Proceedings of the Thirty-second
Western Conference on Linguistics

Volume twenty-six
WECOL 2020

Edited by
Sho Akamine

Hosted by:
California State University, Fresno
November 14 – 15, 2020

Department of Linguistics
California State University, Fresno

Contents

Labeling the Unlabelable in the CP Domain

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1 Introduction

A well-known {XP, YP} problem raised by Chomsky (2008) is now a hot topic of debate. Chomsky (2013, 2015) has claimed that every SO must be labeled for interpretation at the interfaces, as in (1). The label is determined by applying the Labeling Algorithm (LA) to an SO at the timing of Transfer phase by phase. There are two ways to label such a symmetric {XP, YP} constituent, as illustrated in (2b).

(1) All SOs that reach the interfaces must be labeled for interpretation.
(Chomsky 2013:44)

(2) Labeling Algorithm (LA):[1]
a. In {H, XP}, LA selects the label H(ead)
b. In {XP, YP} …,
(i) successive cyclic movement enables the lower copy to be invisible; or
(ii) a symmetric structure is labeled by the most prominent shared feature.
(adapted from Chomsky 2013:46)

In (3), the label of α = {DP, vP} is determined since the DP internally merges with TP, rendering the lower copy invisible from LA; hence, α is unambiguously labeled as vP. Another {XP, YP} problem arises with the merger of DP and TP. The label of β is determined via so-called labeling via feature-sharing. DP and TP share φ-features, which undergo Agree and YP is labeled as <φ, φ>.

(3) $\{_{\beta}$ DP, $\{_{TP}$ T, $\{_{\alpha}$ ~~DP~~, *v*P$\}\}\}$ $\beta = <\varphi, \varphi>$

In languages with agreement, labeling via feature-sharing in (2) is available. What would the label of YP in languages like Japanese, which lacks such agreement, be like? This is the central question with which this paper deals.

The remainder of this paper is organized as follows. In section 2, we first review Takita et al.'s (2015) claim that multiple Transfer contributes to labeling (cf., Narita 2014). I then propose that the timing of Transfer is much less constrained in Japanese due to the lack of unvalued features ([uF]) on phasal heads in the spirit of Fukui and Kasai (2004). In section 3, I will show that the current study accounts for why other types of construction with one-to-many relations in Japanese are possible, namely multiple clefts and comparatives with multiple loci (Takeda 1999, Fukui 1999). Section 4 comprises a summary of this paper.

2 Parameterizing the Timing of Transfer (Kobayashi 2018)

In this section, I propose that Japanese makes extensive use of Transfer in determining the label of SOs. The analysis incorporates the insight of Fukui and Kasai (2004) that the absence of uninterpretable features in Japanese makes the timing and domain of Spell-Out more flexible than in English. Following Takita et al.'s (2015) claim that Spell-Out contributes to determining labels of SOs, Kobayashi (2018) proposes an analysis of why the multiple nominative construction and scrambling are possible in Japanese

* I would like to thank Naoki Fukui, Takaomi Kato, Toru Ishii, Hiroki Narita, and Yushi Sugimoto for their comments on the previous versions of this paper. Thanks also go to anonymous reviewers as well as the participants at the WECOL 2020 held online. This work is supported by JSPS KAKENHI Grant-in-Aid for Early-Career Scientists Grant Number JP19K13228. I am solely responsible for all the remaining errors and inadequacies.
[1] The LA will be revised in the following section.

in light of labeling (Chomsky 2013).

Let us briefly review Takita et al.'s (2015) argument below. They claim that Transfer (or Spell-Out in their terms) determines a label of an otherwise unlabelable structure. In (11), the label of α is not determined by LA since <which book> and $C_{[-Q]}$ do not share [+Q] or [-Q] features. Takita et al. (2015) suggest that Transfer applies to TP, which enables LA to detect $C_{[-Q]}$ as the label of α.

(4) a. I wonder which book Bob thinks John bought.
b. [$_{\alpha}$ <which book> [$_{XP}$ $C_{[-Q]}$ [TP …]]]

(adapted from Takita et al. 2015:9)

Since Transfer "recycles" phasal C in CP as an LI again in (11), LA correctly determines the label of {{which book}, C} as C. This is the essence of their analysis that Transfer contributes to the labeling of an SO.

Fukui and Kasai (2004) claim that Spell-Out can apply much more freely in Japanese than in English, since the absence of uninterpretable features does not pose any constraint on the timing of Spell-Out application. I follow Fukui and Kasai's insightful proposal regarding the timing of Spell-Out. Below, I combine the labeling via Transfer (Takita et al. 2015) and the insight of Fukui and Kasai (2004), and propose that Japanese makes extensive use of labeling via Transfer since the timing of Transfer is much less restricted than in English due to its lack of [uF] in Japanese.

I proposed in Kobayashi (2018) that the timing of Transfer is parametrized due to the presence/absence of [uF]. As Richards (2007) pointed out, valuation of the uninterpretable features and Transfer must apply simultaneously; otherwise, they would become indistinguishable from the inherently valued features, say [uφ] and [vφ]. Such a problem does not arise in Japanese, since the language lacks [uF] in the lexicon.

Here, I assume that Transfer can, in principle, apply at any point in derivation, but it must apply when [uF] is valued; otherwise, the problem pointed out by Richards (2007) arises. Although the timing of Transfer itself is free, [uCase] on any DP in English may lead derivations to crash at the interfaces unless Transfer applies simultaneously with [uF] valuation.[2]

On the other hand, Japanese may apply Transfer at any point in the derivation, as in (5). It follows then that in Japanese, the timing of Transfer is not strictly restricted by the timing of feature valuation.

(5) **Proposal:** The Timing Differences of Transfer in Japanese and English
a. Japanese: Transfer may apply at any point.
b. English: Transfer must apply at valuation of [uF].

The point is that Transfer may or may not apply in Japanese. Following the proposal in (17), I revise Chomsky's LA in (2), as summarized in (18) below.

(6) Labeling Algorithm (revised version):
a. In {H, XP}, LA selects the label H.
b. In {XP, YP}, the symmetric structure is labeled…
(i) by making a lower copy invisible via Internal ***Merger***; or
(ii) by making a copy (phasal interior) invisible via ***Transfer***; or
(iii) by the most prominent shared features via ***Agree***.

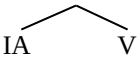
3 Consequences: Labeling the Unlabelable in Japanese

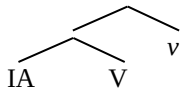
I claim that the current analysis resolves the labeling problem of {XP, YP} structures in Japanese. First, I demonstrate how the {XP, YP} problem between External Argument (EA) and vP is to be solved in simple transitive sentences in Japanese.

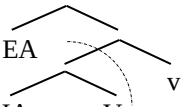
3.1 *Structure Building in Japanese* Let us examine how a sentence with a transitive verb derives in Japanese under the proposal in (17). First, the Internal Argument (IA) and V merge to create a set in (23a),

[2] I continue to assume that [uF] violates the Principle of Full Interpretation at the interfaces, contrary to Preminger (2014).

which is followed by the merger of v in (23b). The EA is introduced in (23c), and Transfer applies to the complement of v. Transfer in (23c) makes VP invisible from Search: hence, what Search can see is {EA, {v}} (= {EA, v}), which is labeled as vP.

(7) a.


b.


c.


⇒ Label({EA, {v}}) = vP

I assume with Fukui (1986) and many others that the subject in Japanese need not raise to TP, which we will discuss further in the next section. After T/C are introduced, the SOs are labeled as TP/CP respectively.

3.2 *Labeling of Operator Constructions in the CP-domain* In this paper, I extend the proposal (5) to two phenomena that involve operator movement in the CP domain. Takeda (1999) provides interesting sets of data, in which multiple elements are licensed: Clefts with multiple foci in (7) and comparatives with multiple loci of comparison in (8).

(8) a. [e_i e_j e_k Kat-ta-no]-wa [Mary$_i$-ga ringo$_j$-o 3-tu$_k$] da.
buy-PAST-NM-TOP M.-NOM apple-ACC 3-CL COP.PRES
'It is [Mary three apples] that (she) bought (them).'

b. [Mary-ga ni-kagetu-mae-ni e_i e_j okut-ta]-no-wa
M.-NOM two-month-before-at send-PAST-NM-TOP
ronbun$_j$-o JEAL$_i$-ni da.
paper-ACC JEAL-to COP.PRES.
'It is [an article to JEAL] that Mary sent (it) (to it).'

(adapted from Takeda 1999:165)

(9) John-wa [Mary-ga e_i e_j okut-ta]-yori ooku-no ronbun$_i$-o
J.-TOP M.-NOM send-PAST-than many-GEN article-ACC
ooku-no syuppansya$_j$-ni okut-ta.
many-GEN publisher-to send-PAST
'John sent more articles to more publishers than Mary did.'

(Takeda 1999:172)

The nature of multiple cleft constructions in (39) has been hotly discussed in the literature (Koizumi 2000, Takano 2002, Fukui and Sakai 2003, Kizu 2005, and Hiraiwa and Ishihara 2012, among others), but it has still not been explained why Japanese allows such constructions while English and other languages do not. Turning to the multiple loci in comparatives in (40), two elements are compared with *-yori*, which corresponds to '(more) than' in English (cf., Kikuchi 1987). The number of loci is, in principle, not limited; thus, a sentence can have more than two gaps, say three, as in (41). Note that none of the English counterparts in (42) is grammatical, as Takeda (1999) has pointed out.

