Tense and Scope in Superlatives

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Abstract This paper provides new evidence that relative readings of superlatives are indefinites, as proposed by Szabolcsi (1986) and Heim (1985, 1999), based on the interaction between tense phenomena and the availability of relative readings. I show that the lack of sequence of tense forces absolute readings of superlatives, as do temporally independent interpretations of predicates. I argue that this is because the "definite article" in relative superlatives is a weak determiner, while absolute superlatives contain a true definite article that comes with its own situation pronoun (Schwarz 2009). The contrast between absolute and relative superlatives in this regard is thus an instance of Musan's Generalization (Musan 1997).

Keywords superlative · sequence of tense · definite article · relative clause · relative superlative

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In Christopher Piñón (ed.), Empirical Issues in Syntax and Semantics 11, 171–198. Paris: CSSP.
http://www.cssp.cnrs.fr/eiss11/

1 Introduction

1.1 Absolute and Relative Readings of Superlatives

This paper is concerned with aspects of a well-known ambiguity in superlatives, namely that of *relative* versus *absolute* interpretations (Heim 1985, Szabolcsi 1986). We can observe these two readings in (1):

(1) John climbed the highest mountain.

On the absolute reading, (1) means that John climbed the highest mountain that there is in some situation (be it the highest mountain in the world, the highest mountain in the country, or perhaps the highest mountain on a certain list). The relative reading, by contrast, compares John to other people: on this reading, (1) is true if John climbed a higher mountain than any other salient individual did, and the sentence can still be true if there is an even higher mountain that was climbed by nobody.

One proposed explanation for this ambiguity is syntactic scope: that

is, the interpretation depends on movement of the superlative operator. Heim (1999) gives the following LFs for the two readings of (1), and the meaning for the superlative operator in (3):

(2) a. John climbed [the [-est C] λd [d-high mountain]]
b. John [-est C] λd [climbed a d-high mountain]

(3) *-est*$(C)(D)(x) = 1$ iff $\forall y \in C[y \neq x \rightarrow \max\{d : D(d)(x) = 1\} > \max\{d : D(d)(y) = 1\}]$

According to (3), the superlative operator takes a set of alternatives (C), a gradable predicate (D), and an individual (x). A sentence containing a superlative is true iff the gradable predicate is true of the superlative's individual argument x to a higher degree than any other alternative to x in C.

In the case of the two readings of *John climbed the highest mountain*, the position of the superlative operator determines the identity of the gradable predicate and set of alternatives in question.

In (2a), the superlative will apply to the gradable predicate [$\lambda x.\lambda d.$ x is a d-high mountain], and C will be a set of mountains. The definite article applies to the predicate [$\lambda x.$ $\forall y \in C$[max{d: x is a d-high mountain} > max{d: y is a d-high mountain}]], which is a predicate that is true of the mountain that is higher than every other mountain in C. The definite article applies to this predicate, and returns the unique member of C of which it is true. The sentence will end up asserting that John climbed a mountain that is higher than any other mountain. In the absence of any context (and thus of any salient option for domain restriction), this will mean that John climbed Mount Everest. This is the "absolute" reading of the superlative, referring to the highest of all mountains.

In (2b), on the other hand, the gradable predicate that *-est C* applies to will be [$\lambda x.\lambda d.$ x climbed a d-high mountain]. The set of alternatives C will contain salient individuals who climbed mountains. (2b) is true iff its subject, John, climbed a higher mountain than any other individual in C did. This is the "relative" reading, comparing John to other salient climbers with respect to the heights of the mountains they climbed.

Also of note is the fact that in (2b), the definite article is given an indefinite interpretation, forming the predicate [$\lambda x.\lambda d.$ x climbed a d-high

mountain]. If it were instead interpreted as definite, (2b) would be true iff the maximal degree d such that John climbed *the* d-high mountain exceeded the maximal degree d' such that Mary climbed *the* d'-high mountain, and so on. The relative reading of (1) would then give rise to the presupposition that there was at most one mountain of any given height: a presupposition that is not, in fact, present.

Aside from being necessary to get the truth conditions of (2b) right, relative superlatives and indefinites appear to have something in common on a deeper level as well. Szabolcsi (1986) noted that superlatives with relative readings pattern with indefinites in environments that give rise to the Definiteness Effect, even though they contain (on the surface) a definite article:

(4) a. *John has the sister.
b. John has the smartest sister.

Despite the apparent presence of the definite article, which leads to the ungrammaticality of (4a), the superlative in (4b) is acceptable on a relative superlative reading that compares alternatives to John with respect to how smart their sisters are. This has been taken as evidence that what looks like a definite in relative superlatives is actually an indefinite (Szabolcsi 1986, Heim 1999).

Some other theories of superlatives, by contrast, hold that even relative readings involve a true definite article (Farkas & É. Kiss 2000, Sharvit & Stateva 2002, Teodorescu 2009). The question of how to reconcile the indefinite-like properties of relative superlatives with the overt definite morphology is still a matter of some controversy. In this paper, I adopt a movement theory of superlatives based on Heim 1999.

In the next section, I will discuss some novel data illustrating another contrast between relative and absolute superlatives. The rest of the paper will be devoted to showing how analyzing the relative/absolute distinction as a contrast in definiteness can help solve the puzzle that these data present.

1.2 The Puzzle

For the first part of the puzzle, consider the contrast between the two sentences in (5), in the given context.[1]

(5) *Context: On a certain game show, the game ends up with each contestant receiving a box with money in it. There are 20 boxes available, each with a different amount of money inside, and 10 contestants. The top prize is a million dollars. At the end of the show, the contestants all open their boxes at the same time.*

a. Which contestant opened the box **that has the most money inside**?

b. Which contestant opened the box **that had the most money inside**?

The question in (5a) is unambiguously an absolute superlative, referring to the box with the million dollars. Since there are more boxes than contestants, the answer could be "Nobody." In (5b), this reading is available, but there is another interpretation as well. This is a relative reading, which asks which contestant won the game (that is, who opened a box with more money in it than any other contestant did).[2]

Either of the sentences in (5) could be uttered just after the game has ended, so this contrast is not about the actual times at which the predicates *box* and *have d-much money inside* hold. The issue is the effect of the expression of tense on the interpretation of the sentence. That is, we can see that the tense of the relative clause has an effect on which interpretations are available: in particular, the relative reading requires sequence of

[1] The judgments in this section are somewhat subtle and difficult, but robust. When presenting this work, I have had audience members tell me that they initially did not perceive the contrasts, but agreed with these judgments once they heard the sentences and contexts read aloud. I therefore advise slow and careful consideration of these examples on each intended reading.

