

Does Relative Clause Extrapolation Exist ?

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0. Introduction

In this paper, we will examine two possible analyses of so-called extrapolation from NPs, in particular, relative clause extrapolation — movement and nonmovement analyses — in light of Chomsky's 1992 Minimalist framework.

Traditionally, (1) is derived from (2) by rightward movement (an extrapolation operation).

- (1) A man came into the room [who was from London].
- (2) A man [who was from London] came into the room.

Nonmovement analyses claim that the alleged extraposed element in (1) is base-generated, not derived by movement, but it is related to the head NP by an interpretive rule.

In section 1, we will examine some problems of a movement analysis of extrapolation. In section 2, we will seek for an alternative under nonmovement analyses.

1. A Movement Analysis

If we adopt a movement analysis of relative clause extrapolation, we must answer the following questions:

- (3) a. What triggers extrapolation ?

- b. Why is extraposition clause-bounded ?
- c. How can we explain differences between REXs and other EXs ?¹⁾

1.1 Optionality of Extraposition

The first question has to do with optional character of extraposition. Movement is a “last resort” operation in that the operations are driven only by morphological necessity (Greed).

Certain features must be checked in the checking domain of a head, or the derivation will crash. If the feature of a head is strong, the movement is overt. If it is not strong, checking must take place at LF. In this respect, extraposition must be driven by some strong features. It is not possible to explain why extraposition is optional in the Minimalist Program.

Furthermore, as Kaan 1992 claims, citing Rochemont and Culicover 1990 and Frazier and Rayner 1988, PP extraposed from NP is not always in focus, hence PP extraposition is not triggered by some focus-related features, and that REX is more difficult to parse than relative clauses adjacent to head NPs. Therefore, it is not tenable to assume appropriate features to drive extraposition. Furthermore, if Kayne 1993 is correct, there is no rightward movement in grammar.²⁾

Following Fukui 1993, we tentatively assume that movement in the canonical direction of the head-complement parameter is costless, hence optional. In essence, Fukui’s proposed parameter value preservation (PVP) measure determines whether movement operations are optional or not. The PVP measure states that the parameter fixed for a language should be maintained. If Move α applies, the resulting structure is consistent with the parameter value fixed for the language, and this movement is evaluated as a costless operation. If it is not consistent with the parameter value, the movement operation is costly;

thus, as long as movement is not driven by some morphological necessity, Move α is not required to apply. Thus, movement is usually considered to be a “last resort” operation in the Minimalist Program.

Since English is a head-first language, and since extraposition is, if it exists, a rightward movement, Fukui’s theory can capture the optional character of extraposition operations: the resultant structure is consistent with the PVP measure, hence optional.

Consider the following.

- (4) X^0 - Complement
 (5) a. ... [_{NP} NP PP/CP]... ADV ...
 b. ... [_{NP} NP t_1]... ADV ... PP₁/CP₁.
-

In (4) an X^0 element precedes its complement, and in (5) NPs precedes PP/CP before or after the extraposition operation applies; hence, the precedence relation is preserved.

1.2 Boundedness of Extraposition

Next, let us go on to consider the more restrictive character of boundedness of extraposition than other A’-movements; extraposition is upward-bounded, while wh-movement is unbounded.

- (6) a. *It was believed that [John saw [a picture t_1] in the newspaper] by everyone [of his brother]₁.
 b. *It was believed that [John saw [a picture t_1] in the newspaper] by everyone [that his brother bought]₁.
 (7) Who₁ did Mary say that [John saw [a picture of t_1] in the news-

paper] ?

The *wh*-element in (7) successive-cyclically moves to the matrix [Spec, CP] via the subordinate [Spec, CP].³⁾ Why is successive-cyclic adjunction barred in case of extrapolation ? If it is not, we need a mechanism to explain the boundedness of extrapolation.⁴⁾ Thus, a movement analysis of extrapolation poses a conceptual problem in terms of simplicity of grammar.

As far as REX is concerned, the boundedness of REX follows from an independently motivated principle of grammar. Following Furu-kawa 1993, we assume that whether or not REX is derived by rightward movement, REX is identified with its head NP by Predication, as required by Principle of Full Interpretation (FI). By virtue of Predication, REX is in a mutual m-command relation with its head NP. Thus REX and its head NP are not too far away, and Predication correctly predicts the boundedness of REX and its head NP.⁵⁾

1.3 Some Differences between REX and EX

Let us consider the third question: what distinguishes REX from other EXs ?