(10) John-wa [Mary-ga e_i e_j e_k okut-ta]-yori ooku-no ronbun$_i$-o
J.-TOP M.-NOM send-PAST-than many-GEN paper-ACC
ooku-no syuppansya$_j$-ni yasui sooryoo$_k$-de okut-ta
many-GEN publisher-to cheap charge-with send-PAST
'John sent more articles to more publishers with cheaper shipping charges than Mary did.'

(11) a. Clefts with multiple foci:

*It is [to Mary about linguistics] that John talked yesterday.

b. Comparatives with multiple loci of comparison:

*John sent more articles$_i$ to more publishers than Mary sent t_i (to) t_j.

(Takeda 1999:165, 172)

We are now ready to discuss how the proposal in (17) works in the CP domain. Let us first examine how multiple clefts are derived via multiple Transfer without labeling failure.

3.2.1 *Multiple Foci in Clefts* The analysis of clefts in Japanese is not uncontroversial. Hoji (1987, 1990) proposes the null-operator movement analysis, while Koizumi (2000) argues that the sequence of multiple nominals in the focus position comprises a verbless remnant VP, obtained via string-vacuous verb raising to T (and to C). Still another analysis comes from Hiraiwa and Ishihara (2012), in which clefts are derived from the focus *-no-da* construction in Japanese. In this paper, I focus on Hiraiwa and Ishihara's analysis that shares basic properties with Hoji's null operator movement analysis in involving A'-movement to the CP domain.[3]

The standard analysis of English clefts involves A'-movement of some kind (Chomsky 1977, Heggie 1988, and others), as illustrated in (43b). Whether it is operator movement or focus movement of an NP, the {XP, YP} problem arises at the node α in (44) when it comes to labeling.

(12) a. It was the movie that Mary saw.

b. It was [the movie]$_i$ [$_\alpha$ *Op*$_i$ [$_{CP}$ that [$_{TP}$ Mary saw t_i]]]

↑_____|

(13) …[$_\alpha$ *Op*$_i$ [$_{CP}$ C^0 […e_i…]]]… α = {XP, CP}

Adopting the analysis of clefts in Belletti (2009, 2015), Rizzi (2015) proposes that such {XP, YP} structures in cleft constructions are labeled as <FOC, FOC>: labeling via feature-sharing (Chomsky 2013) saves the structure α in (44) by identifying [FOC] features on Foc^0/C^0 and another [FOC] on the *Op*. Since labeling via feature-sharing requires Agree (Chomsky 2013), Rizzi and Belletti's analysis implicitly assumes that Foc^0 has [uFOC] and the clefted *Op* has [vFOC] to ensure Agree between Foc^0 and the *Op*.

A word of caution is necessary here regarding the distinction between "syntactic labels" and "what counts as *focus* at the interfaces." C in Japanese lacks [uFoc], and the operators only bear [vFOC] without any [uF]. An apparent problem we face is that {*Op*, CP} in Japanese cannot be labeled as <FOC, FOC> unlike in English. Given this, some might wonder how a clefted XP is interpreted as a "focus" in Japanese, since it does not obtain the <FOC, FOC> label through labeling via feature-sharing. In short, how does the interface interpret an XP without the <FOC, FOC> label as a focus in Japanese? I claim that "the label <FOC, FOC>" and "being interpreted as a focus" comprise two independent properties. That is, agreement between [uFOC] on Foc^0 (or C) and [vFOC] on an *Op* in [Spec, Foc^0] is not a necessary condition for focus interpretation in clefts. Labels are required for an SO to be interpreted at the interfaces, but this does not entail that an SO is interpreted according to its label. Just like the <φ, φ> label for TP (Chomsky 2013) and another <φ, φ> label for *v*P (Chomsky 2015), syntactic labels do not necessarily correspond to their semantic interpretation. Keeping the assumptions as neutral as possible, I assume that an XP is interpreted as a focus if it bears a focus feature. If this is on the right track, focal XPs in clefts can be properly interpreted as foci in Japanese, though it lacks the <FOC, FOC> label.

I focus on Hiraiwa and Ishihara's (2012) analysis that shares basic properties with Hoji's null operator movement analysis in involving A'-movement to the CP domain. Let us turn to the data. Hiraiwa and Ishihara (2012) claim that the clefted sentence in (10) is derived from the -no-da in-situ focus construction in Japanese in (11).

(14) [Naoya-ga t_i t_j age-ta no]-wa Mari$_i$-ni ringo$_j$-o dat-ta.
N.-NOM give-PAST NO-TOP M.-DAT apple-ACC COP-PAST
Lit. 'It was three apples to Mari that Naoya gave.'

[3] For problems of the verb-raising analysis, see Fukui and Sakai (2003) and Kobayashi (2015).

(15) Naoya-ga Mari-ni ringo-o age-ta no dat-ta.
N.-NOM M.-DAT apple-ACC give-PAST NO COP-PAST
'Naoya gave Mari apples.'

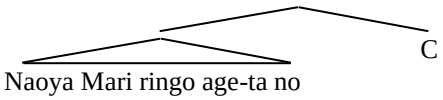
They assume that NPs undergo multiple focus movement to landing sites in the CP-layer, as exemplified in (12a). The remnant phrase headed by -no is then topicalized by internal merger, as in (12b).

(16) a. Mari$_i$-ni ringo$_j$-o [Naoya-ga t_i t_j age-ta no]
↑____↑_____|__|

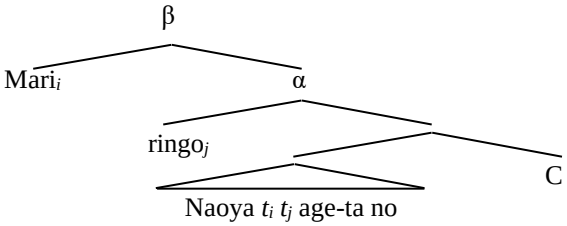
b. Remnant CP topicalization:
[Naoya-ga t_i t_j age-ta no]$_k$-wa [Mari$_i$-ni ringo$_j$-o [t_k datta]]
↑_____|

The {XP, YP} structure appears in (13a). When Mari-ni and ringo-o undergo movement, they create {XP, YP} structures, as illustrated in (13b). Further application of the topicalization in (13c) creates another {XP, YP}. Thus, α, β, and γ in (13c) are unlabelable, since they are all {XP, YP} structures.

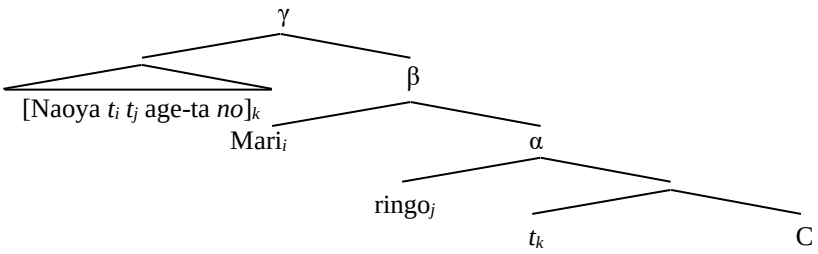
(17) a. Construct (11) *Naoya-ga Mari-ni ringo-o age-ta no-da*:[4]



b. Internal merge of *Mari$_i$-ni* and *ringo$_j$-o* in (13a) (Focus movement):



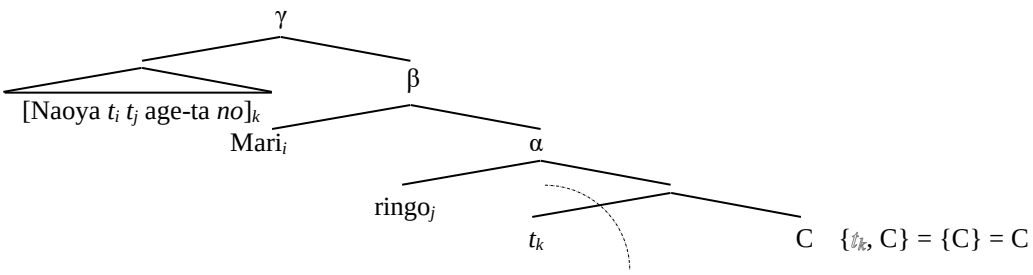
c. Internal merge of the remnant in (13b) (Remnant Topicalization):



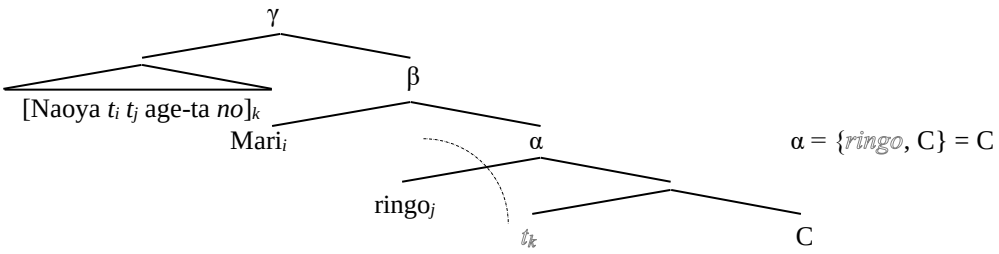
Let us examine how the current analysis overcomes the {XP, YP} problems in (13), which is schematically illustrated in (14). The proposal in (5) predicts that after C transfers its complement in (14a), the singleton set {C}, which is equivalent to its member C (Chomsky 2012, Takita et al. 2015) regains its property as a phase head. It then transfers its derived complement step-by-step, namely *ringo* in (14b) and Mari in (14c). As it reaches (14d), the structure is no longer of the form {XP, YP}. Minimal Search (LA) detects C head, and labels the node γ as CP when the whole structure is transferred.

