

# A Contrast to a Trace

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For movement, such as quantifier raising, the three different structures illustrated in (1) are discussed in the recent literature.

- (1) A girl danced with every boy
- a. [every boy]<sub>x</sub> a girl danced with *x* (*copy + replace*)
  - b. [every boy]<sub>x</sub> a girl danced with [every boy] (*copy*)
  - c. [every boy]<sub>x</sub> a girl danced with [the<sub>x</sub> boy] (*copy + modify*)

In this paper, I'll call the proposal illustrated by (1a) the copy+replace theory since the movement is analyzed as first copying the moving phrase followed by replacing the moving phrase with a trace in the base position of movement. Chomsky (1993) and Fox (1999) argue against the copy+replace theory (1a) on the basis of Condition C data that show that moved material can behave as if it occupied the base position of movement. This behavior would, for example, be expected on the copy theory of movement illustrated by (1b), which also seems conceptually simpler than the copy+replace theory since it involves only copying without replacement. This conceptual advantage, however, is probably only apparent since a theory of the interpretation of structures like (1b) would probably be more complicated than for (1a). Standard assumptions about interpretation, at least, don't predict the right meaning when applied to (1b). For this reason, Chomsky and Fox propose what I'll call the copy+modify-theory illustrated in (1c). This proposes that copying is followed by a trace modification operation that replaces the determiner of the moved DP with something else. I assume that this is an indexed definite determiner, the interpretation of which is to be clarified below.

This paper presents a direct argument for the copy+modify structure (1c). I claim that, in certain cases of sentences containing two occurrences of the same quantificational DP, one occurrence can be contrasted with the trace of the other in a way predicted only by the copy+modify theory. Namely, I claim that the configuration sketched in (2) can arise. In (2), there should be a contrast between the definite determiner inserted by trace modification and the universal quantifier, and hence the second universal quantifier can be focussed.

- (2) [every boy]<sub>x</sub> ... [the<sub>x</sub> boy] ... [EVERY]<sub>F</sub> boy

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### 1. Focus in NP

Before considering the alleged cases of contrast between a trace and an overt DP, consider focus assignment when two overt DPs are contrasted. Selkirk (1984) discusses how contrastive focus and pitch assignment correlate in a general theory of the phonology of focus. How focus and pitch are placed in a simple DP consisting of a determiner and a common noun is a special case within her account. As the following examples show, it behaves exactly like other head-complement structures, in particular verb-object structures.

If there's a narrow focus on either the noun or the determiner, pitch accent must be placed on the contrasting word. This is shown with focus on the noun in (3a) (vs. (3b)) and with focus on the determiner in (4a) (vs. (4b)):

- (3) a. I greeted every girl and [YOU]<sub>F</sub> greeted every [BOY]<sub>F</sub>.  
 b. #I greeted every girl and [YOU]<sub>F</sub> greeted [EVERY]<sub>F</sub> boy.
- (4) a. I greeted the girl and [YOU]<sub>F</sub> greeted [EVERY]<sub>F</sub> girl.  
 b. #I greeted the girl and [YOU]<sub>F</sub> greeted [every GIRL]<sub>F</sub>.

If focus is on the entire DP, however, pitch accent must fall on the head noun, as shown by (5).

- (5) a. I greeted the girl/her and [YOU]<sub>F</sub> greeted [every BOY]<sub>F</sub>.  
 b. #I greeted the girl/her and [YOU]<sub>F</sub> greeted [EVERY boy]<sub>F</sub>

Finally, if there's no focus, pitch accent is odd on either the noun or the determiner as seen in (6).

- (6) a. I greeted every girl and [YOU]<sub>F</sub> greeted every girl.  
 b. #I greeted every girl and [YOU]<sub>F</sub> greeted EVERY girl.  
 c. #I greeted every girl and [YOU]<sub>F</sub> greeted every GIRL.

