

Word-order and argument-marking: Japanese vs Chinese vs Naxi

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Abstract

It is argued that varying word-order is related not to the marking on the arguments indicating their grammatical relations but to the syntax of object. The flexible word-order in Japanese and the lack thereof in Chinese may be attributed to the presence or absence of argument-marking, but evidence from Naxi shows that although argument-marking may help identify the semantic roles of the arguments from the processing point of view, it is syntax that decides the word-order. To the extent that the relative positioning of the object and adverbs cannot be reduced to argument-marking, the mechanism allowing movement of the object past the verb from a universal order derives both the verb-final property and the varying word-order. Insofar as there is no independent motivation for a morphological constraint on movement, certain cases of interpretive ambiguity as a result of lack of argument-marking are best explained by processing difficulty.

Keywords

Movement, processing, syntax of object, Universal Order Hypothesis.

1 Introduction

A common view about word-order is that if the arguments of a predicate are overtly marked, e.g., for Case, leading to the identification of their grammatical relations (subject, object and obliques), then the arguments may be ordered in more than one way. The semantic roles of the arguments can be recognized by their grammatical relations in conjunction with the voice of the predicate (active, passive). Conversely, if such marking is lacking, then linear order is the crucial means to identify the grammatical relations of the arguments and their interpretations with respect to their semantic roles.

The processing point of view above works well for the comparison of a language like Japanese (or Korean) with one like Chinese (or English). The picture becomes a bit more complicated when Naxi comes into the picture. Naxi is a verb-final language like Japanese and Korean. It too marks the arguments to the effect that their grammatical relations may be identified. But the marking is optional; yet, the varying word-order is largely the same.

In this paper I argue that for certain word-orders syntax must be appealed to since they do not fall under the processing account. If the underlying phrase structure is universally the same (Kayne 1994), then the superficial variation with respect to the positions of the object and the verb must be due to movement. This account both derives the verb-final property, which evidently has no bearing on processing, and the varying position of the object. Processing nevertheless has a role to play, insofar as the parser needs to select more than one derivation for the same surface form.

2 Word-order and argument-marking

In Japanese, the arguments in a great many cases (see also note 7) are followed by the nominative marker *ga* for subject, and the accusative marker *o* for object. The subject may appear before or after the object; in either order, the sentence has the same meaning:¹

- (1) a. Taro-ga hon-o yonda (koto). (Japanese)
 -NOM book-ACC read fact
 ‘Taro read books.’
 b. hon-o Taro-ga yonda (koto).
 ‘Taro read books.’

The word-order possibilities increase as a function of the number of arguments of the verb (as well as the presence of an adverb, see (6) and (7) below). A sentence with a three-place predicate taking three arguments would thus have six different word-orders:

- (2) a. Taro-ga Hanako-ni hon-o ageta (koto).
 -NOM -DAT book-ACC give fact
 ‘Taro gave Hanako a book.’
 b. Taro-ga hon-o Hanako-ni ageta (koto).
 c. Hon-o Taro-ga Hanako-ni ageta (koto).
 d. Hon-o Hanako-ni Taro-ga ageta (koto).
 e. Hanako-ni Taro-ga hon-o ageta (koto).
 f. Hanako-ni hon-o Taro-ga ageta (koto).

With the marking on the arguments indicating their grammatical relations, there is no difficulty in identifying the semantic roles of the arguments.

The two word-orders in (1) have the same meaning, different from each other only in focus or emphasis. The unmarked word-order, i.e., no argument is focused or emphasized, is one in which the *ga*-marked subject comes first in the sentence. The order in which the *o*-marked object comes first has a reading in which the object is focused or emphasized.

¹ Japanese root clauses generally require a topic, a phrase followed by the topic marker *wa*. To control for this complication, the morpheme *koto* ‘fact’ is added to turn the preceding clause into an embedded one, as is standard in the formal analysis of Japanese syntax. Abbreviations: ACC=accusative, ADV=adverb, C=complementizer, DAT=dative, DECL=declarative, DES=desiderative, EXP=experiential, NOM=nominative, POT=potential, Q=question, REL=relativizer, VN=verbal noun.

The same is true of the six word-orders in (2). The word-orders in (2a,b) are unmarked, while those in (2c-f) are ones in which the argument that comes first is emphasized.

In this light, the rigid word-order in Chinese is understandable, there being no marking on the arguments for their grammatical relations. Different word-orders result in different, possibly pragmatically odd (indicated by #), interpretations or ungrammaticality:

- (3) a. Zhangsan xihuan Lisi. (Chinese)
 like
 ‘Zhangsan likes Lisi.’
 b. Lisi xihuan Zhangsan.
 ‘Lisi likes Zhangsan.’ NOT ‘Zhangsan likes Lisi.’
- (4) a. Zhangsan kan shu.
 read book
 ‘Zhangsan reads books.’
 b. #shu kan Zhangsan.
 ‘Books read Zhangsan.’ .