[2] These are the absolute and relative readings of *the box that had the most money*, not of *the most money*. A proportional reading of *most*, paraphrasable as "the box that had more than half of the money inside" (see Hackl 2009), is also unavailable. For current purposes, we can assume that the combination of *box* with the relative clause produces the predicate *box that had d-much money inside*, which is parallel to *d-tall mountain* or *d-smart sister* with respect to its interaction with the superlative.

tense.

Similarly to the examples in (1), we can derive the two readings of (5b) by varying the scope of the superlative operator. A first approximation of the relevant LFs is given in (6) (to be revised later):

(6) John opened the box that had the most money inside.

a. Absolute reading:
PAST John open [the [box [-est C] [$\lambda d.\lambda x.$ PAST x have d-much money]]]

b. Relative reading:
PAST John [-est C] $\lambda d.\lambda y.$ y open "the"$_{\exists}$ [box [$\lambda x.$ PAST x have d-much money]]

With present under past, the second of these options is unavailable: only the absolute reading (referring to a particular box that contains the top prize) is possible.

(7) John opened the box that has the most money inside.

a. Absolute reading:
PAST John open [the [box [-est C] [$\lambda d.\lambda x.$ PRES x have d-much money]]]

b. Relative reading (unavailable):
*PAST John [-est C] $\lambda d.\lambda y.$ y open "the"$_{\exists}$ [box [$\lambda x.$ PRES x have d-much money]]

A similar phenomenon occurs when the superlative contains a time-sensitive predicate:

(8) Who married the tallest first-grader?

The sentence in (8) can be a way of asking about a particular person: if John was the tallest member of the salient first-grade class several decades ago, even if some former classmates are currently taller than him, (8) can be interpreted as a question about who married John (an absolute reading). The sentence also has some implausible readings, where a marrying event took place while a participant was still in first grade. These readings are not so interesting, and can be ignored.

The striking fact about (8), however, is that the relative analogue of the first reading is unavailable. (8) cannot be understood to mean "Who married someone whose height in first grade exceeded the first-grade heights of the people that everyone else married?" That is, if the predicates *marry* and *first-grader* are to be interpreted with respect to different times, the superlative must be interpreted as absolute.

1.3 Upstairs *De Dicto* Readings

Another facet of the question of the relative/absolute distinction arises in intensional contexts. A sentence like (9) has a total of five readings; the first four of them are sketched below, along with an LF according to the movement theory and a paraphrase.

(9) John wants to climb the highest mountain. (Based on Heim 1999)

a. Absolute, *de dicto*:
John wants [PRO to climb [the [[-est C] [$\lambda d.\lambda x.$ x is a d-high mountain]]]]
'John wants to climb whichever mountain is the highest.'

b. Absolute, *de re*:
[the [-est C] [$\lambda d.\lambda x.$ x is a d-high mountain]] λ_2 John wants [PRO to climb t_2]
'John wants to climb a particular mountain, which is the highest.'

c. Relative, *de dicto*:
John wants [PRO [-est C] λd to climb "the"$_\exists$ $\lambda x.$ x is a d-high mountain]
'John wants to be the person who climbs a higher mountain than anyone else climbs.'

d. Relative, *de re*:
John [-est C] λd ["the"$_\exists$ $\lambda x.$ x is a d-high mountain] λ_2 wants [PRO to climb t_2]
'The mountain that John wants to climb is higher than the mountain that anyone else wants to climb.'

The fifth reading, the so-called "upstairs *de dicto* reading," is the one that we will primarily focus on here:

(10) Upstairs *de dicto* reading of (9):
John [-est C] λd wants [PRO to climb "the"$_{\exists}$ λx. x is a d-high mountain]
'John's desires with respect to how high a mountain he climbs are more exacting than anyone else's.'

More specifically, the upstairs *de dicto* reading describes a situation where John and his comparison-class cohorts do not have particular mountains in mind that they want to climb. Rather, their desires are about mountain heights: if John wants to climb a mountain that is at least 5000 feet high, Mary wants to climb a mountain that is at least 4000 feet high, and Bill wants to climb a mountain that is at least 3000 feet high, then the sentence is true on this reading. John also does not have any desires about Mary or Bill in this scenario: he does not want to beat them by climbing a higher mountain (as he does in the *de dicto* relative reading), but merely has a stronger desire about how high a mountain he will climb.

In the upstairs *de dicto* reading, the superlative operator has moved to a position outside of the embedded clause, while the DP from which it came remains inside. This contrasts with the other two relative readings – where the superlative operator and the predicate *d-high mountain* are both inside the embedded clause (*de dicto*) or both move out (*de re*) – and with the absolute readings, where the superlative operator is part of a definite DP along with the gradable predicate.

As we can see from the LFs above, the movement theory provides an account of how upstairs *de dicto* readings are possible, by allowing the superlative operator and the associated predicate to be separated by a clause boundary. Non-movement theories tend to have difficulty accounting for upstairs *de dicto* readings (though see Sharvit & Stateva 2002 for one attempt to do so).

Bylinina et al. (2014) provide further support for a movement theory of superlatives by contrasting the behavior of superlatives with that of ordinals in these intensional contexts:

(11) a. John wants to take the earliest train.
b. John wants to take the first train.

As Bylinina et al. point out, (11b) lacks an upstairs *de dicto* reading. That

is, (11a) is true and (11b) is false in a scenario like the one described above for (10) (one where John's desires about how early a train he takes are stronger than Mary's or Bill's, but he doesn't have a particular train in mind and he isn't including Mary and Bill in his deliberations). According to Bylinina et al., this suggests that the superlative operator can move out of its clause, while ordinals must be interpreted *in situ*.

Our two examples from section 1.2 each show us something interesting when we embed them in contexts like (9). We turn first to the phenomenon of sequence of tense in relative clauses:

(12) *Context: The same game show as before. The boxes have been filled with various amounts of money and hidden, and the game is about to start. Before they play the game, the contestants are interviewed. The interviewer asks them, among other things, about the amount of money they hope to win. John is the most ambitious of the contestants: he says that he hopes to win at least $50,000, while the other contestants each say that they hope to win at least $10,000 or $20,000. Later in the show, once the game has been going on for a while, the announcer summarizes what was said in the interviews:*

a. (At the beginning of the game,) John hoped to open the box that had the most money inside.

b. #(At the beginning of the game,) John hoped to open the box that has the most money inside.

