Scrambling

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Abstract

This article is an overview of the literature on scrambling in various languages. It discusses the typology of languages that exhibit this property, as well as different theories and findings that correspond to this phenomenon. Some critical responses to previous literature have been offered where appropriate.

1. Introduction

It has been observed in the literature that some languages maintain fairly free word order. The following examples represent this phenomenon in Japanese and Persian.

Japanese

(1) a. Mary-ga John-ni sono hon-o watasita   S IO O V
     M -Nom J to that book-Acc handed
     'Mary handed that book to John.'
  b. sono hon-o John-ni Mary-ga watasita   O IO S V
  c. John-ni sono hon-o Mary-ga watasita   IO O S V
                    (Saito and Fukui 1998: 443)

Persian

(2) a. man ketâb–â-ro be Sepide dâd – am   S O IO V
     I book -pl – Acc to S gave- 1sg
     'I gave the books to Sepide.'
  b. ketâb-â -ro be Sepide man dâd – am   O IO S V
  c. be Sepide ketâb-â -ro man dâd – am   IO O S V
                   (Karimi 1999b: 160)

The subject (S), direct object (O) and indirect object (IO) appear in different positions with respect to each other in (1) and (2). Persian, but not Japanese, allows the verb to appear in different positions as well. Languages that exhibit this type of freedom in rearranging their phrasal units have been referred to as 'free word order' languages in the literature.

    The term 'scrambling' was coined in the 1960s by John Robert Ross, who put together the first formulation of this phenomenon, and stated

that it was to be distinguished from the phenomenon called 'free word order'. The distinction resided in the idea that scrambling involved movement. Furthermore, he considered scrambling to be of optional stylistic nature (Ross 1967), a view shared later by Chomsky and Lasnik (1977). Other authors, such as Kerstens (1975) and Hoekstra (1984), maintained the optionality view regarding this phenomenon.

Ross further suggested that scrambling was a clause bound phenomenon, as evidenced by the ungrammaticality of the following German example.

(3) *. . . weil Hans *das Buch* versprochen hat [dass er − kaufen wurde]
    because   Hans the book promised   has that he   buy would

However, clause boundedness is not a universal property of scrambling, as recent investigations of languages such as Hindi, Japanese, Korean, and Persian indicate (Saito 1985, 1989, 1992; Mahajan 1990, 1994; Kim 1992; Karimi 2003, 2005, among others). Furthermore, long distance scrambling (LDS) is in fact allowed in the so called 'Third Construction' in German and Dutch (den Besten and Rutten 1989).

(4) . . . weil Hans *das Buch*   versprochen hat   [PRO − zu kaufen]
    because   Hans the book   promised   has   to buy
    'Because Hans has promised to buy the book.'

The contrast between (3) and (4) suggests that scrambling out of a tensed clause is not possible in German, an issue that was first noticed by Bierwisch (1963).

Analyzing the free word order in Japanese, Hale (1980) considered scrambling a purely syntactic operation, contrary to Chomsky and Lasnik. He divided languages into two groups, configurational versus non-configurational, and suggested that scrambling was only allowed in languages that belong to the second group. This approach has been considered fruitful with respect to a number of languages, including Walpiri (Hale 1983), Navajo (Hale et al. 2003), and Hungarian (Kiss 1994, 2003).

Additional work on Japanese in the 1980s (Saito 1985, 1989, among others) refuted the non-configurational property of Japanese, and made it possible to clearly demonstrate the nature of scrambling as a movement operation with identifiable properties and effects. These authors still maintained, however, that scrambling was an optional operation that was undone at the Logical Form (LF), and thus was a semantically vacuous operation.

Literature on scrambling in the 1990s and in the last few years of the third millennium reveals interesting syntactic, semantic and discourse related properties that were not previously addressed. In the context of the most recent theoretical ideas, scrambling raises at least three important questions: (i) what motivates this movement? (ii) is it really an optional

operation as it has been considered in the literature? and (iii) is it semantically vacuous as previously reported? Recent in-depth analyses of scrambling show that this phenomenon is not a uniform operation and that it corresponds to different semantic and discourse functions cross-linguistically.

This article is an effort to address the most important issues regarding the literature on scrambling, and to provide a clear picture of its current status. The article is organized as follows. In Section 2, typological factors that were proposed in the literature to be responsible for the existence of scrambling are discussed. Distinct approaches to scrambling and its nature are reviewed in Section 3. Problems that have been raised regarding each view are also addressed in these two sections. Section 4 concludes this article.

2. Scrambling and Language Typology

The peculiarities of scrambling have led authors to raise questions about the nature of languages that allow this phenomenon: why is scrambling possible in languages such as Persian, German, Hindi, Japanese, and Korean, but not in English and French? Is this phenomenon related to specific properties of these languages? In this section, I take a look at the important factors proposed in the literature to be responsible for the differences between scrambling and non-scrambling languages.

The morphological consideration with respect to scrambling is discussed in Section 2.1. Non-configurationality and the concept of adjunction sites are examined in Sections 2.2 and 2.3, respectively, followed by a brief overview of the head–parameter in Section 2.4. A specific type of scrambling, called Japanese style scrambling, which is suggested to appear only in languages that lack D(eterminers), is discussed in Section 2.5.

2.1 RICH MORPHOLOGY

The first languages that were considered to exhibit scrambling were those with a rich morphological case system, such as Latin, German, and Japanese. Thus, a natural correlation was assumed to hold between the presence of rich morphology and scrambling.

