

Comparative Simplification

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In an unpublished paper (Geis ms.), I argued that there is a systematic transformational relationship between sentences like (1) and (2) that contain adverbial occurrences of earlier than and later than and sentences like (3) and (4) that contain adjectival occurrences of these comparatives.

- (1) John left earlier than Sue did.
- (2) John arrived later than Sue did.
- (3) John left at a time that was earlier than the time at which Sue left.
- (4) John arrived at a time that was later than the time at which Sue arrived.

I further argued that the rule that relates (1) and (2) to (3) and (4), respectively--a simplification (SIMP) rule that deletes the underlined elements of (3) and (4)--must have a global derivational constraint imposed on it. The results of this paper were briefly presented by Lakoff 1970 in support of his contention that global constraints are required to account for a wide range of phenomena.

Baker and Brame 1972 have since argued that there is a simpler description of sentences like (1) and (2) than that suggested above, one that does not require postulation of a global constraint. In this paper, I shall present a strengthened version of my original argument, as well as provide additional evidence in support of it, and then go on to point out some major difficulties with the analysis provided by Baker and Brame.

I.

Sentences like (1) and (2) which contain adverbial occurrences of earlier than and later than (adverbial time comparatives or AdvTC) differ from sentences like (3) and (4) which contain adjectival occurrences of these comparatives (adjectival time comparatives or AdjTC) in that AdvTC are unacceptable if their main and subordinate clauses have different verbs, while AdjTC are acceptable. Sentences (5)-(8) illustrate this difference.

- (5) *John left earlier than the volcano erupted.
- (6) *John arrived later than Sue's party ended.
- (7) John left at a time that was earlier than the time at which the volcano erupted.

- (8) John arrived at a time that was later than the time at which Sue's party ended.

These data might appear at first to be evidence against the hypothesis that there is a systematic transformational relationship between AdvTC and AdjTC. However, I shall demonstrate that a proper formulation of the constraint responsible for blocking derivations of AdvTC like (5) and (6) actually requires that AdvTC be derived from AdjTC.

To account for the fact that (7) and (8) are unacceptable, we might, as a first approximation, impose constraint A on derivations of AdvTC.

- (A) The main and subordinate clauses of any AdvTC must each contain an occurrence of the same verb.

Note, however, that sentences (1) and (2) do not satisfy A, but are nevertheless acceptable. This problem can easily be resolved, of course, if we assume that (1) and (2) are derived from (9) and (10), respectively, by an application of VP deletion and assume that constraint A applies prior to the application of this deletion rule.

- (9) John left earlier than Sue left.
 (10) John arrived later than Sue arrived.

Although constraint A will account for the simplest cases of AdvTC, it is clearly too weak to account for certain more complex cases. Note, for example, that (11)-(14) satisfy A but are unacceptable.

- (11) *John left earlier than the girl who left died.
 (12) *John left later than we made the claim that he would leave.
 (13) *John left later than Sue suggested that for Harry to leave would be a crime.
 (14) *John left earlier than we knew that Bill left.

The comparative clauses of (11)-(14) do not have a great deal in common: the subordinate occurrence of leave is in a nominal complement in (11), a relative clause in (12), a sentential subject in (13), and the object complement of the factive verb know in (14). However, there is one property that they share, namely that these subordinate occurrences of leave--the only verb in the comparative clauses of these sentences capable of satisfying constraint A--are in constructions that constituents cannot be moved out of.

Let us consider example (12) in some detail. Pairs like (15) and (16) are very similar in meaning, but differ syntactically in the important respect that the that-clause of (15) is within a complex NP (cf. Ross 1967), while the that-clause of (16) is not.

- (15) We claimed that John would leave.
 (16) We made the claim that John would leave.

One consequence of this difference is that constituents of the that-clause of (15) can be moved out of this clause while constituents of the that-clause of (16) cannot. In this light, note that (17) is ambiguous while (18) is not.

- (17) When did we claim that John would leave?
 (18) When did we make the claim that John would leave?

In (17) when can be interpreted as modifying either claim or leave, for the time adverbial underlying when can have been moved to initial position from either clause of this sentence. In (18), on the other hand, when can be interpreted as modifying made the claim, but not leave, for Ross' complex NP constraint (CNPC) would block the movement of when (or, rather, the constituent underlying when) out of the clause containing leave, but not out of the clause containing made the claim.

Now compare the unacceptable sentence (12) with (19).

- (19) John left later than we claimed he would (leave).

