a DP in the standard *than*-clause, and therefore in predictions of grammaticality. Modeled after key examples in Bhatt and Takahashi (2011), each pair of subject comparatives had one sentence that posed a Principle C violation, as in (11), and the other minimally different one, as in (12), that did not. Subject comparatives further varied in terms of the type of the matrix predicate (ECM, e.g. *want*, and ditransitives, e.g. *introduce*).

(11) ECM predicate (pronoun >> R-expression)
More people wanted her$_i$ to go to Aspen than to Mary$_{*i/j}$'s hometown.
…than [~~d-many people wanted **her$_i$** to go~~] to **Mary**$_{*i/j}$'s hometown.

(12) ECM predicate (R-expression >> pronoun)
More classmates wanted Alec to date her$_i$ than Jane$_{i/j}$'s next door neighbor.
…than [~~d-many classmates wanted~~] **Jane**$_{i/j}$'s next door neighbor [~~to date **her$_i$**~~].

Experiment 1 was a Forced-Choice task designed as a first-pass assessment to measure preference. Stimuli were delivered via slides. Each trial consisted of two slides, as shown in (13). Slide 1 presented a scenario involving two equally salient same-gender characters (*Mary* and *Jane*). Slide 2 presented (in both visual and auditory form) a target sentence with a pronoun, potentially referring to either female antecedent. Participants were asked to read and listen to the sentence (delivered twice) and decide which character it was about. Auditory stimuli were recorded in a sound-attenuating recording booth by a female native speaker of English. Stimuli included 6 object and 6 subject comparatives, and 2 ACD controls with licit and illicit co-reference presented in a pseudo-randomized order.

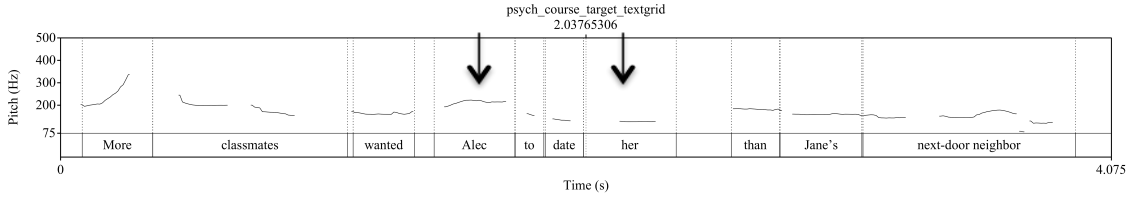
(13) *Figure 2. Stimulus for a sample subject comparative in (11) in Exp. 1 (Forced-Choice Task).*



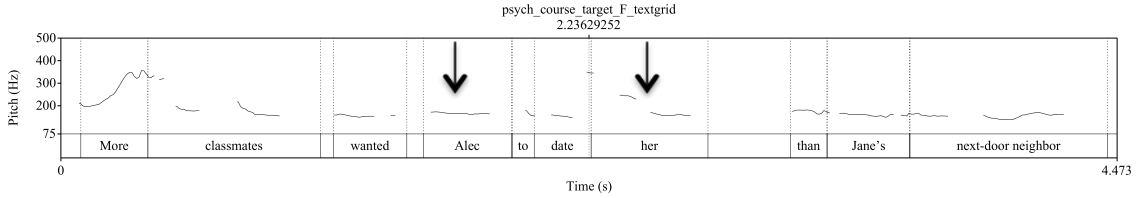
Participants were randomly assigned to one of the two prosodic conditions, depending on whether the matrix pronoun received prosodic prominence or not. In particular, we manipulated stress and deaccenting of the pronoun versus other key DPs in the sentence to

see whether backgrounding or foregrounding certain components in the structure would influence participants' responses in terms of possibility of co-reference. Pitch tracks in (14) and (15) below present two prosodic versions of (12): the former shows a deaccented pronoun coupled with a contrastive focus on DP *Alec*, while in the latter the pronoun is stressed and the name is deaccented.