Comparing German and Dutch, Neeleman (1994) suggests that the fact that the former exhibits more freedom in word order rearrangements than the latter is due to its richer morphological case system. That is, thematic roles of subjects, objects, and indirect objects are morphologically marked in German, and thus these elements can appear in any order. In contrast, thematic roles must be represented by the fairly fixed word order of arguments in Dutch (but see Section 2.5) due to lack of morphological case in this language, while adjuncts appear freely in different positions. Compare the following data taken from Dutch in (5) and German in (6).

(5) a. Dat Jan de mannen deze film toont
       that Jan the men   the picture shows
   b. *Dat deze film Jan de mannen toont.
   c. *Dat de mannen Jan deze film toont.
   d. *Dat Jan deze film de mannen toont.

(6) a. Dass die Frau   den Männern   den Film   zeigt
       that the woman-NOM the men-DAT   the picture-ACC   shows
   b. Dass den film die Frau den Männern zeigt.
   c. Dass den Männern die Frau den Film zeigt.
   d. Dass die Frau den Film den Männern zeigt. (Neeleman 1994: 416)

Dutch lacks morphological case, and scrambling of arguments results in ill-formedness in this language, as in (5). In contrast, German arguments reveal morphological case, and they may freely scramble as shown in (6).

The existence of a rich morphological case system, however, is not necessarily a prerequisite for scrambling. Modern Persian, for example, only marks specific objects for case. Subjects and non-specific objects are not morphologically marked, yet they scramble nevertheless, as shown in (7).

(7) a. mâdar   barâ bachche se   dâstan goft
      mother   for child   three story said
      'The mother told the child three stories.'
   b. barâ bachche mâdar se dâstân goft
   c. barâ bachche se dâstân mâdar goft
   d. se dâstân barâ bachche mâdar goft

None of the arguments is morphologically marked in (7), and yet they may appear in different positions in the clause (see Section 3.3 for a discussion on discourse-related scrambling in Persian).

2.2 CONFIGURATIONALITY

Some authors have considered scrambling languages to be non-configurational. That is, the structure of the clause is assumed to be flat in these languages (Hale 1980 and Farmer 1980 for Japanese; Haider 1988 for German; T. Mohanan 1990 for Hindi and Urdu; and Kiss 1994, 2003 for post-verbal elements in Hungarian, among others). Other authors have considered them configurational in the sense that there is a hierarchical, asymmetric relation between the constituents of a sentence (Saito and Hoji 1983; Saito 1985 for Japanese; Bayer and Kornfilt 1994 for German; and Neeleman 1994 for Dutch, among others).

In a non-configurational language, the subject and object are at the same level, as in (8), and thus their order is not relevant.

(8)

```
           S
    ┌──────┼──────┐
 Subject  Verb  Object
```
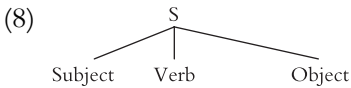
The non-configurationality view has been challenged in the literature. Whitman (1982) and Saito (1985) have shown that Japanese phrase structure cannot be flat. Their analyses are based on syntactic asymmetries between the external arguments (subjects) and internal arguments (objects) (Marantz 1981; Williams 1981). Saito discusses syntactic asymmetries between the two in Japanese. Two of them are listed here:

a. There are idioms consisting of a transitive verb + object, but not verb + subject, to the exclusion of the object.

b. The semantic role of the subject often depends on the choice of the object, but the semantic role of the object depends on the lexical properties of the verb.

Thus, these authors suggest a configurational structure for Japanese, as in (9).

(9)

```
           S
    ┌──────┴───┐
 Subject      VP
         ┌────┴────┐
       Verb      Object
```
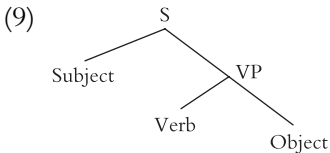
Furthermore, there are other languages that exhibit the scrambling phenomenon, but are clearly configurational, such as Persian. This is evident by binding facts, as in (10).

(10) a. Kimea [bachche-hâ-ro]$_i$ be hamdige$_i$ mo'arrefi   kard
          K   child-pl-Acc   to each other introduction did-3sg
          'Kimea introduced the children to each other.'
      b. *Kimea [hamdigar-ro]$_i$ be [bachche-hâ]$_i$ mo'arrefi kard
      c. *Kimea be [bachche-hâ]$_i$ [hamdigar-ro]$_i$ mo'arrefi kard
                                        (Karimi 2005: 123)

The contrast between (10a) and (10b) shows that the antecedent must precede the anaphor in order to bind it. Example (10c) indicates that hierarchy, rather than precedence, is the prerequisite for binding in this language.

2.3 ADJUNCTION SITES

Müller and Sternefeld (1993) provide a different type of answer to the question raised in this section. They argue that the type of adjunction that is allowed in a given language determines the existence or lack of scrambling and the scope of this phenomenon in that language. English, they suggest for example, does not allow adjunction at all, thus it does not exhibit any kind of scrambling. German, Korean, and Japanese allow

VP and IP adjunction, and Russian has all three types, namely, VP, IP, and CP adjunctions.

According to these authors, lack of CP adjunction in German, Korean, and Japanese explains lack of LDS of adjuncts in those languages, as the trace of the adjunct would be subject to empty category principle that requires the trace of a moved element to be properly governed either lexically (by the verb) or by its antecedent. Long-distance scrambling of objects is possible in Korean and Japanese, as the trace of the object is properly governed by the verb. In German, these authors suggest, all traces have to be antecedent-governed, and consequently, there is no LDS in tensed clauses in this language. Russian allows scrambling of arguments and adjuncts, as it allows all kinds of adjunction.

