

# 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 view, it is syntax that decides the word-order. Insofar as 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.

**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 relative positioning 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.

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## 2 Word-order and argument-marking

In Japanese, the arguments in a great many cases (see also note 5) 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:<sup>1</sup>

- (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.'

With the marking on the arguments indicating their grammatical relations, there is no difficulty in identifying the semantic roles of the arguments. This is why the two orders in (1) have the same meaning.

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 interpretations (indicated by #):

- (2) a. Zhangsan xihuan Lisi. (Chinese)  
like  
'Zhangsan likes Lisi.'  
b. Lisi xihuan Zhangsan.  
'Lisi likes Zhangsan.'
- (3) a. Zhangsan kan shu.  
read book  
'Zhangsan read 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 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 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:

- (4) 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.'

It is conceivable that the object in (1a) and (4a) is in a position inside the VP, and ends up in a position to the left of the subject in (1b) by movement, possibly via the intermediate position in (4b), as in (5) (the derivation in (5) will be later revised):

- (5) hon-o<sub>i</sub> Taro *t<sub>i</sub>* (tokidoki) *t<sub>i</sub>* yonda.

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<sup>1</sup> 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, C=complementizer, EXP=experiential, NOM=nominative, Q=question, REL=relativizer.

Given the word-order facts in (2)-(3), it comes as no surprise that the object in Chinese cannot occur in any position between the subject and the verb:<sup>2</sup>

- (6) a. Zhangsan jingchang kan shu. (Chinese)  
           often read book  
           ‘Zhangsan often read books.’  
       b. \*Zhangsan jingchang shu kan.  
       c. \*Zhangsan shu jingchang kan.

The ungrammaticality of the examples in (6b,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 the grammatical relation and semantic role of the object. The exclusion of the examples in (6b,c) is clearly due to the syntax of Chinese restricting the object to postverbal position (see note 2, however).

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 (4), but not in Chinese in (6). 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):

- (7) a. Aka nee Ahua dol meil. (Naxi)  
           NOM ACC teach  
           ‘Aka taught Ahua.’  
       b. Ahua dol Aka nee meil.  
           ‘Aka taught Ahua.’
- (8) 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.’

The grammatical relations of the arguments can accordingly be identified and their semantic roles can be recognized.

In contrast with that in Japanese, however, the marking on the arguments in Naxi is optional. The sentences in (7) are also grammatical if one of the arguments is not marked. Regardless of word-order, the meanings of the sentences are the same:

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<sup>2</sup> 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 4.

- (9) a. Aka nee Ahua meil. (Naxi)  
           NOM teach  
       ‘Aka taught Ahua.’  
    b. Ahua Aka nee meil.
- (10) a. Aka Ahua dol meil.  
           ACC teach  
       ‘Aka taught Ahua.’  
    b. Ahua dol Aka meil.

For the sentences in (8), the marking on either argument or both may be absent:

- (11) a. Aka nee ddee ni ggug ddee ni Ahua meil. (Naxi)  
           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.’
- (12) 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.’
- (13) 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.’

The marking on the arguments evidently has little bearing on the word-orders in (9)-(13).

When neither argument is marked, however, word-order seems to be crucial in determining the grammatical relations of the arguments. Thus, in contrast with the pairs of the sentences in (9)-(12) where one of the arguments is marked or the pair in (13) where an adverb occurs between the arguments, it is quite difficult to interpret the pair of sentences in (14) to have the same meaning:

- (14) a. Aka Ahua meil. (Naxi)  
           teach  
       ‘Aka taught Ahua.’  
    b. Ahua Aka meil.  
       ‘Ahua taught Aka.’ NOT ‘Aka taught Ahua.’

Speakers take the first argument to be the subject and the second the object.

We may fall back on the observation earlier that without the marking on the arguments, the grammatical relations are determined by word-order. But this move is ill-advised from the perspective of the syntax of object. I return to this point section 4.

### 3 The universal base hypothesis and the syntax of object

Suppose the underlying basic clause structure is universally as in (15) (Kayne 1994):

(15) Universal Order Hypothesis  
Spec-Head-Complement

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):

(16)  $O_i \dots [_{VP} V t_i]$

The verb-final property is thus a direct consequence of the object moving past the verb. This would also explain why the object does not appear in a postverbal position in Japanese:

(17) \*Taro-ga yonda hon-o. (Japanese)  
-NOM read book-ACC  
'Taro read a book.'

Whatever sanctions the movement of the object 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. On this view, then, the word-orders in (1) and (4) are all related to the same leftward movement of the object.