[4] Since multiple elements undergo internal merger, traces and indices are put here for expository reasons.

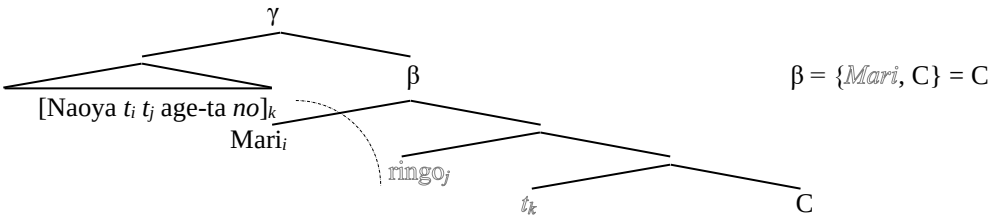
(18) a.



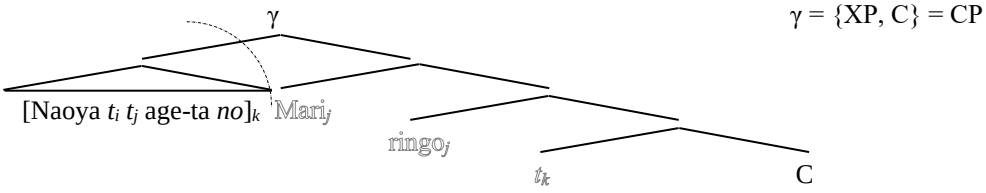
b. {C} = C, and Transfer *ringo$_j$*:



c. {C} = C, and Transfer *Mari$_i$*:



d. {C} = C: Label of γ is CP (irrelevant detail omitted):



On the other hand, such multiple Transfer is not available in English when it comes to operator constructions. Since Transfer must apply upon valuation of [uFoc] on C, the phase head C itself undergoes Transfer together with the whole CP. Since there is no phasal head left in the workspace, multiple merger of operators ends up in the unlabelable {XP, YP} structure.

3.2.2 *Comparatives with Multiple Loci* Next, we turn to comparatives. I assume with Kikuchi (1987) and Watanabe (1992) that Japanese -yori comparatives involve null-operator movement, which relates gaps in the -yori clause to the nominals that are loci of comparison outside of it. The contrast in (15) indicates that the construction is sensitive to island effects, which suggests that it involves null-operator movement from out of the -yori clause.

(19) a. *[Minna-ga [*Op$_i$*[***naze*** Paul-ga t_i yon-da ka]]
everyone-NOM why Paul-NOM read-PAST Q
siritagattei-ru yori] John-ga takusan-no hon-o yon-da.
want.to.know-PRES than John-NOM many-GEN book-ACC read-PAST
'John read more books than everyone wants to know why Paul read.'
(adapted from Watanabe 1992:277, cf., Kikuchi 1987:34)

b. [Minna-ga [Op_i [Paul-ga t_i yon-da to]] uwasasitei-ru yori]
everyone-NOM Paul-NOM read-PAST that rumor.do-PRES than
John-ga takusan-no hon$_i$-o yon-da.
John-NOM many-GEN book-ACC read-PAST
'John read more books than everyone rumors that Paul read.'

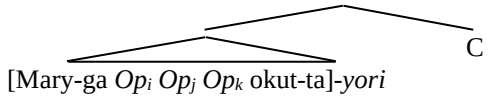
(Watanabe 2001:211)

Given this assumption, the schematic representations of (16a) with three loci of comparison will be something like in (16b). Why is such multiple construction possible in Japanese, but not in English? The proposal in (5) predicts that Transfer applies more flexibly in Japanese, rendering C to regain its property as a phase head as it Transfers its complement Ops iteratively.

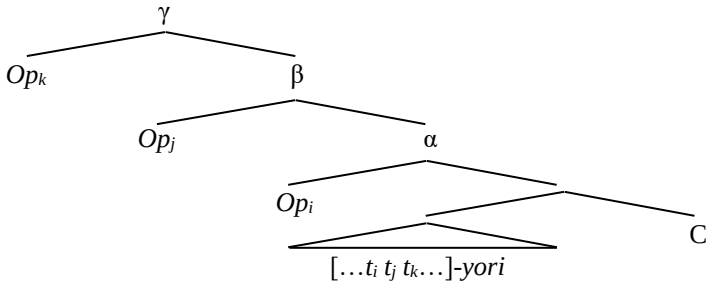
(20) a. John-wa [Mary-ga *Op$_i$ Op$_j$ Op$_k$* okut-ta]-yori [ooku-no
J.-TOP M.-NOM send-PAST-than many-GEN
ronbun]$_i$-o [ooku-no shuppansya]$_j$-ni [yasui sooryoo]$_k$-de okut-ta
paper-ACC many-GEN publisher-to cheap fee-at send-PAST
'John sent more articles to more publishers at cheaper shipping charges than Mary did.'
b. …[$_{CP}$ *Op$_i$ Op$_j$ Op$_k$* [Mary-ga t_i t_j t_k okut-ta]]-yori …
↑__↑__↑_____|_|_|

The tree diagrammatic representation of a possible derivation under the current analysis is depicted in (17). After operators are internally merged to the edge of C in (17a-c), it starts transferring its complements consecutively, as illustrated in (18).

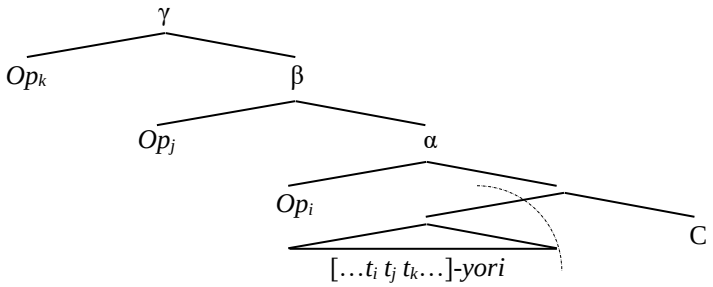
(21) a. Merger of C to the *-yori* clause:[5]



b. Internal merger of *Op*s:



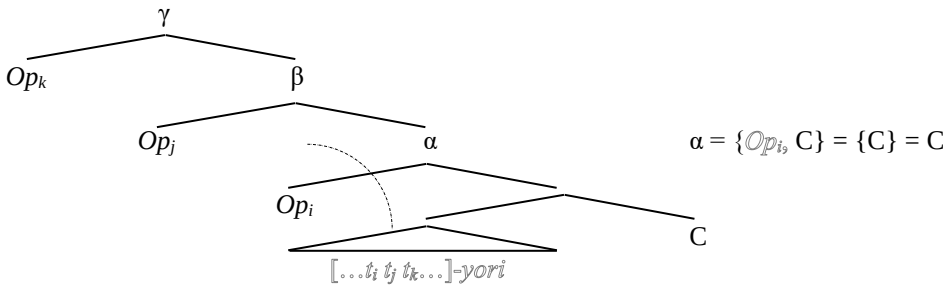
(22) a. Transfer of *yori*P:



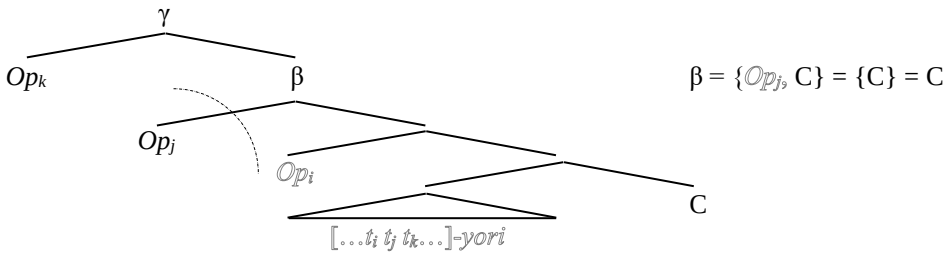
{C} = C

[5] Again, traces/indices are only for expository reasons.

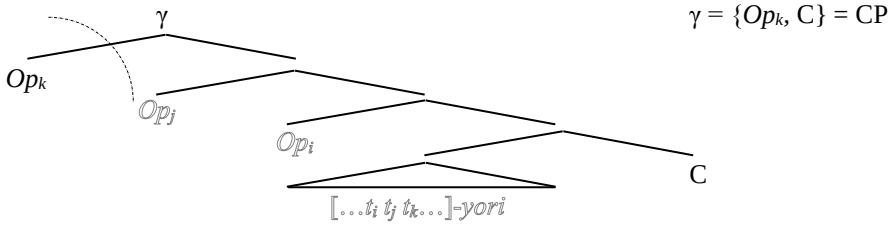
b. {C} = C, and Transfer Op_i



c. {C} = C, and Transfer Op_j



d. {C} = C: Label of α is CP (irrelevant detail omitted):



English, on the other hand, cannot make use of such multiple Transfer. The proposal in (5) correctly predicts that such multiple loci of comparison in comparative constructions are labelable and available in Japanese.

4 Conclusion

I proposed that the lack of [uF] in Japanese allows it to apply Transfer in a much less restricted form in terms of its Timing (Fukui and Kasai 2004). Following the idea of Takita et al. (2015) and others that Transfer contributes to labeling, I have demonstrated that the proposal in (17) overcomes several {XP, YP} problems in Japanese with no recourse to Saito's (2014, 2016) anti-labeling features. I will conclude the paper by mentioning a remaining issue to be examined in future research. It concerns how different kinds of movement are distinguished in the current theory with the assumption that move comprises internal merge. Clefts differ from scrambling in that the movement involved in the former is considered to be focus movement, which does not allow reconstruction in (57).

