An Optimal So-Inversion Theory

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1. Introduction

The purpose of this paper is to examine *so*—inversion constructions in English, investigate some merits and demerits of a few analyses, and find out an optimal *so*—inversion theory based on some syntactic and semantic characteristics of the *so*—inversion construction. Quirk et al. (1985) regard *so* in this construction as not a VP pro—form but an additive adverb, equivalent in meaning to *too* or *also*. This analysis has some merits in that it may capture some semantic characteristics of this construction. However, it has some demerits in that it may have difficulty in capturing some syntactic characteristics of this construction. Unlike this analysis, Toda (2007) analyzes *so* in this construction as a VP pro—form. This analysis captures some syntactic characteristics of this construction relatively well, but it also has some problems on semantic aspects. In this respect, I wish to try to explore some syntactic and semantic

characteristics of this construction. It will be argued that both Quirk et al.'s (1985) and Toda's (2007) analyses are inappropriate in some respects, because they fail to capture some syntactic or semantic characteristics. Therefore, I will propose a *so*—inversion theory that makes up for these problems.

2. So as an Adverb

Quirk et al. (1985: 882) claim that *so* is not a pro-form, but an additive adverb,¹⁾ equivalent in meaning to *too* or *also* in the following subject-operator inversion sentences, i.e., *so*-inversion constructions.

- (1) a. You asked him to leave, and so did I.
 - [= I asked him to leave, too]
 - b. The corn is ripening, and so are the apples.
 - [= the apples are ripening too]
 - c. You've spilled coffee on the table, and so have I.
 - [= and I've spilled coffee on the table, too]

In order to confirm this, they give the following example sentence and argue that the construction is elliptical, and that the missing predication can be supplied.

(2) You asked him to leave, and so did we (ask him to leave).

¹⁾ Toda (2007: 188) argues that so in this construction is a verb phrase pro-form. However, Quirk et al. (1985: 882) note that so has the value of a conjunct, though they describe it as an additive adverb. In this respect, they argue that it may be compared with so as a resultative conjunct.

He was irritable, unjust, unreliable, and so became increasingly unpopular.

They point out that the nonelliptical variant in (2) is rarely used because it is needless repetition. It seems undeniable that the missing predication, ask him to leave, exists in the speaker's mind. Furthermore, they attribute the existence of the variant in (2) to the fact that the connection between the clause so did we and its antecedent clause is made by ellipsis, rather than by a substitute form.

Quirk et al. support this conclusion by arguing that *so* in this construction is parallel to the negative additive adverbs *neither* and *nor*, which similarly take subject—operator inversion.

(3) The corn isn't ripening, and *neither/nor* are the apples (ripening).

In this respect, they claim that it is possible to apply a rule in which So + op + S is changed into S + op, too (without change of meaning) for all clauses of this pattern. It seems undeniable that the missing predication in (3), ripening, exists in the speaker's mind as does the missing predication in (2), $ask\ him\ to\ leave$. It seems true that the missing parts exist in the speaker's mind, even though it is awkward to repeat them. In this respect, we should take this into account to explain the so-inversion construction.

Quirk et al. note that So + op + S may be used with a negative operator in very informal style, even though it is parallel with the negative constructions Neither/Nor + op + S. In this case, it refers back to a negative clause.

- (4) A: My sister can't drive a car.
 - B: So can't a lot of other people, but that doesn't prevent them from trying.

[= Neither can ...]

It seems evident that the so-inversion construction in (4) and the neither/nor-inversion construction in (3) have a few things in common. First, they all have the inverted word order, i.e., So + op + S or Neither/Nor + op + S. Second, they all have the missing predication. As is presumed, the so-inversion construction in (4) also seems to have the missing predication as shown in the following example.

(5) So can't a lot of other people (drive a car), but that doesn't prevent them from trying.

With respect to the missing predication of the *so*-inversion construction, Toda (2007) disagrees with Quirk et al. (1985). Consider the following sentence (6), rewritten from sentence (2).