Another striking difference between *wh*-movement and extrapolation is that an extraposed element from subject NP (SX) is licensed, whereas *wh*-extraction from subject NP is not. How can we explain the following contrast ?

- (8) a. A man appeared with blond hair.
b. A man appeared who had blond hair.
- (9) a. *Which actors would beautiful pictures of cost too much ?
b. *Of which actors would beautiful pictures cost too much ?

Note that any theory that apparently allows the rightward extractions from subject NPs and blocks the leftward extractions from subject NPs fails to capture the difference between the relative clause extraposition and the other extrapositions.⁶⁾ Consider the following paradigm.

- (10) a. A man hit Mary who had hostility toward her.
b. *A man hit Mary with hostility toward her. (Nakajima 1993)
- (11) a. A new book has attracted many people which is concerned with the origin of human language.
b. *A new book has attracted many people about the origin of human language. (Nakajima 1993)

Based on this fact, Johnson 1985, among others, claims that PP extraposition is derived by rightward movement, an instance of Move α , hence violating "Subject Condition",⁷⁾ while relative clause extraposition is not, since REX is related to its head NP via Predication.

There is more evidence supporting that EX other than REX is derived by movement. *wh*-movement exhibits "Specificity Condition" effects: *wh*-extraction is prohibited from specific NPs.

- (12) a. *Who did you remember John's friend of ?
b. *Who did you buy every picture of ? (Johnson 1985:102)

PP extraposition is also prohibited from specific NPs while REXs are easily related to specific NPs as their heads.

- (13) a. *The review came out yesterday of John's book.

b. A review came out yesterday of John's book.

(Fiengo 1980: 151)

(14) a. *The review appeared of Bill's new book.

b. The man just called you who wanted a job. (Nakajima 1993)

(15) a. The man came in that we talked about.

b. The fact remains that we lost. (Fiengo 1980: 151)

For these reasons, we conclude that EX is derived by rightward movement, an instance of Move α .

Suppose that REX moves out of subject NP, leaving a trace. FI requires that REX and its head NP satisfy Predication, and adjunction sites of REXs, therefore, can follow naturally from Predication. If REX leaves a trace, the head NP and the trace of REX have already established a Predication relation, as in a sentence containing a non-extrapolated relative clause. In this respect, Predication could not predict its boundedness; some mechanism other than Predication might be needed to establish the required relationship between REX and its head NP. Suppose further that the trace of REX is deleted to save illicit movement from subject NP only if Predication is respected. However, this is basically equivalent to the claim that REX moves out of subject NP without leaving a trace, namely, essentially the same as a nonmovement approach to REX, as Lasnik and Saito 1992 point out.

Furthermore, Johnson 1985 observes that some predicates preclude extraposition from subject NPs.

(16) a. A man entered with green eyes.

b. A woman walked in with a scarlet carnation.

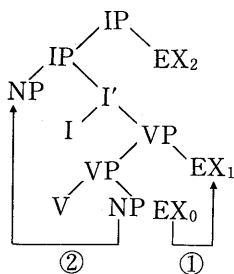
c. A child was seen with a yo-yo.

(17) a. *A man died with blue eyes.

- b. *A man ate the oranges with green eyes
 c. *A woman left the room with green eyes.
 d. *A child screamed with green eyes.
- (18) a. A rumor was spread that Mary is in town.
 b. *A rumor means that Gary is wrong that Mary knew Gödel well.
- (19) a. A proof has been published that Gödel's Incompleteness Theorem is incomplete.
 b. *A proof implies that Gödel was lazy that Gödel's Incompleteness Theorem is incomplete.

Under the Unaccusative Hypothesis, it might be possible to assume that, in all the grammatical instances above, EXs are extraposed from the original positions of their derived subjects, and that subsequently, subject NPs move to [Spec, IP] for Case checking.

(20)

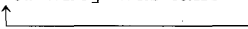
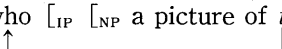


Once we adopt this approach, it is not possible to block *wh*-extraction out of derived subject NP, as in (21).


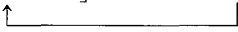
- (21) *Who_i was [_{NP} a picture of _{t_i}]_j taken _{t_j} by Bill ?