(23) *Taro-ga [Hanako-ga t_i tabe-ta ka] siritagattei-ru no-wa nani$_i$-o da.
T.-NOM H.-NOM eat-PST Q want.to.know-PRS NM-TOP what-ACC COP
'It was what that Naoya wants to know Mari ate.'

(Hiraiwa and Ishihara 2012:158)

Under the current Minimalist theory, movement is an instance of (internal) merge, so it is likely that focus movements are also instances of internal merger. The fundamental properties of the focus movements must not be neglected, however. I could not have reached a satisfactory answer to this issue yet, since it requires tackling a fundamental question as to how A-movement, A'-movement, and their differences should be treated under the current Minimalist Program. All I can say at this juncture is that both clefts and scrambling create {XP, YP} structures. If this is the case, then these movements pose a problem to

Chomsky's (2013, 2015) labeling algorithm. Nevertheless, further research is needed on this issue.

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Feature Splitting Lexical Insertion in Tough Constructions

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1 Introduction

We explore an extension of the Move-F hypothesis, whereby operations affect only those features that enter into checking (Chomsky 1995). In this view, Pied-piping a whole category is tied to the nature of Spell-Out: Spell-Out cannot apply to isolated features and other scattered parts of words. Let us assume that a lexical item (LI) is composed of 3 feature matrices as in (1).

(1) a. Formal Features {FF} (= phi/agreement/Case features)
b. Semantic Features {SemF}
c. Phonological Features {PhF}

According to the Move-F hypothesis, {FF} are attracted by a probe/target, as shown in (2).

(2) [$_{CP}$ C [$_{IP}$ you bought {**SemF,PhF,** **FF**}$_{\textbf{what}}$]]

The rest of the LI pied-pipes to a position adjacent to {FF}, prior to Spell-Out (Agbayani and Ochi 2006). Pied-piping of {SemF, PhF}, shown in (3), has the effect of restoring the 'lexical integrity' of the item whose formal features are displaced.

(3) [$_{CP}$ {**FF**}$_{\textbf{what}}$-C [$_{IP}$ you bought {**SemF,PhF,** }$_{\textbf{what}}$]]

We assume with Chomsky (1995) that lexical integrity must be satisfied on the PF side of the derivation.

(4) "... it is properties of the phonological component that requires such pied-piping. Isolated features and other scattered parts of words may not be subject to its rules, in which case the derivation is canceled; or the derivation might proceed to PF with elements that are "unpronounceable," violating FI."
(Chomsky 1995: 262-263)

As shown in (5), lexical integrity of LI is restored after movement of {SemF,PhF} (to the CP region in this case).

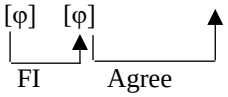
(5) [$_{CP}$ {**SemF,PhF**}$_{\textbf{what}}$ {**FF**}$_{\textbf{what}}$ C [$_{IP}$ you bought **what**]]
[lexical integrity satisfied]

* We thank the participants of WECOL2020 and Comparative Syntax and Language Acquisition Workshop (CSLA) #11 (February 21, 2021 at Nanzan University) for useful comments. The research is financially supported by the Grants-in-Aid for Scientific Research (C) (No. 17K02809 & No. 20K00679), the Ministry of Education, Culture, Sports, Science, and Technology of Japan.

Proceedings of *WECOL 2020*

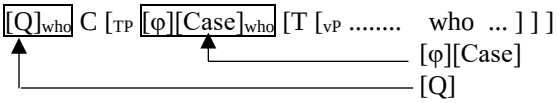
Move-F was abandoned by Chomsky (2001) in favor of Agree, which does not involve feature splitting. However, we believe that the evidence against Move-F was simply inconclusive. In fact, feature splitting operations thrive in recent syntactic theorizing. For example, Aoun and Nunes (2007) offer an analysis of the so-called vehicle change phenomena (see Fiengo and May 1994) in terms of feature movement. Further, Feature Inheritance (FI) of Chomsky (2008) is clearly an instance of feature splitting, as illustrated in (6).

(6) $[_{CP}$ C $[_{TP}$ T $[_{vP}$ ..... DP ...]]]



Also, Obata and Epstein (2011, 2012) analyze improper movement and *tough*-constructions in terms of feature splitting operations, as illustrated in (7).

(7) Who left?



In light of this theoretical background, we explore an aspect of Move-F not shared by Agree: If Move-F is available, then the computational system can split a LI, allowing its subparts to be scattered in the course of the derivation for both *Internal Merge* (= Movement) and *External Merge* (= Lexical Insertion). We show that this feature splitting yields fruitful results for *Tough* Constructions (TC).

2 Feature splitting lexical insertion – Tough Constructions (TC)

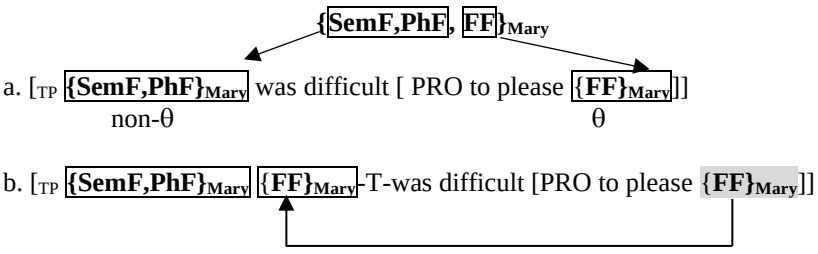
As stated above, if Move-F is part of UG, then the computational system can split a LI, allowing its subparts to be scattered in the course of the derivation for both *Internal Merge* (= Movement) and *External Merge* (= Lexical Insertion). Consider *Tough Constructions* (TC) under this perspective.

(8) Mary_1 was easy/tough/difficult to please e_1

Two major lines of approach to TCs can be found in the literature. One line of approach, including Rosenbaum (1967), Postal (1971), Hicks (2009), Hartman (2011), and Obata & Epstein (2012), posits that the TC subject is a derived subject (although details of those analyses differ considerably). The other line of approach to TC (e.g., Lasnik and Fiengo (1974), Chomsky (1977, 1981), Rezac (2006) etc.) holds that the TC subject is base-generated in the matrix subject position (again, details differ among those in this camp). As will be demonstrated below, our analysis is a hybrid of the two: it posits a movement dependency between the TC subject and the gap, while the substantial part of the TC subject is base-generated in the matrix subject position.

To derive (8), we propose that: (a) *Mary* is pulled from the Lexical Array; (b) Features comprising *Mary* are split up, with $\{\text{SemF,PhF}\}_{\text{Mary}}$ inserted in the matrix clause and $\{\text{FF}\}_{\text{Mary}}$ in the infinitival clause; and (c) $\{\text{FF}\}_{\text{Mary}}$ moves to the matrix clause to be reunited with $\{\text{SemF,PhF}\}_{\text{Mary}}$. (9) roughly illustrates this derivation (see (13) and (14) for a more precise illustration of the derivation).

(9)



FF-movement helps to create a "derived predicate" consisting of the TC predicate and the embedded clause, with the moved FF (adjoined to matrix T) translated into a λ-operator that binds a variable in the gap position. In effect, we are implementing Rezac's (2006) idea (binding of a null pronoun (*pro*) in the infinitival clause, mediated by an Agree relation with the matrix T) in terms of FF-movement instead of Agree.

(10) $[_{TP}$ **{SemF,PhF}$_{Mary}$** {**FF**}$_{Mary}$-T-was difficult [PRO to please {**FF**}$_{Mary}$]
[Mary [λx. [T-was difficult [PRO to please x]]]]

Several questions immediately arise.

(11) a. If a single lexical item is split up and externally merged into those positions, how is the Case property satisfied?
b. Is this feature splitting derivation an option or is it mandatory for deriving TCs?
c. Can the split lexical insertion operate in the other direction, so that {FF} is merged into the TC subject position and {SemF,PhF} is merged into the embedded clause?

Let us start with (11a). Suppose that arguments are all DPs, whether complex or (seemingly) simplex. In particular, a proper name may have an overt determiner in some languages such as Portuguese.

(12) A Maria saiu. (Portuguese)
the Maria left
'Maria left.' (Hornstein et al. 2005)

We assume that English proper names are also headed by a null D head. Notice now that N (= *Mary*) also has {FF}, which we think can participate in Case relations: See Corver (1992) and Bošković (2008) for the view that UG allows NPs as well as DPs to function as arguments.

Now let us reconsider the derivation of (8) in this light. As shown in (13), after the null D and the N (= *Mary*) are merged, feature splitting applies to D. As shown in (14), FF of this null D is merged inside the embedded clause and the rest of (13), consisting of {SemF,PhF}$_D$, and {SemF,PhF,FF}$_{Mary}$, is merged into the matrix clause.