An analysis of scrambling based on adjunction sites faces some problems. First, English does exhibit adjunction, at least with respect to adverbials, and yet lacks scrambling. Furthermore, Persian should allow CP adjunction, similar to Russian, as it allows LDS of arguments and adjuncts across tensed clauses. Such a prediction, however, would have the following problem: if LDS is due to CP adjunction in this language, the sentence in (11b) where the scrambled element is adjoined to CP should be grammatical, a prediction that proves to be wrong on empirical grounds (Karimi 2005).

(11) a. Kimea goft [$_{CP}$ ke Rahjue ketâb-â-ro   be Papar   dâd]
          K   said   that R   book-pl-Acc   to P   gave
          'Kimea said that Rahjue gave the books to Papar.'
      b. *Kimea goft [$_{CP}$ be Papar$_i$ [$_{CP}$ ke Rahjue ketâb-â-ro t$_i$ dâd]

It seems, therefore, that adjunction sites cannot be parametrized to account for scrambling, or lack of it, in a given language.

2.4 THE POSITION OF THE VERB

One interesting fact about scrambling is that it seems to be related to the position of the verb, since the majority of scrambling languages are verb final. For example, of all Germanic languages, four are of SOV type (Dutch, German, Frisian, and Old English), and they all exhibit scrambling (Neeleman 1994). Those languages that lack scrambling (English, Danish, Norwegian, Swedish, and Icelandic) are of SVO type.

Several authors have tried to explain the correlation between scrambling and the position of the verb. Neeleman (1994), for example, suggests that scrambling applies in a θ-domain, the domain where θ-roles are saturated (i.e., VP). If this domain coincides with the domain of adjuncts, scrambling is possible; otherwise, it is not. That is, in an SVO language like English, objects are base generated to the right of the verb, whereas in SOV languages, they are base-generated to the left of the verb, in the same

domain as adjuncts. Therefore, scrambling is possible in the latter, but not the former.

Similarly, Fukui (1993) explains word order differences between English and Japanese on the basis of his Head-parameter that is based on the position of the verb in these languages. His analysis relies on the notion 'cost' (Chomsky 1991) that states that the application of each rule will require some 'effort', and hence some 'cost'. Therefore, each movement has to be motivated by some factor. Combining the notion of 'cost' with parametric values, Fukui suggests that 'a grammatical operation is costless as long as it creates a structure consistent with the parameter value of a given language.' This proposal has two implications. First, a grammatical operation that destroys the parameter value of a language is costly, and hence has to be motivated by some deriving force such as Case. Second, if a grammatical operation is costless, it can optionally apply. However, if the result of an operation is consistent with the parameter value of a language, some other principles might 'force' it. A rule that is not con-sistent with the parameter value, however, must have a deriving force.

According to Fukui, leftward movements are costless in Japanese, as this language is head final, and therefore, the verb is in the final position. Thus, the movement of the object does not have to be motivated by a morphological feature. In contrast, rightward movement would be costly, unless it is motivated by some sort of morphological force. As Case is assigned leftward in Japanese, and there is no specifier-head agreement in this language (Fukui 1988), there is no grammatical factor to force the rightward movement.

In a head-initial language like English, in contrast, leftward movement is costly because it is inconsistent with the head-parameter. Thus, this type of movement has to be morphologically motivated. This language exhibits only two types of rightward movements, namely, extraposition and heavy NP shift, and neither one of them is motivated by a morphological force. The reason is that these movements are consistent with the head-parameter, and therefore, are costless.

Finally, Saito and Fukui (1998) provide a similar proposal within the minimalist program (MP) framework, by suggesting that scrambling is an optional operation that is possible only if it is compatible with the head-parameter property of the language.

There are at least two problems with the proposals presented in this section. First, even though the majority of scrambling languages exhibit an SOV order, there are also SVO languages that allow scrambling, such as Polish (Haegeman 1995) and Russian (Müller and Sternefeld 1993; Bailyn 1995, 2003). Moreover, this hypothesis does not say anything about languages that exhibit a mixed structure with respect to the head. That is, there are SOV languages that are head-initial in phrases other than VP (German and Persian), and allow scrambling out of DP, a head-initial phrase.

2.5 NP VERSUS DP LANGUAGES

Chomsky (2000) suggests that the merge (base generation) of lexical insertion is subject to last resort. That is, the merge of lexical elements applies only if the derivation does not converge without it. Chomsky (2005) radically revises this assumption by stating that no aspect of lexical insertion is subject to last resort.

Bošković (2004, 2005) takes a position that falls in between these two, and suggests that only functional categories, such as D(eterminers), are subject to last resort. That is, functional categories are merged only if the derivation requires their presence, and thus they must appear in the position they are expected to be, namely, the θ (argument)-position. Based on this assumption, he proposes that DPs, containing the functional head D, must check their θ-features immediately, and thus must be merged in their θ-positions. NPs, however, are lexical items that lack a functional head, and thus are not subject to this restriction, and can be merged freely in any position.