Absent the marking on the argument indicating their grammatical relations, the only means to identify the grammatical relations and semantic roles of the arguments in Chinese is linear order. The argument to the left of the verb is the subject, and the argument to the right of it is the object. The interpretation of the example in (4b) is odd, since the subject of the verb *kan* ‘read’ cannot be inanimate.

Similarly, a sentence with a three-place predicate such as that in (5a) may not have the alternative word-orders in (5b-e) or many other logically possible ones:²

- (5) a. Zhangsan gaosu Lisi yige gushi.
 tell a story
 ‘Zhangsan told Lisi a story.’
 b. Lisi gaosu Zhangsan yige gushi.
 ‘Lisi told Zhangsan a story.’ NOT ‘Zhangsan told Lisi a story.’
 c. *Zhangsan gaosu yige gushi Lisi.
 d. *Zhangsan yige gushi gaosu Lisi.

² A few ditransitive verbs have flexible word-order. For instance, with the verb *song* ‘give’ the direct object and indirect object appear occur in either order after the verb, although neither of them can appear preverbally:

- (i) a. Zhangsan song yiben shu gei Lisi.
 give one book to
 ‘Zhangsan gave Lisi a book.’
 b. Zhangsan song gei Lisi yiben shu.
 c. *Zhangsan gei Lisi song yiben shu.
 d. *Zhangsan yiben shu song gei Lisi.

Example (ic) is marginally possible with a different interpretation in which Lisi is not the Goal but the Benefactive, i.e., Zhangsan donated a book on behalf of Lisi.

- e. *Zhangsan Lisi gaosu yige gushi.

The varying word-order in Japanese applies to the object and an adverb as well. The object may appear to the right or left of an adverb:

- (6) a. Taro-ga tokidoki hon-o yonda (koto). (Japanese)
 -NOM sometimes book-ACC read fact
 ‘Taro sometimes read books.’
 b. Taro-ga hon-o tokidoki yonda (koto).
 ‘Taro sometimes read books.’
- (7) a. Taro-ga shinchoo-ni kotoba-o eranda (koto).
 -NOM care-DAT word-ACC choose fact
 ‘Taro carefully chose his words.’
 b. Taro-ga kotoba-o shinchoo-ni eranda.

It is conceivable that the object in (1b) originates in a position inside the VP, and moves in a position to the left of the subject, possibly via the intermediate position in (6b) or (7b), as in (8) (the derivation in (8) will be later revised):

- (8) hon-o_i Taro t_i (tokidoki) t_i yonda (koto).

Given the word-order facts in (3)-(4), it comes as no surprise that the object in Chinese cannot occur in any position between the subject and the verb:³

- (9) a. Zhangsan jingchang kan shu. (Chinese)
 often read book
 ‘Zhangsan often read books.’
 b. *Zhangsan jingchang shu kan.
 c. *Zhangsan shu jingchang kan.
- (10) a. Zhangsan hen zixi de jiexi nage nan ti.
 very detail DE explain that difficult problem
 ‘Zhangsan explained that difficult problem in detail.’
 b. *Zhangsan hen zixi de nage nanti jiexi.
 c. *Zhangsan nage nanti hen zixi de jiexi.

³ The object may occur between the subject and the verb if it is preceded by a morpheme that does not appear in postverbal position, e.g., *ba*:

- (i) ta ba zheben shu kan wan le.
 he this book read finish PAST
 ‘He finished reading the books.’

I return to the case where the object unaccompanied by the morpheme *ba* occurs before the subject in section 5.

The ungrammaticality of the examples in (9b,c) and (10b,c) surely has nothing to do with the failure to identify the grammatical relation and semantic role of the object. Given its appearance after the subject, it is in principle possible to identify its grammatical relation and semantic role. The exclusion of the examples in (9b,c) and (10b,c) is clearly due to the syntax of Chinese restricting the object to postverbal position (see also note 3).

Even though the flexible word-order in Japanese and the rigid word-order in Chinese can be attributed to their independent difference with respect to argument-marking, this account is incomplete. It cannot explain why the object may appear either to the left or right of an adverb in Japanese in (6) and (7), but not in Chinese in (9) and (10). There is no possible processing difficulty distinguishing the object from the adverb. Clearly it is syntax that determines the position of the object.

That varying word-order need not be related to the marking on the arguments indicating their grammatical relations is clear from Naxi, a minority language spoken in Yunnan, China. Much like Japanese, the verb comes at the end of the sentence. The arguments in Naxi, like those in Japanese, may be marked. The subject may be followed by the marker *nee* and the object the marker *dol* (or *gol*) (cf. He 1987:90). As in Japanese, the ordering of the marked arguments is relatively free:

- (11) a. Aka nee Ahua dol meil. (Naxi)
 NOM ACC teach
 ‘Aka taught Ahua.’
 b. Ahua dol Aka nee meil.
 ‘Aka taught Ahua.’
- (12) a. A’ liaif nee Ahua dol me baba.
 NOM ACC not help
 ‘Alian did not help Ahua.’
 b. Ahua dol A’ liaif nee me baba.
 ‘Alian did not help Ahua.’