(13) $[_{DP}$ D$_\varnothing$ $[_{NP}$ Mary]]
{SemF,PhF}$_D$ **{FF}$_D$**

(14) [[**{SemF,PhF}$_D$, {SemF,PhF,FF}$_{Mary}$**] T-was difficult $[_{CP}$ PRO to please {**FF**}$_D$]]
NOM ACC

As mentioned above, we have two sets of {FF} in this representation, one for the null D and the other for *Mary*. We assume that *please* and {FF}$_D$ enter into a Case relation in the embedded clause. As for the Case relation in the matrix clause, we propose that the finite T head enters into a Case relation with {FF} of *Mary*, which enables the T head to assign nominative Case to it. Note that we assume that {FF}$_{Mary}$ is visible for T because, even though the D layer is present above the N *Mary*, the former lacks {FF}. In effect, we assume that the subject nominal has the label of N, assuming that D lacks a categorial feature. This is how a single argument is seemingly doubly Case marked: When the D head of a DP argument undergoes feature splitting, two sets of {FF} become available for Case relations.

Note that the way feature splitting operates in (13) is not something specific to feature splitting lexical insertion: it is also how features are split up in the case of Internal Merge (IM). Consider A-movement of *Mary* in (15a). {FF} of D undergoes feature movement to the position of the T head (15b), and the rest of the object DP pied-pipes so that lexical integrity is restored (15c).

(15) a. Mary was arrested.

b. [$_{TP}$ {FF}$_D$-T [$_{VP}$ was arrested {{SemF,PhF, FF}$_D$, {FF,SemF,PhF}$_{Mary}$}]]

c. [$_{TP}$ [$_{T'}$ {FF}$_D$-T [$_{VP}$ was arrested {{SemF,PhF, FF}$_D$, {FF,SemF,PhF}$_{Mary}$}]]]

Now we would like to relate the current discussion about Case to the issue in (11b) and say that the feature splitting derivation as depicted in (9) is in fact mandatory for deriving TCs. Consider the non-feature splitting derivation in (16), in which the entire DP *Mary* is inserted into the embedded clause (and undergoes movement to the matrix clause).

(16) *[$_{TP}$ **{FF}$_D$** T-was difficult [PRO to please {**FF, SemF,PhF}$_D$, {FF,SemF,PhF}$_{Mary}$**]]

This derivation is excluded because the FF-movement of the D head from the embedded clause to the matrix clause has no driving force. First, {FF} of D has its Case property satisfied in the embedded clause. It thus has no Case reasons to move. Second, recall that the FF-movement in (9) is driven by the need to restore lexical integrity. But the FF-movement is not motivated for this reason here, as lexical integrity is observed without movement of FF. At the same time, the matrix T has Case to assign (it also has an EPP property to be satisfied). The only legitimate derivation when the entire DP *Mary* is introduced as a unit into the embedded clause is to merge the expletive *it*, which gives rise to the following:

(17) It was difficult to please Mary.

Let us turn to question (11c) by considering the derivation in (18), with {FF}$_{Mary}$ inserted in the matrix clause and {SemF,PhF }$_{Mary}$ in the infinitival clause. Note that in order to simplify the discussion, we continue to pretend as if *Mary* is split up, although it is actually the D head that undergoes feature splitting.

(18) * **{ FF, SemF,PhF }$_{Mary}$**

[$_{TP}$ **{ FF }$_{Mary}$** was difficult [PRO to please { **SemF,PhF }$_{Mary}$**]]

θ

We will see empirical reasons for excluding this type of derivation in the next section. For now, let us say that such a derivation is blocked for θ-theoretic reasons. If θ-relations reduce to formal feature assignment/checking (see Hornstein 2001), {FF} should be merged into the gap position, which is a θ-position, rather than the TC subject position, which is commonly assumed to be a non-θ-position.

In the next section, we demonstrate that our split lexical insertion hypothesis can derive several properties of TC constructions.

3 Deriving the properties of TC

3.1 *Inability to appear in "anti-pronominal" contexts* As noted by Cinque (1990) and Rezac (2006), TC shows sensitivity to so-called "anti-pronominal" contexts, which refer to positions that cannot host a pronominal element. There are a number of such contexts (see Postal 1993), but here we take up two of them, shown in (19) and (20). (19) is an example of change-of-color contexts in the sense of Postal (1998). As (19a) shows, the NP slot following the direct object and designating changes of color does not tolerate a definite pronoun even when its reference is salient enough in the context. Importantly, (19b) shows that the TC gap cannot occur in such a position. Similarly, the second object position in the dative construction cannot host a pronoun, as shown in (20a). Once again, the TC gap cannot occur in such a position (20b).

(19) a. It is easy to paint this house {this color/green/*it}.
b. *{This color/Green}$_1$ is easy to paint this house e$_1$. (Poole et al. 2017)

(20) a. It is not easy to give (even) that man {those books/*it/*them}.
b. *Those books$_1$ are not easy to give (even) that man e_1. (Lasnik and Fiengo 1974)

Based on such data, Cinque (1990) and Rezac (2006) propose that TC shows AC effects because the TC gap is a *pro* (21a). But an overt pronoun cannot occur in place of the gap (21b), which casts some doubt on their proposal.

(21) a. Mary$_1$ was easy [to please *pro*$_1$]
b. *Mary$_1$ was easy to please her.

Let us characterize anti-pronominal contexts as syntactic positions that demand full-fledged material. By "full-fledged" material, we mean an item such as an R-expression whose semantic content is sufficiently rich. We assume that pronouns do not qualify as "full fledged" as they possess {FF} and {PhF} but arguably lack most if not all of {SemF} (see Oku 1998 and Reuland 2011). Given this, our feature splitting analysis of TC offers a natural account of this restriction. As shown in (22), what is merged into the gap position is nothing but a set of formal features. Importantly, {FF} is even less contentful than ordinary pronouns as the latter presumably have minimal {SemF} in addition to {FF}. Hence, {FF} does not count as full-fledged in the above sense.

(22) * $\boxed{\{\text{SemF,PhF}\}_{\text{green}}}$ T-is easy [to paint this house $\boxed{\{\text{FF}\}_{\text{green}}}$]
AC

Note that our analysis accommodates the ungrammaticality of (21b) straightforwardly. What is merged into the gap position is {FF} of *Mary*. Consequently, no pronunciation can be assigned to it.

3.2 *Absence of reconstruction effects* It has been noted that reconstruction effects are absent in TC (Postal 1974, Rezac 2006, Fleisher 2013). For instance, (23a) and (23b) from Postal (1974) are not synonymous.

(23) a. Nothing$_1$ is hard (for Melvin) to lift e_1.
≠ b. It is hard (for Melvin) to lift nothing.

Our analysis, in which only {FF} is externally merged within the TC complement clause, can offer a principled explanation for this restriction if aided by Lasnik's (1995) proposal that features relevant for scope (and binding) are included in {SemF}, but not in {FF}.

(24) $\boxed{\{\textbf{SemF,PhF}\}_{\textbf{nothing}}}$ T-is hard [PRO to lift $\boxed{\{\textbf{FF}\}_{\textbf{nothing}}}$]

Lasnik's (1995) proposal is based in part on a paradigm like the following.

(25) a. Someone$_1$ seems to himself$_1$ [t_1 to be in the room].
b. *There seems to himself$_1$ to be someone$_1$ in the room.

(26) and (27) show the derivations of (25a) and (25b), respectively. While {FF}-movement takes place in both cases, (25a) has the additional category movement and, importantly, the anaphor *himself* is licensed in this example but not in the other example. Lasnik took this observation as an indication that the features of *someone* relevant for binding do not reside in the {FF} of *someone*. Rather, they must be part of the {SemF} of *someone*.

(26) a. {FF}-movement

$[_{TP}$ **{FF}**$_{someone}$-T seems to **himself** [{**SemF**,PhonF, _}$_{someone}$ to be in the room]]

b. Pied-piping

$[_{TP}$ **{FF}**$_{someone}$-T seems to **himself** [**{SemF**,PhonF, }$_{someone}$ to be ....]

(27) {FF}-movement only

$[_{TP}$ there **{FF}**$_{someone}$-T seems to **himself** [{**SemF**,PhonF, _}$_{someone}$ to be in the room]]

Returning to (23), {SemF} of *someone* are not part of the embedded clause throughout the derivation. This explains why (23a) and (23b) are not synonymous.[1]

Similarly, our analysis explains why the TC subject cannot be an idiom chunk (Lasnik and Fiengo 1974).

(28) a. *Tabs$_1$ are easy to keep e_1 on Mary.
b. *Advantage$_1$ was easy to take e_1 of Bill.

Let us assume with Chomsky (1995) that an idiomatic expression (e.g., *keep tabs on*, *take advantage of*) must form a syntactic unit at some point in the derivation. Under our analysis, only {FF} of an idiom chunk are merged with the rest of the idiomatic expression. {SemF} of such idiom chunks, which play an important role in the requirement for idioms, are never part of the embedded clause.

(29) *{SemF,PhonF}$_{tabs}$ are easy [to keep {FF}$_{tabs}$ on Mary]

Recall that we suggested in the previous section that the 'reverse' lexical insertion scenario as depicted in (18) should be excluded for θ-theoretic reasons. Here we have empirical reasons for rejecting such a derivation. If such derivation were available, we would lose an account of (23) and (28). What is crucial for our analysis is that {SemF} of TC are always merged in the matrix clause.

3.3 *Incompatibility with ECM subject position* Our analysis also explains why the TC gap cannot occur in an ECM subject position (Postal 1974).

(30) *Mary$_1$ was tough (for anyone) to find [e_1 to be competitive]

Here we adopt Lasnik's (2001) argument from Pseudogapping that {FF} by itself cannot satisfy the EPP. Lasnik proposes that Pseudogapping is derived via object raising followed by VP Ellipsis.