In (19), the subordinate (deleted) occurrence of leave--the verb that satisfies constraint A--is not within a complex NP and the sentence is acceptable, but in (12), as we noted above, the subordinate occurrence of leave is within a complex NP and the sentence is unacceptable. This important difference between (12) and (19) can be exploited if we assume that AdvTC are derived from AdjTC, for in the derivation of AdjTC, a time adverbial (cf. at which in (20) and (21)) is moved to clause-initial position.

- (20) John left at a time that was later than the time
at which we made the claim that he would leave.
 (21) John left at a time that was later than the time
at which we claimed he would leave.

Note that (20) is unacceptable if at which is interpreted as modifying leave, the only verb in the unacceptable AdvTC (12) that satisfies constraint A. On the other hand, (21) is acceptable if at which is interpreted as modifying leave, the only verb in the acceptable AdvTC (19) that satisfies A. Thus, we may conclude that a given AdvTC will be acceptable if, in the derivation of its corresponding AdjTC, at which can be moved out of the clause containing the verb that satisfies A.

The above correlation between AdvTC and AdjTC can be captured if we assume that AdvTC are derived from AdjTC by SIMP and if we revise A along the following lines:

- (B) SIMP may apply to a given AdjTC if and only if there exist a verb V_i in the main clause and a verb V_j in the subordinate clause such that

(a) $V_i = V_j$ and (b) at which originated in the same clause in underlying structure as V_j .

Let us briefly see how B works. In AdjTC (20), we do have an occurrence of the same verb in the main and subordinate clause. Thus B(a) is satisfied. However, the subordinate occurrence of leave in (20) cannot satisfy B(b), thanks to the CNPC. Thus, (12) cannot be derived from (20). In the case of AdjTC (21) we have verbs which satisfy both B(a) and (b). Thus (19) can be derived from (21).

The need to state B as a global derivational constraint is clear. We must impose constraint B after at which has been moved to clause-initial position in the derivation of AdjTC, if the CNPC is to do its work. On the other hand, after at which has moved to the front of a given AdjTC, it is impossible to determine what clause at which came from unless we allow B to look back at some earlier stage of the derivation of that AdjTC. I have chosen to have B look back to underlying structure, but I have no compelling argument that it must look back that far. However, it is certain that B must look back to a stage in the derivation of AdjTC that precedes the movement of at which to initial position.

Returning to (11)-(14), we note that the deviance of (11), like (12), is due to the CNPC. The AdjTC corresponding to (11), namely (22), is unacceptable if at which is interpreted as modifying leave:

(22) John left at a time that was earlier than the time at which the girl who left died.

A somewhat different explanation is required for (13) than that given for (11) and (12), since Ross' sentential subject constraint (SSC) is involved. The AdjTC corresponding to (13), namely (23), is acceptable, but not if at which is interpreted as modifying leave:

(23) John left at a time that was later than the time at which Sue suggested that for Harry to leave would be a crime.

In this case, leave occurs within the sentential subject of would be a crime and the SSC blocks movement of at which out of the clause containing leave, the only verb capable of satisfying B(b). Still another explanation is required for (14), for its unacceptability is due to the fact that constituents cannot be moved out of the complements of factive verbs. Observe that the AdjTC corresponding to (14), namely (24), is unacceptable if at which is interpreted as modifying leave.

(24) *John left at a time that was earlier than the time at which we knew that Bill left.

(Sentence (24) is also unacceptable if at which is interpreted as modifying know, for reasons of no interest to us here.)

Although constraint B accounts for a wider class of AdvTC than does A, it is also too weak. Observe that (25) and (26) satisfy B, but are unacceptable nevertheless.

- (25) *The boy who left died earlier than Sue left.
 (26) *That Harry left upset me later than Sue left.

The explanation of the deviance of (25) and (26) is quite straightforward. Note that (27) and (28), the AdjTC corresponding to (25) and (26), respectively, are acceptable, but not if at a time is interpreted as modifying the superordinate occurrences of leave in these sentences.

- (27) The boy who left died at a time that was earlier than the time at which Sue left.
 (28) That Harry left upset me at a time that was later than the time at which Sue left.

In order to account for (25) and (26), we need only revise B along the lines of C:

- (C) SIMP may apply to a given AdjTC if and only if there exist a verb V_i in the main clause and a verb V_j in the subordinate clause such that (a) $V_i = V_j$, (b) at which originated in the same clause in underlying structure as V_j , and (c) at a time originated in the same clause in underlying structure as V_i .