As well, the object marked with *dol* may appear either to the right or left of an adverb:

- (13) a. Aka nee ddee ni ggug ddee ni Ahua dol meil.
 NOM one day and one day ACC teach
 ‘Aka taught Ahua everyday.’
 b. Aka nee Ahua dol ddee ni ggug ddee ni meil.
 ‘Aka taught Ahua everyday.’
- (14) a. A’ liaif nee balyil bbei Ahua dol me baba.
 NOM intention ADV ACC not help
 ‘Alian intentionally did not help Ahua.’
 b. A’ liaif nee Ahua dol balyil bbei me baba.
 ‘Alian intentionally did not help Ahua.’

With marking on the arguments, their grammatical relations and semantic roles can be recognized without regard to the positions in which they appear.

In contrast with Japanese, however, the marking on the arguments in Naxi is optional.

The sentences in (11) and (12) are also grammatical if one of the arguments is not marked. Regardless of word-order, the meanings of the sentences are the same:

- (15) a. Aka nee Ahua meil.
 NOM teach
 ‘Aka taught Ahua.’
 b. Ahua Aka nee meil.
 ‘Aka taught Ahua.’
- (16) a. A’ liaif nee Ahua baba.
 NOM help
 ‘Alian helped Ahua.’
 b. Ahua A’ liaif nee baba.
 ‘Alian helped Ahua.’
- (17) a. Aka Ahua dol meil.
 ACC teach
 ‘Aka taught Ahua.’
 b. Ahua dol Aka meil.
 ‘Aka taught Ahua.’
- (18) a. A’ liaif Ahuadol me baba.
 ACC not help
 ‘Alian did not help Ahua.’
 b. Ahua dol A’ liaif me baba.
 ‘Alian did not help Ahua.’

For the sentences in (13) and (14), the marking on either argument or both may be absent:

- (19) a. Aka nee ddee ni ggug ddee ni Ahua meil.
 NOM one day and one day teach
 ‘Aka taught Ahua everyday.’
 b. Aka nee Ahua ddee ni ggug ddee ni meil.
 ‘Aka taught Ahua everyday.’
- (20) a. Aka ddee ni ggug ddee ni Ahua dol meil.
 one day and one day ACC teach
 ‘Aka taught Ahua everyday.’
 b. Aka Ahua dol ddee ni ggug ddee ni meil.
 ‘Aka taught Ahua everyday.’
- (21) a. Aka ddee ni ggug ddee ni Ahua meil.
 one day and one day teach
 ‘Aka taught Ahua everyday.’
 b. Aka Ahua ddee ni ggug ddee ni meil.
 ‘Aka taught Ahua everyday.’

Suppose the underlying basic clause structure is universally as in (27) (Kayne 1994):

- (27) Universal Order Hypothesis (UOH)
Spec-Head-Complement

If the object is base-generated in the complement position, then the order in which the object, a complement, appears before the verb must be due to it moving past the verb (the precise position where the object moves to need not concern us here):

- (28) Object_{*i*} ... [_{VP} V *t_i*]

The verb-final property is thus a direct consequence of the object moving past the verb.

The fact that the object does not appear in a postverbal position in Japanese thus follows straightforwardly:⁴

- (29) a. *Taro-ga yonda hon-o. (Japanese)
 -NOM read book-ACC
 ‘Taro read a book.’
 b. *Taro-ga Hanako-ni ageta hon-o.
 -NOM -DAT gave book-ACC
 ‘Taro gave Hanako a book.’

Whatever allows the object to move past the verb, the same will sanction leftward movement of the object to any other clause-internal position. In other words, if the object can make the first move, then it can make the subsequent move. Therefore, the word-orders in (1), (2), (6) and (7) are all related to the same leftward movement of the object.

The Japanese examples in (6) and (7) would be more accurately represented as in (30) and (31) respectively:

- (30) a. Taro ga tokidoki hon-o_{*i*} [_{VP} yonda *t_i*] (=6)
 b. Taro ga hon-o_{*i*} tokidoki *t_i* [_{VP} yonda *t_i*]
(31) a. Taro ga shinchoo ni kotoba-o_{*i*} [_{VP} eranda *t_i*] (=7)
 b. Taro ga hon-o_{*i*} shinchoo ni *t_i* [_{VP} eranda *t_i*]

The order in which the *o*-marked object appears before the *ga*-marked subject in (1b) and (2c,d) would be more accurately represented as in (32):

- (32) a. hon-o_{*i*} Taro ga *t_i* (tokidoki) *t_i* [_{VP} yonda *t_i*]
 b. hon-o_{*i*} Taro ga *t_i* (shinchoo ni) *t_i* [_{VP} eranda *t_i*]

The object originates in the position after the verb, by the UOH. If movement is subject to

⁴ For reason of space, I cannot discuss various issues with the indirect object, e.g., *Hanako-ni* in (29). I simply assume here that it is base-generated in a projection above the VP (see Pytkänen 2008). This assumption is consistent with the occurrence of the indirect object before the verb.

the Minimal Link Condition (Chomsky 1995), i.e., movement must be to the closest available position, then the object in (32) conceivably moves through two intermediate positions before it lands in a position before the subject. The examples in (30) and (31) can be taken to be independent evidence for two intermediate positions after the subject.