[1] A question may arise as to how the selectional property of the embedded clause predicate is satisfied in our analysis. For example, *Water is easy to please* is odd for the same reason that *It is easy to please water* is. The object of *please* should be [+ animate], but since only FF originates in the embedded clause under our analysis, there is no way to distinguish this type of example from good cases of TCs in which the selectional property is satisfied (thanks to Satoshi Oku (p.c.) for raising this issue). While the issue merits further scrutiny, we believe that it is not something specific to our analysis. For example, if we adopt a traditional approach to relative clause examples such as *the book which$_i$ John read t_i*, where the relative operator moves within a relative clause, the same issue about selection arises.

(31) You might not believe me but you will Bob. (Pseudogapping)

(32) [$_{Agr\text{-}sP}$ you [$_{TP}$ will [$_{VP}$ V [$_{Agr\text{-}oP}$ Bob$_i$ [$_{\sout{VP}}$ ~~believe t_i~~]]]]]

Assuming that {FF}$_{believe}$ moves to the higher V slot, movement of {SemF,PhonF}$_{believe}$ to the higher V position is obligatory in non-elliptical structures because {SemF,PhonF}$_{believe}$ would be PF-defective as it has not been reunited with {FF}$_{believe}$:

(33) a. *.... but you will Bob believe.

b. [$_{Agr\text{-}sP}$ you [$_{TP}$ will [$_{VP}$ {FF}$_{believe}$-V [$_{Agr\text{-}oP}$ Bob$_i$ [$_{VP}$ {SemF,PhonF,_}$_{believe}$ t_i]]]]]

Deletion renders the offending element invisible to the PF interface, so there is no PF crash in (32).

(34) [$_{Agr\text{-}sP}$ you [$_{TP}$ will [$_{VP}$ {FF}$_{believe}$-V [$_{Agr\text{-}oP}$ Bob$_i$ [$_{VP}$ {SemF,PhonF, _}$_{believe}$ t_i]]]]]

Importantly, Lasnik points out that VP-ellipsis without pied-piping of the entire subject DP is impossible, as shown in (35b), which indicates that satisfaction of the EPP property demands a full category. The derivation of this example depicted in (36) does not meet this demand.

(35) a. Mary said she can't swim, even though she (really) can [$_{VP}$ ~~*t* swim~~].
b. *Mary said she can't swim, even though (really) can [$_{VP}$ ~~she swim~~]

(36) *[$_{TP}$ (really) {FF}$_{she}$-T$_{can}$ [$_{VP}$ {SemF,PhF, _}$_{she}$ swim]

Returning to TC constructions, we would then predict that (30) (= (37a) below) is bad because {FF}$_{Mary}$ alone cannot satisfy the EPP.[2]

(37) a. *Mary$_1$ was tough (for anyone) to find [e_1 to be competitive]

b. {SemF,PhonF}$_{Mary}$ T-was tough [to find [{FF}$_{Mary}$ to be {FF}$_{Mary}$ competitive]]

Two comments are in order here. First, we assume that a good instance of TC such as (38) below has PRO in the spec TP position of the embedded clause, which can satisfy the EPP property.

(38) Mary$_1$ was tough [PRO to please e_1].

There is evidence that PRO is in the spec of TP. According to Lobeck (1990) and Saito and Murasugi (1990), a functional head F can license ellipsis of its complement when F undergoes spec-head agreement. For

[2] Insertion of an expletive into this EPP position does not lead to improvement, as shown in (i) (thanks to Shintaro Hahashi (p.c.) for raising this issue). We assume that such an example is ruled out as the expletive *it* requires a finite CP as associate.

(i) *Mary$_1$ was tough (for anyone) to find [it to be e_1 competitive]

instance, the [+wh] C in (39a) licenses TP-ellipsis whereas the [-wh] C (= *that*) in (39b) does not. Similarly, the tensed T in (40a) licenses VP-ellipsis but the raising T does not (39b).[3]

(39) a. John met someone, but I don't know who [$_{C'}$ C *e*]
b. *John believes that Peter met someone, but I don't think [$_{C'}$ that *e*].

(40) a. John praised Susan, and Kate [$_{T'}$ did *e*], too.
b. *It seems that John knows French, but Mary doesn't seem (to me) [$_{T'}$ to *e*]

And as Bošković (1997) points out, control infinitival T does license VP-ellipsis, which indicates that it undergoes spec-head agreement with PRO.

(41) John didn't pass the exam, although he tried [$_{T'}$ PRO to *e*].

Second, the TC gap in a Small Clause (SC) complement yields a better result (Postal 1974), suggesting that there is no comparable EPP position in SCs.

(42) Mary$_1$ was tough (for anyone) to find e_1 competitive. (SC)

Independent evidence for the absence of an EPP position in SCs is offered by Johnson (2004), who points out that predicate inversion is possible with ECM but impossible with SCs. (43a-b) serve as the baseline data for (43c-d), which involve predicate inversion. According to Johnson, the ECM clause in (43c) has an extra specifier position (the spec of TP) to which the inverted predicate *the real problem* can move, as shown in (44a). (43d) is bad because the SC has no comparable specifier position (44b).

(43) a. They consider me to be the real problem. (ECM)
b. They consider me the real problem. (SC)
c. They consider the real problem to be me. (ECM + Predicate Inversion)
d. *They consider the real problem me. (SC + Predicate Inversion)

(44) a. They consider [$_{TP}$ the real problem$_i$ to be [$_{XP}$ me [t_i]]]

b. *They consider [$_{XP}$ me [the real problem]]]]

Our analysis goes beyond ECM. It can explain why the TC gap cannot occur in a subject position (45a) or in a passive clause (45b). As shown in (46a, b), the EPP property of the infinitival clause cannot be satisfied in those cases.

(45) a. *John$_i$ is easy [e_i to please Mary]
b. *John$_i$ is easy [to be pleased e_i]

(46) **{SemF,PhF, FF}$_{John}$**

a. {SemF,PhF}$_{John}$ T is easy ... [$_{TP}$ {FF}$_{John}$ to$_{\mathbf{EPP}}$ [$_{vP}$ {FF}$_{John}$ please Mary]]

[3] We assume that the raising T has the EPP-property, which is satisfied in (i) when *Mary* passes through the spec of the embedded TP. As discussed in this section, however, satisfaction of the EPP property does not reduce to feature checking.

(i) Mary$_1$ seems [$_{TP}$ t_1 to [t_1 know French]].

b. $\boxed{\{SemF,PhF\}_{John}}$ T is easy ... [$_{TP}$ $\{FF\}_{John}$ to$_{\mathbf{EPP}}$ [$_{vP}$ be pleased $\boxed{\{FF\}_{John}}$]]

3.4 *Phase boundedness* One prominent approach to TC is to posit A-bar movement, for instance null operator movement, in the TC embedded clause (47). Island evidence (e.g., (48)) has often been taken to suggest A-bar movement in TCs (Chomsky 1977):

(47) Mary$_1$ was difficult [$_{CP}$ *Op$_1$* [$_{TP}$ PRO to please *t$_1$*]]

(48) *John$_1$ would be difficult to convince Mary that [pictures of *t*$_1$] should go on sale.

And yet, it was observed by Postal (1974) (see also Grano and Lasnik 2018) that the TC complement cannot embed a finite clause.

(49) *Mary$_1$ was difficult to believe that John met *e*$_1$.

Postal (1974) characterizes this locality restriction by saying that the TC subject and the gap must be "quasi-clause mates": no finite clause boundary should separate the two positions. We think that Postal's (1974) observation deserves renewed attention. (48), for example, is ungrammatical simply because the TC subject and the gap are not quasi-clause mates.

Some discussion is in order regarding two movement-based analyses of TC which have been explored in previous work: The null operator analysis and the direct movement analysis. The null operator analysis wrongly predicts a Principle C violation: The *wh*-trace behaves like an R-expression (Chomsky 1981, Browning 1987). What about direct movement of the matrix subject? Direct movement gives rise to improper movement (*A-bar Movement > A-Movement), which should be ungrammatical.

(50) Mary$_1$ was difficult [$_{CP}$ *t$_1$* [$_{TP}$ PRO to please *t$_1$*]]
* A-Movement A-bar Movement

(51) *John$_1$ seems [$_{CP}$ *t$_1$* that [$_{TP}$ Bill likes *t$_1$*]]
* A-Movement A-bar Movement

Furthermore, Obata & Epstein's (2011, 2012) two-step feature splitting Internal Merge (movement) analysis of TC still gives rise to the improper movement scenario (see also Bruening 2012, Hicks 2009).

Feature Splitting External Merge in 'Tough' environments could avoid the problems associated with improper movement in the following way. Suppose that we adopt Chomsky's (1981) conjecture that TC undergoes reanalysis by which the *tough* predicate and the infinitival *to + predicate* form a complex predicate of some sort (52a). Thus, (8) may be analyzed as in (52b) after reanalysis.

(52) a. [$_{AP}$ easy [PRO to please]] → [$_{AP}$ [$_{A}$ easy-to-please]] (Zwart 2012)
b. [$_{TP}$ Mary$_1$ was [$_{AP}$ [$_{A}$ easy-to-please]] *e*$_1$]

This line of analysis allows us to strengthen Postal's (1974) statement by replacing "quasi-clause mates" with "clause mates". With this, we propose to capture the ill-formedness of examples such as (49) in terms of the following general restriction on feature splitting:

(53) *Derivational Lexical Integrity*
Features belonging to the same LI must be affected simultaneously.

