

The role of event comparison in comparative illusions

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INTRODUCTION: Grammatical Illusions

Comparative illusions like (1) ('Escher sentences') are not interpretable, yet are initially judged as acceptable [1,2].

(1) *More Americans have been to Russia than I have.*

In (1), *more* should induce a comparison between the cardinality of the main clause subject 'more people' and a corresponding NP in the *than*-clause, e.g. (2).

(2) *More Americans have been to Russia than Canadians have.*
more(number of Americans who have b.t.R, number of Canadians who have b.t.R)

In classic 'Escher' sentences, no suitable NP emerges even after VP-ellipsis is resolved:

(3) *more* (number of Americans who have been to Russia, number of ???)

It is remarkable, then, that these sentences initially strike most listeners as highly acceptable. The examples have been known for at least 25 years, but there have been almost no systematic studies of the illusions, their origin, or of how general the phenomenon is.

HYPOTHESES & PREDICTIONS

A typical listener gets flustered when challenged to explain the meaning of a sentence like (1). Often, she objects that the sentence really does mean something, suggesting e.g.:

- ⊗ **Event comparison:** *Americans have been to Russia more than I have.*
- ⊗ **More than 'just me':** *More Americans have been to Russia than just me.*

Our experiments address these intuitions, but, more broadly, aim to investigate whether the illusions really are as acceptable as grammatical comparatives like (2), and under what conditions people are more or less susceptible to the illusion.

M(ain) Hypothesis. Listeners mistakenly assign an event comparison interpretation. There are at least 2 possibilities for how the switch to event comparison could be achieved:

Syntactic reanalysis: *Americans have been to Russia more than I have.*

Semantic coercion: *more* (# of events of Americans going to R., # of events of me going to R.)

~ Test of the event comparison hypothesis: *repeatable vs. non-repeatable predicates:* Participants will be less susceptible to illusion-type sentences with 'non-repeatable' predicates (those that denote an action an individual may do only once; e.g. *More Americans won the lottery yesterday than I did.*)

~ Test of syntactic vs. semantic hypotheses: *'more' vs. 'fewer':* 'More', the determiner, is morphologically identical to the adverb. If participants are less susceptible to illusion-type sentences with 'fewer' (whose adverbial counterpart is 'less'), this provides evidence for syntactic reanalysis.

A(dditional) Hypotheses:

A1 Ellipsis. [5] thought the illusion was restricted to instances of ellipsis. If we modify unelided VPs in the *than*-clause to provide contrast with the matrix VP, we predict no difference in acceptability: *More Americans have been to Russia than I have been to Canada.*

A2 'Just me'. Counterbalancing the number of items which do/do not support a 'just me' reading, we predict equivalent acceptability: *More girls drive to school than she does/he does.*

A3 Type of subject NP. Classic illusions involve a 1st person pronoun subject.

A3.1 Pronouns vs. full-NPs. Full NPs (e.g. 'the boy') are better counterparts to 'more NPs' and thus more likely to insist on individual comparison.

A3.2 Person. 3rd person pronouns, unlike 1st person, trigger a search for an antecedent, and so will lower acceptability.

A3.3 Singular vs. plural. Plural subjects can induce coercion of a plurality of events, so increase acceptability.

METHODS

12 native speakers of English per study, 7-point scale, off-line ratings. In both Exp. 1 and Exp. 2, half of the items had 'repeatable events' predicates, half 'non-repeatable events' predicates. Exp. 1: 48 target items combined with 144 fillers (balanced for grammaticality/ungrammaticality), distributed across 8 questionnaires. Exp. 2: 36 target items combined with 108 fillers, distributed across 6 questionnaires.

ACKNOWLEDGMENTS: This work was made possible by generous support from a Baggett Fellowship (to AW) and a Mellon Foundation Fellowship (to RP).