For verb-medial languages like Chinese, the mechanism that derives the verb-final property is not at work. The object hence does not move past the verb. Whatever principle preventing the object from moving leftward in (9b) and (10b) would also prevent it from moving further in (9c) and (10c).⁵

(33) *Object_i ... t_i ... [_{VP} V t_i]

Naxi is a verb-final language, much like Japanese. The sentences in (11)-(12) can thus be derived in the same way as those in Japanese in (34):

- (34) a. Ahua dol_i Aka nee t_i (ddee ni ggug ddee ni) t_i [_{VP} meil t_i] (= (11b))
 ‘Aka taught Ahua (everyday).’
 b. Ahua dol_i A’ liaif nee t_i (balyil bbei me) t_i [_{VP} baba t_i] (= (12b))
 ‘Alian (intentionally) did not help Ahua.’

Evidence for the two positions between the subject and the verb in (34) comes from examples in (13) and (14). These can be more accurately represented as in (35) and (36):

- (35) a. Aka ddee ni ggug ddee ni Ahua dol_i [_{VP} meil t_i] (= (13))
 b. Aka Ahua dol_i ddee ni ggug ddee ni t_i [_{VP} meil t_i]
 (36) a. A’ liaif ddee balyil bbei Ahua dol_i [_{VP} baba t_i] (= (14))
 b. A’ liaif Ahua dol_i balyil bbei t_i [_{VP} baba t_i]

The leftward movement of the object explains its non-occurrence after the verb:

- (37) a. *Aka nee meil Ahua dol.
 NOM teach ACC
 ‘Aka taught Ahua.’
 b. *A’ liaif nee me baba Ahua dol.
 NOM not help ACC
 ‘Alian did not help Ahua.’

The examples in (15)-(18) too can be similarly derived, despite the marking being absent on one of the arguments:

- (38) a. Aka nee Ahua_i meil t_i (= (15))
 ‘Aka taught Ahua.’

⁵ What is meant here is that the object does not move past the verb in surface structure. It is conceivable that the object moves past the verb at some stage in the derivation and the verb subsequently moves past the object, yielding the verb-object order (see Huang, Li and Li 2009).

- b. Ahua_i Aka nee t_i meil t_i
- (39) a. A' liaif nee Ahua_i me baba t_i (=16)
 'Alian did not help Ahua.'
 b. Ahua_i A' liaif nee t_i me baba t_i
- (40) a. Aka Ahua dol_i meil t_i (=17)
 b. Ahua dol_i Aka t_i meil t_i
- (41) a. A' liaif Ahua dol_i me baba t_i (=18)
 b. Ahua dol_i A' liaif t_i me baba t_i

It is therefore clear that varying word-order has more to do with the syntax of object rather than with argument-marking.

4 Processing strategy

From the perspective of the analysis of word-order discussed in the last section, there is apparently no reason why the object cannot move across the subject deriving (42b) and (43b) respectively from (42a) and (43a) preserving the same meaning, the same way the object moves across the subject in (40b) and (41b), a problem noted in section 2:

- (42) a. Aka Ahua_i meil t_i (=25)
 teach
 'Aka taught Ahua.'
 b. Ahua_i Aka t_i meil t_i
 'Ahua taught Aka.' NOT 'Aka taught Ahua.'
- (43) a. A' liaif Ahua_i me baba t_i
 not help
 'Alian did not help Ahua.'
 b. Ahua_i A' liaif t_i me baba t_i
 'Ahua did not help Alian.' NOT 'Alian did not help Ahua.'

Indeed, given that the subject need not be marked for its grammatical relation (see (40a) and (41a)) and the object moving over the subject need not be marked for its grammatical relation (see (38b) and (39b)), it is difficult to see why the derivations in (42b) and (43b) should be syntactically impossible.

The obvious difference between the sentences in (42) and (43) and those in (38) and (39) is that none of the arguments in the former is marked for their grammatical relations, while one of the arguments in the latter is marked.

We can impose a constraint on movement of the object to the effect that the object may move over the subject only if either one of them is marked. This would derive the correct result, but at the expense of making the movement operation less general. There seems to be no principled reason why a syntactic operation like movement should be constrained by the morphological marking on the argument, especially when movement of the object over

an adverb is not subject to such a constraint:

- (44) a. Aka ddee ni gguq ddee ni Ahua_i meil t_i
 one day and one day teach
 ‘Aka taught Ahua everyday.’
 b. Aka Ahua_i ddee ni gguq ddee ni t_i meil t_i
 ‘Aka taught Ahua everyday.’
- (45) a. A’ liaif balyil bbei Ahua_i me baba t_i
 intention ADV ACC not help
 ‘Alian intentionally did not help Ahua.’
 b. A’ liaif Ahua_i balyil bbei t_i me baba t_i
 ‘Alian intentionally did not help Ahua.’