Split lexical insertion is a single operation: It targets a lexical item, splits it into subparts, and merges them into two distinct positions. Since this is a single operation, feature splitting and lexical insertion must take place all at once. Given Chomsky's (2008) conception of syntactic simultaneity, (53) effectively restricts the domain of feature splitting lexical insertion to a single *phase* domain (Chomsky 2008). Let us set aside a *v*P phase and assume that a finite CP constitutes a phase.

Here is how (53) excludes (49) while ruling in (52b). One crucial difference between the two cases is that a phase boundary separates the TC subject and the gap in the former but not in the latter. In the latter case, therefore, the feature bundles of *Mary* (or the null D) can be manipulated simultaneously (54).

(54) $\{\boxed{\text{SemF,PhF}},\boxed{\text{FF}}\}_{\text{Mary}}$

$[_{\text{TP}}$ was $[_{\text{AP}}\ [_{\text{A}}$ easy-to-please$]]$ $]$

But the situation is crucially different for (49). As (55) shows, $\{\text{FF}\}_{\text{Mary}}$ and the rest of the category cannot be inserted simultaneously because they must be introduced into separate phase domains.

(55) a. $\{\text{SemF, PhonF, FF }\}_{\text{Mary}}$

$[_{\mathbf{CP}}$ that John met $\boxed{\{\text{FF}\}_{\text{Mary}}}$ $]$

b. $\{\text{SemF, PhonF, }\}_{\text{Mary}}$

$[_{\text{TP}}$ was difficult [to believe $[_{\mathbf{CP}}$ that John met $\boxed{\{\text{FF}\}_{\text{Mary}}}$ $]]$

Obviously, our analysis generates many questions that need to be addressed. In particular, since our analysis posits FF-movement from the embedded clause to the T head in the matrix clause, questions naturally arise about the absence of "defective intervention" effects. In (56), for example, FF-movement to the matrix T head crosses the embedded PRO subject and the PP *for us*.

(56) a. Fat is hard for us to avoid.

b. $[\mathbf{\{SemF,PhF,\ \}_D}, \mathbf{\{SemF,PhF, FF\}_{Fat}}]$ T-is hard [for us] $[_{\text{CP}}\ [_{\text{TP}}\ \boxed{\text{PRO}}$ to avoid $\{\mathbf{FF}\}_{\mathbf{D}}]]$

Note that PRO may or may not be an intervener depending on how reanalysis works: see (52b). More generally, Bruening (2014) suggests that there are no defective intervention effects in TC (and beyond), contrary to Hartman (2011), who provides data such as (57) as evidence for defective intervention effects in TCs. (58) from Bruening (2014) poses a problem for such an account. As Bruening notes, placing an experiencer PP to the left of the *tough* predicate (but to the right of the TC subject) leads to improvement.

(57) Sugar was very hard (*on me) to give up. (Hartman 2011)

(58) Sugar is for many people difficult to give up. (Bruening 2014)

If we accept Bruening's (2014) overall conclusion that defective intervention has no place in the theory of grammar, one cannot dismiss the one-step movement analysis advocated here by saying that the postulated FF-movement crosses potential interveners.

4 Conclusion

The split lexical insertion hypothesis offers a comprehensive analysis of TC, deriving some of its crucial properties. As noted at the outset, our analysis is a hybrid of two prominent approaches to TC: it postulates movement from the embedded clause to the matrix clause (as in Hicks (2009)) while also base-generating the substantial part of the TC subject in the matrix clause (see Chomsky (1977), Rezac (2006)).

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A Comparative Study on Attachment of English and Mandarin Relatives

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1 Introduction

The attachment of Mandarin relative clauses is ambiguous when there is more than one nominal phrase after it. For instance, in (1), the relative clause "da yumaoqiu de" (play badminton de) can be attached to both "Xiaoli" (Lee, low-attachment NP) and "nver" (daughter, high- attachment NP). Overall, the higher NP "nver" is prefered for Chinese speakers.

(1) [da yumaoqiu de]RC Xiaoli de nver
[play badminton COMP] Lee GEN daughter
"The daughter of Lee who plays badminton".

2 Comparative Analysis

When it comes to languages with pre-nominal relative clauses, the experiment carried out by Kamide & Mitchell (1997: 249) shows that a significant high attachment preference with 66% among Japanese speakers ($p < .015$). Kayne (1994) proposes the promotion analysis (see also Yun et al. 2015: 120, etc.), which argues that RC head moves from the gap to RC head position directly, especially for pre-nominal relative clauses because they don't have overt relative pronouns. Huang, Li & Li (2009: 218) proposes the Chinese modification structure: as shown in (2) - (3), where all the modification elements stand before the DP or NP head. In terms of pre-nominal Chinese relative clauses, they can occur at any position among I-III.

(2) Mod + Mod + Mod +…+NP/DP

(3) I + Demonstrative + II + Number + Classifier + III + Noun

Furthermore, the position of Chinese relative clauses is more flexible than that of English ones. For instance, Chinese relative clauses can stand between the first NP and the second NP, as shown in (4)-(5). However, English relatives cannot, as shown in (6)-(7).

(4) chi wufan de Ming de pengyou
eat lunch COMP Ming GEN friend
"the friend of Ming who eats lunch". (high/low attachment)

(5) Ming de chi wufan de pengyou
Ming GEN eat lunch COMP friend
"the friend of Ming who eats lunch". (high attachment)

(6) the friend of Ming who eats lunch (high/low attachment)

(7) * the friend who eats lunch of Ming

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3 Summary

The fact that Chinese RC and other nominal modifiers, all stack before the head NP without a strictly fixed order, provides Chinese speakers with a bias towards the final NP head as a parsing strategy. That is to say, the first NP could be easily treated as a modifier for the second NP, instead of as a head noun itself. In contrast, English RCs are fixed and post-nominal (Adj + NP + RC), which means only RC is after the NP; while other modifiers are pre-nominal. Therefore, the NP immediately before RC is more likely to be treated as the head. With the demonstratives, numbers and classifiers, the attachment interpretation might be shifted, on which further experiments can be carried out in future studies.

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An Analysis of Hidatsa Mid Vowel Duration

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1 Introduction

The consensus on the Hidatsa[1] phonetic inventory has generally been that it has 5 vowels, */a/, /e/, /i/, /o/ and /u/,* and 2 diphthongs */ia/ and /ua/,* and that vowel length is phonemically contrastive for high vowels, */i/ and /u/,* and the low vowel */a/*. However, there is dispute about whether the mid-vowels, /e/ and /o/, contrast in length. Boyle (2007) asserts that mid vowels in Hidatsa are "...relatively rare and usually long...:" and that for all Hidatsa vowels, "[l]ength… is phonemic"). Conversely, Park (2012) states that only the "[v]ocalic length of high and low vowels is phonemic".

Our aim in this paper is to resolve this question using data that we have collected by measuring mid-vowel duration.

2 Methodology

We used Praat, phonetics software (Boersma & Weenink 2018), to analyze recordings of Hidatsa words containing mid-vowels, from the dictionary audio files supplied by John Boyle, California State University, Fresno. With this software, we measured the duration of the mid-vowels where Praat showed the pitch and intensity overlapping, This was done because pitch, intensity and duration are the most important variables for vowels, prosodically. Because some sounds make the vowels harder to measure, we did not include vowels adjacent to other vowels, nor to the consonants /r/, /w/, /n/, /m/, /ʔ/, or /h/.

Since the position of a given vowel in a word could itself alter the length of a vowel and be a confounding variable, we have categorized the vowels by their position in their respective words in order to compare vowels in the same position more easily. The possible positions that we decided upon were initial position, meaning that the vowel appears at the beginning of the given word, e.g. the /e/ in *ecca,* 'everything', and the /e:/ *eecí*, 'urinate'; medial open position, meaning that the vowel appears within the word but in an open syllable, e.g. the /o/ in *iixóki*, 'red fox', and the /o:/ in *áabacigooshi*, 'to wheeze'; medial closed position, meaning that the vowel appears within a word but in a closed syllable, e.g. the second /o/ in *gohgogshhí,* 'chipmunk', and the /o:/ in *ahbóogsha*, 'earring'; and final position, meaning that the vowel appears at the end of the word in an open syllable, e.g. *áabe*, 'collar', and *abaxéexee*, 'elephant'.

We measured all of the mid vowels in the provided dictionary audio files that matched our criteria that we are aware of.

3 Data and Analysis

3.1 Below are shown the distributions of /e/ and /e:/ vowel duration for comparison. We did not include the distributions for /e/ or /e:/ in the medial closed position or initial position, because the sample sizes were too small to be useful for statistical analysis.

[1]Hidatsa is an endangered language, closely related to Crow, in the Siouan language family.

*We would like to thank John Boyle and Chris Golston for the counsel and audio recordings, and the audience at WECOL 2020 for their input.