The sentences in (12) show the same contrast that the unembedded examples in the previous section did: in order to be interpreted on the intended reading from the given context (that is, the upstairs *de dicto* reading), the relative clause containing the superlative must obey sequence of tense. With present under past, the only available readings are the absolute ones, where John hopes to open the million-dollar box.[3]

Similarly, a time-sensitive predicate can be interpreted independently on an absolute reading, but not a relative reading. The paraphrases of

[3]More specifically, these readings are the *de dicto* absolute reading (where in each of John's desire-worlds, he opens the box that has the most money in that world) and the *de re* absolute reading (where John wants to open a particular box, and that box is the one with the most money in it).

each of the readings are given below; the LFs are analogous to those in (9).

(13) John wants to marry the tallest first-grader.

a. 'John wants to marry whoever is/was the tallest first-grader.' (Absolute, *de dicto*)

b. 'John wants to marry a particular person, who is/was the tallest first-grader.' (Absolute, *de re*)

c. 'John wants to be the person who marries a taller (#former) first-grader than anyone else does.' (Relative, *de dicto*)

d. 'The (#former) first-grader that John wants to marry is taller than the first-grader anyone else wants to marry.' (Relative, *de re*)

e. 'John has the strongest requirements for the minimum height of the (#former) first-grader he marries.' (Upstairs *de dicto*)

In other words, the absolute readings allow the predicate *first-grader* to be interpreted as 'former first-grader', while the relative readings force *first-grader* to be interpreted at the same time as either *want* or *marry* (due to the semantics of *want*, the *marry*-time is in the future with respect to the matrix time). What is interesting about this contrast is that it falls out not according to whether the DP is interpreted *de dicto* or *de re*, but according to whether the superlative has a relative or absolute interpretation.

In sum, searching for upstairs *de dicto* readings in both of these contexts has reinforced the puzzle: relative readings systematically differ from absolute readings, in a way that cross-cuts distinctions of intensionality.

To answer the question of why relative readings in finite relative clauses require sequence of tense, and why relative readings are unavailable when a noun like *first-grader* is modified by a superlative, some investigation of the relevant properties of definites and of tense is in order. We will look at definiteness in section 2, and move on to tense in section 3.

2 The Differences between Strong and Weak NPs

2.1 Musan's Generalization

Definiteness is well known to have an effect on the temporal (and modal) interpretation of NPs (Musan 1997, Keshet 2008). Specifically, the interpre-

tative possibilities available for *weak* (existential) determiners are more limited. This phenomenon is known as Musan's Generalization.

(14) Musan's Generalization:
A noun phrase can be temporally independent if and only if it is strong. (Keshet 2008:42)

Determiners like *three* and *many* can have either a strong or a weak construal. The weak interpretation is forced in existential environments like the Existential *There* Construction. The contrast between the strong and weak versions of *three* in (15) and *many* in (16) illustrates the effect of Musan's Generalization.

(15) Some politicians knew each other in college. In fact,
a. three U.S. senators were attending Harvard together in 1964.
b. #there were three U.S. senators attending Harvard together in 1964.

(16) The professors in this department are quite young. In fact,
a. many professors were in kindergarten in the 1980s.
b. #there were many professors in kindergarten in the 1980s.
(Keshet 2008:42)

If the determiner receives a weak interpretation, the NP cannot be independent, and must inherit its evaluation world and time from the matrix clause. This leads to the observed oddness of the weak version, since the only available interpretation of (16b) is one where *professor* and *in kindergarten* are true of the same individuals at the same time.[4]

2.2 Situations and Determiners

Schwarz (2009) proposes to explain Musan's Generalization by giving

[4] *Three* and *many* are useful for illustrating the contrast, since they allow either a strong or a weak construal. DPs that are obligatorily weak seem to be rare, though bare plurals do show the effect outside of the Existential *There* Construction:

(i) #Professors were in kindergarten in the 1980s.

According to the analysis of relative superlatives that I am pursuing in this paper, they constitute a second example of a DP that is always weak.

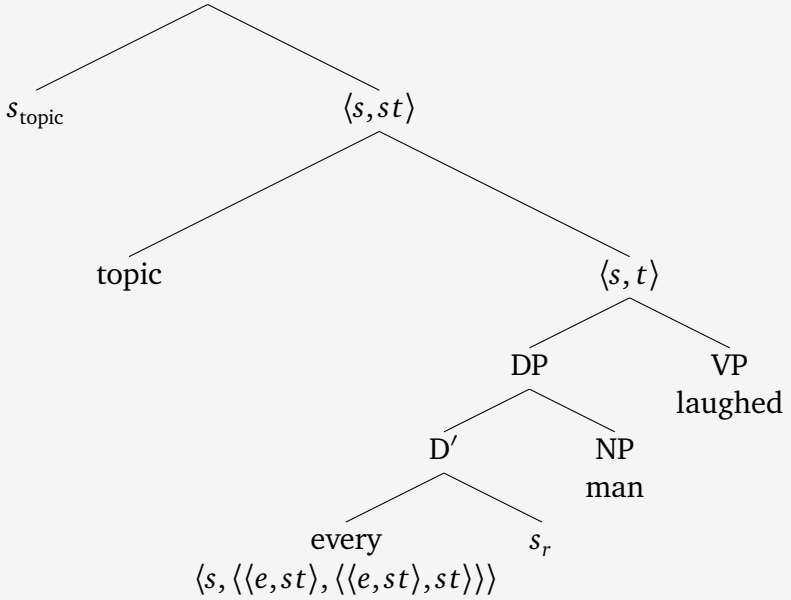


Figure 1 Schwarz's (2009) structure for *every* (somewhat simplified)

strong determiners an extra argument slot for a resource situation pronoun, as shown in figure 1.

The lexical entry for *every* is given in (17):

(17) $[\![\text{every}]\!] = \lambda s_r \in D_s.\lambda P \in D_{\langle e,st \rangle}.\lambda Q \in D_{\langle e,st \rangle}.\lambda s.\forall x[P(x)(s_r) \rightarrow Q(x)(s)]$ (Schwarz 2009:95)

A strong determiner like *every* takes a resource situation pronoun as its first argument (which can be either bound or free), and the restrictor is evaluated with respect to this situation. Thus, it is possible for the restrictor and scope of a strong determiner to be evaluated with respect to different situations.

A weak determiner, on the other hand, does not take a situation argument, as shown in figure 2. The weak determiner *a* takes two properties, both of which are evaluated with respect to the topic situation. For *a man laughed* to be true, there must be an individual who both laughed and is a man in that same situation.