The adverbs in (44b) and (45b) are not marked for their being adverbs, inasmuch as the subject in (42b) and (43b) is not marked for it being a subject. Yet, the object may move across the adverb. We can certainly make the distinction between arguments and adverbs and bring it to bear on the movement operation. Nevertheless, to the extent no other syntactic operation is conditioned by argument-marking, it is hard to think of a syntactic reason for why the movement operation should be subject to the morphological marking on the arguments. As we will see below, imposing such a constraint would lead to certain empirical problems.

If we are to maintain the full generality of the movement operation, then the derivations in (42b) and (43b) are syntactically possible. I would like to suggest that it is processing that explains why these examples are not taken by speakers to have the same meaning as that of the underlying sentences in (42a) and (43a) respectively. The surface forms of (42b) and (43b) co-incide with the sentences that can be independently generated in which the object is not moved over the subject:

- (46) a. Ahua Aka_i meil t_i
 teach
 ‘Ahua taught Aka.’
 b. Ahua A’ liaif_i me baba t_i
 not help
 ‘Ahua did not help Alian.’

Without the marking on the arguments indicating their grammatical relations, the parser has no reason to take the first argument to be the object moving across the subject. Moreover, as the surface forms in (42b) and (43b) can readily be derived as in (46a) and (46b) respectively, the parser would select this derivation instead of the derivation in (42b) and (43b) where the object moves over the subject.

This processing account has both conceptual and empirical advantages. Conceptually, the generality of the movement operation can be fully maintained. Empirically, it explains why the examples in (47a,b) and (48a,b) where the argument in the relative clause is marked are unambiguous, while those in (47c) and (48b) where it is not marked are ambiguous:

- (47) a. Aka nee meil gge xi.

- NOM teach C person
‘The person who Aka taught.’
- b. Aka dol meil gge xi.
ACC teach C person
‘The person who taught Aka.’
- c. Aka meil gge xi.
teach C person
‘The person who Aka taught.’ OR ‘The person who taught Aka.’
- (48) a. A’ liaif nee me baba gge xi.
NOM not help C person
‘The person who Alian did not help.’
- b. Ahua dol me baba gge xi.
ACC not help C person
‘The person who did not help Ahua.’
- c. A’ liaif me baba ggexi.
not help C person
‘The person who Alian did not help.’ OR ‘The person who did help Alian.’

In the movement analysis of relative clauses (Chomsky 1977) the head noun is related to the relativized argument by a (possibly empty) operator (Chomsky 1986, Browning 1987). In English, it is plausible that in a relative clause like that in (49a) there is an empty operator (O) performing the same function as the relative pronoun *who* or *which* in (49b). It moves to SpecCP much like *who* and *which*:

- (49) a. The person [_{CP} O_i [_{IP} John taught *t_i*]]
b. The person [_{CP} who_i [_{IP} John taught *t_i*]]

Along these lines, the Naxi examples in (47a,b) and (48a,b) would be derived as in (50a,b) and (51a,b) respectively:

- (50) a. [_{CP} O_i [_{IP} Aka nee *t_i* meil *t_i*] gge] xi (=47a)
b. [_{CP} O_j [_{IP} *t_j* Aka dol_i meil *t_i*] gge] xi (=47b)
- (51) a. [_{CP} O_i [_{IP} A’ liaif nee *t_i* me baba *t_i*] gge] xi (=48a)
b. [_{CP} O_j [_{IP} *t_j* Ahua dol_i me baba *t_i*] gge] xi (=48b)

The empty operator in (50a) and (51a) originates as the object of the verb, and that in (50b) and (51b) as the subject of the verb.⁶ In (47c) and (48c) the argument in the relative clause is not marked for its grammatical relation; hence, the operator can either be the object or the subject of the verb. The structures in (52) and (53) reflect this ambiguity in (47c) and

⁶

Like Chinese, Naxi has no overt relative pronouns. It is therefore not possible to determine empirically where the empty operator in (50)-(53) moves to. The analysis in the text remains the same, if it turns out that SpecCP is to the right, contra the UOH.

(48c):

- (52) a. $[_{CP} O_i [_{IP} Aka\ t_i\ meil\ t_i]\ gge]]\ xi.$ (=47c)
 ‘The person who Aka taught.’
 b. $[_{CP} O_j [_{IP} t_j\ Aka_i\ meil\ t_i]\ gge]]\ xi.$
 ‘The person who taught Aka.’
- (53) a. $[_{CP} O_i [_{IP} A'\ liaif\ t_i\ me\ baba\ t_i]\ gge]]\ xi.$ (=48c)
 ‘The person who A' liaif did not help.’
 b. $[_{CP} O_j [_{IP} t_j\ A'\ liaif_i\ me\ baba\ t_i]\ gge]]\ xi.$
 ‘The person who did not help Alian.’