Collins (1994) attempts to rule out such examples in terms of economy of derivation.⁸⁾ When more than one derivation is possible, the most


economical derivation is chosen on the basis of the cost of possible derivations. If passive precedes *wh*-movement, *wh*-movement violates Subject Condition.

- (22) a. [_{CP} [_{IP} [_{NP} a picture of who] was taken *t* by Bill]]

 b. * [_{CP} who [_{IP} [_{NP} a picture of *t*] was taken *t* by Bill]]

 Subject Condition violation

If passive follows *wh*-movement, this *wh*-movement is longer than *wh*-movement out of subject; object is more remote from [Spec, CP] than subject in terms of the XP's crossed. Compare (23 a) with (22 b).

- (23) a. * [_{CP} who [_{IP} [_{VP} was taken [_{NP} a picture of *t*] by Bill]]]

 less economical derivation than (22 b)
 b. [_{CP} who [_{IP} [_{NP} a picture of *t*] was taken *t* by Bill]]



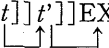
Let us examine extrapolation in light of Collins 1994. To escape Subject Condition, extrapolation must precede passive.

- (24) * [_{IP} [_{IP} [_{NP} NP *t*]_i [_{VP} V... *t*_i...]] EX]

 Subject Condition violation


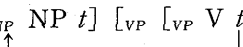
Under the standard generalization, EXs from subject NPs are assumed to be in IP or in VP.⁹⁾

In (25 a), where EX moves to an IP adjoined position at one fell swoop, the number of XP's crossed is more than (24); hence this

derivation is not chosen. In (25 b), EX moves to an IP adjoined position via VP-adjunction. The total number of the XP's crossed is the same as (25 a).¹⁰

- (25) a. $[_{IP} [_{IP} [_{VP} V [_{NP} NP t]]] EX]$

- b. $[_{IP} [_{IP} [_{VP} [_{VP} V [_{NP} NP t]] t']] EX]$


In case that EX is adjoined to VP, the number of XP's crossed by extraposition in (26 a) is the same as (24). However, the structure would be ruled out by a condition like "Proper Binding Condition", as is assumed in Lasnik and Saito 1992.

- (26) a. $[_{IP} [_{VP} [_{VP} V [_{NP} NP t]]] EX]$

- b. $[_{IP} [_{NP} NP t] [_{VP} [_{VP} V t]] EX]$


In any event, economy consideration cannot capture the basic facts with respect to the anti-Subject Condition effects of extraposition. We will not discuss this issue any further, since the purpose of this paper is not concerned with the proper formulation of the mechanism to capture why extraposition is possible only from derived subject. See Furukawa 1991 for a solution to this problem.

2. Nonmovement Analyses

We have seen that there exist some crucial differences between REX and other EXs. To explain the differences, we have assumed different derivations: EX is derived by movement, while REX is not. The last question to ask is, then, how REX is derived.

2.1 Merge vs Base-Generation

If it is not derived by movement, the first possibility to consider is that REX is base-generated.

Let us consider “anti-reconstruction” property of relative clauses. See the following contrast:

- (27) a. Which claim that John_i made did he_i later deny *t* ?
b. *Whose claim that John_i likes Mary did he_i deny *t* ?

(Lebeaux 1991: 211)

The pronoun can take *John* in the relative clause as antecedent in (27 a). On the other hand, the pronoun in the argument clause does not take *John* as antecedent in (27 b).

In the Minimalist framework, this adjunct-argument asymmetry is assumed to be due to the difference in their derivations:¹³⁾ insertion of arguments is cyclic, hence before *wh*-movement, obeying the Extension Condition, whereas adjunct can be introduced non-cyclically, hence adjoined to the *wh*-phrase after moving to [Spec, CP], by means of Merge (Generalized Transformation). Under the Copy Theory of movement, the trace left behind is a copy of the moved element, deleted by a principle of the PF component in the case of overt movement, hence (27) will be mapped to the followings in LF:

- (28) a. [_{wh-} which claim that John made] did he later deny
[_{wh-} which claim]
b. [_{wh-} whose claim that John likes Mary] did he deny
[_{wh-} whose claim that John likes Mary]

Several LF operations, such as a QR-like operation and a complementary LF deletion, apply to (28) to form an appropriate operator-variable relation, yielding (29).