The differences between absolute and relative superlatives with respect to their definiteness behavior suggest that the definite article in absolute

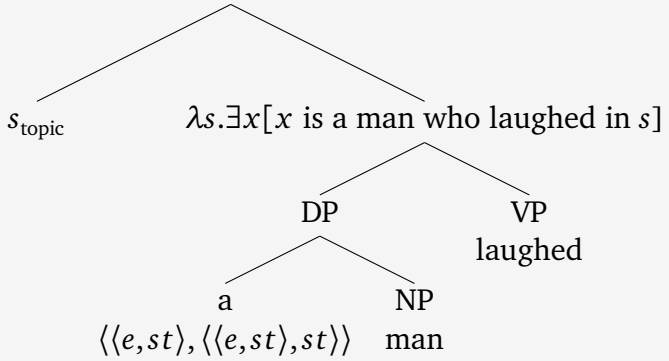


Figure 2 Schwarz's (2009) structure for the indefinite article

superlatives patterns with other strong determiners in having a situation pronoun argument. This allows the predicates in the NP part of the superlative to be interpreted separately from the matrix, unlike with the existentially-interpreted version of the definite article that we find in relative superlatives. In order to explain the phenomenon of sequence of tense in relative clauses, we will next investigate the question of what role is played by tense itself.

3 Topic Situations and Times

3.1 Tense Pronouns

Kratzer (1998) analyzes sequence of tense as a consequence of the presence of a "zero" tense. The analogy is with bound indexical pronouns like the ones in (18):

(18) a. Only I got a question that I understood.
b. Only I think that Mary will invite me.
c. Only I considered the question of whether I should leave before I got bored.

These sentences have strict readings, where the lower instance of the first-person pronoun refers to the speaker; however, they also have sloppy readings, paraphrasable as "Only I am an x such that x got a question x understood," and so on. On Kratzer's view, these instances of *I* are zero pronouns: they start out with no ϕ-features, but receive them through a process of feature transmission when bound by a local antecedent. This is

how it can be possible for a bound pronoun to be pronounced as *I*.

Kratzer proposes that in addition to zero pronouns, there are also zero tenses: that is, English has indexical present and past tenses, as well as a zero tense that must be bound by a local antecedent. If one of these zero tenses appears in a finite clause, it can receive features from its antecedent and be pronounced like an ordinary tense morpheme (just like a zero personal pronoun that ends up being pronounced as *I*).

The inventory of tenses according to Kratzer's analysis is given in (19). Kratzer gives them the type i, and has aspect phrases take them as arguments to form propositions.

(19) Kratzer's (1998:101) inventory of tenses:

a. $[\![\textsc{present}]\!]^{g,c}$ is only defined if c provides an interval t that includes t_0 (the utterance time). If defined, then $[\![\textsc{present}]\!]^{g,c}$ = t.

b. $[\![\textsc{past}]\!]^{g,c}$ is only defined if c provides an interval t that precedes t_0. If defined, then $[\![\textsc{past}]\!]^{g,c}$ = t.

c. $[\![\varnothing_n]\!]^{g,c} = g(n)$

That is, (nonzero) tenses refer to time intervals given by the context, and introduce presuppositions about those intervals. This is similar to how personal pronouns refer to salient individuals in the context, and may introduce gender presuppositions.

3.2 The Relationship between Situations and Tenses

Armed with a way of dealing with both indexical tenses and sequence of tense, we can now explain the sequence of tense contrast in superlatives. I will assume that the topic situation of the clause comes in with the tense operator, which takes it as an argument. The output is an object which, like one of Kratzer's tenses in (19), refers to an interval.

(20) a. $[\![\textsc{present}]\!]^g = \lambda s\colon \tau(s) \supseteq t_0.\ \tau(s)$

b. $[\![\textsc{past}]\!]^g = \lambda s\colon \tau(s) < t_0.\ \tau(s)$

That is, the nonzero tense PRESENT or PAST takes a situation and returns the time interval associated with it, introducing the presupposition that the situation (respectively) includes or precedes the utterance time. As

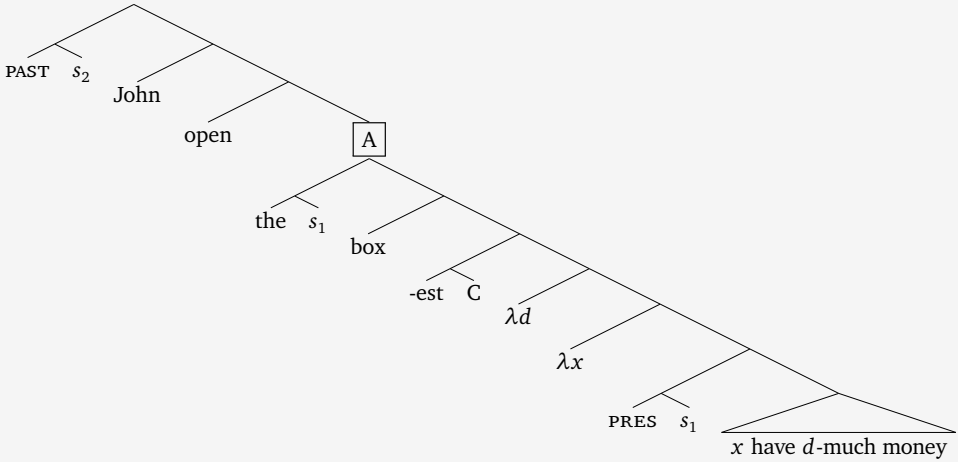


Figure 3 LF of an absolute superlative with present under past

in Kratzer's original proposal, a zero tense is bound by the closest higher tense and inherits its features.

We can now see how present under past in an absolute superlative is derived. The lexical entry for the strong determiner *the* is given in (21):

(21) $[\![\text{the}]\!] = \lambda s.\lambda P_{\langle e,st\rangle} : \exists!x[P(x)(s)].\iota x.P(x)(s)$ (Schwarz 2009:148)

The LF for the sentence *John opened the box that has the most money inside* is shown in figure 3. The constituent marked $\boxed{\text{A}}$ is a definite DP. Its interpretation is given in (22):

(22) $[\![\boxed{\text{A}}]\!] = \iota x.x$ is a box in s_1 & $\forall y \in C[x \neq y \rightarrow x$ has more money in s_1 than $y]$
Presupposition of the definite article: there is exactly one such box.
Presupposition of PRES: the runtime of s_1 contains t_0.