Bošković further suggests that some languages exhibit a specific brand of scrambling. This type of scrambling, coined as Japanese style scrambling (JSS) by him, is different from other types of scrambling in that it is optional and semantically vacuous, and does not represent discourse functions such as topic and focus. This approach is based on a theory about scrambling proposed by Bošković and Takahashi (1998) (see Section 3.1.2 below). Relevant to our discussion is the claim that JSS is only possible in languages that lack D, such as Japanese and Slavic languages (except for Bulgarian). His claim regarding lack of D in these languages is based on syntactic properties such as left branch extraction and determiner stacking (e.g., Corver 1992; Trenkic 2004). The following examples, taken from Serbo-Croation, represent these two properties.
Serbo–Croation

(12) a. cijeg$_i$ si vidio [t$_i$ oca]?
        Whose are seen   father
        'Whose father did you see?'
    b. *whose$_i$ did you see [t$_i$ father]

(13) ta moja   slika
      *this my picture

In (12a), *whose* is extracted out of the DP in Serbo–Croation, while its English counterpart in (12b) is ungrammatical. In (13), two determiners are stacked, and the English translation of this phrase is ungrammatical. The argument is based on the following two assumptions: (i) D cannot move, thus *cijeg* 'whose' is not a D, as it has moved out of its clause, and

(ii), there can only be one occurrence of D in a DP, and thus the combination of *ta maja* 'this my' indicates that they are not instances of D. Bošković suggests that languages that lack D allow JSS simply, because NP, but not DP, can be merged anywhere in the clause, and have its θ feature checked later at LF.

The literature on scrambling suggests, however, that the DP, rather than NP, is subject to scrambling cross-linguistically. This claim is clearly argued for in the case of Hindi, German, Dutch, Turkish, and Persian, among other languages (Mahajan 1992; Diesing 1997; Kornfilt 2003; Karimi 2003, 2005). Furthermore, it is well-known that definite noun phrases that are considered to be DP rather than NP are subject to object shift in Scandinavian languages (Thráinsson 2001), a syntactic process that has been suggested to be subject to the same mechanism as scrambling (Chocano 2007).

Moreover, it is not clear whether JSS applies only in languages that lack D. De Hoop (2003), for example, suggests that definite nominal phrases optionally scramble in Dutch, without any semantic or discourse functional effects, properties that are considered to uniquely apply to JSS in determiner-less languages. Dutch, however, is clearly a DP language.

3. Theories about the Nature of Scrambling

Scrambling has been considered as a base-generation phenomenon by some authors, and as the result of movement by others. In recent years, scrambling has been examined with respect to discourse information factors such as focus and topic. In this section, I discuss two types of approaches to the base-generation theory, in Section 3.1, followed by a review of the literature on scrambling as a syntactic movement, in Section 3.2. The final portion of this section is devoted to the correlation between scrambling as a syntactic movement and discourse information.

3.1 BASE–GENERATION APPROACH

Some authors have considered the free word order variations in scrambling languages as the result of base-generation. In this section, I review two types of approaches towards this theory. In Section 3.1.1, an early version of base-generation theory that was proposed in the 1980s and 1990s is addressed, with some references to more recent versions of this approach. The MP approach is reviewed in Section 3.1.2.

3.1.1 Early Approaches to Base-Generation

Assuming a configurational status for Dutch and German, Riemsdijk (1989) suggests that free word order in these languages arises from the base-generation of hierarchical structures in which the arguments and

adjuncts are arbitrarily distributed. Neeleman (1994) makes a distinction between ordinary scrambling and focus in Dutch and states that only the latter is the result of movement. Bayer and Kornfilt (1994) argue along the same lines. Similar to Neeleman, they criticize the A-and-A′ analyses based on the lack of ordering restrictions for multiple scrambled elements. Both of these studies suggest that constituents are directly inserted in an A-position in non-focal scrambling, and that this direct insertion is possible in OV languages, like German, but not in VO languages, such as English. This is because scrambling interacts with other syntactic rules: for Neeleman, for example, this phenomenon interacts with the θ-domain in an OV language, a domain where arguments and adjuncts are both licensed (see Section 2.4). In other words, base-generation theories consider the D-structure identical to the S-structure, except for those cases that receive a focus interpretation.

In recent years, more refined base-generation theories have been proposed, such as Neeleman and Reinhart (1998), based on θ-role assignment, and Case checking at PF, and Fanselow (2001, 2003), based on θ-role assignment, and Case checking at LF. Chocano (2007) offers a detailed review of these analyses and provides arguments against a unified base-generation approach towards all types of scrambling cases. Nevertheless, she adopts this approach for those cases when scrambling takes place within the strict limits of the maximal projection of the selecting head; that is, scrambling within the verb phrase. As for Japanese, a new proposal has been offered within the MP (Chomsky 1995) to support the base-generation approach. This is the topic of the next section.

3.1.2 A Minimalist Approach to Base-Generation

Bošković and Takahashi (1998) state that two conditions are necessary for the existence of scrambling. First, the language must allow an argument to be base-generated in an IP adjoined position, and second, the language must allow arguments to move back into their θ-positions at LF. As for the first requirement, these authors argue that Japanese allows multiple IP adjunction, evidenced by the existence of multiple subjects (see Kuroda 1988; Fukui and Saito 1992), whereas English does not exhibit this option. Regarding the second condition, they suggest that English requires θ-positions to be filled (either by the full XP or its copy) in overt syntax, a requirement that is absent in Japanese.

