

Sentence Adverb and Inversion

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0. Jackendoff (1972) pointed out an interesting phenomenon in English that the subject-auxiliary inversion (henceforth SAI) does not take place in a sentence with the sentence-modifying adverb (henceforth S adverb). Thus, Jackendoff illustrates the following sentences:

- (1) a. Bill apparently has never seen anything to compare with that.
b. *Never has Bill apparently seen anything to compare with that.
- (2) a. Tom probably ran so fast that he got to Texas in ten minutes.
b. *So fast did Tom probably run that he got to Texas in ten minutes.

(1b) and (2b) are derived from (1a) and (2a), respectively, by the application of the adverbial preposing and SAI. But they are unacceptable for many native speakers⁽¹⁾. As Jackendoff (1972:86) suggests, it would be absurd to impose on the structural description of SAI a condition saying that the presence of S adverb blocks its application, or to propose the output condition on the inversion rule. In view of this absurdity or difficulty, he correctly put forth the argument that a principled explanation of such a phenomenon should involve the semantic information. However, as far as I know, there is no agreement on where the unacceptability of (1b) and (2b) comes from. My concern in the discussion to follow is to investigate what kind of semantic information makes unacceptable the subject-auxiliary inverted sentence containing S adverb.

1. There exist various kinds of sentences which take the configuration Aux-NP-VP, which has been introduced by the application of SAI⁽²⁾. We will be able to classify them in terms of the triggering elements of SAI.

(A) Question

- a. Who did John kill last night?
- b. Did Mary get up early yesterday?

(B) Preposed negated constituent

- a. Never has Bill seen a tiger.
- b. Under no circumstances must the switch be left on.
- c. Rarely did John go to the park with his daughter.
- d. Only by this means is it possible to explain his failure to act decisively.

(C) Preposed emphatic element

- a. So high did prices rise that many people could no longer afford the necessities of life.

* I am grateful to J. Hinds, I. J. Hesselink, and B. A. Harlan for acting as my informant.

b. Too young is he to do the task.

(D) *Proposed pro-form*

a. Mary will enter the competition. So will Joan.

b. Peter doesn't hunt rabbits. No, $\left\{ \begin{array}{l} \text{nor} \\ \text{neither} \end{array} \right\}$ does Paul.

Before considering the relationship between S adverbs and the (A)-(D) sentence types, let us first survey the system of rules proposed in Jackendoff (1972). He claims that "inversion would introduce some semantic factor not present in noninverted forms, and this factor would be incompatible with the readings of S adverbs (p. 86)". And he tried to explain (1b) and (2b) by setting up a projection rule describing the semantic effect of inversion and a well-formed condition relating the semantic effect of inversion to the presence of sentence-scope element. (3) and (4) represent these rules. (I have slightly modified Jackendoff's original formulation.)

(3) Projection rule for inverted S

A sentence containing the configuration Aux-NP-VP receives the semantic marker X in its semantic interpretation. (OBLIGATORY)

(4) Well-formed condition for inverted S

a. A sentence containing a preposed element whose scope is the entire sentence must have the semantic marker X in order to be semantically well-formed. Conversely, X may only occur in the scope of a sentence-scope element.

b. The semantic marker X is incompatible with the readings of S adverbs. This system of rules accounts for the following sentences.

(5) *Never Bill has seen such a big snake.

(6) *So fast Tom ran that he got to Texas in ten minutes.

(7) *Not long ago was there a rainstorm.

All of the above sentences are generated in the syntactic component because Jackendoff assumes that SAI is optional. However, they will all be ruled out for the semantic reason. In (5) and (6), *never* and *so far* is a sentence-scope element. But since (3) does not assign the semantic marker X to them, (4a) is violated. In (7), only the adverbial element is within the scope of negation. So, (4a) is also violated because (3) obligatorily assigns X to it⁽³⁾.

(1b) and (2b) could be explained in the same way. They contain the configuration Aux-NP-VP, so they should be obligatorily assigned the semantic marker X by (3). Since they have S adverbs, (4b) blocks them as ungrammatical.