The Japanese examples in (4) and (1b) would be more accurately represented as in (18):

(18) a. Taro ga tokidoki hon- $o_i$  [ $_{VP}$  yonda  $t_i$ ] (Japanese)  
b. Taro ga hon- $o_i$  tokidoki  $t_i$  [ $_{VP}$  yonda  $t_i$ ]  
c. hon- $o_i$  Taro ga  $t_i$  (tokidoki)  $t_i$  [ $_{VP}$  yonda  $t_i$ ]

The object originates in the position after the verb, by the Universal Order Hypothesis. If movement is subject to the Minimal Link Condition (Chomsky 1995), i.e., movement must be to the closest available position, then the object in (18c) conceivably moves through two intermediate positions before it lands in a position before the subject. Examples (18a,b) may be taken to be independent evidence for two intermediate positions.

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 prevents the object from moving leftward in (6b) would also prevent it from moving further in (6c):<sup>3</sup>

(19) \* $O_i \dots t_i \dots [_{VP} V t_i]$

Naxi is a verb-final language, much like Japanese. The sentences in (7)-(8) can thus be derived in the same way as those in Japanese in (18):

(20) a. Aka nee Ahua dol $_i$  [ $_{VP}$  meil  $t_i$ ] (=7)  
NOM ACC teach  
'Aka taught Ahua.'  
b. Ahua dol $_i$  Aka nee  $t_i$  [ $_{VP}$  meil  $t_i$ ]  
'Aka taught Ahua.'

(21) a. Aka ddee ni ggug ddee ni Ahua dol $_i$  [ $_{VP}$  meil  $t_i$ ] (=8)  
one day and one day ACC teach  
'Aka taught Ahua everyday.'

<sup>3</sup> 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. Aka Ahua dol<sub>i</sub> ddee ni ggug ddee ni  $t_i$  [<sub>VP</sub> meil  $t_i$ ]  
 ‘Aka taught Ahua everyday.’

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

- (22) \*Aka nee meil Ahua dol. (Naxi)  
           NOM teach ACC  
 ‘Aka taught Ahua.’

The examples in (9)-(10) too can be similarly derived, despite the marking is absent on one of the arguments:

- (23) a. Aka nee Ahua<sub>i</sub> meil  $t_i$  (Naxi)  
           NOM teach  
 ‘Aka taught Ahua.’  
 b. Ahua<sub>i</sub> Aka nee  $t_i$  meil  $t_i$   
 ‘Aka taught Ahua.’

- (24) a. Aka Ahua dol<sub>i</sub> meil  $t_i$   
           ACC teach  
 ‘Aka taught Ahua.’  
 b. Ahua dol<sub>i</sub> Aka  $t_i$  meil  $t_i$   
 ‘Aka taught Ahua.’

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 (25b) from (25a) preserving the same meaning the same way the object moves across the subject in (23b) and (24b), a problem noted in section 2:

- (25) a. Aka Ahua<sub>i</sub> meil  $t_i$  (=14)  
           teach  
 ‘Aka taught Ahua.’  
 b. Ahua<sub>i</sub> Aka  $t_i$  meil  $t_i$   
 ‘Ahua taught Aka.’ NOT ‘Aka taught Ahua.’

Indeed, given that the subject need not be marked for its grammatical relation (see (24a)) and the object moving over the subject need not be marked for its grammatical relation (see (23b)), it is difficult to see why the derivation in (25b) should be syntactically impossible.

The obvious difference between the sentences in (25) and those in (23) and (24) is that none of the arguments in (25) is marked for their grammatical relations, while one of the arguments in (23) and (24) 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 argument-marking, especially when movement of the object over an adverb is not subject to such a constraint:

- (26) a. Aka ddee ni gguq ddee ni Ahua<sub>i</sub> meil *t<sub>i</sub>* (Naxi)  
           one day and one day teach  
           ‘Aka taught Ahua everyday.’  
       b. Aka Ahua<sub>i</sub> ddee ni gguq ddee ni *t<sub>i</sub>* meil *t<sub>i</sub>*  
           ‘Aka taught Ahua everyday.’

The adverb in (26b) is not marked for it being an adverb, inasmuch as the subject in (25b) 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 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 derivation in (25b) is syntactically possible. I would like to suggest that it is processing that explains why the example is not taken by speakers to have the same meaning as that of the underlying sentence in (25a). The surface form of (25b) co-incides with that of a sentence that can be independently generated in which the object is not moved over the subject:

- (27) Ahua Aka<sub>i</sub> meil *t<sub>i</sub>* (Naxi)  
                           teach  
           ‘Ahua taught Aka.’

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 form in (25b) can readily be derived as in (27), the parser would select this derivation instead of the derivation in (25b) 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 can explain why the examples in (28a,b) where the argument in the relative clause is marked are unambiguous, whereas the example in (28c) where it is not marked is ambiguous:

- (28) a. Aka nee meil gge xi. (Naxi)  
           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.’