(14) *Figure 3. Pitch track for a subject comparative in (12): deaccented pronoun*



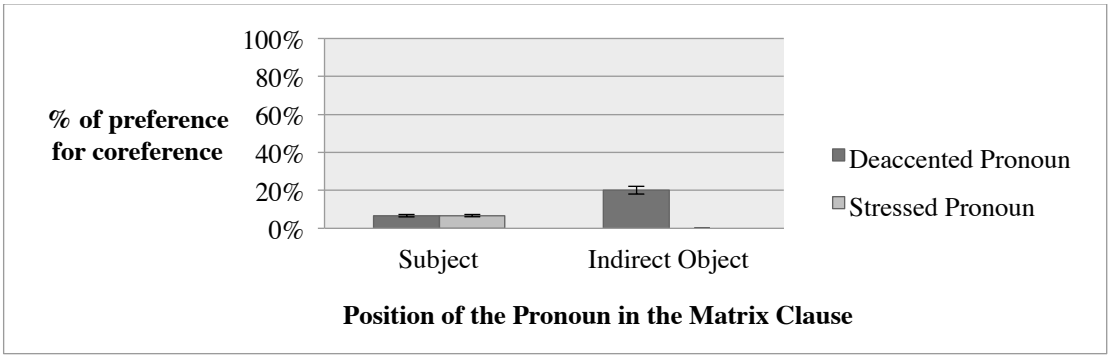
(15) *Figure 4. Pitch track for a subject comparative in (12): stressed pronoun*



3.3 Results

Object Comparatives. All the target object comparatives involved Principle C violations. As expected, participants almost never accepted co-reference where the pronoun was in the matrix subject position, as shown in (16). With the pronoun in the indirect object position of the matrix ditransitive predicate, there was a slightly higher co-reference acceptance rate, although still not exceeding 20%. At the same time, in the condition with the contrastive pitch on the pronoun the possibility of co-reference was ruled out completely by participants.

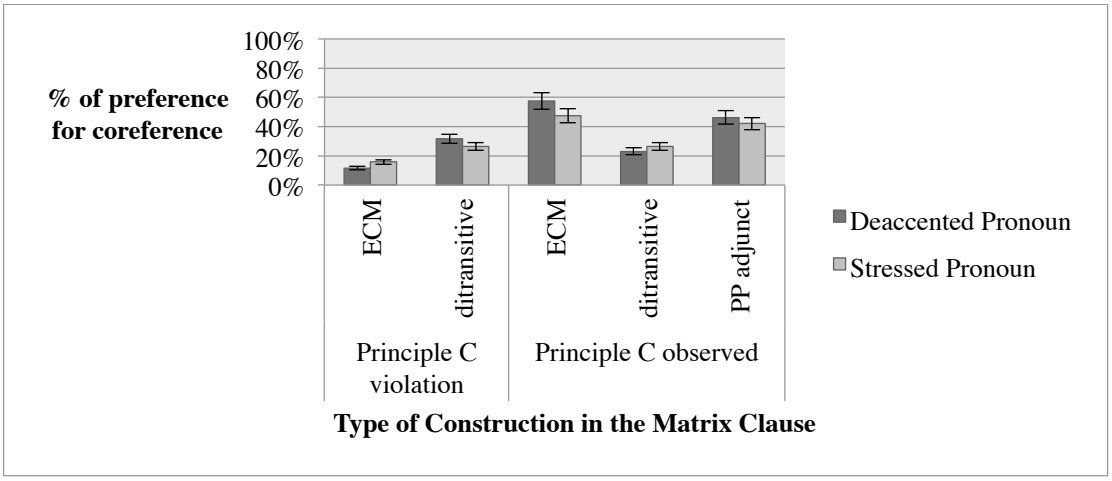
(16) *Figure 5. Responses to object comparatives indicating co-reference, given structure and prosodic condition (Experiment 1)*



Subject Comparatives. As shown in (17), co-reference was dispreferred in subject comparatives with a Principle C violation; however, acceptance percentages were further from zero than one would expect given a violation of a major structural constraint (11.6%

and 15.8% for the two prosodic conditions with ECM predicates, and 31.8% and 26.3% with ditransitives). Responses to structures with the reversed c-command relation between the pronoun and the R-expression yielded predictably higher co-reference acceptance rates ranging between 23.1% and 57.7%.