- (29) a. [which] [that John_i made] did he_i later deny [_{wh-} *t* claim]
b. [whose] did he_i deny [_{wh-} *t* claim that John_i likes Mary]

“Condition C of Binding Theory” states that referential expression is not bound, hence not *c*-commanded by coreferential NP. Thus, *John_i* is not bound in (29 a), but it is bound by *he_i* in (29 b), violating Condition C. Given the Copy Theory of movement, the adjunct-argument asymmetry can follow from the claim that substitution is cyclic while adjunction is noncyclic.¹²⁾ In this sense, relative clauses can be introduced anywhere by Merge as long as Predication is respected. We conclude that REX is not base-generated, hence not cyclically introduced in its adjoined position.¹³⁾

2.2 Stranding Analysis

Kayne 1993 proposes that there is no rightward movement, since he does not admit rightward adjunction in his framework. Thus, extending Sportiche’s 1988 analysis of “quantifier floating” to extraposition, Kayne 1993 assumes that REX and other EXs strand when leftward movement takes place.

- (30) a. Who_i did John pretend that it was *t_i* [that was from Boston] that everybody liked.
b. Two boys_i were killed *t_i* [who were just five years old] as an annual sacrifice to their God.
c. ? Two men_i were killed *t_i* [who were from Chicago] by a lot of

farmers in anger.

(Suzuki 1993 a: 133)

(31) Who_i do you know *t_i* [with blond hair] ?

(Rochemont and Culicover 1990: 166)

One advantage of this proposal is that the strict boundedness of extraposition could be captured.

(32) * [The fact that somebody walked in] upset me [who you know].

Furthermore, provided that nothing is extracted from a subject, hence no trace left behind in the subject NP, anti-Subject Condition effects is expected in terms of extraposition from the derived subject.¹⁴⁾

(33) [Many papers]_i have been published [*t_i* [on the Minimalist Program]].

(Nakajima 1993)

(34) a. *A man saw/met/hit/paid/remembered/etc. me [from Nuie].

b. *A man said/whispered/claimed/believed/etc. that is made sense [from Nuie].

(Johnson 1985: 109)

If no rightward movement from subject NP is assumed, then the stranding analysis will amount to saying that extraposition from object NP does not exist, since object NP is not overtly raised, or at least saying that the adjunction site of SX and an “extraposed” element from object NP (OX) is the same. In fact, as several syntactic tests verify, adjunction sites of SX and OX are different.

(35) a. *They said that a man would come in and come in who had lived in Boston, a man did.

b. They said that a man would come in and come in a man did who

-
- had lived in Boston. (Culicover and Rochemont 1990: 35)
- (36) a. John said that he would meet a man at the party who was from Philadelphia, and meet a man at the party who was from Philadelphia he did. (Rochemont and Culicover 1990: 34)
- b. *John said that he would meet a man at the party who was from Philadelphia, and meet a man at the party he did who was from Philadelphia. (Culicover and Rochemont 1990: 28)

Kayne's approach fails to explain this basic fact.¹⁵⁾ However, our proposal here can handle (35) and (36) as well as the following paradigm in (37).

- (37) a. A man came into the room last night [_{ox} that I had just finished painting] [_{sx} who had blond hair].
- b. *A man came into the room last night [_{sx} who had blond hair] [_{ox} that I had just finished painting]. (Nakajima 1992: 314)

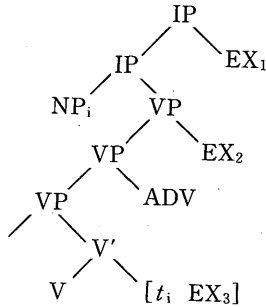
As far as (37) is concerned, as Rochemont and Culicover 1990 postulate, some interpretive dependency rule might explain this even under Kayne's analysis.¹⁶⁾

Furthermore, how can we explain an example like (38)?

- (38) Many papers have been published recently [on the Minimalist Program].

In (38), the EX seems to be structurally higher than the adverbial under Kayne's 1993 analysis, since its original position, a complement position to *published*, is lower than the adverbial. The linear order of the sentence like (38) clearly excludes EX₃ in (39).

(39)



Again, Kayne's stranding approach falls to explain this simple fact, but our approach does not pose this problem.¹⁷⁾

Suppose that stranding EX, more precisely, [*t* EX], is subject to rightward movement, contra Kayne 1993.¹⁸⁾ To be sure, this can also explain why extraposition is upward-bounded, since a trace in stranded EX must be bound by EX's head NP on the basis of the fact that the trace is left behind by NP movement to [Spec, IP], but this analysis provides no explanation in terms of the anti- Subject Condition effects of extraposition.