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 relative clauses there is an empty operator performing the same function as the relative pronoun *who* or *which*. It moves to SpecCP much like *who* and *which*:

- (29) a. The person [<sub>CP</sub> who<sub>i</sub> [<sub>IP</sub> John taught *t<sub>i</sub>* ]]  
       b. The person [<sub>CP</sub> *O<sub>i</sub>* [<sub>IP</sub> John taught *t<sub>i</sub>* ]]

Along these lines, the Naxi examples in (28a,b) would be derived as in (30a,b) respectively:

- (30) a. [CP  $O_i$  [IP Aka nee  $t_i$  meil  $t_i$ ] gge ] xi. (=28a)  
 b. [CP  $O_j$  [IP  $t_j$  Aka dol<sub>i</sub> meil  $t_i$ ] gge ] xi. (=28b)

The empty operator in (30a) originates as the object of the verb, and that in (30b) as the subject of the verb.<sup>4</sup> In (30c) 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 representations in (31) reflect this ambiguity:

- (31) a. [CP  $O_i$  [IP Aka  $t_i$  meil  $t_i$ ] gge ] xi.  
 'The person who Aka taught.'  
 b. [CP  $O_j$  [IP  $t_j$  Aka<sub>i</sub> meil  $t_i$ ] gge ] xi.  
 'The person who taught Aka.'

In (31) 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 (31a) 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 form in (28c) cannot be represented, the derivation in (31a) being excluded by the constraint restricting movement over the subject only if either argument is marked for its grammatical relation.

A question that arises is to what extent the processing account for the interpretation of the example in (25b) bears on the ambiguous interpretation of the example in (28c). More specifically, we might wonder whether the way the parser selects one derivation over the other for the same surface form in (25b) would apply to (28c) as well. After all, the two derivations in (31) have the same surface form.

An obvious difference between the surface form in (25b) and that in (28c) is that the former is a declarative clause and the latter is a relative clause. On the one hand, in declarative clauses, the first argument unmarked for its grammatical relation can be taken to be the subject (see (24a)), unless the following argument is marked to be the grammatical subject (see (23b)). If both arguments are unmarked for their 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, since it does not involve movement of the object over the subject.

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 or object; it can even be in an embedded clause arbitrarily far away from the head noun it is related to:

- (32) a. Ahua shel mei Aka nee meil gge xi. (Naxi)  
           say C          NOM teach REL person  
           'The person Ahua said Aka taught'  
 b. Alia vq Ahua shel mei Aka nee meil gge xi.  
           think say C          NOM teach REL person  
           'The person Alia thinks Ahua said Aka taught.'

If the parser has no problem locating the gap arbitrarily far away from the head noun in (32), then it should have no problem in locating the object gap in (31).

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 (28c), it clearly cannot be

<sup>4</sup> Like Chinese, Naxi has no overt relative pronouns. It is therefore not possible to determine empirically where the empty operator in (30) moves to. The analysis in the text remains the same, if it turns out that SpecCP is to the right, contra the Universal Order Hypothesis.



an adequate account for the unambiguous interpretation of the example in (25b). 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.<sup>5</sup>

## 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 to be problematic in light of the examples in (33):

- (33) 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 (33b) 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 (33b) is moved from a postverbal position, then there would 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 (6b,c)) (see also note 2).

Second, the clause-initial phrase in (33b) 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):

- (34) a. Zheben shu<sub>i</sub>, Zhangsan renshi [[<sub>CP</sub> hen duo kan guo *pro*<sub>i</sub>] de ren ]  
           this book know very many read EXP C person  
           ‘This book, Zhangsan knows many people who read.’ (Chinese)  
       b. ?\*ano hon-o<sub>i</sub> John-ga [[<sub>CP</sub> *t*<sub>i</sub> 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<sub>i</sub> Aka nee [[<sub>CP</sub> jjaif bbeeq *t*<sub>i</sub> 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 (34a) 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 (34b) (Saito 1985:307) and the Naxi example in (34c) are ruled out as ungrammatical, as the accusative object moves out of the relative clause, a syntactic island.

Third, the clause-initial phrase in (33b) cannot be a *wh*-phrase, while there is no such restriction in Japanese or Naxi:

- (35) 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?’

<sup>5</sup> This processing analysis for Naxi carries straightforwardly to cases in Japanese where the subject and object are marked identically, e.g., *Taro-ga Hanako-ga suki da* ‘Taro likes Hanako’. Much like in (27), the first NP is understood to be the subject and the second the object. The relative clause *Taro-ga suki na hito* too is ambiguous, meaning either ‘the person who Taro likes’ or ‘the person who likes Taro’. Space limitation prevents me from discussing the morphosyntax of these cases. I thank a reviewer for drawing my attention to this point.

- 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 (35a) 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 (33b) 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 (15). Thus, to the extent that varying word-order cannot be derived in any other principled way, the Universal Order Hypothesis has some empirical basis. Moreover, insofar as the ambiguity of the example in (28c) and the lack thereof in the example in (25b) can be explained in structural terms, the existence of the empty operator in relative clause is empirically justified.

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