(17) *Figure 6. Responses to subject comparatives indicating co-reference, given structure and prosodic condition (Experiment 1)*



Thus, while object comparatives patterned largely as predicted, given the c-command relation between a pronoun in the matrix clause and R-expression in the standard, subject comparatives with a Principle C violation in many cases unexpectedly licensed co-reference.

4. Experiment 2: Modified Truth-Value Judgment Task

4.1 Participants

45 undergraduate students (all native speakers of American English, separate pool from Experiment 1) receiving course credit participated. 2 additional non-native speakers were excluded.

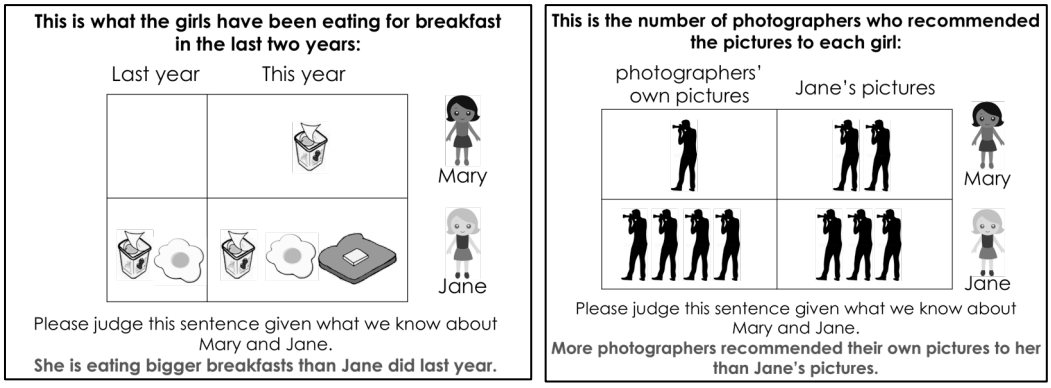
4.2 Experimental Design and Procedure

Since Experiment 1 (Forced-Choice task) revealed participants' preference for/against co-reference, but did not directly indicate whether they ruled out the other option as ungrammatical, we followed up with a modified version of Truth Value Judgment Task (Crain & Thornton 1998). Test items were the same structural types of object and subject comparatives with backwards anaphora, as in Experiment 1.

Stimuli were delivered via slides. For each trial, a slide presented relevant quantitative information about two same-gender characters, as exemplified in (18). Participants were asked to review the chart, then click to reveal the target sentence underneath, which was accompanied by an auditory version of the sentence repeated twice. Since with a TVJT each trial was less time-consuming than with the Forced-Choice task, we were able to extend the

number of both test items and controls to include 12 object comparatives, and 6 subject comparatives, as well as 6 comparatives and 4 ACD controls with licit and illicit co-reference presented in a pseudo-randomized order. Participants were asked to judge the truth of the sentence given the quantitative information in the chart and provide justification for their answer to confirm that they were interpreting the comparative as intended by the experiment design. Context favored co-reference, while Principle C may have barred it. As prosody was seen to matter only for object, and not subject, comparatives in Experiment 1, it was not manipulated for subject comparatives in Experiment 2.