In (52) and (53) neither the argument in the relative clause nor the empty operator are marked. If movement of the object across the subject is possible only if either argument is marked, then the derivation in (52a) and (53a) would be impossible, for neither the operator nor the other argument in the relative clause are marked for their grammatical relations. Consequently, the ambiguity of the surface forms in (47c) and (48c) cannot be represented, the derivations in (52a) and (53a) being excluded by the constraint restricting movement over the subject only if either argument is marked for grammatical relation.

A question that arises is to what extent the processing account for the interpretations of the examples in (42b) and (43b) bears on the ambiguous interpretations of the example in (47c) and (48c). More specifically, we might wonder whether the way the parser selects one derivation over the other for the same surface forms in (42b) and (43b) would apply to (47c) and (48c) as well. After all, the two derivations in (52) as well as those in (53) have the same surface forms.

An obvious difference between the surface forms in (42b) and (43b) and those in (47c) and (48c) is that the former are declarative clauses and the latter are relative clauses. On the one hand, in declarative clauses, the first argument unmarked for its grammatical relation can be taken to be the subject (see (40a) and (41a)), unless the following argument is marked to be the grammatical subject (see (38b) and (39b)). If both arguments are unmarked for grammatical relations, then the derivation in which the first argument is the subject requires less time to complete than the derivation in which it is taken to be the object. In the first case, there is no movement of the object over the subject (see the discussion around (46)), while in the second case, there is (see (42b) and (43b)).

On the other hand, in relative clauses, there is always an empty operator in SpecCP c-commanding the rest of the clause. Regardless of it being the subject or object, the empty operator must move to SpecCP. The task of the parser is to locate the gap of the operator. In principle, it can be the subject, the object or even in an embedded clause arbitrarily far away from the head noun it is related to, schematically as in (54c) for the two examples in (54a,b):

- (54) a. Ahua shel mei Aka nee meil gge xi.
 say C NOM teach REL person
 ‘The person Ahua said Aka taught’
- b. A' liaif vq Ahua shel mei Aka nee meil gge xi.
 think say C NOM teach REL person
 ‘The person Alian thinks Ahua said Aka taught.’

- c. $[_{CP} O_i [_{IP} \dots [_{CP} t_i [_{IP} \dots t_i \dots]]] gge] xi.$

If the parser has no problem locating the gap arbitrarily far away from the head noun in (54), then it should have no problem in locating the object gap in (52) and (53).

To the extent an additional syntactic constraint imposing an argument-marking condition on movement incorrectly rules out one of the readings of the example in (47c) and (48c), it clearly cannot be an adequate account for the unambiguous interpretations of the examples in (42b) and (43b). Processing is a more plausible explanation, however, for the interpretation is obtainable from the same surface form whose derivation is independently possible and requires less time to complete.

This processing analysis for Naxi carries straightforwardly to certain cases in Japanese where the subject and object of a predicate are marked identically, with a little twist because of an independent property of the Japanese grammar.

In Japanese the two arguments of a verbal noun are marked with the marker *ga* (see (55a)), and the argument of a verb in the potential or desiderative form can be (alternatively) marked with *ga* instead of *-o* (see (55b,c)) (see Johnson 2008:50, especially Kuno 1973 and Kuno and Johnson 2005 for theoretical discussions):⁷

- (55) a. Taro-ga Hanako-ga suki de aru (koto).
 -NOM -NOM like be fact
 ‘Taro likes Hanako.’
 b. Taro-ga Hanako-ga tasukerareru (koto)
 -NOM -NOM help.POT fact
 ‘Taro can help Hanako.’
 c. Taro-ga Hanako-ga tasuketai (koto)
 -NOM -NOM help.DES fact
 ‘Taro wants to help Hanako.’

Much like the situation in Naxi in (25) and (26), the speakers I consulted found the example in (55a) to be unambiguous. They take the first argument to be the subject and the second argument to be the object. For the examples in (55b,c), there is a complication. Most speakers find these examples not very natural, for the same notions can be expressed with the object marked with the object-marker *-o*. However, the object may be marked with *ga* unproblematically if the subject is marked with the topic marker *wa*. In contexts where the object is focused, then (55b,c) are marginally possible. To the extent that this marginal case is acceptable, speakers invariably take the first argument to be the subject, and the second the object. This is consistent with the grammaticality of the example in (55a).

Much like those in Naxi in (47c) and (48c), relative clauses with the verbal noun predicate *suki* ‘like’ are ambiguous (see (56a)), while those in the potential or desiderative forms are not (see (56b) and (56c)). In the latter two cases, if the argument in the relative clause is marked with *ga*, it is understood as the subject:

- (56) a. Taro-ga suki na hito.

⁷ I thank an abstract reviewer and a member of the audience in my oral presentation of this paper for drawing my attention to examples comparable to (55a).

- NOM like ADJ person
 ‘The person who Taro likes’ OR ‘the person who likes Taro’
- b. Taro-ga tasukerareru hito.
 -NOM help.POT person
 ‘The person who Taro can help.’
- c. Taro-ga tasuketai hito.
 -NOM help.DES person
 ‘The person who Taro wants to help.’