The system of rules (3)-(4) obviously predicts that all the sentences in (A)-(D) above mentioned must be assigned the semantic marker X by (3), and so the well-formed condition (4b) will prevent S adverbs from co-occurring with them. We must ask whether this prediction is correct or not.

1.1 (A)

Generally speaking, the interrogative sentence cannot contain S adverb within or outside itself.

- b. *Under no circumstances must the switch

certainly
obviously
curiously
naturally

 be left on.
- c. *Rarely did John

evidently
apparently
unfortunately
strangely

 go to the park with his daughter.
- d. *Only by this means is it

certainly
obviously
curiously
naturally

 possible to explain his failure to act decisively.

However, when the evaluative adverbs take the front position, the above sentences are grammatical.

- (12) a.

{Unfortunately}
{Strangely}

, never has Bill seen a tiger.
- b.

{Curiously}
{Naturally}

, under no circumstances must the switch be left on.
- c.

{Unfortunately}
{Strangely}

, rarely did John go to the park with his daughter.
- d.

{Curiously}
{Naturally}

, only by this means is it possible to explain his failure to act decisively.

These sentences obviously provide the counterexamples to Jackendoff's system of rules (3)-(4).

Bellert (1977) also gives a semantic explanation to (11). Her explanation is based on the interrelation of the semantic scope of negation and S adverb. Thus, in order to account for the unacceptability of (11), she states as follows:

Bellert's (32) *Never did John probably run so fast.

Bellert's (34) *Never did John fortunately run so fast.

A modal adverb, such as *probably* in the example above, is a predicate over the truth of the respective proposition, and as such it can apply without inconsistency to a negated sentence (*John never run so fast*) or, more precisely, to the truth of a negated sentence. In (32), however, both the proposition and the modal adverb that qualifies its truth are in the scope of negation (the negation expressed by *never*), and this is a contradiction. For we cannot negate or deny a proposition and qualify its truth as probable at the same time.

The evaluative adverb is a predicate over the event or state of affairs described by the entire sentence or clause in which it occurs, and we can very well evaluate an event or state of affairs described by a negative sentence ... If, however, the negating element is

preposed, the adverb that is interpreted as a predicate evaluating the event described by the negated sentence falls within the scope of that negation, and this makes the sentence semantically incoherent.

Bellert's above explanation can adequately account for the well-known fact that S adverbs are not acceptable in the position immediately after the negative element *not*, unless they are intonationally broken from the rest of the sentence⁽⁴⁾.

- (13) a. {Certainly }
 {Unfortunately }
 }, John is not honest.
- b. John is not, {certainly }
 {unfortunately }
 }, honest.
- c. *John is not {certainly } honest.
 {unfortunately }

In (13a) and (13b), *certainly* and *unfortunately* qualifies the truth of the sentence *John is not honest*, while in (13c), there is a semantic contradiction. So, we can say that S adverbs cannot occur within the scope of negation in a simple sentence, but the negation can occur within the scope of S adverb.

Now, we must ask whether Bellert's scope explanation can be applied to (11). At first glance, her explanation would seem to be a best approach to (1b), (2b), and (11). If it is correct, their unacceptability could be accounted for without making appeal to the ad hoc semantic factor introduced by SAI. There is, however, a counterexample to her scope explanation. As can be seen from (13a) and (13b), the sentence containing the negation and S adverb is grammatical only if the negation is within the scope of S adverb. Note, incidentally, that all the ungrammatical sentences which Jackendoff and Bellert considered contain S adverb within the scope of negation. Therefore, it will be predicted that (1b), (2b), and (11) would be grammatical if S adverbs would be preposed into the front position of a sentence. This prediction holds good in the evaluative adverbs such as *fortunately*, *surprisingly*. See the sentences in (12) for this. However, the sentence with modal adverb is ungrammatical again even if the modal adverb is preposed into the front position. Consider the following:

- (14) a. *{Evidently }
 {Apparently }
 }, never has Bill seen a tiger.
- b. *{Certainly }
 {Obviously }
 }, under no circumstances must the switch be left on.
- c. *{Evidently }
 {Apparently }
 }, rarely did John go to the park with his daughter.
- d. *{Certainly }
 {Obviously }
 }, only by this means is it possible to explain his failure
 to act decisively.