These authors write that '. . . scrambled elements are directly base-generated in their surface positions and undergo LF movement (lowering in most cases) to the positions where they receive theta roles.' θ-Roles, they suggest, are formal features, and therefore capable of deriving movement. Their analysis is based on the assumption that scrambling is semantically vacuous. They suggest that in those cases where scrambling creates scope ambiguity, as in (14), the verb moves to T(ense) at LF, and can θ-mark the scrambled element.

(14) Daremo$_i$-ni dareka-ga t$_i$ atta
everyone-Dat someone-Nom met
'Everyone, someone met.'

According to Bošković and Takahashi, the scrambled quantifier phrase in (14) can take scope over the subject, as the verb moves to T at LF, and can θ mark the object from that position. In contrast, the scrambled quantifier phrase cannot take scope over the matrix subject in (15), as V to INFL is not possible across clause boundaries.

(15) Daremo$_i$-ni   dareka-ga   [Mary-ga   t$_i$ atta to] omotteiru
everyone-Dat someone-Nom Mary–Nom   met that thinks
= for some x, x a person, x thinks that for every y, y a person, Mary met y.
≠ for every y, y a person, there is some x, x a person, such that x thinks that Mary met y.

There are, however, some problems with this analysis cross-linguistically. For example, various data in Persian could not be accounted for given this type of MP style base-generation approach.

First, a LDS quantifier plays a role in the scope interpretation in this language. The following contrast provides evidence for this claim.

(16) a. har dâneshju-i fekr mi-kon-e [$_{CP}$ Kimea ye pesar-i-ro dust dâr-e]
every student-ind thought dur-do-3sg K a boy-ind-râ friend have-3sg
'Every student thinks that Kimea loves one boy.' ∀ > ∃; *∃ > ∀
b. ye pesar-i-ro$_i$ har dâneshju-i fekr-mi-kon-e [$_{CP}$ Kimea t$_i$ dust-dâr-e] ∃ > ∀; ∀ > ∃

In (16a), the universal quantifier has scope over the existential quantifier, but not vice versa. Therefore, only one interpretation is available: *for every student it is the case that he/she thinks that Kimea loves one (arbitrary) boy.* The sentence in (16b) is the result of LDS in which the existential quantifier has moved to the initial position of the matrix clause, and may take scope over the universal quantifier from that position. That is, in addition to the interpretation available for (16a), the following interpretation is also possible, and in fact, it is the primary reading for this sentence: *there is one specific boy such that every student thinks Kimea loves him.* As mentioned before, Bošković and Takahashi claim that the ambiguity of quantifiers is available only within a simple clause due to V to INFL raising. Thus, the sentence in (16b), an instance of ambiguity created by LDS, contradicts their claim.

Furthermore, Bošković and Takahashi's theory is based on the assumption that scrambled elements return to their argument position at LF to check their θ-roles, implying that only arguments are subject to scrambling. The

sentences in (17), however, show that adjuncts may undergo LDS, and create ambiguity as well.

(17) a. cherâ$_i$ fekr mi-kon-i [$_{CP}$ Kimea emruz bargasht t$_i$]?
      why think dur-do-2sg K today returned
      'Why do you think Kimea returned today?'
   b. key$_i$ Kimea goft [$_{CP}$ ke Sepide xune xaride t$_i$]?
      when K said that S house bought is
      'When did Kimea say that Sepide has bought a home?'

Persian is a wh-in-situ language. However, wh-phrases may scramble, as in (17). The scrambled wh-adjuncts in (17) can be interpreted either in the matrix clause or in the embedded clause. A theory that is based on LF lowering of elements motivated by θ-features, therefore, cannot account for these data. See Bailyn's (2001) reply to Bošković and Takahashi for similar criticisms. See also Johnson and Park (2001) who have shown that Korean, a scrambling language, does not support conclusions drawn from Japanese.

3.2 SCRAMBLING AS A SYNTACTIC MOVEMENT

Most authors have considered scrambling as the result of movement. From a movement point of view, clause-bound scrambling has been considered to be A-movement (Fanselow 1990; Mahajan 1990, 1994; Santorini 1991; Déprez 1994; among others), while LDS has been suggested to be A′-movement (Mahajan 1990, 1994; Saito 1985 and in subsequent work up to 1998, among others). Finally, Webelhuth (1992) suggests a mixed landing site for scrambled elements, arguing that this position reveals both A and A′ properties. In this section, I briefly address all three approaches.

Scrambling as an instance of A-movement is discussed in Section 3.2.1. A proposal that considers clause bound scrambling to be triggered by the Extended Project Principle (EPP), thus an instance of A-movement, also appears in this section. Scrambling as an A′-movement is discussed in Section 3.2.2, followed by an examination of Webelhuth's (1992) dichotomy regarding the mixed properties of the landing site of scrambled elements in Section 3.2.3.

3.2.1 A-Movement Approach

A-movement typically extracts a DP from a [+Theta], [−Case] position to a [−Theta], [+Case] position and is triggered by a morphological feature associated with Case. A-movements are considered to have distinct syntactic properties.

   a. They are subject to *locality*.
   b. They may override Weak Crossover (WCO).
   c. They are not subject to reconstruction (they do not leave a copy behind).

Furthermore, binding is considered to be a property of A-positions.

The syntactic properties of A-movement have been employed as diagnostic tools to examine the nature of scrambling. Based on these tests, local scrambling has been considered to be an A-movement into the specifier of a functional head, triggered by Case. Some of the reasons behind this assumption are discussed below.