EXPERIMENT 1: Testing hypotheses M, A1-2

Manipulations (shown below through examples, with condition number prefixed):

(i) **Predicate-type** (repeatable, non-repeatable), (ii) **Subject-type** (definite NP, bare plural), (iii) **Comparative determiner** (more, fewer), and (iv) **Presence/absence of ellipsis.**

Sample 'non-repeatable events' item, by condition:

cond	sentence	mean
1	More workers were laid off from the plant than the manager was.	2.81
2	More workers were laid off from the plant than the manager was fired from the factory.	2.92
3	Fewer workers were laid off from the plant than the manager was.	2.65
4	Fewer workers were laid off from the plant than the manager was fired from the factory.	2.54

cond	sentence	mean
5	More workers were laid off from the plant than managers were.	5.73
6	More workers were laid off from the plant than managers were fired from the factory.	5.90
7	Fewer workers were laid off from the plant than managers were.	5.69
8	More workers were laid off from the plant than managers were fired from the factory.	5.75

Sample 'repeatable events' item, by condition:

cond	sentence	mean
1	More students get involved with team sports than the teacher does.	3.77
2	More students get involved with team sports than the teacher gets involved in community service.	3.23
3	Fewer students get involved with team sports than the teacher does.	3.33
4	Fewer students get involved with team sports than the teacher gets involved in community service.	3.42

cond	sentence	mean
5	More students get involved with team sports than teachers do.	6.38
6	More students get involved with team sports than teachers get involved in community service.	5.98
7	Fewer students get involved with team sports than teachers do.	5.77
8	Fewer students get involved with team sports than teachers get involved in community service.	5.67

Does predicate type matter (M)? YES.

No effect of predicate type across *bare plurals* conditions ($F = 1.26, p = 0.270$)

Highly significant effect of predicate type across *illusions* ($F = 13.92, p < 0.001$)

Is there support for the syntactic account? NO.

No effect of comparative determiner in *illusions* or *bare plurals* ($F = 1.21, p = 0.278$)

Is ellipsis necessary (A1)? NO.

No effect of presence/absence of ellipsis in either *illusions* or *bare plurals* ($F = 0.07, p = 0.793$).

Support for 'just me' reading (A2)? NO.

No effect of 'just me' in either *illusions* or *bare plurals* ($F = 0.11, p = 0.743$)

⊗ **Participants didn't much like the 'illusion'-type sentences. Why?**

⊗ **We did not include sentences strictly of the 'classic' illusion type, which has a pronominal subject of the *than*-clause.**