The head NP *box* and the relative clause combine by Predicate Modification. According to Keshet's (2008) Intersective Predicate Generalization – a more general version of Musan's Generalization – this means that they must be interpreted with respect to the same situation. The sentence is true iff at some past time t_2, John opened the unique box that that currently (during some span of time t_1 that includes the utterance time) con-

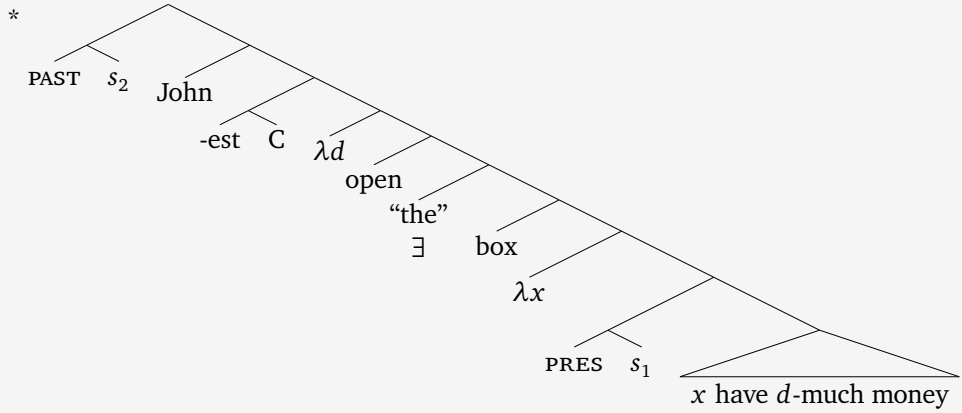


Figure 4 Tense conflict leads to the unavailability of a relative reading

tains more money than any other box currently contains (at t_1). It is possible to derive this interpretation because the strong determiner comes with a situation argument that can be coindexed with the situation argument of the tense of the relative clause.

The LF for the unavailable relative reading of a superlative with present under past is given in figure 4. Again, *box* is combining with the relative clause by Predicate Modification, which means that they must be interpreted with respect to the same situation. However, the next situation pronoun above *box* is the one associated with the matrix PAST. The situations s_1 and s_2 must be different, because of the presuppositions of the tense operators: PAST presupposes that its situation argument is temporally located before the utterance time, while PRESENT presupposes that the runtime of its situation argument includes the utterance time. Thus, the head noun *box* and the relative clause cannot be interpreted with respect to the same situation, violating the Intersective Predicate Generalization. Unlike the case of the absolute superlative above, *box* has no strong determiner above it, and thus no alternative for a situation of evaluation.

In order for a relative reading to be possible, the tense of the relative clause will have to be a zero tense bound by the matrix tense, as shown in figure 5. This zero tense receives its pronunciation and features from its antecedent, resulting in sequence of tense. Here, both the relative clause and the head noun *box* are evaluated with respect to the matrix situation s_2, and the Intersective Predicate Generalization is not violated. The sen-

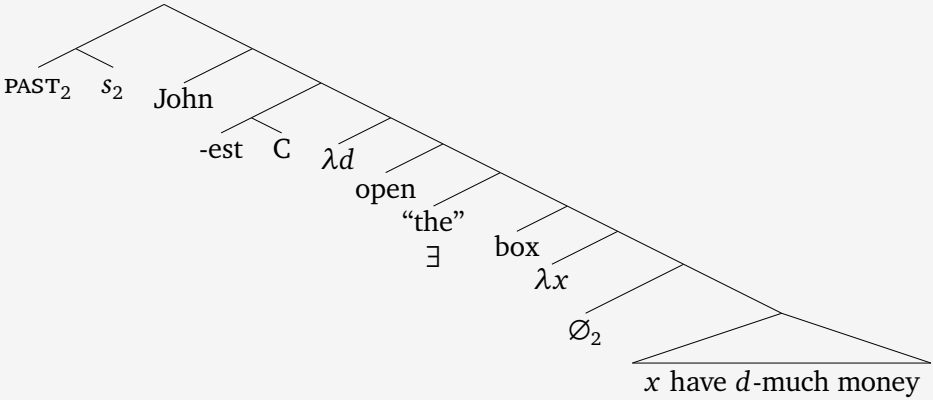


Figure 5 Relative reading with bound tense

tence is true iff at some time t_2 (which precedes the utterance time), for all x in the comparison class C who are not John, the (maximal) amount of money in the box that John opened at t_2 is larger than the (maximal) amount of money in the box that x opened at t_2.

The derivation of a relative reading in an intensional context (as in section 1.3) is shown in figure 6. Since the embedded clause is non-finite, it does not have a tense of its own, and depends on the matrix tense for its interpretation. As in the unembedded example in figure 5, the relative clause contains a bound zero tense, which results in the appearance of past tense morphologically; present tense in the relative clause would result in the same conflict that arose before. Thus, relative clauses of this kind must obey sequence of tense if they are to give rise to relative readings, regardless of whether they appear in matrix or embedded clause positions.

3.3 Temporally Independent Relative Clauses

At this point, it should be noted that although relative clauses combine with their head nouns by Predicate Modification, finite relative clauses have been observed to allow some temporally independent interpretations, as illustrated in (23).

(23) There were many professors who were in kindergarten in the 1980s at the conference.

The first thing to notice about (23) is that the relative clause contains

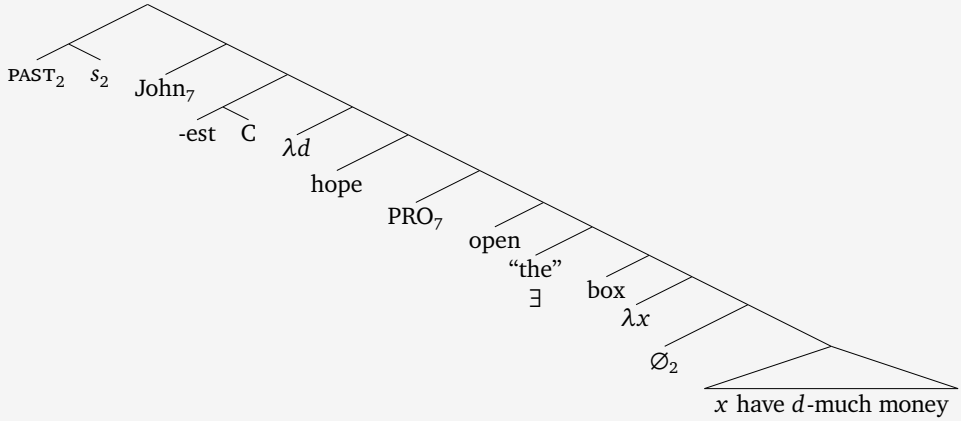


Figure 6 Upstairs *de dicto* reading of *John hoped to open the box that had the most money*

an overt temporal expression, without which an independent reading is impossible:

(24) #There were many professors who were in kindergarten at the conference.
(Intended reading: 'There were many professors at the conference who had been in kindergarten at some point.')