(6) You asked him to leave, and so did we (ask him to leave). (= (2))

Quirk et al. regard (6) as an example confirming the claim that "so is not a pro-form at all, but an additive adverb, equivalent in meaning to too or also." In other words, they claim that "the construction is elliptical and that the missing predication can be supplied." On the contrary, Toda (2007: 192) argues that if (6) were to be spoken as written, the supplied elements ask him to leave would usually be stated as an afterthought, with a pause after the stressed we. Toda adds that if ask him to leave is an afterthought, then the construction with initial so in (6) has almost the same pattern as (7), where he stands for Charlie Brown.

(7) He is a good boy, Charlie Brown.

Toda explains that *so* stands for *ask him to leave* in (6) and what appears after a pause is a restatement of what *so* stands for.

I agree with Toda that *he* stands for *Charlie Brown* in (7). However, I don't agree with Toda that *so* stands for *ask him to leave* in (6). It seems that the *so* in (6) doesn't have the same meaning as the added expression *ask him to leave*, since it contains an additional meaning that does not exist in the added expression, such as *also* or *too*. Consider the following example sentences of my own.

- (8) a. You asked him to leave, and so did we.
 - b., and so did we (ask him to leave).
 - c., and we asked him to leave.
 - d. and we also asked him to leave.
 - e., and we asked him to leave, too.

In all the sentences in (8), nobody may deny that (8a) is the best, since it is concise and may carry the same meaning that (8d-e), which contain the adverb *also* or *too*, may have. In this respect, it seems to me that (8c) is not so good as (8a). In other words, it seems clear that sentence (8c) without the adverb *also* or *too* is worse than (8d-e) with it. Since the inverted part in (8a), *so did we*, contains the meaning that the adverb *also* or *too* has in (8d-e), it becomes difficult to say that *so* in (8b) has the same meaning as the missing predication, *ask him to leave*. This makes Toda's argument weak.

Toda (2007: 193) tries to support the argument that *so* stands for the missing predication by the following examples.

- (9) a. Bill must be a genius, and so must Ann, be a genius.
 - b. Bill must be a genius, and so must be Ann, a genius.

Toda argues that so in (9a) stands for the missing part be a genius, and that so in (9b) stands for a genius. At any rate, this argument seems to be difficult to be retained, for the same reason that I have given in connection with (8).

Birner (1996: 45) gives a peculiar *so*—inversion construction in which the verb is not the auxiliary but the main verb *ended*.

(10) So ended one of the more sordid episodes in a long-running housing war that has engulfed NY neighborhoods from the sedate brownstones of the Upper West Side to seedy streets in Brooklyn.

Toda (2007: 189) excludes this kind of so-inversion construction from the discussion. However, it seems that (10) is different from the so—inversion construction that we have been discussing. It seems to me that there exist a few differences between (8a), the normal so-inversion construction under discussion, and (10), a peculiar type of so-inversion construction. In other words, the so in (8a) has both predication and an additional adverb meaning also or too, whereas so in (10) does not have them. The so in (10) seems to be a mere adverb which is used for a previous proposition. Note that the so in (8a) and (10) has a characteristic in common. The characteristic is that the so functions as an adverb, and this makes it a bit hard to analyze the two so-inversion constructions differently. This argument is also supported by Birner's analysis of so-inversion as AdvP-inversion. Contrary to this way of analysis of the so-inversion construction, Toda (2007) tries to analyze this construction from a different point of view. It will be shown, in section 3, how well Toda's analysis works with respect to this construction.

3. So as a VP Pro-form

In the preceding section, we examined Quirk et al.'s analysis of so as an adverb in the so-inversion construction. Contrary to this analysis, Toda (2007: 188) argues that the initial so in the following examples is a verb phrase pro-form.

- (11) a. John can speak French, and so can Mary.
 - b. Frank adores dogs, and so does his wife.

Toda argues that there are arguments against the subject—auxiliary (or operator) inversion (or I—to—C movement) analysis, which Quirk et al. (1972, 1985) and Huddleston and Pullum (2002) employ to describe the construction in (11) on the assumption that initial *so* is an adverb.