In these sentences, S adverbs are outside the scope of negation. If Bellert's analysis is correct, they should have to be grammatical just as the sentences in (12) and (13a). But their acceptability is not a degree improved. I do not believe that the semantic principle based on the scope of negation is the best approach

to explain the relation between S adverbs and the subject-auxiliary inverted sentence⁽⁵⁾. The sentences in (14) claim that the scope explanation is inadequate and some other principle should be looked for.

1.3 (C)

The sentences of (C) cannot contain S adverbs within themselves like those of (B). Consider the following:

- (15) a. *So high did prices $\left. \begin{array}{l} \text{evidently} \\ \text{certainly} \\ \text{unfortunately} \\ \text{surprisingly} \end{array} \right\}$ rise that many people could no longer afford the necessities of life.
- b. *Too young is he $\left. \begin{array}{l} \text{apparently} \\ \text{obviously} \\ \text{strangely} \\ \text{naturally} \end{array} \right\}$ to do the task.

Bellert (1977) also gives a semantic explanation similar to the above. Thus, she says:

A sentential element that is preposed from its ordinary position to the front of the sentence for the sake of emphasis is then no longer within the scope of the sentential adverb, which as a rule is interpreted as qualifying the truth of the entire proposition in which it occurs. The result is an effect of semantic incoherence that makes such sentences unacceptable.

This explanation predicts, just like that in section 1.2, that if the sentential element is in the scope of S adverb, the sentence is grammatical. This prediction holds good in the sentence with the evaluative adverb. See the following:

- (16) a. $\left. \begin{array}{l} \text{Unfortunately} \\ \text{Surprisingly} \end{array} \right\}$, so high did prices rise that many people could no longer afford the necessities of life.
- b. $\left. \begin{array}{l} \text{Strangely} \\ \text{Naturally} \end{array} \right\}$, too young is he to do the task.

However, the sentence with modal adverb is ungrammatical even if the sentential element is in the scope of the modal adverb. Consider the following:

- (17) a. $\left. \begin{array}{l} \text{Evidently} \\ \text{Certainly} \end{array} \right\}$, so high did prices rise that many people could no longer afford the necessities of life.
- b. $\left. \begin{array}{l} \text{Apparently} \\ \text{Obviously} \end{array} \right\}$, too young is he to do the task.

Within Bellert's framework, there is nothing to block these sentences. Jackendoff (1972) also cannot account for the difference in grammaticality between (16) and (17).

1.4 (D)

The sentences of (D) can contain S adverb.

- (18) a. Mary will enter the competition. So, $\left. \begin{array}{l} \text{evidently} \\ \text{certainly} \\ \text{strangely} \\ \text{surprisingly} \end{array} \right\}$, will Joan.
- b. Napoleon is followed through her complex marriage with Joe Dimaggio, though Mailer never directly attempted to talk to the Yankee Clipper ... "I heard that he was impossible." So, apparently, were most of the people in the star's constellation. (TIME, Jun. 16, 1973)
- c. Peter doesn't hunt rabbits. No, nor, $\left. \begin{array}{l} \text{apparently} \\ \text{reportedly} \\ \text{fortunately} \\ \text{naturally} \end{array} \right\}$, does Paul.
- d. Nor, obviously, can one seriously claim that only in N-verb complements can English subject NPs end with prepositions. (Postal, *On Raising*)

In these sentences, S adverbs can take the front position of a sentence.