Following Kusumoto (2005) and Keshet (2008), the possibility of a temporally independent interpretation can be explained by giving the relative clause an indexical tense operator above its overt tense. In the case of (23), this tense operator will refer to the topic time of the sentence (i.e., the time that the professors were at the conference), and thus the relative clause can undergo Predicate Modification with *professors*. The resulting predicate will be one that is true of individuals who are professors at the topic time, and who (also at the topic time) have the past property of having been in kindergarten in the 1980s.

Based on the contrast between (23) and (24), I assume that it is the overt temporal expression itself that allows for the insertion of the indexical tense operator.[5] Importantly, the superlative examples central to the

[5]Kusumoto (2005:325) also discusses "later than matrix" readings of relative clauses, such as the following:

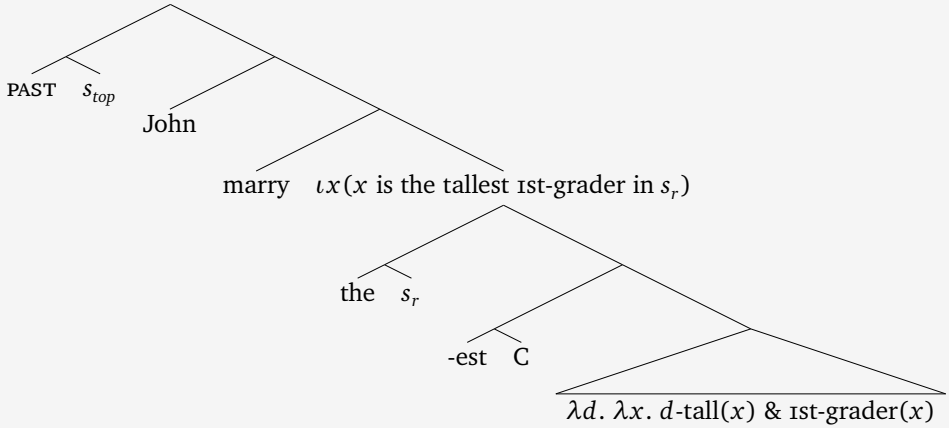


Figure 7 LF of the absolute reading of *John married the tallest first-grader*

present paper do not have overt temporal expressions; on these assumptions, then, the incompatibility of present under past with the relative construal is still expected.

3.4 Contrasts other than Sequence of Tense

Like the cases of superlatives inside relative clauses, the interaction between temporally independent interpretations and the possibility of relative readings can be explained by the presence or absence of a situation pronoun on the determiner. The absolute reading of *John married the tallest first-grader* is illustrated in figure 7.

The direct object of *marry* here is a definite DP that refers to the individual in s_r (the situation corresponding to the first argument of *the*) who is a first-grader taller than any other first-grader in s_r. So if we set s_r to be located 20 years ago, and the topic situation to be last week, we can derive the intended temporally independent reading. On this reading, the sentence is true iff last week, John married the person who was the tallest in their first-grade class 20 years ago.

If we try to derive a temporally independent relative reading, we run

(i) Hillary married a man who became the president of the U.S.

This example has no overt temporal expression, but an independent interpretation of the relative clause is still possible. Here, I assume that a verb like *become* can also introduce a tense operator for the relative clause.

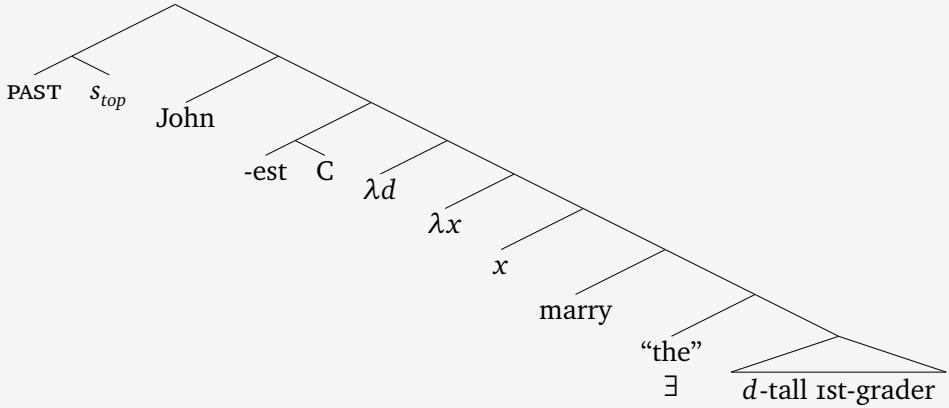


Figure 8 Implausible relative reading of *John married the tallest first-grader*

into the same problem as before: the lack of an extra situation pronoun argument for the determiner means that the predicate *first-grader* must be interpreted with respect to the same time as the main verb (in accordance with Musan's Generalization). Thus, the only available relative reading is an implausible simultaneous one.

The situation with the upstairs *de dicto* reading, shown in figure 9, is the same as the matrix relative reading. Since the weak DP does not have its own situation pronoun, the predicate *first-grader* is again interpreted with respect to the same time as *marry*, likewise resulting in an implausible simultaneous reading.

Let us next consider superlatives that are hosted in a modifier smaller than a full relative clause. (25c) is analogous to our earlier relative clause examples, but the superlative is inside a PP modifier rather than a finite clause.

(25) a. Which contestant opened the box that had the most money inside?
b. Which contestant opened the box that has the most money inside?
c. Which contestant opened the box **with the most money inside**?

In (25c), both the absolute and relative readings are available. The relative

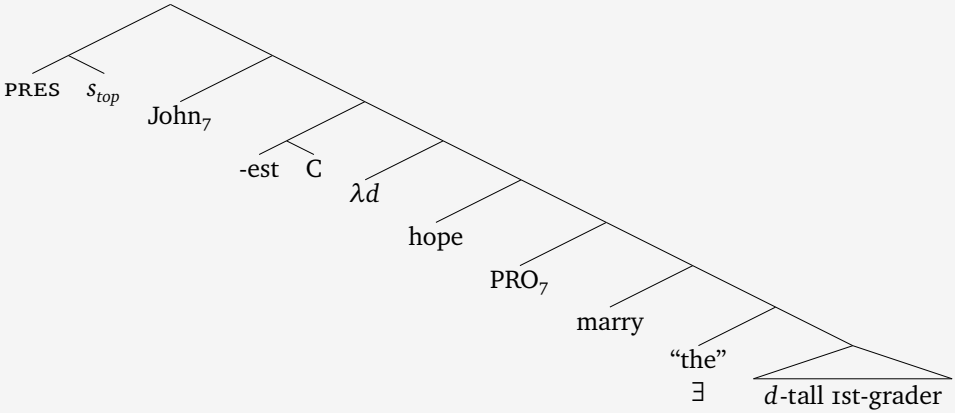


Figure 9 Implausible upstairs *de dicto* reading of *John wants to marry the tallest first-grader*

reading is unsurprising: Szabolcsi (1986) observed that superlatives have no trouble scoping out of non-finite clauses. The question is how to get the absolute reading.