Let us examine Toda's arguments against Quirk et al. (1985). Consider the sentences in (12) given by Quirk et al. (1985: 882), cited by Toda (2007: 189).

- (12) a. You asked him to leave, and so did I. [= (1a)]
 - b. The corn is ripening, and so are the apples. [= (1b)]
 - c. You've spilled coffee on the table, and so have I. [= (1c)]
 - d. The corn isn't ripening, and {neither/nor} are the apples. [= (3)]

Quirk et al. claim that the sentences with the initial *so* in (12a-c) are derived via the application of subject-operator inversion (or I-to-C movement) in the same way as the sentence with *neither* or *nor* in (12d) is. However, Toda (2007: 189) gives the following examples against this claim.

- (13) a. If the necessity for the agreement is overlooked, then so will be the necessity of the child's having been trained to react to certain things in a certain way for it to mean anything by 'It is red.'
 - b. In the museum field, the equity is different, and so must be their approach.
 - c. The results of education are long term and far reaching and so must be our commitment.
 - d. "The Queen's servants are quite accustomed to the Queen and her headaches." And, she does not add, so must be His Majesty.
 - e. She is virginal, and so must be her priestesses.
 - f. But the main elements have been retained and so, more importantly, has been the standard.

As is pointed out by Toda, I-to-C movement cannot account for the position of *be* in the right conjuncts. If I-to-C movement alone had applied, the resulting sentences would have had *be* after the subject, not before.²⁾ It seems to me that this fact may not be denied. In this respect, an optimal *so*-inversion theory cannot help reflecting this fact to get some generalization.

Toda (2007: 190) gives the following sentences to show that the construction under discussion cannot be derived only via I-to-C movement.

²⁾ Toda (2007: 190) points out that all of the examples in (13) are grammatical with an alternative word order, as in (i).

The results of education are long term and far reaching and so must our commitment be.

Toda admits that (i) involves I-to-C movement, but argues that I-to-C movement is not the means by which a subject like *our commitment* in (13c) follows the verb.

- (14) a. Bill must be a genius and so must be Ann.
 - b. *Bill mustn't be a gossip and neither must be Ann.
 - c. Bill mustn't be a gossip and neither must Ann be.

Toda explains that (14a) is acceptable to many speakers while (14b) is unacceptable. Note that (14c) is acceptable. From this, Toda concludes that (12d) involves I-to-C movement. These observations lead Toda to the conclusion that the construction under discussion may be derived via other movements plus I-to-C movement.

Now, let us examine how Toda accounts for this inversion construction. Toda proposes an analysis in which VP-preposing (or topicalization), I-to-C movement, subject postposing, and obligatory proverbalization are responsible for the derivation of the *so*-inversion construction. Toda gives the following VP-preposing example, taken from Quirk et al. (1985).

(15) They have promised to finish the work, and finish it they will.

In sentence (15), the VP *finish it* is moved to the sentence-initial position, and the auxiliary *will* is left behind. Toda gives the relevant derivation of (15), as shown in (16).

(16) VP-preposing

. . . [CP[VP finish it] $_i$ [IP they [I will t_i]]]

Toda explains that VP-preposing first triggers I-to-C movement. It also triggers the process of subject postposing by which the subject moves across the entire VP from Spec, IP and adjoins to IP, as in (17biii).³⁾

³⁾ This hypothesis is contrary to Kayne's (1994) proposal that there is no rightward movement. At any rate, Toda does not deal with the adequacy of this proposal.

Subject postposing is followed by obligatory proverbalization, which changes the fronted VP into the pro-form *so*, as shown in (17biv).