### 2. Surprising data

Surprisingly, (7) allows pitch accent on the determiner *every* in the embedded clause, even though exactly the same DP occurs also in the matrix clause.<sup>1</sup>

- (7) I greeted every girl AFTer YOU (had) greeted EVERY girl.

1. Some English speakers like (7) only with the pluperfect *had greeted*, but more than five don't care. The pluperfect relates to the particular interpretation (7) with pitch accent on *every* receives, but otherwise doesn't affect my point. I assume that the difference between the two groups of speakers is whether they generally use the pluperfect or not.

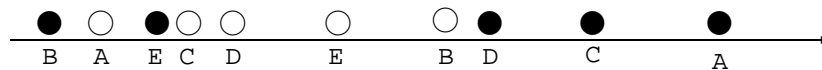
In particular, there's a contrast between the coordinate clause example repeated in (8a) from (6b) and the subordinate clause example repeated in (8b).

- (8) a. #I greeted every girl and YOU greeted EVERY girl.  
 b. I greeted every girl after YOU (had) greeted EVERY girl.

Pitch accent in (7) is optional, but it correlates with a difference in interpretation. Consider first the situation sketched in (9). Assume a scenario with five girls, A to E. Both you and I have to greet all the girls for some reason, and we're now talking about how quickly we each have accomplished our task. The sketch indicates, on a time axis, the time at which you greeted a particular girl by a white circle, and the time at which I greeted a particular girl by a black circle.

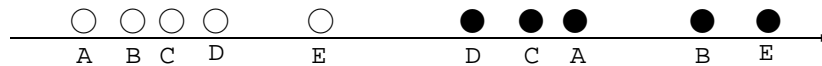
In the situation sketched below (9), only (9) without the pitch accent is judged true.

- (9) I greeted every girl AFter YOU greeted every girl.  
 'You were done greeting the girls before I was done.'



Sentence (11) (=7) with pitch accent on *every*, however, is judged to be false in the same situation. Both (9) and (10) are true only in the situation sketched following (10).

- (10) I greeted every girl AFter YOU greeted EVERY girl.  
 'You were done greeting the girls before I started.'



The contrast in (11) illustrates the same point. Here imagine a scenario where it's our task to be able to recognize all the boys as quickly as possible.

- (11) a. YOU started recognizing every boy AFter I started recognizing every boy.  
 'I could recognize all the boys before you could recognize all the boys.'  
 b. YOU started recognizing every boy AFter I started recognizing

EVERY boy. ‘I could recognize all the boys before you could recognize any boys.’

A further relevant control are examples like (12), where the head noun of the two quantificational DPs is different. The natural pitch placement for (12) is on the head noun *boy*, rather than on the quantifier.

(12) I greeted every girl *AFTER* YOU (had) greeted every *BOY*.

The contrast between (7) and (12) provides one argument against the suggestion of Chris Barker (p.c.) that licensing of the focus in (7) involves accommodation of (13) to license the contrast. This accommodation should also be possible in the case of (12) (and also for (6a)).

(13) I greeted every girl after you greeted some girls.

### 2.1. Scope of the ‘after’-clause

The difference in interpretation brought out by the pitch accent on *every* can be analyzed as the relative scope of *every* and the *after*-clause. I assume that *after* is a generalized quantifier of time intervals as defined in (14).<sup>2</sup>

(14)  $\llbracket \text{after} \rrbracket (P)(Q) = 1$  iff.  $\text{endpoint}(\min\{t : P(t)\}) < \text{endpoint}(\min\{t : Q(t)\})$

An argument for this semantics for *after* comes from (15) with two achievement predicates. (15) could be true if John completes his house later than Mary hers, regardless of when the two started construction. This is predicted by the comparison of endpoints as stated in (14).

(15) John built a house after Mary built a house.

The semantics for *after* in (14) predicts that scopal ambiguities with other quantifiers in the same clause should arise.<sup>3</sup> Such a scope ambiguity is attested by (16), which is ambiguous between the two readings paraphrased in (16a) and (16b).