Ogihara (1994) points out that relative clauses whose tense matches that of the matrix can have either a simultaneous or an independent reading:

(26) John met a man who was holding a book in his hand.
   a. Simultaneous reading: The man was holding a book in his hand at the time of John's meeting him.
   b. Independent reading: The man was holding a book in his hand at some other salient past time.

If we change Ogihara's example to a reduced relative or PP modifier, we find that only the simultaneous reading is possible:

(27) a. John met a man holding a book in his hand.
   b. John met a man with a book in his hand.

However, if the NP hosting the reduced relative is definite, both readings are available again:

(28) John met the man holding a book in his hand. / John met the man

with a book in his hand.

a. Simultaneous reading: John met the salient man who had a book in his hand at the time.
b. Independent reading: John met the man who had a book in his hand at some other salient past time (e.g., in that picture I'm pointing to).

This is an instance of a more general method of interpretation for definites: as shown in (29), definite descriptions can be temporally shifted and used anaphorically.

(29) When I last visited my friend, he had two children: a six-year-old and a ten-year-old. **The six-year-old** graduated from medical school two years ago. (Keshet 2008:159)

The definite description can refer to an individual who was a six-year-old at a particular past time, which precedes the matrix topic time (which, in this case, is located two years before the utterance time). Similarly, the independent reading of (28) comes about if the situation argument of the definite article differs from the topic situation.

The LFs for *John opened the box with the most money inside* are given in figures 10 and 11. Similarly to the earlier examples, the absolute reading refers to the box that has more money in it than any other box in the situation s_r. (In the context we have been considering for this sentence, s_r is the same as the topic situation of the clause.) The meaning of the relative reading can be computed in the same way as in a full relative clause with a zero tense; the lack of tense in this case has the same effect.

4 How to Scope Out of a Relative Clause

I have proposed to explain the behavior of superlatives in relative clauses based on movement of the superlative operator to a position outside of the relative clause. This seems to conflict with the idea that relative clauses are scope islands. However, there is evidence that not all relative clauses are the same in this respect, and thus that a scope-based analysis of these relative readings is still tenable.

According to Hulsey & Sauerland (2006), there are two types of relative clauses in English: the *raising* structure and the *matching* structure. These

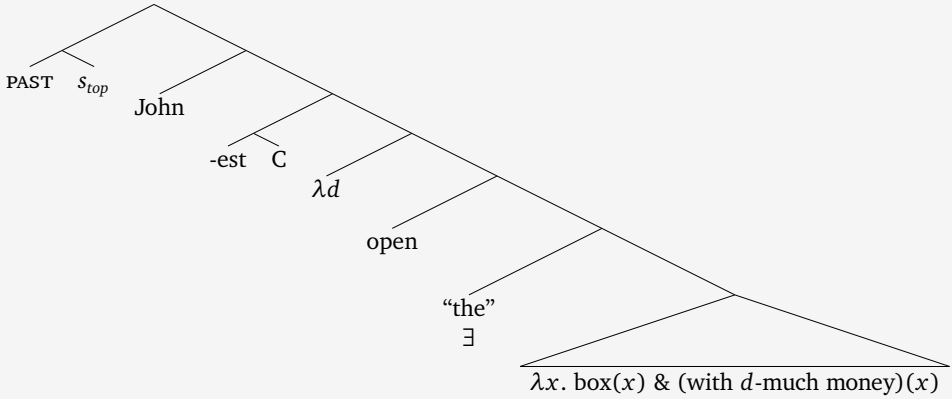


Figure 10 Relative reading of *John opened the box with the most money inside*

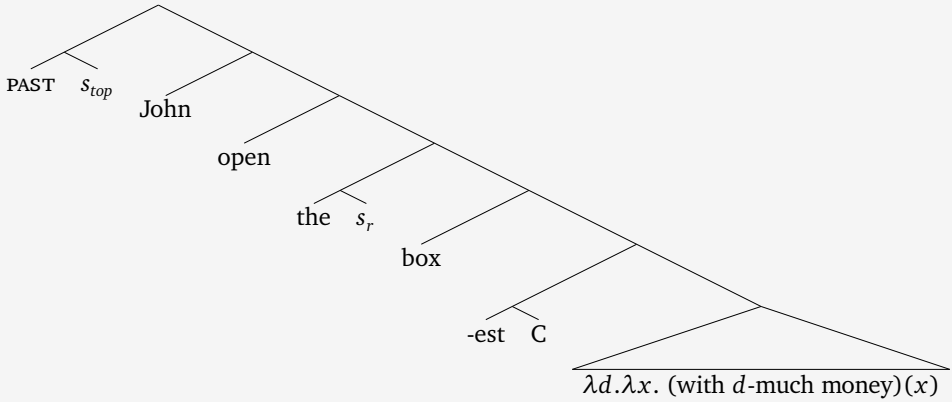
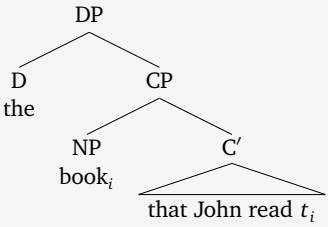


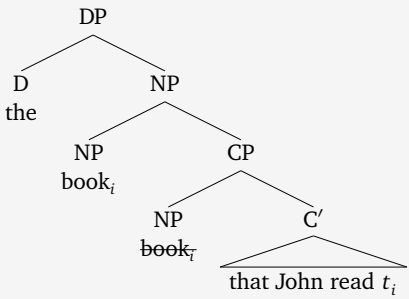
Figure 11 Absolute reading of *John opened the box with the most money inside*

two possible structures of the DP *the book that John read* are shown in (30).

(30) a. Raising:



b. Matching:

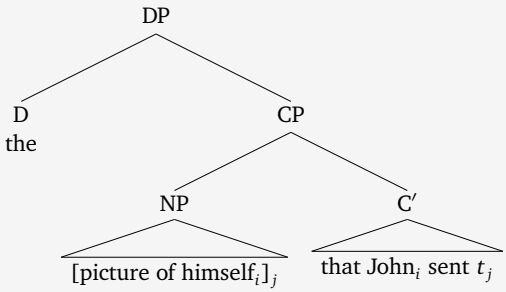


The raising relative clause in (30a) has one copy of the head NP *book*, which originates inside the relative clause. A matching relative clause, by contrast, has two separate instances of the head NP, one inside and one outside.