Binding and Reconstruction. The copy of an A-moved element is subject to Principle A of the binding theory. That is, it must be bound by its antecedent within its local binding domain. The ill-formedness of (18) is due to the fact that the copy is not locally bound by its antecedent, thus violating Principle A of the binding theory.

(18) *John seems [$_{CP}$ that it appears [$_{CP}$ ~~John~~ to be happy]]

Clause-bound scrambled elements are argued to create new binding relations, as the German example in (19).

(19)   . . . weil wir die Frauen$_i$ einander$_i$ t$_i$ vorgestellt   haben
        because we the women   each other   introduced   have
        'Because we have introduced the women to each other.'

If the object *die Frauen* were in an A′-position, it could not bind the anaphor, and the sentence would be ruled out by Principle A. The grammaticality of this sentence implies that the object must be in an A-position.

Furthermore, reconstruction is suggested to be possible only from an A′-position (Mahajan 1990, among others). If clause-bound scrambling is in fact A-movement, reconstruction cannot apply from the landing site of the scrambled element at LF. Consider the example in (19) once more. Scrambling feeds binding in this example, which in turn suggests that the scrambled DP is not reconstructed at LF, and thus must c-command the reciprocal from an A-position at that level.

Anti-Weak Crossover effect. Weak Crossover is yet another test that has been employed to distinguish between an A-movement and an A′-movement. The WCO effect is obtained when an element in an A′-position c-commands a bound variable inside a DP and its own trace at the same time at LF. A bound variable is a pronoun that is bound by an element in an A′-position. Thus, a wh-trace (A′-trace) triggers WCO-effects, while an NP-trace (A-trace) does not.

It has been argued in the literature that clause-bound scrambling does not trigger WCO effects, and thus has to be considered A-movement. The following sentence illustrates this assumption.

(20) weil Maria [jeden Gast]$_i$ [ohne seinem$_i$ Partner e vorzustellen] allein
t$_i$ lässt.
because M every guest without his partner to introduce alone
leaves
'Because Maria leaves each guest alone without introducing (them)
to his partner.' (Déprez 1994: 128)

The argument is that the noun phrase *jeden Gast* must c-command the
pronoun from an A-position in (20), as otherwise this sentence would
be ungrammatical. In other words, (20) reveals an anti-WCO effect, a
property attributed to A-movements.

   Scrambling as A-movement has been discussed in recent years in
connection with the EPP. That is, it has been suggested that EPP, a D
feature specific to T that triggers movement of XP into the specifier of
TP (Chomsky 1995), is responsible for clause bound movements.
Holmberg and Nikanne (2002) and Bailyn (2003), for example, discuss
clause bound scrambling in Finnish and Russian, respectively, in con-
nection with EPP. On the basis of Japanese, Miyagawa (1997) suggests
two types of scrambling: A-scrambling, associated with some feature
on T, and A′-scrambling, associated with focus. Miyagawa (2001, 2003)
then suggests that the feature triggering A-scrambling is EPP. He supports
this claim by resorting to scope interaction of negation with quantifier
phrases.

(21)   zen'in-ga   sono   tesuto-o   uke--nakat-ta   (yo/to omou)
       all–Nom   that   test–Acc   take–Neg–Past
       'All did not take that test.'   (Miyagawa 2001: 303)
a.   all > not: It was the case that all did not take the test (nobody
                    took the test)
b.   *not > all   It was not the case that all took the test (some took the
                    test and some did not).

Yo/to omou in (21) represents exclamation. The subject in this example
can only receive a wide scope with respect to negation, as in (a). Therefore,
it must be out of the scope of negation, as shown in (22).

(22)
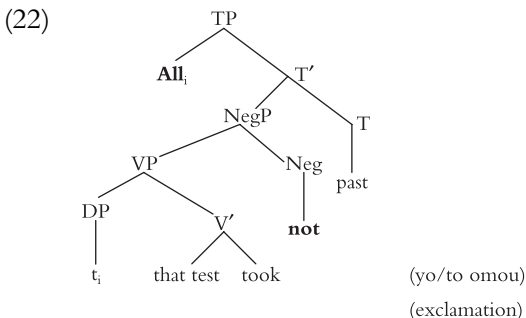
In other words, there is no reconstruction in the case of (21), and therefore, narrow scope of the quantified subject with respect to negation is not available.

Compare (21) with (23) below where the factual *koto* has replaced the exclamation *yo/to omou*. Both readings in (a) and (b) are now available.

(23) zen'in-ga sono tesuto-o uke-nakat-ta koto
       all–Nom that test-Acc take-Neg-Past
       'All did not take that test.'   (Miyagawa 2001: 303)
a.   all > not: It was the case that all did not take the test (nobody took the test)
b.   not > all: It was not the case that all took the test (some took the test and some did not).

The idea is that when the sentence ends with *koto*, the subject may receive either wide or narrow scope. The contrast between (21) and (23), both exhibiting SOV order, is that *Koto* in the latter allows verb movement to T. This movement is considered to expand the domain of V, making the subject and the object equidistant from the specifier of T(ense)P(hrase) (Chomsky 1993). Consequently, the object, instead of the subject, can move into the specifier of TP to satisfy the EPP, an instance of A-movement. Then the subject undergoes A'-movement for focus. As it is in an A'-position, reconstruction is possible, and thus its copy takes a narrow scope with respect to negation. This is illustrated in (24).