The reason for this difference between (56a) on the one hand, and (56b,c) on the other is that marker *-o* for object can be used for predicates in the potential or desiderative form, but not for verbal noun predicates. In other words, since the object of the predicates in the latter two cases can be clearly marked with the object marker *-o*, the reading of the relative clause in which the subject is relativized can be clearly indicated with the *o*-marked object:

- (57) a. Taro-o tasukerareru hito.
 -ACC help.POT person
 ‘The person who can help Taro.’
- b. Taro-o tasuketai hito.
 -ACC help.DES person
 ‘The person who wants to help Taro.’

The interpretive difference between (56a) on the one hand, and (56b,c) on the other by no means undermines the processing account for the ambiguity of (56a). In fact, it re-enforces it. This is precisely because the object of the predicates in the potential or desiderative form may be unambiguously marked with the object marker *-o* that the parser has no reason to suppose that the argument marker with the marker *ga* in (56b,c), which is used in most cases elsewhere for subject, is the object.

Apart from the independent difference with respect to the marking of the object in verbal noun predicates and predicates in the potential or desiderative form, the syntactic structure for the relative clauses in Japanese and Naxi are the same. The ambiguity of example (56a) stems from it having two different structures (see (58). The trace after the predicate is due to the UOH in (27)), and the non-ambiguity of examples (56b,c) is due to their unique structures in (59):

- (58) a. [_{CP} *O_i* [[_{IP} Taro-ga *t_i* suki *t_i*] na]] hito. (=56a)
 ‘The person who Taro likes.’
- b. [_{CP} *O_j* [[_{IP} *t_j* Taro-ga_{*i*} suki na *t_i*]]] hito.
 ‘The person who likes Taro.’
- (59) a. [_{CP} *O_i* [[_{IP} Taro-ga *t_i* tasukerareru *t_i*]]] hito. (=56b)
 ‘The person who Taro can help.’
- b. [_{CP} *O_i* [[_{IP} Taro-ga *t_i* tasuketai *t_i*]]] hito. (=56c)
 ‘The person who wants to help Taro.’

The structures in (58) are identical to those in (52) and (53) in Naxi. Likewise, the structures in (59) are just the same as those in (50a) and (51a).

The non-ambiguity of the examples in (57) is straightforward. As the argument in the relative clause is marked with the object marker *-o*, the head noun *hito* ‘person’ is understood to be related to the subject, as the structures in (60) show:

- (60) a. $[_{CP} O_i [_{IP} t_i \text{Taro-}o_j \text{tasukerareru } t_j]]] \text{ hito.}$ (=57)
 ‘The person who Taro can help’
 b. $[_{CP} O_i [_{IP} t_i \text{Taro-}o_j \text{tasuketai } t_j]]] \text{ hito.}$
 ‘The person who wants to help Taro’

The structures in (60) are identical to the ones in (50b) and (51b) for Naxi.

In Japanese as well, there is no problem for the parser to relate the head noun to an argument in an arbitrarily deeply embedded clause (cf. (54) for Naxi):

- (61) a. *ichiro-ga taro-ga suki da to omotte iru hito.*
 -NOM -NOM like be C think person
 ‘The person Ichiro thinks Taro likes.’ OR ‘the person Ichiro thinks likes Taro’
 b. *?*jiro-ga ichiro-ga taro-ga suki da to omotte iru to itta hito.*
 -NOM -NOM -NOM like be C think C said person
 ‘The person Jiro said Ichiro thinks Taro likes.’ OR
 ‘The person Jiro said Ichiro thinks likes Taro’
 c. *Taro-ga suki da to ichiro-ga omotte iru to jiro-ga itta hito.*
 -NOM like be C -NOM think C -NOM said person
 ‘The person Jiro said Ichiro thinks Taro likes.’ OR
 ‘The person Jiro said Ichiro thinks likes Taro’

The example in (61a) has the structure in (62a), while those in (61b,c) have the structures in (62b,c) respectively:⁸

- (62) a. $[_{CP} O_i [_{IP} S [_{CP} t_i [_{IP} S t_i V]] V]]] \text{ hito.}$
 b. $[_{CP} O_i [_{IP} S [_{CP} t_i [_{IP} S [_{CP} t_i [_{IP} S t_i V]] V]] V]]] \text{ hito.}$
 c. $[_{CP} O_i [_{CP} t_i [_{CP} t_i [_{IP} S t_i V]] [_{IP} S V]] [_{IP} S V]]] \text{ hito.}$

A notable processing difficulty with SOV languages is that the clausal complement occurs between the subject and the verb. Thus, within the embedded clause the order is again SOV. This results in center-embedding (see (62a)). As is well-known (Kimball 1973), processing center-embedding structures is difficult. The difficulty increases as a function of the depth of embedding. Speakers manage to process one level of center-embedding as in (62a), but they find two levels of center-embedding as in (62b) extremely difficult.