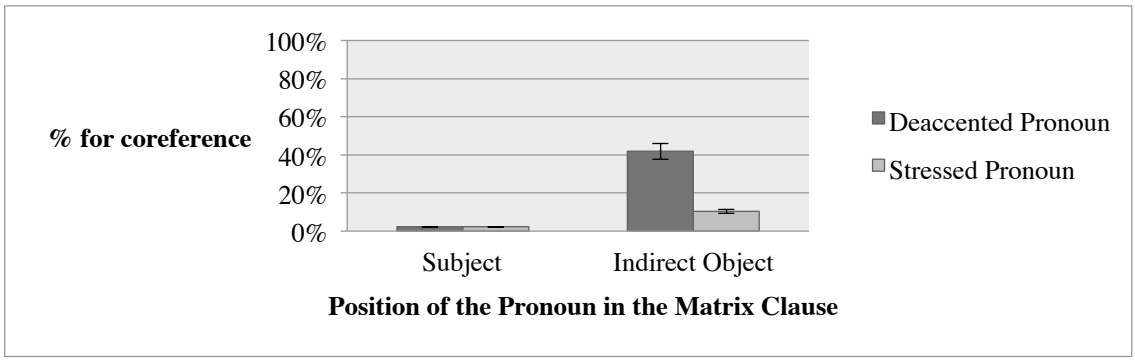
(18) *Figure 7. Stimuli for a sample object and subject comparatives in Exp. 2 (TVJT)*



4.3 Results

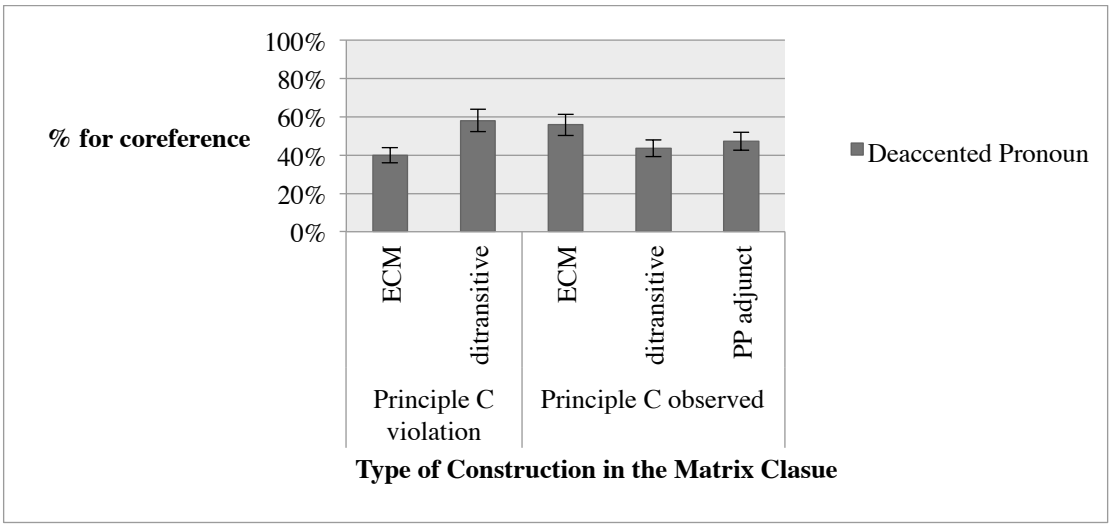
Object Comparatives. The results for object comparatives in Experiment 2 patterned very closely with those of Experiment 1: all the object comparatives involved a principle C violation, and thus, as expected, there was almost floor effect in terms of acceptance of co-reference with object comparatives that had a pronoun in the matrix subject position. Still, participants were likely to accept co-reference with the pronoun as an indirect object of a ditransitive predicate, while contrastive pitch on the pronoun vs. the R-expression strongly promoted disjoint reference.

(19) *Figure 8. Responses to object comparatives indicating co-reference, given structure and prosodic condition (Experiment 2)*



Subject Comparatives. Participants did not, however, respond as expected given the violation of a major structural constraint in subject comparatives, as shown in (20). There was no noticeable contrast in their acceptance of co-reference between the target subject comparatives with a Principle C violation and the ones that had the position of the pronoun and the R-expression reversed and Principle C observed. The acceptance rate of subject comparatives with a pronoun c-commanding the R-expression ranged between 40% and 58.1%; while for test items where the R-expression c-commanded the pronoun this range was between 43.6% and 55.8%.