(24)
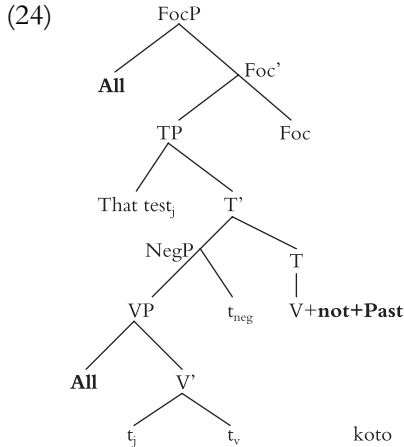
(in fact)

In (24), the subject *all* is in the specifier of the focus phrase, c-commanding the negation and yielding the interpretation in (a). As focus movement is considered to be an instance of A'-movement (see Section 3.2.2 below for properties of A'-movement), it reconstructs, and thus its copy is in the specifier of VP, c-commanded by the negation, and thus yielding the interpretation in (b).

An issue worth mentioning is that some authors have rejected the existence of A–movement altogether (Manzini and Roussou 2000, among others). This line of thought suggests that the standard cases of A-movement, such as passive and raising, are the result of base-generation. If this assumption holds water, then A-scrambling can be considered to be an instance of base-generation (or Merge) as well.

3.2.2 A'–Movement Approach

A'-movement is traditionally assumed to create a chain whose tail is [+Case] and its head is [−Case]. Thus, A'-movement is not motivated by Case, but rather by other kinds of features such as a wh-feature. A'-positions reveal specific syntactic properties. Two of them are listed below:

   a. *parasitic gaps are* licensed by elements in A'-positions.
   b. copies left by A'-movement enter semantic interpretation at LF. That is, A'-movement is subject to reconstruction (Mahajan 1990, adopted by Chomsky thereafter).

Based on these specific properties, scrambling has been considered A'-movement by a number of authors [Saito 1985 and subsequent work up to 1998; Mahajan 1990, 1994 with respect to LDS, similar to Dayal 1994; Müller and Sternefeld 1994; Vikner 1994; and Miyagawa 1997 (with respect to focus), among others]. I discuss these issues in what follows.

Parasitic gaps. Chomsky (1982) states that a *parasitic gap* is a variable directly bound by an element outside the adjunct containing it. As variables must be A'-bound, only A'-movement would generate the antecedent for a parasitic gap. It has been argued in the literature that scrambling licenses parasitic gaps (Webelhuth 1992; Vikner 1994; among others), and therefore, it must be A'-movement. Consider the following example.

(25) . . . weil er den Patienten$_i$ [ohne PRO vorher e$_i$ zu untersuchen] t$_i$ operierte
     Because he the patient without first to examine operated
     'Because he operated on the patient without first to examine (him).'

The scrambled element *den Patienten* licenses the gap (illustrated as 'e'), and therefore, must be in an A'-position. See Karimi (1999a) for restrictions on the interaction of scrambling with parasitic gaps.

Binding. Binding relations have led some authors to claim that LDS is an instance of A'-movement (Saito 1989, 1992; Mahajan 1990; among others), because this type of movement does not allow binding from the landing site of the moved element.

(26) *?karera$_i$ – o [Masao-ga [otagai$_i$ – no sensei] – ni [$_{CP}$ [$_{IP}$ Hanako-ga
        they – Acc   M – Nom each other -Gen teacher – to   H – Nom
    t$_i$ hihansita] to]   itta] (koto)
        criticized Comp said   fact
    '*Them$_i$, Masao said to each other$_i$'s teachers that Hanako criticized'

The argument is that the scrambled element must have been reconstructed in (26), leaving the anaphor unbound.

3.2.3 Webelhuth's Dichotomy
There are some cases in which the landing site of a scrambled element reveals both A and A' properties simultaneously. The German sentence in (20), repeated in (27), illustrates this observation.

(27) weil Maria [jeden Gast]$_i$ [ohne seinem$_i$ Partner e vorzustellen] allein t$_i$ lässt.
    because M every guest without his partner to introduce alone leaves
    'Because Maria leaves each guest alone without introducing (them) to his partner.' (Déprez 1994: 128)

The scrambled object licenses the gap, an A' property. At the same time, it reveals an anti-WCO property, as it is c-commanding the co-indexed pronoun in the adjunct clause and its own trace at the same time. This fact implies that the object must be in an A-position.

These peculiarities lead Webelhuth (1992) to propose a dichotomy that suggests that the landing site of scrambled elements exhibits mixed properties. Webelhuth proposes that scrambling is a third type of movement, next to A and A' movement. See Saito (1992) and Karimi (2005) for alternative proposals regarding Webelhuth's dichotomy.

3.3 SCRAMBLING AS A DISCOURSE MOTIVATED OPERATION

Research in recent years indicates that some types of scrambling cases represent discourse functions. Focus, for example, is one factor that is represented by dislocated elements (Miyagawa 1997; Bailyn 1999, 2001, 2003; Karimi 1999b, 2005). Topic is yet another such factor (Kiss 2003; Karimi 2005).

In a language like Persian, scrambled elements may be interpreted as topic or focus based on their stress patterns.

(28) a. Kimea goft [ke Rahjue ketâb-â-ro   az   Parviz xaride]
        K   said that R   book-pl râ from P   bought is
        'Kimea said that Rahjue had bought the books from Parviz.'
    b. [**ketâb-â-ro**]$_i$ Kimea goft [ke Rahjue t$_i$ az Parviz xaride]
        – 'As for the books, Kimea said that Rahjue has bought (them) from Parviz.' or

– 'It was the BOOKS that Kimea said that Rahjue had bought (them) from Parviz.'

c. **[az Parviz]**$_i$ Kimea goft [ke Rahjue ketâb-â ro t$_i$ xaride]
– 'From Parviz, Kimea said that Rahjue had bought the books.'
– 'It was from PARVIZ that Kimea said that Rahjue had bought the books.'