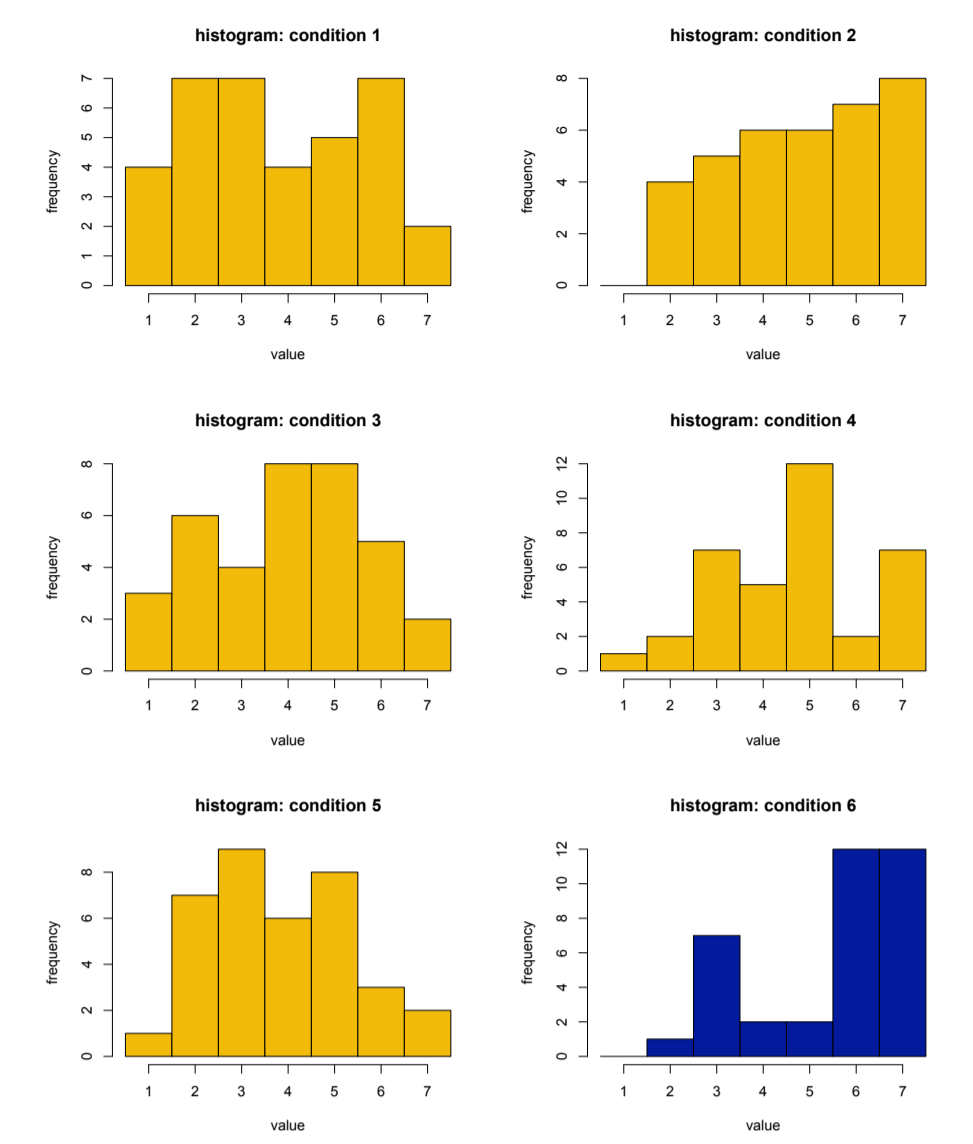
EXPERIMENT 2: Testing hypotheses M, A2-3

Manipulations (shown below through examples, with condition number prefixed):

(i) **Predicate type**, (ii) **Subject-type** (pronoun, definite NP, bare plural), (iii) **Subject plurality** (singular, plural), and (iv) **Person** (1st/3rd).

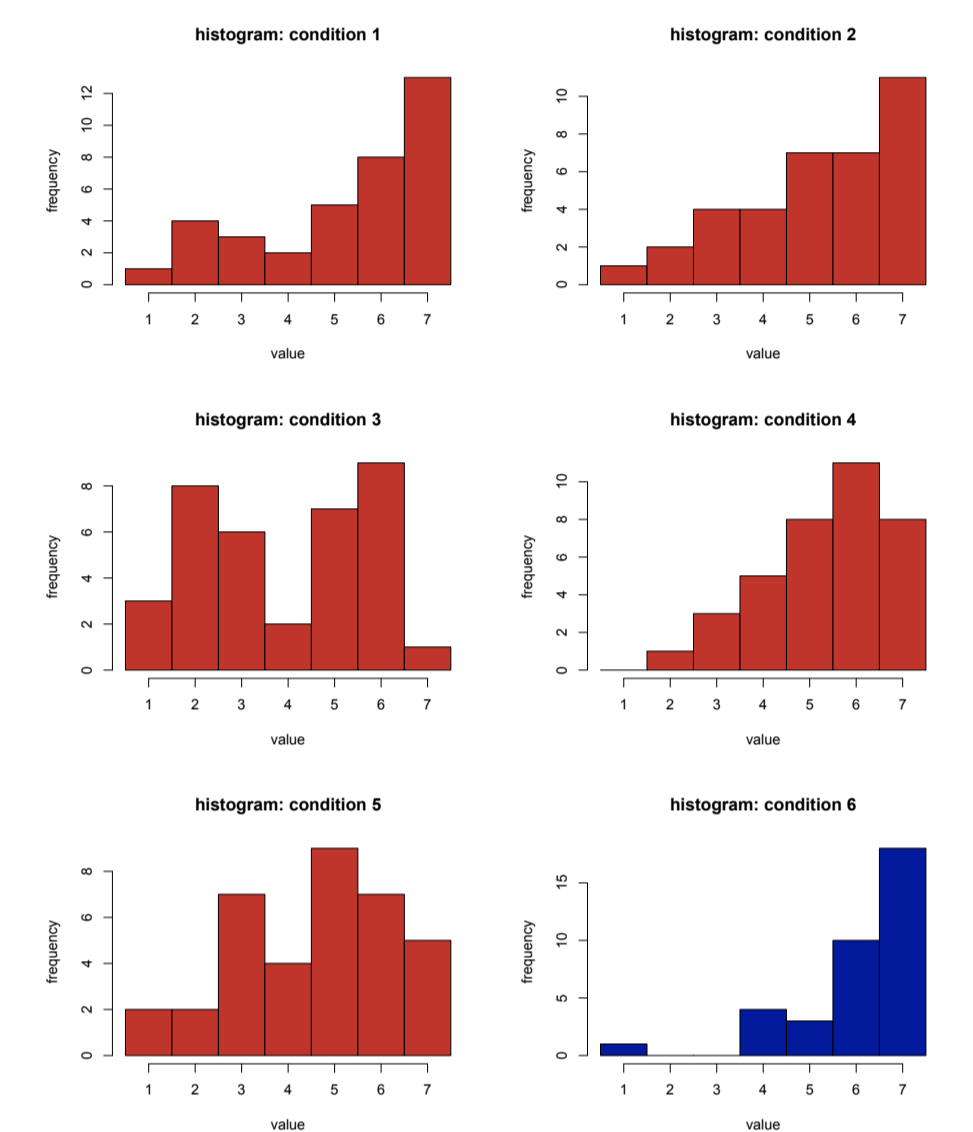
Sample 'non-repeatable events' item, by condition:

cond	sentence	mean
1	More New Yorkers began law school this semester than I did.	3.78
2	More New Yorkers began law school this semester than we did.	4.86
3	More New Yorkers began law school this semester than the rich Canadian did.	3.97
4	More New Yorkers began law school this semester than the rich Canadians did.	4.64
5	More New Yorkers began law school this semester than she did.	3.83
6	More New Yorkers began law school this semester than rich Canadians did.	5.47



Sample 'repeatable events' item, by condition:

mean	cond	sentence
5.28	1	More undergrads call their families during the week than I do.
5.19	2	More undergrads call their families during the week than we do.
3.92	3	More undergrads call their families during the week than the grad student does.
5.36	4	More undergrads call their families during the week than the grad students do.
4.58	5	More undergrads call their families during the week than he does.
6.05	6	More undergrads call their families during the week than grad students do.



Further support for event comparison (M)? YES.

No effect on *bare plurals* ($F = 2.81, p = .108$)

Significant effect within *illusions* ($F = 2.47, p < 0.01$)

Any support for 'just me' (A2)? NO.

No effect in condition 5 (only condition where comparison possible) ($F = 7e^{-04}, p = 0.979$)

Is the pronoun necessary (A3.1)? IT SEEMS NOT.

Comparing conditions 3 and 5 (matching *sg+3rd p.*), there is no effect ($F = 0.86, p = .355$)

Does person play a role (A3.2)? NO.

Comparing conditions 1 and 5 (matching *pro+sg*), there is no effect ($F = 1.20, p = 0.276$)

Does *than*-clause subject plurality matter (A3.3)? YES.

Here we see a huge difference in acceptability ($F = 14.06, p < 0.001$).

DISCUSSION: Main claims

⊗ The illusions are nearly perfectly acceptable when the elided VP is 'repeatable', or when plural *than*-clause subjects provide a plurality of 'non-repeatable' events.

⊗ Singular NPs like *he and the boy*, that depend on context for reference resolution, may lower acceptability by drawing attention to themselves and to illicit individual comparison.

⊗ Susceptibility to the illusion is modulated by semantic properties, and thus supports the feasibility of a semantic coercion account.

⊗ Comparative illusions do not reflect broad superficial heuristics.

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