Constraint C(c) need not, of course, be formulated as a global constraint, but since C(b) must be so formulated, there is no harm in formulating C(c) in a similar way.

The focus of the above argument has been on a proper formulation of constraint A. However, we must not overlook the fact that the proper formulation of this constraint appears to require that we assume that AdvTC are derived from AdjTC, for only on this assumption can Ross' constraints on movement rules be exploited. In what follows, I provide additional evidence for this analysis.

Observe that (29) is self-contradictory.

- (29) *John was born earlier than he was (born).

Not surprisingly, the AdjTC corresponding to (29), namely (30), is also self-contradictory.

- (30) *John was born at a time that was earlier than the time at which he was born.

The presence of the time adverbials in (30) is crucial to an explanation of the fact that it is self-contradictory. We can factor (30) into the three propositions of (31).

- (31) a. John was born at t_i .
 b. John was born at t_j .
 c. t_i was earlier than t_j .

However, since John can only have been born once, t_i and t_j must be the same time, but t_i cannot both be earlier than t_j and the same as t_j .

Since (29) contains no time adverbials, we cannot account for (29) in the way that we accounted for (30)—unless, of course, we derive AdvTC from AdjTC. But it would not be rational to provide different explanations for the fact that (29) and (30) are self-contradictory. Consideration of a more complicated case will drive this point home.

As we noted earlier, if the verb in the comparative clause of any AdvTC which satisfies C(a) is in the complement of a factive verb, the AdvTC will be unacceptable. This is the case with (32).

- (32) *John was born earlier than we knew he was.

Sentence (32) not only violates constraint C, it, like (29) and (30), is also self-contradictory, a property not normally associated with violations of C. Now, suppose we were to claim that what is wrong with (29) is that it asserts that the state of affairs 'John was born' obtained earlier than the state of affairs 'John was born'. Such an explanation is reasonable and does not require reference to the presence of time adverbials. However, this ploy will not work for (32), since there is no conflict in saying that the state of affairs 'John was born' obtained earlier than the state of affairs 'we knew that John was born'. On the other hand, if we factor (32) into the three propositions of (33), i.e. if we derive AdvTC from AdjTC, we can account for the unacceptability of (32) in a straightforward way.

- (33) a. John was born at t_i .
 b. We knew that John was born at t_i .
 c. t_i was earlier than t_i .

Proposition (33c) is, of course, self-contradictory. It would therefore appear that the hypothesis that time adverbials do exist in the underlying structure of AdvTC is correct.

Let us consider another, somewhat different, phenomenon. Observe that (34) is self-contradictory.

- (34) *John left later than we will.

We might attempt to account for (34) with a constraint to the effect that the main and subordinate clauses of AdvTC must agree in tense. However, the problem is somewhat more complicated than this. Notice that the highest verb in the comparative clause of (35) disagrees in tense with the verb in the main clause, but the sentence is nevertheless acceptable.

(35) John left later than he says he did.

What appears to be going on in the case of (34) and (35) is that the verbs that satisfy constraint C must agree in tense. This description will, I think, work. However, it is not difficult to see that it would be a mistake to associate this tense harmony phenomenon with constraint C.

Observe that (36), like (34), is unacceptable, but that (37), like (35), is acceptable.

(36) *John left at the time when we will leave.

(37) John left at the time when he says he did.

In a previous study (Geis 1970), I showed, on the basis of data like (36) and (37), that sentences containing temporal relative clauses uniformly exhibit tense harmony and argued that this fact can best be accounted for by assuming (a) that the head noun phrases of time adverbials like those that occur in (36) and (37) have temporal reference features assigned to them--let us say either [+past] or [-past]--which are consistent with the auxiliaries of the clauses they occur in, and (b) that the identity condition on relativization is sensitive to these features. Given these two assumptions, we can account for the fact that (36) is unacceptable by noting that the head noun phrases of at a time and the adverbial underlying at which must have the temporal reference features [+past] and [-past], respectively, and, thus, that the identity condition on relativization cannot be satisfied. Sentence (37), on the other hand, is acceptable, but only on a derivation in which where originates in the clause containing did.

The AdjTC corresponding to (34) and (35), namely (38) and (39), respectively, also exhibit tense harmony.

(38) *John left at a time that was later than the time at which we will leave.

(39) John left at a time that was later than the time at which he says that he left.

If the principles used in the description of (36) and (37) are extended to (38) and (39), it will follow that the subject of later than in (38) must be marked [+past] and its object [-past], an empirical impossibility, but the subject and object of later than in (39) must both be marked [+past] (on the derivation of (39) in which at which originates in the same clause as left), which is empirically possible.