(16) I greeted every girl after five o’clock.

- a.  $\text{after}(\lambda t \text{ } t = \llbracket \text{five o’clock} \rrbracket)(\lambda t \text{ I greeted every girl in } t)$   
 ‘I was done greeting the last one of all the girls after five o’clock.’

2. For simplicity, I assume here that all relevant minima and endpoints are defined.

3. Ultimately *after* should be considered in the wider context of comparatives, as it’s for all intents and purposes equivalent to *later than*. See Rullmann (1995), Kennedy (1997), Schwarzschild and Wilkinson (1999), and Heim (2000) for scopal interactions in comparatives.

- b. every girl  $\lambda x$  after( $\lambda t$   $t$ =[[five o'clock]]) ( $\lambda t$  I greeted  $x$  in  $t$ )  
*'I was done greeting the first one of all the girls after five o'clock.'*

But, the same scope ambiguity in (17) predicts the difference in meaning observed above.

- (17) I greeted every girl after you greeted every girl.
- a. after( $\lambda t$  YOU greeted every girl in  $t$ ) ( $\lambda t$  I greeted every girl in  $t$ ).  
*'I greeted the last girl later than you greeted the last girl.'*
- b. every girl  $\lambda x$  after( $\lambda t$  you greeted every girl in  $t$ ) ( $\lambda t$  I greeted  $x$  in  $t$ ).  
*'I greeted the first girl later than you greeted the last girl'*

Assuming that the *after*-clause is adjoined to VP, quantifier raising of the object derives the ambiguities in (16) and (17). Though there are probably other possibilities, for concreteness I'll assume QR to VP as the source of the ambiguity in the following.

### 3. Analysis

At this point, we can explain the correlation between the scope of the quantifier in the matrix clause and the presence of a pitch accent on the quantifier in the embedded clause. Consider the structure the copy+modify theory predicts for the reading where *every* takes scope above *after* in (18). Here, the quantifier in the embedded clause at least in principle could be contrasted with the boxed material in the matrix clause.

- (18) every girl <sub>$x$</sub>  [... the <sub>$x$</sub>  girl] [after ... EVERY girl]]

At this point, it is already clear why the account to be fleshed out in the following can only succeed in combination with the copy+modify theory of traces. Consider the LF-structures the three versions of QR yield for (17b). In (19a), a plain variable occupies the base position; in (19b), an exact copy of the moved phrase; and in (19c) a modified copy of the moved phrase.

- (19) a. every girl <sub>$x$</sub>  [...  $x$ ] [after ... EVERY girl]]  
 b. every girl <sub>$x$</sub>  [... every girl] [after ... EVERY girl]]  
 c. every girl <sub>$x$</sub>  [... the <sub>$x$</sub>  girl] [after ... EVERY girl]]

Only (20c) has a contrast of the right kind to potentially license focus on *every* in the *after*-clause. Namely, the contrast between *every* and the modified determiner *the <sub>$x$</sub>*  in the base position of QR. Structure (19a) predicts incorrectly

that the pitch could fall on *girl*, while (19b) predicts that focus shouldn't be licensed at all.

For the interpretation of structure (19c), I adopt from Sauerland (2000a) the lexical entry in (20) for the indexed definite determiner  $the_x$ , where  $g$  is the assignment function.