Under the VP Internal Subject Hypothesis (ISH), a subject is in [Spec, VP], moving to [Spec, IP] for Case checking. In case that EX strands in [Spec, VP], this analysis yields an ungrammatical sequence.¹⁹⁾

- (40) a. *A man has [_{VP} [*t* [with green eyes]] ate the apples].
 b. *A man has [_{VP} [*t* [who had hostility toward her]] hit Mary].

3. Concluding Remarks

In this paper, we have explored some problems of extraposition in light of the Minimalist Program. We have seen that REX is derived by

Merge, not by rightward movement.

We have left open the anti-Subject Condition effects with respect to extraposition within the Minimalist Program.

Further research will be required.

Notes

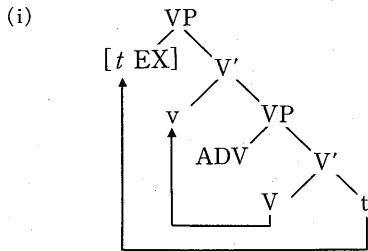
- 1) In this paper, REX and EX will be referred to as an extraposed relative clause and an extraposed element except REX, respectively.
- 2) See Kayne 1993, and see Chomsky 1994 and Oba 1994 for criticism. Kayne's analysis of extraposition will be taken up in Section 2.
- 3) This is because movement cannot skip potential landing sites.
- 4) Several proposals have been put forward. See Johnson 1985, Nakajima 1989, Rochemont and Culicover 1990, Suzuki 1993 b, among others, and references cited there. See also section 2.
- 5) See Furukawa 1993 for further motivation.
- 6) See Furukawa 1991 for details of inadequacies of proposals for this problem.
- 7) "Subject Condition" is subsumed under Condition on Extraction Domain (CED) or Bounding Condition in the *Barriers* framework of Chomsky 1986 b. See Kitahara 1994 for a new proposal in terms of CED.
- 8) We adopt Chomsky's 1994 simplified version of Collins 1994 for convenience. See Collins 1994 for more detailed discussion.
- 9) We tentatively follow Culicover and Rochemont 1990 for expository purposes. For different analyses, see Guéron 1980, Furukawa 1993 and Suzuki 1993 a.
- 10) If the notion of "cross" is refined, it might be possible to account for the facts within the framework of Collins 1994. Note, however, t' does not properly bind t in subject NP in (25 b).
- 11) For details of the Minimalist theory, see Chomsky 1992, Chomsky 1994, Chomsky and Lasnik 1991, and Lasnik 1993.
- 12) See Chomsky 1992, and for problems and further extension of the Copy Theory of movement, see Ike-uchi 1994 and Nunn 1994.
- 13) This approach can explain the following pair, where topicalization of

PP and relative clause from subject NP seems to be blocked by Subject Condition.

- (i) a. *By Chomsky, a book appeared recently.
 b. *Who was from Philadelphia, a man was painting the wall.
 (Suzuki 1993 a: 130)

Under our proposal, (i a) is ruled out by the Subject Condition, whereas (i b) is out, since there is no appropriate NP which establishes a mutual m-command relationship with the topicalized relative clause.

- 14) Kayne 1993 treats REX and EX uniformly. The syntactic differences between REX and other EXs must be accounted for. One possible solution to this problem might be to posit Merge in terms of derivation of REX, maintaining the stranding approach to EXs. However, this version of the stranding approach inherently poses problems. See below.
- 15) Ungrammatical sequences in (35) and (36) could be ascribed to improper anaphoric relations between the subject NP and its trace in the EX.
- 16) Since Rochemont and Culicover 1990 claim that both SX and OX can adjoin to VP, this contrast can be explained not structurally but with recourse to an interpretive dependency rule. See Furukawa 1993 and Nakajima 1992 for different approaches.
- 17) If we adopt Larsonian shells as Chomsky 1994 assumes, this problem might be solved. But we will not pursue this possibility here.



- 18) However, if rightward movement applies to (40 b), *A man* is not linked to its original position directly. See the following.

- (i) A man_i has [_{VP} _{t_i} hit Mary] [_{t_i} [who had hostility toward her]]_j.
- 19) In our framework, this fact cannot be explained, either. We leave this problem open.

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