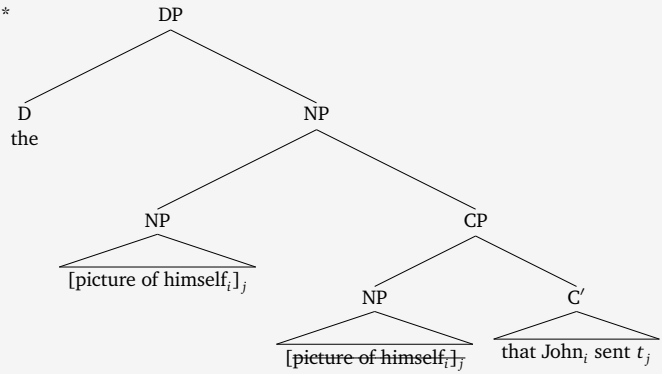
The raising structure is necessary for certain variable binding configurations, such as the one in (31).

(31) a. Mary liked [the picture of himself$_i$ that John$_i$ sent].

b. Raising:



c. Matching: *



In the raising structure in (31b), *John* can bind *himself*. This is not possible

in a matching structure, ruling out that parse.

Hulsey & Sauerland also point out that if *John* in (31) is replaced with a quantifier, it can take wide scope. Thus, (32a) has the LF in (32b):

(32) a. Mary liked [the picture of himself$_i$ that every boy$_i$ sent].
b. every boy λy. Mary liked [the λx. y sent the$_x$ picture of y][6]

That is, (32a) has a reading where for every boy y, Mary liked the picture of y that y sent. In order to get this reading, rather than a reading where there is a single object that is a picture of every boy, *every boy* must outscope the definite in which it originates. Therefore, Hulsey & Sauerland argue, raising relative clauses are not islands for Quantifier Raising: an individual quantifier such as *every boy* can QR to a position outside the relative clause.

The matching analysis, on the other hand, is needed for extraposition. When the relative clause is extraposed, the variable binding configuration in (31) is no longer possible, as shown in (33).

(33) a. I saw the picture of himself$_i$ that John$_i$ liked.
b. *I saw the picture of himself$_i$ yesterday that John$_i$ liked.

This is because matching relative clauses are the kind of constituent that can undergo Late Merge, and raising relative clauses are not. In a matching structure, the relative clause is an adjunct to the head NP; in a raising structure, by contrast, the head NP is the specifier of a CP whose head is inside the relative clause. Furthermore, the head NP originated inside the relative clause, making it impossible for the relative clause to be Merged later than the head NP. Thus, if extraposition requires Late Merge (Fox & Nissenbaum 2000), then only matching relative clauses should be able to be extraposed.

As shown in (34), there is no problem with extraposition per se:

(34) I saw the picture of Bill yesterday that John liked.

The trouble with (33b) is that the binding configuration requires the rais-

[6]The subscripted *the* here is a shorthand: 'the$_x$ picture' is equivalent to 'the λy. $x = y$ and picture(y)'.

ing analysis, while the extraposition of the relative clause requires matching. The incompatibility of these requirements rules out (33b).

What does all of this mean for *the box that had the most money inside*? If the relative clause here is a scope island, then it should be impossible to move the superlative operator in the way that I have proposed. Therefore, if the mechanism I have been using to derive relative readings is correct, then the relative clause that we see in this example must be the kind of relative clause that allows QR outside of it (i.e., the raising structure).

One complication that arises here is that not all superlatives in relative clauses can have relative readings. Shimoyama (2014:316) presents the data in (35) to illustrate an apparent scope-island effect with relative clauses:

(35) *Context: A diagram consisting of numbered triangles and circles of various sizes.*
   a. Triangle 1 touches the largest circle.
   b. Triangle 1 touches the circle that is largest.

Somewhat surprisingly given the data that we have seen so far in this paper, (35b) lacks a relative reading, in contrast to (35a). In a situation where Triangle 1 is touching a larger circle than any other triangle is, but there is an even bigger circle in the diagram that is not touching anything, (35b) is judged to be false.

Other variants of (35b) with relative clauses show the same lack of a relative reading:

(36) a. Triangle 1 touches the circle that is the largest.
   b. Triangle 1 touches the circle that is the largest circle.

I do not have an answer to the question of why this should be. However, the sentences from earlier in this paper that allow relative readings out of relative clauses differ from (35b) and its variants in one particularly salient way: in these new examples that have no relative readings available, the verb of the relative clause is *be*. If the predicative structure of this particular relative clause imposes other constraints on its syntax, this could help explain why QR is blocked here.

Turning back now to sentences like *Who opened the box that had the*

most money inside?, we have seen that the relative reading requires a raising structure for the relative clause. The prediction of the analysis I have proposed is that extraposition of this relative clause should make the relative reading unavailable.

(37) Who opened the box by accident that had the most money inside?

This prediction is indeed borne out: (37) only has an absolute reading, even though the tense of the relative clause matches the matrix. Like the combination of extraposition and binding in (33b), the conflicting constraints on the relative clause block the relative reading. The absolute reading, which does not require QR out of the relative clause, is still available.

Hulsey & Sauerland also point out that not everything is capable of scoping out of a relative clause: individual quantifiers like *everyone* can do so, but verbs like *believe* cannot. The facts discussed in this section suggest that the superlative operator *-est* resembles individual quantifiers in its ability to undergo QR out of a relative clause, as long as the relative clause in question has a structure amenable to QR.

5 Conclusion

Among the differences between relative and absolute readings of superlatives are several contrasts related to definiteness, which have been interpreted to suggest that relative superlatives contain a "fake" definite article that has an indefinite interpretation. In this paper, I have presented some further phenomena that follow the same pattern: relative readings of superlatives in relative clauses require sequence of tense, while predicates modified by relative superlatives must receive a simultaneous interpretation. Absolute superlatives, by contrast, allow for tense mismatching (present under past) and temporally independent interpretations. I have argued that these effects can be explained by the fakeness of the fake definite article: unlike the real definite article, which is a strong determiner, the indefinitely-interpreted version of the definite article that appears in relative superlatives lacks the extra situation argument that would allow its restrictor to be interpreted independently from its scope.

Acknowledgments I would like to thank Martin Hackl, Irene Heim, and David Pesetsky for their help with this project. I am also very grateful to Michael Yoshitaka Erlewine, Christopher Piñón, Norvin Richards, Philippe Schlenker, and Bernhard Schwarz for useful comments and discussion; to anonymous reviewers for CSSP and EISS for additional helpful comments; and to Elizabeth Coppock and Florian Schwarz for asking me some questions so interesting that I don't yet know how to address them. Thanks also to my many other friends and colleagues who patiently put up with my endless questions about *the box that had the most money inside*.

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