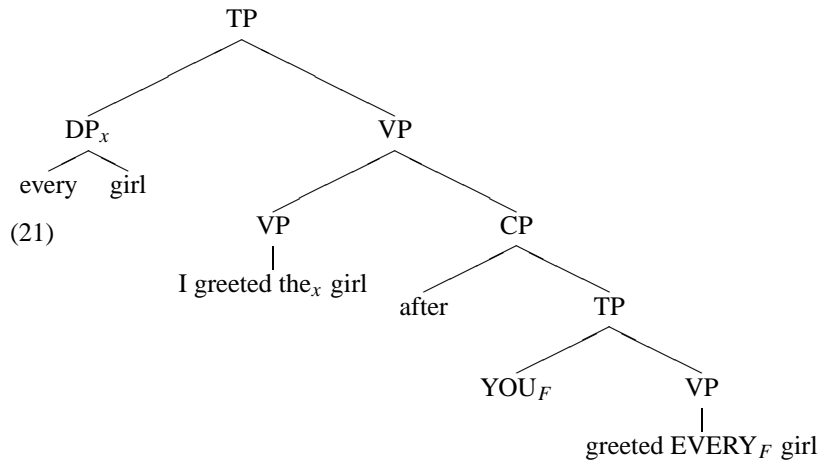
- (20)  $\llbracket the_x \rrbracket^g(P)$  is defined if  $P(g(x))$   
 if defined  $\llbracket the_x \rrbracket^g(P) = g(x)$

As Fox (1999) points out, the lexical entry in (20) predicts the right interpretation in all cases where the binder of  $x$  is a conservative determiner.

### 3.1. Restrictions

The explanation seems incomplete as it stands because it doesn't answer the following questions: Why can't the QRed DP *every girl* serve as an antecedent for destressing? Why is simple type-resolving QR to a position taking scope lower than the *after*-clause not sufficient to license focus? I would like to claim that the answer to these question follows from the theory of focus licensing in Schwarzschild (1999). According to Schwarzschild, any constituent XP that isn't focussed must be given, i.e. its focus value must be entailed by some discourse antecedent.

Consider the structural representation of our main example in (21). According to Schwarzschild's proposal, the lack of focus on *greet*, on VP, and on TP in the *after*-clause is only licensed by a comparison of these constituents with the corresponding nodes in the matrix clause.



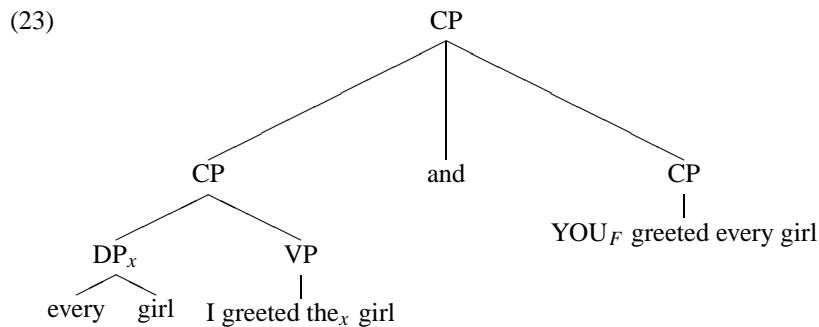
However, givenness of the VP and TP node requires focus marking on *every*.

Specifically, constituents including *every girl* aren't available as antecedents for givenness since they include the given constituent itself. Therefore, focus on *every* is predicted to be obligatory.

Example (22) with coordination (repeated from (6a)) differs in this respect, and the analysis of (22) carries over to the case of QR to a position lower than the *after*-clause.

(22) #I greeted every girl and YOU greeted EVERY girl.

Consider structure (23) for (22) with QR within the first conjunct. The constituents including *every girl* are still available as antecedents to license de-stressing of *every girl* in the second conjunct. Note that QR in (22) doesn't change the interpretation, and therefore will not disturb the givenness licensing relations between the two clauses.



But, QR to position higher than conjunction is blocked in (23) by the coordinate structure constraint (Ruys 1993). Since only QR to a position outside of the first conjunct would predict focus licensing to be possible, focus on *every* cannot be licensed in (22).<sup>4</sup>

#### 4. Further support and related issues

In this section, I mention three further pieces of support for the copy+modify theory of A-bar movement. Two of these relate to earlier work of mine. The third points to an A/A-bar difference in the focus licensing paradigm considered above.

4. A prediction of this approach is that pitch accent on the second quantifier should be possible in examples similar to (23) where the coordinate structure constraint is overcome by inserting a pronoun in the second conjunct. At present, my best effort of coming up with such an example is (i) and I'm not sure of the judgement.