- (19) a. Mary will enter the competition. $\left. \begin{array}{l} \text{Evidently} \\ \text{Certainly} \\ \text{Strangely} \\ \text{Surprisingly} \end{array} \right\}$, so will Joan.
- b. Peter doesn't hunt rabbits. No, $\left. \begin{array}{l} \text{apparently} \\ \text{reportedly} \\ \text{fortunately} \\ \text{naturally} \end{array} \right\}$, nor does Paul.

Notice that, whether they are modal or evaluative adverbs, all the S adverbs can occur within or outside the subject-auxiliary inverted sentences of (D) type. It is clear that the above sentences are all counterexamples to the analysis of Jackendoff's. If the pro-forms *so* and *nor* are the sentential scope element like *never*, *rarely*, and *no*, the above sentences also provide the counterexamples to the analysis of Bellert's.

2. I have so far reviewed and criticized the discussions of Jackendoff (1972) and Bellert (1977). Jackendoff's system of rules has proved to be descriptively inadequate, because it cannot account for the difference between (11) and (12) or between (15) and (16): the modal adverbs cannot occur within or outside the subject-auxiliary inverted sentences of (B)-(C) types, while the evaluative adverbs can occur outside such sentences, but not within them. Even if we assume that this difference could be explained in terms of some principle, there also remains one crucial problem in Jackendoff's analysis. He hypothesized that SAI itself carries the meaning X, and this is incompatible with the meaning of S adverbs. If he is correct, there must be the principle that distinguishes SAI of (B)-(C) types between that of (D) type. For the sentences of (D) type permit S adverbs to take every possible position, as can be seen from (18) and (19). Such a principle would be extremely difficult to find out. Rather, it seems that SAI does

not carry in itself any meaning, and the very meaning of the sentences such as (A), (B), and (C) is incompatible with the meaning of S adverbs. The problem is, what kind of the semantic effect of such sentences is relevant.

Bellert (1977) proposed the different approach, that is, the semantic scope explanation. It would seem to be an interesting way to account for the phenomenon in question in terms of the notion of scope, without making crucial use of somewhat vague semantic factor as in Jackendoff (1972). However, the sentences (14) and (17), which all contain the modal adverbs, provide a counterexample to the contention that the scope of the negation and S adverb alone is relevant to the unacceptability of the inverted sentence with S adverb, although the evaluative adverbs surely follow the scope explanation as shown in (12) and (16)⁽⁶⁾. How are these differences to be accounted for? I do not want to say that the cases with the evaluative adverbs are to be explained by the scope rules, while the cases with the modal adverbs by the other constraints. The same general restriction seems to operate on both cases. In this section, I shall propose one possible approach.

Let us first consider the semantic function of a sentence which has undergone SAI. In section 1.1, I have already argued the semantic effect of the equestion, which is quite different from that of (B) and (C) type sentences. By using the subject-auxiliary inverted sentences of (B)-(C) types, the speaker imposes the strong emphasis on the preposed elements such as *never*, and *so far*. Moreover, he assigns the most highest probability to the truth-value of the entire proposition. That is, the speaker is asserting the truth of the proposition. This semantic function seems to be the same as that of modal adverbs such as *evidently*, *probably*, *apparently*. (D) type is, however, different from (B) and (C). The pro-forms *so* and *nor* are rather like the coordinators. For example, (20a) and (20b) can be paraphrased into (21a) and (21b), respectively.

(20) a. Mary will enter the competition. So will Joan.

b. Peter doesn't hunt rabbits. Nor does Paul.

(21) a. Mary will enter the competition, and Joan will enter the competition, too.

b. Peter doesn't hunt rabbits, and Paul doesn't hunt rabbits, either.

so is the pro-form of the preceding clause containing the affirmative meaning, and *nor* is of the preceding clause containing the negative meaning. The sentences in (20) are used more often and preferably than those in (21). The reason for it is that the sentences in (21) are semantically and syntactically redundant. So, by using the pro-forms *so* and *nor* requiring SAI, the speakers do not seem to be asserting the truth of the proposition. In this respect, we can distinguish (D) from (B) and (C).