If the word-order is rearranged resulting in a non-center-embedding configuration, then the parser has no problem with it. In (62c), the clausal complement consistently is to the left of the subject and the verb taking it as complement, resulting in a non-center-embedding configuration. Speakers find it unproblematic.

⁸ According to the UOH, the clausal complement originates in a postverbal position. For simplicity’s sake, the movement of the clausal complement to a preverbal position is left out.

In any event, in Japanese as well, the parser has no difficulty finding the gap in the original position of the empty operator in relative clauses, just as in Naxi.

5 Topic structure

The claim that the object having the same form as that occurring in the postverbal position cannot appear before the verb may seem problematic in light of the example in (63b):

- (63) a. Zhangsan kan wan zheben shu le. (Chinese)
 read finish this book PAST
 ‘Zhangsan finished reading books.’
 b. Zheben shu, Zhangsan kan wan le.

There are reasons to suppose that the example in (63b) is not derived by fronting the object, but by base-generating the object in its surface position as some sort of topic.

First, if the object in (63b) is moved from a postverbal position, then there would be no reason why Chinese should differ from Japanese and Naxi in not allowing the object to move to a position between the subject and the verb (see (9b,c)) (see also note 3).

Second, the clause-initial phrase in (63b) can be related to an argument that lies in a relative clause, a syntactic island for extraction (Ross 1967) (the empty operator related to the head noun is left out for simplicity):

- (64) a. Zheben shu_i, Zhangsan renshi [[_{CP} hen duo kan guo *pro*_i] de ren]
 this book know very many read EXP C person
 ‘This book, Zhangsan knows many people who read.’ (Chinese)
 b. ?*ano hon-o_i John-ga [[_{CP} *t*_i katta] hito] ni aitagatte iru rasii.
 that book-ACC -NOM bought person to meet seem
 ‘It seems that John wants to see the person who bought that book.’
 (Japanese)
 c. *chee tee’ ee dol_i Aka nee jjaif bbee_q [[_{CP} *t*_i xaq gge] xi] see.
 this book ACC NOM very many buy C person know
 ‘This book, Aka knows many people who bought.’ (Naxi)

The Chinese example in (64a) is grammatical, since the clause-initial phrase is not moved out of the relative clause but is related to an empty pronoun *pro* in argument position. By contrast, the Japanese example in (64b) (Saito 1985:307) and the Naxi example in (64c) are ruled out as ungrammatical, as the accusative object moves out of the relative clause, a syntactic island.

Third, the clause-initial phrase in (64b) cannot be a *wh*-phrase, while there is no such restriction in Japanese or Naxi:

- (65) a. *shenme Zhangsan kan wan le? (Chinese)
 what read finish PAST
 ‘What did Zhangsan finish reading?’

- b. nani-o Taro-ga yonde shimatta no? (Japanese)
 what-ACC -NOM read finish Q
 ‘What did Taro finish reading?’
- c. eqzee Aka nee lvq seiq? (Naxi)
 what NOM read finish
 ‘What did Aka finish reading?’

If a non-subject clause-initial phrase in Chinese is a base-generated topic, then the example in (65a) would be straightforwardly excluded. Topics must carry old information and *wh*-phrases carry no new information. By contrast, the fronted object in Japanese and Naxi is not a base-generated topic; therefore, it may be a *wh*-phrase.

In sum, despite appearance, the example in (63b) is not evidence that the object in Chinese may move past the verb.

6 Conclusion

In this paper, I show that varying word-order has little to do with argument-marking. It is the syntax of object that accounts for the varying position of the object. On the one hand, if the object can move past the verb, deriving the verb-final property, then it may move further leftwards to a structurally higher position above the subject. On the other hand, if the first move past the verb fails, then it is impossible for it to move to a structurally higher position.

The obligatory argument-marking in Japanese and the lack thereof in Chinese gives the impression that varying word-order correlates with argument-marking. The optional argument-marking in Naxi shows that this impression does not exactly correspond to all the facts. Word-order may vary even when argument-marking is not obligatory. One case where the absence of argument-marking seems to restrict word-order possibilities is in fact related to the processing strategy whereby the parser discards a derivation with movement in favor of one without.

The account for varying word-order in terms of the syntax of object is most sensible only if the basic clause structure is as in (27). Thus, to the extent that it cannot be derived in any other principled way, the UOH has some empirical basis. Moreover, insofar as the ambiguity of the example in (47c) and (48c) and the lack thereof in the example in (42b) and (42b) can be explained in structural terms, the existence of the empty operator in relative clause is empirically justified.

Acknowledgment

I am grateful to Masayuki Hirata and Yurie Hara for sharing their native judgment of Japanese with me, and to He Lijuan, He Wanchuan, He Zhili, Yang Yunfang and Zhao Qinglian for being patient language consultants for Naxi. I thank three anonymous reviewers for insightful comments, constructive criticisms and helpful suggestions. The work reported in this paper is supported by a GRF grant (CityU 146010) from the Research Grants Council of the Hong Kong Special Administrative Region government, for which I am very grateful. I assume responsibility for any inadequacy that remains.

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