(i) I greeted every girl on Christmas day and you greeted every girl on her birthday.

#### 4.1. Condition C

The best known argument for the copy theory of movement are Condition C effects (Chomsky (1993) and Fox (1999)). (24) shows two cases where a moved phrase triggers a Condition C effect as if it was in the base position.

- (24) a. \*Which talk of Bill<sub>i</sub>'s did he<sub>i</sub> miss?  
 b. \*Someone has introduced him<sub>i</sub> to every friend of Bill<sub>i</sub>'s.

Example (25a) involves overt *wh*-movement, while (24b) involves quantifier raising of *every friend* over the LF-position of the subject.

A prediction of the copy+modify theory is that A-bar movement should be able to obviate Condition C if the triggering R-expression occurs in the determiner of the A-bar moving phrase. The contrast in (25) corroborates this prediction (Sauerland 1998:39).

- (25) a. Someone must've fed him<sub>i</sub> John<sub>i</sub>'s every move over earphones.  
 b. \*Kasparov must've fed him<sub>i</sub> John<sub>i</sub>'s every move over earphones.

I assume here that in (26a) the object *John's every move* undergoes quantifier raising, leaving only *the<sub>x</sub> move* in the base position of movement. Therefore, no Condition C effect between *him* and *John* is observed in (25a). In (25b), however, I assume that quantifier raising of the object *John's every move* is blocked by the scope-economy condition of Fox (2000a). Therefore, Condition C cannot be obviated in (25b).<sup>5</sup>

#### 4.2. Trace identity

In (Sauerland (1998) and Sauerland (2000b)), I developed a second argument for the copy theory of movement based on contrasts like (26).

- (26) a. Mary visited a town that's near a town/one Bill did.  
 b. \*Mary visited a town that's near a lake Bill did.

The explanation of (26) argues that the meaning of two traces, that of QR and that in the ACD relative clause, must be identical for the sentence to be grammatical. Furthermore, I show that this is actually a consequence of the

5. A further control for (25a) suggested by Chris Potts (p.c.) is (i). Since in (i), the R-expression *John* seems to appear in the complement position of *move*, it should not be affected by the determiner modification rule. Therefore, (i) is expected to be a Condition C violation. However, the status of (i) seems comparable to (25a).

(i) Someone must've fed him<sub>i</sub> every move of John<sub>i</sub>'s over earphones.

The unexpected grammaticality of (i), however, might also provide evidence that *John's* really isn't the complement of *move*, but possibly undergoes covert raising into the determiner domain.



standard assumption that an elided VP must be (more or less) identical to its antecedent.

If we accept the explanation of the paradigm in (27) I offered in my earlier work, there's a straightforward argument for the copy+modify theory. Namely, (27) shows that differences of the determiner don't matter for trace identity.

- (27) a. Mary visited every town that's near a town/one Bill did.  
 b. \*Mary visited every town that's near a lake Bill did.

But, this is only compatible with the explanation based on VP-identity if the determiners aren't represented in the elided VP and its antecedent, while the NP-complements of these determiners are. These are exactly the structures predicted by the copy+modify theory.

### 4.3. A vs. A-bar movement

As is well known, A-movement differs from A-bar movement in tests for the copy theory of movement. Possibly, A-movement doesn't leave a copy as suggested first by Fox (1999).

The difference between A and A-bar movement is illustrated for Condition C in (28) and for trace identity in (29).

- (28) a. [One relative of Kai<sub>j</sub>'s]<sub>i</sub> seemed to him<sub>j</sub> to t<sub>i</sub> like Kazuko.  
 b. \*[Which relative of Kai<sub>j</sub>'s]<sub>i</sub> did he<sub>j</sub> say t<sub>i</sub> likes Kazuko.
- (29) a. ?The town near the lake that was ⟨visited by vandals⟩ seems to have been visited by vandals, as well.  
 b. \*The town near the lake they did ⟨visit⟩, the vandals seem to have visited, as well.