The sentence in (28a) represents an unmarked word order. In (28b) and (28c), the object and the PP, respectively, have scrambled to the front of the matrix clause, representing either topic or contrastive focus, based on their stress.

Wh-phrases are subject to scrambling as well. Consider the examples in (29).

(29) a.   Kimea   diruz   [$_{vP}$ ketâb-ro   be   ki   dâd]?
           K   yesterday   book-Acc   to   who   gave
           'Who did Kimea give the book to yesterday?'
      b.   [$_{FocP}$ *be ki* [$_{TP}$ Kimea [diruz [$_{vP}$ ketâb-ro t dâd]]]]
           'Who was it that Kimea gave the book to yesterday?'
                                            (Karimi and Taleghani 2007: 169)

The wh-phrase in (29a) receives an information focus interpretation in terms of Kiss (1998). The answer to this question is something like *ketâb-ro be Parviz dâd* 'she gave the books to Parviz.' The wh-phrase in (29b) has scrambled, and receives a contrastive interpretation (Karimi 1999b, 2003, 2005). This question occurs when the speaker has a set of people in mind, and wonders which one of them was the receiver of the book.

Scrambling representing focus and topic are considered to be instances of A'-movement. That is, the scrambled element is moved into the specifier of a topic or focus projection where it receives its discourse-related interpretation. [see the tree in (24) for focus movement.]

4. Conclusion

In this article, the literature on scrambling was reviewed with regard to the typology of languages that allow this phenomenon and theories that try to explain it. We saw a number of proposals regarding the typology of scrambling languages that range over configurationality, the adjunction sites allowed in a given language, the position of the verb, and the parametric differences proposed to exist between languages with respect to nominal constructions that are assumed to be responsible for a specific brand of scrambling.

Furthermore, I reviewed some of the major theories that have tried to discover the syntactic nature of scrambling. We saw that one line of thought considers scrambling a base-generation phenomenon. Within the MP model, this approach is translated as an instance of Merge under certain parametric conditions.

I further reviewed the literature on scrambling from a movement point of view. A brief survey of clause-bound scrambling into a Case

position was presented, revealing properties of A-movement. This type of scrambling was later discussed as a movement triggered by EPP. The discussion in this article also suggests that LDS reveals some properties of A'-movement, such as licensing a parasitic gap and allowing reconstruction. We further saw an analysis of scrambling as a non–Argument/non–operator movement, as suggested by Webelhuth (1992). Finally, movement in scrambling languages was considered as contributing to the discourse functional interpretation of the output.

The outcome of this review provides some responses to the questions raised in the introduction: (a) What motivates this movement? (b) Is it really an optional operation as it has been considered in the literature? and (c) Is it semantically vacuous as previously reported?

First and foremost, it clearly shows that scrambling is not a unified operation, and rather consists of different types of operations, representing A-movement triggered by EPP (or a case of base-generation), or A'-movement representing focus and topic. Both types of movements have been observed in non-scrambling languages as well. Second, these operations cannot be considered optional. Finally, scrambling is not semantically vacuous, at least with respect to the majority of scrambling languages. Consequently, we can no longer ask why some languages allow scrambling and some do not. The relevant question would be why some languages exhibit overt movements that represent discourse functions such as focus and some do not. In other words, the parametric difference between the languages that allow scrambling and those that do not boils down to similar parametric differences with respect to the presence and absence of structural wh-movement.

It was briefly mentioned that the existence of A-movement has been challenged in recent literature, and the classical instances of this type of movement, such as passive and raising, have been considered to be the result of base-generation, or Pure Merge to use a more recent terminology. Thus, scrambling can be considered either as a base-generation phenomenon or the result of A'-movement, representing discourse functions. This is consistent with those analyses of scrambling that make a distinction between base-generation and focus movement, such as Neeleman (1994), Neelman and Reinhart (1998), and Fanselow (2001, 2003). The case of Japanese scrambling, as well as some instances of Dutch scrambling that are suggested to be purely optional and semantically/discourse functionally vacuous, would then be considered as the result of base-generation. The nature of this type of scrambling, and the reason for their existence, still requires further investigation.

Short Biography

Simin Karimi's research concentrates on syntax, the interface between syntax–semantics, syntax–morphology, and syntax and discourse factors.

She has authored and co-authored articles that were published in linguistics journals such as *Lingua, Linguistic Inquiry, Linguistic Review, Linguistic Analysis, Canadian Journal of Linguistics*, and *Lexicology*. She is the author of a volume entitled *A Minimalist approach to scrambling* (Mouton, 2005). In this work, she investigates the syntactic, semantic, and pragmatic aspects of scrambling, and their consequences for syntactic theories, by concentrating on the structure of Persian. She is also the editor of *Word order and scrambling* (Blackwell, 2003), a volume consisting of 14 articles presenting various approaches to scrambling in different languages. She is the co-editor of a volume entitled *Phrasal and clausal architecture* (John Benjamins, 2007). She was a visiting scholar at MIT (1999) and Cambridge University in United Kingdom (2004). She holds a PhD in Linguistics from the University of Washington, Seattle (1989). She is a professor of Linguistics at the University of Arizona.

Note

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