- (17) a. [IP Mary [I' can [VP speak French]]]
 - b. i. VP-preposing $[_{CP}[_{VP} \text{ speak French}]_i [_{IP} \text{ Mary } [_{I'} \text{ can } t_i]]]$
 - ii. I-to-C movement
 [cp[vp speak French]; [c'[c can]; [IP Mary [I' t; [vp ti]]]]]
 - iii. Subject postposing
 [CP[VP speak French]i [CC[C can]j [IP[IP tk [I tj [VP ti]]]]
 Marvk]]]
 - iv. Obligatory proverbalization so can Mary

Toda argues that the preposed (or topicalized) VP moves into Spec,C, following a current generalization that prevents a phrase from moving into a head position. The empty category in VP after the I *can* is the trace of VP-preposing, and not the trace of VP-ellipsis. Toda makes it clear that VP-ellipsis is not relevant to the construction under discussion. Toda supports this argument by the following examples.

- (18) a. *Bill must be a genius, and Ann must, too.
 - b. Bill must be a genius, and so must Ann.
- In (18), VP-ellipsis with epistemic *must* cannot delete *be* as part of the VP, while the *so*-inversion construction does not necessarily need *be*.

Now, let us examine how Toda (2007: 191) derives the following examples in (19).

- (19) a. Bill must be a genius and so must Ann.
 - b. Bill must be a genius and so must be Ann.
 - c. Bill must be a genius, and so must Ann be.

Toda derives the second conjuncts in (19a-c) through the following processes as in (20a-c), respectively.

(20) a. i. VP-preposing

[CP[VP] be a genius $]_i$ [IP] Ann [IP] must [IP]

ii. *I−to−C movement*

 $[CP[VP \text{ be a genius}]_i [CC[C \text{ must}]_j [IP \text{ Ann } [I \text{ } t_j \text{ } [VP \text{ } t_i]]]]]$

iii. Subject postposing

 $[CP[VP \text{ be a genius}]_i [C'[C \text{ must}]_j [PP[P \text{ } t_k [I' \text{ } t_i]]] Ann_k]]]$

iv. Obligatory proverbalization

so must Ann

b. i. VP-preposing

 $[_{CP}[_{VP} \text{ a genius}]_i \ [_{IP} \ Ann \ [_{I'} \ must \ [_{VP} \ be \ t_i]]]]$

ii. *I-to-C movement*

 $[CP[VP \text{ a genius}]_i [CC[C \text{ must}]_j [IP \text{ Ann } [IT]_i t_j [VP \text{ be } t_i]]]]]$

iii. Subject postposing

iv. Obligatory proverbalization

so must be Ann

c. i. VP-preposing

 $[CP[VP \text{ a genius}]_i [IP \text{ Ann } [I' \text{ must } [VP \text{ be } t_i]]]]$

ii. *I-to-C movement*

 $[_{CP}[_{VP} \text{ a genius}]_i \ [_{C'}[_{C} \text{ must}]_j \ [_{IP} \text{ Ann } [_{I'} \ t_j \ [_{VP} \text{ be } t_i]]]]]$

iii. Subject postposing

No application
iv. *Obligatory proverbalization*so must Ann be

Toda supports the analysis by the following example sentences.

- (21) a. I left and so did Bill.
 - b. Did Bill leave?
 - c. Bill did not leave.
 - d. Bill DID leave.
 - e. *Bill did leave.

Toda explains that the grammaticality of (21a) forms the basis for the assumption that *so* occupies Spec,C. The dummy *do* surfaces only in C position, as in (21b), or I position when negation is present or when it is focused, as shown in (21c-e). Since *did* in (21a) is not focused, and negation is not present, it must be in C. But if it is in C, then the only position *so* could be in is Spec,CP.

So far, we have seen that Toda's analysis of the *so*—inversion construction has some merits. First of all, it clearly shows the processes in which this construction is derived. These processes have not been accounted for in detail by Quirk et al. (1985). Second, it has a merit, since it tries to account for the relative position of the elements of this construction. Above all, it has a merit in that some similar constructions to the *so*—inversion construction may be accounted for by similar processes of analysis. It is true that this analysis has not a few merits, but it also has a few problems. First of all, it has started with the false assumption that *so* is not an adverb, but a verb phrase pro—form. As a result, this assumption leads to a different semantic interpretation of this construction.

This different interpretation has consequently produced a different structure of this construction.