It should be clear that if we derive AdvTC from AdjTC, we can account for the fact that (34) is unacceptable and (35) acceptable in a straightforward fashion, for AdvTC and AdjTC pattern alike. Were we not to relate AdvTC to AdjTC, on the other hand, we would be forced to conclude that the fact that AdvTC and AdjTC function alike with respect to the phenomenon of tense harmony is an accident. This is, I think, an untenable conclusion.

My account of the phenomenon of tense harmony may not, of course, prove to be completely satisfactory. However, it is very important to note that the facts that comprise the tense harmony phenomenon pertain to temporal relative clauses alone. As (40) illustrates, tense harmony does not obtain in the case of locational relative clauses, and as (41) suggests, it does not typically obtain for comparatives.

- (40) John lives at the place where Joe once lived.
 (41) John runs faster now than he ever did before.

Thus, if we do not derive AdvTC from AdjTC, we will miss an important linguistic generalization.

II.

In a reply to Lakoff 1970, a paper that discussed a number of global derivational constraints, including the one presented above, Baker and Brame 1972 argue that AdvTC can be accounted for without imposing a global constraint on their derivations. In this section, I examine their counter-proposal and show it to be unsatisfactory on a number of grounds.

According to Baker and Brame, AdvTC (42) is derived from an underlying structure something like (43).

- (42) John left earlier than Bill left.
 (43) John left [AP [Deg more than [g Bill left
 that early]g]Deg early]AP

Several grammatical processes are required in order to map (42) into (43), including in particular the deletion of the subordinate occurrence of that early. Baker and Brame agree that a constraint like A above must be imposed on the derivation of (42), but they do not state it. I presume that it should be formalized along the lines of D.

- (D) For comparative formation to apply (including the deletion of that early from the subordinate clause), there must exist verbs V_i and V_j in the main and subordinate clauses respectively such that (a) $V_i = V_j$, (b) V_i and early are clause mates, and (c) V_j and that early are clause mates.

Thus, the two occurrences of early in (43) play the same sort of role as the time adverbials referred to in constraint C.

Let us turn now to consider (44), one of the data that gave rise to the global constraint of the previous section.

- (44) *John left earlier than the girl who left died.

According to Baker and Brame's analysis, (44) would have to be derived from (45).

- (45) John left [AP [Deg more than [S [NP the girl [S
who left that early]S]NP died]S]Deg early]AP

And they say, 'We can account for the ill-formedness of the sentences resulting from the application of Comparative formation by assuming, as does Ross (1967:411ff.) that this rule, like the very similar rule that forms relative clauses, is subject to the Complex NP constraint' (71). Thus, according to Baker and Brame, (44) cannot be derived from (45) because the CNPC will, if extended to comparative formation (a deletion rule), block the deletion of that early from (45). Examples like (12)-(14) would be dealt with by a similar extension of other constraints on movement rules to the Baker and Brame rule of comparative formation.

Baker and Brame's assumption that their rule of comparative formation is subject to the CNPC is absolutely crucial to the viability of their alternative analysis. As we shall see below, there is very good reason to doubt the correctness of this assumption. First, however, I would like to draw attention to certain other defects.

Baker and Brame claim that their analysis is simpler than the analysis suggested above. This claim could scarcely be more facile. In the first place, note that the analysis of section I is semantically as well as syntactically motivated, in that it correctly predicts that a given AdvTC will be semantically equivalent to its corresponding AdjTC. This semantic fact must be accounted for, presumably by mapping AdvTC and corresponding AdjTC into semantically equivalent, if not identical, semantic representations. Baker and Brame do not indicate how they would propose to account for the semantic equivalence between AdvTC and AdjTC and, until they do, it will be impossible to determine if their analysis is simpler than the one presented in section I.

We noted above that sentences like (46) and (47) are self-contradictory.

- (46) *John was born earlier than he was.
(47) *John was born earlier than we knew he was.

Within the framework of section I, (46) and (47) could be accounted for without difficulty. However, it is by no means clear that they can be accounted for at all within the framework provided by Baker and Brame. We might stipulate that John was born early cannot be both subject and object of more than, but this ploy cannot, as far as I can see, be extended to account for the fact that (47) is self-contradictory.