To complete the picture consider a case where A-movement determines the scope of a universal quantifier relative to an *after*-clause. Consider the paradigm in (30). It seems considerably harder to license focus on *every* when the universal quantifier occupies the subject position of both the matrix and the embedded clause.<sup>6</sup>

- (30) a. Every boy left after every boy was supposed to leave.  
 b. ??Every boy left after EVERY boy was supposed to leave.

6. Actually for some speakers (myself included), (30b) is quite acceptable on the reading where the universal takes scope above the *after*-clause. There's, however, a contrast to the object cases. But, this correlates with the fact that the data in (28) and (29) are also not so clear-cut, though the contrasts are real for most speakers.

The contrast between A and A-bar movement is expected, if wide scope of the subject above the *after* clause isn't derived by quantifier raising, but by A-movement of the subject from its VP-internal position to the surface subject position (Spec(TP)) of the English clause.<sup>7</sup>

#### 4.4. Pronouns

Danny Fox (p.c.) pointed out to me that contrasts similar to the one discussed above arise with pronouns. Consider the data (31) with pitch accent on the universal quantifier in the embedded clause.

- (31) a. Every girl wanted me to greet her after YOU greeted EVERY girl.  
 b. Every girl said that I greeted her after YOU greeted EVERY girl.

As in the cases with traces, the pitch accent must not fall on the universal, but on the noun following it, if the antecedent of the pronoun/trace has a different noun following the quantifier. This is shown in (32) (vs. (31b)).

- (32) Every boy said that I greeted him after YOU greeted every GIRL.

These data support the conclusion of Sauerland (2000a) that bound variable pronouns can receive an analysis like the one the copy+modify theory proposes for traces. On this proposal, one possible representation of (31a) is (33).

- (33) every boy  $\lambda x$   $x$  said that I greeted the <sub>$x$</sub>  boy after [you]<sub>F</sub> greeted every [girl]<sub>F</sub>.

Once representations of bound variable pronouns as in (33) are assumed, the account of focus licensing proposed above for traces carries over.<sup>8</sup>

#### 5. Conclusion

I have argued for a version of the copy theory of movement that includes a post-movement determiner modification rule creating structures like (34) for movement of *every boy*.

7. If A-movement doesn't leave a copy, but does leave a trace, we would actually expect that this trace should be in contrast to the entire QP in the *after* clause. As shown in section 1 above, we would therefore expect pitch accent to fall on the common noun *boy*.

(i) ??Every boy left after every BOY was supposed to leave.

8. In Sauerland (2000a), I assume that pronouns can optionally be definite descriptions with an NP-restrictor. This would lead me to expect that focus on the quantifier should be optional in the cases considered in this section. I'm at present not confident whether this prediction holds.

(34) [every boy]<sub>x</sub> ... the<sub>x</sub> boy

The prediction of this analysis I argued to be borne out is that under certain circumstances a second occurrence of the moving quantifier could be contrasted with the trace of QR receiving narrow focus on the Determiner.

(35) [every boy]<sub>x</sub> ... the<sub>x</sub> boy ... [EVERY]<sub>F</sub> boy

I have argued one example that bears out this prediction is (36) (repeated from (7)).

(36) I greeted every girl AFter YOU (had) greeted EVERY girl.

I have furthermore shown that the new evidence presented here integrates well with other evidence for the copy theory of movement from Condition C and trace identity.

The copy+modify theory argued for here (and in Elbourne (2001), Fox (2000b), Sauerland (2000b)) seems to be conceptually less attractive than a system with just copying from the perspective of narrow syntax. However, the plain copy theory doesn't have a conceptual advantage when the interpretive system is considered alongside narrow syntax. Comparing the copy+modify theory to the copy+replace theory, on the other hand, it seems that the copy+modify involves the minimal change required for the LF-structures to be interpretable, and therefore the result argued for empirically above might be the best imaginable one.

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