4. The Structure of So-Inversion Constructions

In the preceding section, we saw a verb phrase pro-form approach to the so- inversion construction and its consequences. In this section, we will investigate the possibility of exploring a new analysis that reflects all the facts related to this particular construction. To explore this possibility, we will discuss some problems of the two analyses, based on so as an adverb and so as a verb phrase pro-form, in section 4.1. and the structure of so-inversion constructions in section 4.2.

4.1. Problems of the Analyses of So as an Adverb and a VP Pro-form

The analysis of *so* as an adverb accounts for the *so*—inversion construction very well on semantic aspects. In other words, it does not reveal any problems semantically in accounting for this construction, since it analyzes this construction as having the adverb *also* or *too*. However, it does not give any clear description of the structure of the construction. As a result, it is not easy to say what elements occupy what positions in this construction. Moreover, this analysis does not give a detailed account of the processes in which the construction is derived. Consider the following examples, repeated as (22).

- (22) a. You asked him to leave, and so did I. (= (1a)
 - b. The corn is ripening, and so are the apples. (= (1b))

c. You've spilled coffee on the table, and so have I. (= (1c))

In (22a-c), it is not easy exactly what position *so* occupies in the second conjunct of each sentence. Besides, it is not clear how this analysis will account for some similar constructions to the *so*-inversion construction, as shown in (23).

- (23) a. Bill must be a genius and so must be Ann. (= (19b))
 - b. Bill must be a genius, and so must Ann be. (= (19c))

In (23a), the element *be*, which is not an operator, precedes the subject *Ann*. On the contrary, in (23b), it follows the subject *Ann*. In all these constructions, it is undeniable that the operator *must* precedes the subject *Ann*. However, it is clear that they are similar to *so*—inversion constructions, but a little different. It is not known how well Quirk et al.'s (1985) analysis, based on *so* as an adverb, can deal with these facts.

Next, let us examine some problems of the analysis in which *so* is regarded as a verb phrase pro-form rather than as an adverb. Consider the following examples, repeated as (24).

(24) a. You asked him to leave, and so did we. (= (8a))
b., and so did we (ask him to leave). (= (8b))
c., and we asked him to leave. (= (8c))
d. ..., and we also asked him to leave. (= (8d))
e. ..., and we asked him to leave, too. (= (8e))

If we say that so is merely a verb phrase pro-form, it is equivalent to saying that the so-inversion construction (24a) has a similar meaning to (24c) without the adverb also or too, rather than to (24d-e) with the

adverb. However, it seems clear that (24a) has a similar meaning to (24d-e), rather than to (24c). In this respect, we should take this fact into consideration when we try to account for the *so*-inversion construction satisfactorily.

4.2. The Structure of So-inversion Constructions

Since both analyses have some problems either syntactically or semantically, it is essential to find out an analysis that will work them out. First of all, in order to work them out, an optimal *so*—inversion theory should be based on *so* as an adverb, not as a verb phrase pro—form. Then we may tentatively think of the *so*—inversion rule as (25).

(25) The So-Inversion Rule Invert the subject and operator after the adverb so.

The rule (25) does not have any problems in dealing with the normal so—inversion constructions as shown in (22). However, it has difficulty in accounting for some similar constructions as shown in (13) and (23). They have the structure 'So + operator + be + subject' or 'So + operator + so + subject + so + so in these examples, so exists before or after the subject, and this makes it impossible for us to apply the rule (25) to the second conjunct of each sentence. For this reason, we have to revise the rule (25) as (26).

(26) The Revised So-Inversion Rule

- a. Invert the subject and operator after the adverb so.
- b. If there is an epistemic operator, either the subject is inverted with 'the epistemic operator + be' or the subject comes

between the epistemic perator and be.

The revised so-inversion rule (26) may account for both canonical so-inversion constructions in (22) and uncanonical ones in (13) and (23). Consider the following examples of my own, all of which contain the aspectual operator *will*. The rule (26b) excludes the unacceptable sentence (27b)⁴, since it does not have the epistemic operator *must*.