Now, we can suppose that the subject-auxiliary inverted sentences of (B)-(C) types receive the semantic effect similar to that of the modal adverbs. If this supposition is correct, the readings of (22a) and (23a) would roughly be (22b) and (23b) respectively, where M means the semantic function of the modal adverbs.

(22) a. Never did John run so fast.

- b. M (John never ran so fast)
- (23) a. So fast did John run that I could not catch up with him.
b. M (John ran so fast that I could not catch up with him)

Notice that these are not the complete semantic representation.

Before considering the main theme of this paper, I must consider the constraint among the ordering of S adverbs. As Jackendoff (1972) observes, two modal adverbs cannot exist in one sentence:

- (24) a. *Evidently, John probably left.
b. *Apparently, John undoubtedly left.

In these sentences, the modal adverb within a sentence is in the scope of another modal adverb in front of the sentence. So, we can say that M does not include itself within its scope:

- (25) *M (M(...))

In case of the ordering of the modal adverb and the evaluative adverb, the modal adverb must follow the evaluative adverb as can be seen from the following sentences:

- (26) a. *Evidently, Max has happily been climbing the walls.
b. Happily, Max has evidently been climbing the walls.
- (27) a. *Undoubtedly, Max has surprisingly been climbing the walls.
b. Surprisingly, Max has undoubtedly been climbing the walls.

If we assume that the evaluative adverbs receive the semantic meaning E, then the above sentences show that M cannot contain E within its scope, but E can contain M within its scope. So, we can obtain the following types of the readings, in which (a) is semantically anomalous and (b) good:

- (28) a. *M (E(...))
b. E (M(...))

We can now explain these facts semantically. Recall that the modal adverbs assign a probability or a degree of likelihood to the truth value of the proposition. The proposition that has already been assigned such a modal meaning cannot receive the same meaning of the modal adverb, because it makes the sentence semantically contradictory and redundant. For that reason, we get (25). On the contrary, the evaluative adverbs entail the truth of a proposition. So, if a sentence contains an evaluative adverb, it will always be established that the proposition of the sentence is true. When the sentence with the evaluative adverb is in the scope of the modal adverb, the sentence will get anomalous for the same reason as (25). So, we get (28a).

Now, let us return to our main theme. We observed in sections 1.2 and 1.3 that modal adverb cannot take any position in a sentence containing the configuration Aux-NP-VP.

- (29) a. *Never has Bill evidently seen a tiger.
b. *Evidently, never has Bill seen a tiger.
- (30) a. *So high did prices apparently rise that many people could no longer afford the necessities of life.
b. *Apparently, so high did prices rise that many people could no longer

afford the necessities of life.

We assumed that these types of inverted sentences receive the semantic marker M. So, the above sentences are all assigned the reading (25), which is ungrammatical. We also observed that the evaluative adverb can occur in the front position of the subject-auxiliary inverted sentence, but not within it.

- (31) a. Unfortunately, never has Bill seen a tiger.
 b. Surprisingly, so high did prices rise that many people could no longer afford the necessities of life.
- (32) a. *Never has Bill unfortunately seen a tiger.
 b. *So high did prices surprisingly rise that many people could no longer afford the necessities of life.

The reading of the sentences in (31) corresponds to (28b) which is grammatical, while the reading of (32) corresponds to (28a) which is ungrammatical. In this way, we can account for the difference in grammaticality between (31) and (32)⁷.

In section 1.4, we observed that all the S adverbs can occur within or outside the sentences of (D) type. This is because the (D) type sentences does not receive the semantic marker M.

To summarize, I have proposed that the co-occurrence restriction between S adverb and the subject-auxiliary inverted sentence can be adequately explained by the semantic scope rule which restricts the surface ordering of S adverbs, on the assumption that the semantic effect of the subject-auxiliary inverted sentences of a particular type is the same as that of the modal adverbs, that is, the assertion of the truth of the proposition. In this way, we could account for the fact in question without making appeal to the ad hoc semantic marker as in Jackendoff (1972). And we could account for the counter-examples to Bellert (1977). However, I have presented the semantic scope rule only in a crude descriptive form. It must be necessary to further elaborate such a rule.