(20) *Figure 9. Responses to subject comparatives indicating co-reference, given structure and prosodic condition (Experiment 2)*



Again, with object comparatives participants' judgments were generally predictable form Principle C relations: co-reference was disallowed when the overt pronoun c-commanded the DP (especially when prosodic prominence favors disjoint reference). Subject comparatives, where the c-commanding pronoun was a part of the material elided under identity, revealed higher than expected acceptability of co-reference.

5. General Discussion and Conclusions

In this research, we conducted experiments to reveal the effect that structural factors, such as subject vs. object placement of the degree head and the extent of comparative ellipsis, have on acceptability judgments of illicit co-reference relations in English comparative constructions. By incorporating into our experimental design two conditions tied to varying prosodic delivery of target stimuli, we were also able to reveal the role of prosody in disambiguating between a co-referential and a disjoint reference readings of the same sentence. We have demonstrated how backwards anaphora that violates Principle C in a comparative construction may be perceived as acceptable under the influence of such extra-syntactic factors as ease or difficulty of processing, conceptual plausibility or focus marking imposed by particular prosodic conditions.

As the studies have shown, with object comparatives participants' judgments were generally linked to Principle C. With subject comparatives, where the c-commanding pronoun was a part of the material elided under identity, higher than expected acceptability rates were revealed.

Indeed, subject comparatives, unlike object comparatives, have been reported as a source of grammatical illusions (Townsend & Bever 2001; Wellwood et al. (in revision), Phillips et al. 2011). Cases of grammatical illusions in subject comparatives, such as (21), appear to be grammatical sentences; however, when a native speaker is faced with a task to provide meaningful interpretation of such sentences, they generally admit that they cannot do so.

(21) More people have been to Russia than I have.

We propose that subject comparatives in our studies also created a grammatical illusion, but of a different kind: unlike (21), they made conceptual sense, i.e. redeemed a semantically well-formed interpretation, while violating a major structural constraint. Still, a common denominator between the two types is that in both the comparative is introduced by the very first word in the sentence, while the standard of comparison is only delivered at the very end. In this respect subject comparatives are rather similar to garden path sentences (Frazier 1978), with a degree head creating potential ambiguity early on in the sentence and the standard providing a focus of comparative and resolving the ambiguity sentence-finally. As a result the processor is front-loaded, and the parser is lured into accepting a particular co-reference relation despite the fact that it violates Principle C, because interpretation linked to it is pragmatically plausible.

As judgments of sentences with Principle C violations are typically robust (Kazanina et al., 2007), we argue that what we observed with subject comparatives was not participants ignoring c-command relations, but mistakenly perceiving these constructions as grammatical. A similar phenomenon was reported in Grant et al (2012) as an account for acceptable voice-mismatch in ellipsis, where it was argued that structural violations present as less severe violation when attention is drawn away from syntactic form, e.g. by implicitly focusing the modality or polarity of the state of affairs described. We propose a similar effect for subject comparatives, which also involve ellipsis: such structures place an implicit focus on a conceptually plausible comparative relation, which draws the attention away from an illicit binding relation and, as a result, creates an illusion of grammaticality.

Our studies have shown that there is significantly more to judgments of sentences implicating Principle C than merely checking the structural relation between the potentially co-indexed pronoun and R-expression. Backwards anaphora that violates Principle C may be perceived as acceptable by native speakers due to interaction of a number of syntactic and extra-syntactic factors. A subject comparative with a standard *than*-clause merged with a degree head under the matrix subject position creates a processing difficulty; comparative ellipsis eliminates a pronoun that causes a Principle C violation from the phonological form. At the same time, the comparative itself yields a pragmatically plausible interpretation. As a result, the binding relation between the pronoun and the c-commanded R-expression is backgrounded, while the comparative relation is focused, which results in acceptability judgments of sentences that we otherwise would expect to be ruled out as ungrammatical.

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Vera Gor
vgor@linguistics.rutgers.edu