- (27) a. Tom will be a doctor and so will be Ann. b. *Tom will be a doctor and so will Ann be.
- Next, let us examine how we can derive the *so*-inversion construction when we regard *so* as an adverb. Consider the following examples, repeated as (28).
 - (28) a. [IP Mary [II can [VP speak French too]]] (= (11a))
 - b. i. VP-preposing $[_{CP}[_{VP} \text{ speak French too}]_i \ [_{IP} \text{ Mary } [_{I'} \text{ can } t_i]]]$
 - ii. I-to-C movement $[_{CP}[_{VP} \text{ speak French}]_i [_{C'}[_{C} \text{ can}]_j [_{IP} \text{ Mary } [_{I'} t_j [_{VP} t_i]]]]]$
 - iii. Obligatory adverbialization
 [CP[VP SO]; [C'[C can]; [IP Mary [I' tj [VP ti]]]]]

The analysis (28) tells us that the verb phrase speak French too, which

⁴⁾ My informant tells me that (27a) is acceptable, while (27b) is not. She also admits the grammaticality of the examples in (23), which have the epistemic operator *must*.

contains the adverb too, moves to Spec.CP. Then the I can moves to C. The next step is obligatory adverbialization in which the verb phrase containing the adverb too is obligatorily changed to the adverb so. The obligatory adverbialization causes the subject postposing as a natural sequence for the derivation of inversion constructions. The analysis shown in (28) is supported by other inversion constructions in English. Consider the following examples in (29).

- (29) a. Never will she buy a car. [Emonds 1976: 40]
 - b. Only a few students did he meet in the East. [Emonds 1976: 401
 - c. A: I can't swim. B: Neither can I. [Swan 1995: 358]

In (29a), the negative adverb never is preposed, and this in turn triggers the subject – operator inversion. Likewise, in (29b), the negative noun phrase only a few students is preposed, which triggers the subject-operator inversion. Swan (1995: 358) regards neither in (29c) as an adverb meaning 'also not.' This analysis also supports my analysis of so as an adverb meaning 'also' or 'too.'

5. Conclusion

So far, we have examined two analyses of so-inversion constructions. One analysis focuses on so as an adverb and accounts for this construction very well on semantic aspects. It does not reveal any problems semantically in accounting for this construction, since it regards this construction as having the adverb also or too. However, it does not give any clear description of the structure of the construction. As a result, it is

not easy to say what elements occupy what positions in this construction. Moreover, this analysis does not give a detailed account of the processes in which the construction is derived. The other analysis focuses on *so* as a verb phrase pro-form, and it has a merit in that it can give a detailed account of the structure of this construction. However, it also reveals some problems, since it has started with a false assumption that *so* is a pro-form, rather than an adverb. Since these two analyses have some serious problems, I have proposed a new analysis that will solve these problems. The revised *so*-inversion rule that I have proposed will be helpful in getting rid of these problems. Besides, my analysis of the structure of *so*-inversion constructions is supported by other constructions in English. Therefore, further studies should be based on *so* as an adverb, rather than as a verb phrase pro-form.

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Abstract

An Optimal So-Inversion Theory

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The so in so—inversion constructions in English is analyzed differently by Quirk et al. (1985) and Toda (2007). Quirk et al. (1985) regard it as not a VP pro—form but an additive adverb, equivalent in meaning to too or also. This analysis may capture some semantic characteristics of this construction. However, it has difficulty in capturing some syntactic characteristics of this construction. Unlike this analysis, Toda (2007) analyzes so in this construction as a VP pro—form. This analysis may capture some syntactic characteristics of this construction relatively well, but it also has some problems on semantic aspects. In this respect, I try to explore some syntactic and semantic characteristics of this construction. I argue that both Quirk et al.'s (1985) and Toda's (2007) analyses are inappropriate in some respects, because they fail to capture some syntactic or semantic characteristics. Therefore, I propose an optimal so—inversion theory that makes up for these problems.

Key words: so—inversion construction, obligatory adverbialization, verb phrase pro—form, subject—operator inversion, subject postposing,

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