The phenomenon of tense harmony could be accounted for within the Baker and Brame framework by including within constraint D a statement to the effect that the tenses of the verbs that satisfy D(a) must be compatible. However, such a move would entail that we miss the generalization that the phenomenon of tense harmony is associated with temporal relative clauses. Since the Baker and Brame proposal and the one advanced in section I both appear to work, we must choose the one that is superior on explanatory grounds, i.e. the proposal of section I.

Baker and Brame note that AdvTC containing sooner than are also subject to the like-verb constraint, and cite data like (48) and (49) in support of this claim.

- (48) John left sooner than Bill did.
 (49) *John left sooner than Sam slugged Pete.

They go on to point out that (48) creates a problem for the view that AdvTC are derived from AdjTC for (50), the AdjTC corresponding to (48), is ungrammatical:

- (50) *John left at a time that was sooner than the time at which Bill left.

Baker and Brame correctly note that this problem does not arise for their analysis. However, they fail to note that (48) presents an even graver problem for their analysis than for that of section I, for according to their analysis, the main and subordinate clauses of (48) would have as their sources the semantically deviant (51a) and (51b), respectively.

- (51) a. *John left soon.
 b. *Bill left that soon.

A crucial assumption of Baker and Brame's analysis is that their rule of comparative formation, the rule that deletes that early from structures like (43), is subject to Ross' constraints (as well as those discovered since) on movement or chopping rules, i.e. rules that move constituents over essential variables. Ross based his suggestion that comparative formation is subject to his constraints on chopping rules on data like (52) and (53):

- (52) John is taller than we claimed he is.
 (53) *John is taller than we made the claim that he is.

In (52), the subordinate (deleted) occurrence of tall is inside a complex NP and, according to Ross, if we were to impose the CNPC on this deletion rule, we could account for the unacceptability of this sentence. Similar data appeared to support the view that such deletions are subject to his other chopping constraints.

Let us now attempt to determine whether Ross' constraints on chopping rules do, in fact, apply to the deletion rule in question. First, note that (54), an admitted stylistic barbarity, is more acceptable than (55).

- (54) ?John is taller than we claimed he is wide.
 (55) *John is taller than we made the claim that he is wide.

There has been no deletion of the subordinate adjective in the case of (54) and (55), and thus we cannot appeal to any constraint on

deletion rules, including Ross' constraints on chopping rules, to account for the difference in the degree of acceptability of (54) and (55).

There are more convincing examples. Consider

- (56) The room turned out to be a little wider than we thought it was long.
 (57) *The room turned out to be a little wider than we knew it was long.

In (57), but not (56), long occurs in a construction that constituents cannot be moved out of. However, note that extending to the deletion associated with comparative formation the constraint which prohibits movement of constituents out of factive clauses will not enable us to account for the fact that (56) is acceptable and (57) unacceptable, for long is deleted from neither of these sentences.

Robert Freund has suggested to me an alternative interpretation of the facts which led Ross to think that the rule that deletes the subordinate occurrences of compared adjectives is subject to his chopping constraints. Freund noted that if we assume a comparative like (58) is derived from the structure underlying (59), we can account for all of the data that led Ross to think that comparative formation is subject to his chopping constraints.

- (58) John is taller than Bill.
 (59) John is tall to a degree that is greater than the degree to which Bill is tall.

Observe that the adverbial underlying to which in (59) moves in the derivation of this sentence. As a result, if we were to adopt such an analysis, Ross' chopping constraints would necessarily come into play in the derivation of comparatives. In this light compare (60) and (61) with (56) and (57) respectively.

- (60) The room turned out to be wide to a degree that was a little greater than the degree to which we thought it was long.
 (61) *The room turned out to be wide to a degree that was a little greater than the degree to which we knew it was long.

Since (60) and (61) are very complex, it is difficult to make very good judgments concerning them. However, note that the constraint that prohibits movement of constituents out of the complements of factive verbs will block derivation of (61), but will not block derivation of (60). This analysis thus correctly predicts that (56) is acceptable but (57) is not. Thus, it would appear that Baker and Brame's suggestion that their rule of comparative formation is subject to Ross' chopping constraints is not as well motivated as either they or Ross have imagined.

I would be less than honest if I failed to point out that AdvTC do not fit very nicely into the framework of this alternative

analysis of comparatives. Note how cumbersome (62) is.

(62) *John left at a time that was early to a degree
that was greater than the degree to which
Sue's leaving was early.

A major difficulty with (62) is that, to the degree to which it is interpretable at all, early is understood in its absolute, rather than its relative, sense. However, a close look at underlying structures like (43) will reveal that the Baker and Brame analysis is infected by the same problem.

References

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