NOTES

(1) Culicover and Wexler (1973) pointed out that these sentences are not so bad, and they observed the following grammatical sentences, which have the same syntactic structure as (1b) and (2b):

- (i) Not once did John apparently attempt to stop the meeting.
 (ii) So fast could John allegedly run that he would have been here by now if it were true.

I also observed the following:

- (iii) Probably not since the days of the ancient Greeks have so many exposed so much to so many. (TIME, Feb. 11, 1974)
 (iv) Perhaps, by relentless pursuit of the President's weakness will we cover up our own and thus be exorcized. (N. Y. T, Apr. 14, 1974)
 (v) Perhaps inside the reverential walls of a house of worship may it be presumed to expect conduct of deferential behavior to the host religious order. (N. Y. T, Sep. 12, 1977)

My informants, who all reject (1b) and (2b), accept the above sentences. At

the present stage of my knowledge, I cannot understand at all why there exists such a difference in grammaticality. Notice that those sentences are counterexamples to my proposal in section 2.

- (2) There is another kind of inversion transformation, i. e., Be-switch. This can apply to the sentence with S adverb. See the following:
- (i) Beside him, increasingly, is Richard Bach. (TIME, Nov. 13, 1973)
 - (ii) It was a little difficult getting in through the window, but he made it, and surely in the corner of the room was the mouse.
 - (iii) Behind the trees, $\left. \begin{array}{l} \text{reportedly} \\ \text{unfortunately} \\ \text{probably} \end{array} \right\}$, is John's house.

It is not clear to me what explanation must be given to the difference between these sentence and the subject-auxiliary inverted sentences. The relationship between S adverb and the inversion transformation in general will be very interesting to investigate.

- (3) The NEG element in the front position of a sentence has an entire sentence scope only if SAI has applied, and SAI applies only if the NEG element in the front of a sentence has an entire sentence scope. For the possible approach to this generalization, see Liberman (1974).
- (4) Most speakers admit that the evaluative adverb cannot occur in the position immediately after *not*. However, judgement on the sentence containing modal adverb immediately after *not* varies from speaker to speaker. Thus, according to Schreiber (1968) and Hartvigson (1969), the following sentences are grammatical and differ in meaning.

- (i) John obviously is not a scholar.
- (ii) John is not obviously a scholar.

The meaning of (i) corresponds to (iii) while that of (ii) corresponds to (iv):

- (iii) It is obvious that John is not a scholar.
- (iv) It is not obvious that John is a scholar.

But, Greenbaum (1969) reports that many native speakers reject (ii). Keyser (1968) also pointed out that the following is no good.

- (v) *John didn't certainly work.

- (5) There are some examples which Bellert's explanation alone might seem to be working on. See the following:

- (i) a. *No sooner had Mary fortunately said it than she realized her mistake.
b. Fortunately, no sooner had Mary said it than she realized her mistake.
- (ii) a. *No sooner had Mary apparently said it than she realized her mistake.
b. Apparently, no sooner had Mary said it than she realized her mistake.

These sentences can be adequately accounted for in terms of Bellert's scope explanation, but not in terms of the semantic rule in section 2. I do not know any explanation to them. But it seems to me that *no sooner ... than*, which is rather idiomatic, does not convey the semantic function similar to the modal adverb even if SAI has taken place.

- (6) See also note (5).

(7) Our explanation can account for the difference between the following sentences :

(i) Never has Bill stupidly seen a tiger.

(ii) *Stupidly, never has Bill seen a tiger.

This is because the subject oriented adverbs such as *stupidly* cannot occur outside the scope of modal adverb.

(iii) Probably, Bill stupidly saw a UFO.

(iv) *Stupidly, Bill probably saw a UFO.

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