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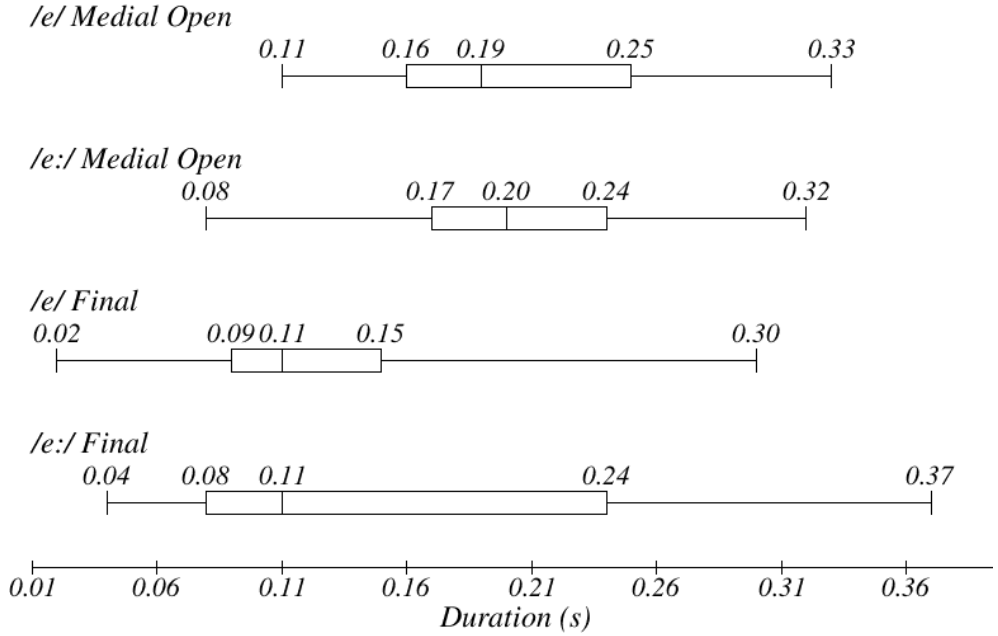
Figure 1. /e/ and /e:/ Duration Distributions with Outliers Removed



Notice that the distributions of the durations for medial open /e/ and the durations for medial open /e:/ overlap considerably. In fact, the interquartile range (the middle 50% of the values of the distribution) for the medial /e:/ durations is contained within the interquartile range of the medial /e/ durations. With so much overlap, it is reasonable to conclude that there is no durational distinction between medial open /e/ and /e:/. For the final /e/ and /e:/ durations, there is a similarly large amount of overlap, with the interquartile range of the final /e/ durations being contained within the interquartile range of the final /e:/ durations. As with the medial open /e/ and /e:/ duration distributions, there is so much overlap between the lengths of final /e/ and /e:/ that it is reasonable to conclude that there is no distinction between final /e/ and final /e:/.

For further com[2]parison, below are shown the ratios of the means of the lengths of medial open /e:/ compared to medial open /e/, and final /e:/ compared to final /e/.

Table 1. /e/ and /e:/ Duration Averages and Ratios

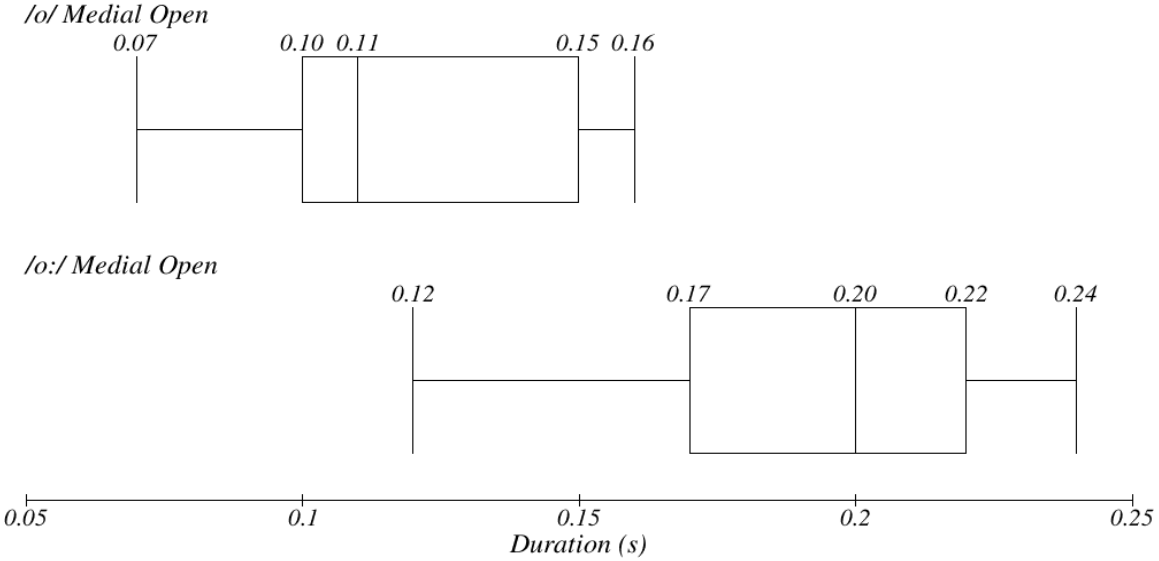
Position in Word	/e/ Duration Mean (s)	/e/ Sample Size	/e:/ Duration Mean (s)	/e:/ Sample Size	Ratio /e:/:/e2/
Medial (open)	0.20	11	0.15	33	0.74
Final	0.12	124	0.15	37	1.24

As shown in Figure 2, the ratio of the mean of the durations of medial open /e:/ compared to that of medial open /e/ is 0.74, meaning that on average, in our sample, the medial open /e:/ has a shorter duration than that of the medial /e/. For the final position, the ratio of the mean of the durations of final /e:/ compared to that of final /e/ is 1.24, meaning that in our final position sample, /e:/ is slightly longer than /e/ on average. However, we would expect, based on an acoustics study on Japanese vowel length distinction by Akaba (2008), that, if length were phonemic, then the long vowels would be about 2.7 times the length of the short vowels. However, as is clear from the table, the ratio of the mean duration of medial /e:/ compared to that of medial /e/ is 0.74, and, for the final position, the ratio is 1.24, which is much less than 2.7, and further indication that length is not contrastive for the vowel /e/.

[2] Note that the calculations for the ratios were done before the values of the means were rounded.

3.2 The following graphic shows the distributions of /o/ and /o:/ vowel duration for comparison. We were only able to gather sufficiently large samples for meaningful statistical analysis for /o/ and /o:/ vowels in the medial open position.

Figure 2. /o/ and /o:/ Duration Distributions with Outliers Removed



Notice that, although the overlap is not as great as in the case of the /e/ to /e:/ distribution comparisons, there is still considerable overlap between the /o/ and /o:/ length distributions in figure 2. Most of quartile 3 and quartile 4 of the distribution of medial open /o/ lengths are contained within quartile 1 of the distribution of medial open /o:/ lengths.

While this overlap is considerable, it is perhaps not enough overlap to make the definitive claim that medial open /o/ and /o:/ are not distinct in length, so the following table show the ratios of the means of the lengths of medial open /o:/ compared to medial open /o/.

Table 2. /o/ and /o:/ Duration Averages and Ratio

Position in Word	/o/	Sample Size	/o:/	Sample Size	Ratio /o:/:/o/
Medial (open)	0.12	14	0.19	27	1.61

Table 2 shows that the ratio of the mean of the durations of medial open /o:/ compared to that of medial open /o/ is 1.61. As previously mentioned, the expectation for the ratio of long vowel duration to short vowel duration would be about 2.7. Therefore, the ratio of 1.61 indicates that medial open /o/ and /o:/ are likely not distinct in length, and it would therefore not be unreasonable to conclude that /o/ and /o:/ are not distinct in any position.

3.3 The existence of mid vowel minimal pairs would strongly support the stance that length is phonemic for mid vowels. We did not discover any minimal pairs for short and long mid vowels, however. This does not necessarily mean that no such minimal pairs exist, but if they do exist, then we are unaware of them in our samples.

4 Discussion

Our data suggests that the duration of mid vowels is probably not phonemic. But this raises the question of why length is not phonemic in mid-vowels while it is phonemic for high vowels and low vowels in Hidatsa. It would be very unusual for a language to have five long vowels with only three corresponding short vowels. But this phenomenon could be explained by the two rare diphthongs, /ia, ua/, found in Hidatsa. It is possible that, in a language ancestral to Hidatsa, there existed the vowels /e: o:/, but those long vowels fractured, respectively, into the diphthongs /ia, ua/, that we see today. An example of vowel breaking in

another language is Spanish. In the evolution from Late Latin to Spanish, there was much diphthongization, such as the breaking of the vowel /e/ into /je/ and /o/ into /we/. For example, in Late Latin, 'stone' is *petra*, and in Spanish it is /'pje.dra/, and in Late Latin 'fire' is *focu*, while in Spanish it has evolved into /fwe.go/ (Chitoran & Hualde, 2007). Vowel breaking is a possible explanation for the uneven number of short and long vowels in Hidatsa, but further research is needed to come to a conclusion on that hypothesis.

5 Conclusion

Our analysis of Hidatsa mid vowel duration data supports the conclusion that Hidatsa mid vowel duration is not phonemic. The distributions of their durations overlap significantly, and the ratio of the long mid vowels compared to short mid vowels is much less than 2.7, which would be the ratio that we would expect if mid vowel length were phonemic. A possible explanation for the unequal number of short and long vowels that this conclusion would entail is that at some point in the evolution of Hidatsa, diphthongization occurred in the mid vowel, but further research is necessary to verify that hypothesis.

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A Restriction on Ambiguous Rule Applications and its Consequences
- Determinacy Theory of Movement -

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1 Introduction

The Minimalist Program seeks a "principled account" of all phenomena of human language, and has the Strong Minimalist Thesis (SMT) (1) as its core hypothesis (see, among others Chomsky 1995, 2000):

(1) The Strong Minimalist Thesis (SMT)
Language is an optimal solution to legibility conditions. (Chomsky 2000: 97)

The SMT claims that the computational system for human language should be a "perfect system," meeting the interface conditions in a way that satisfies the 3rd factor principles, which are language-independent principles. Among the third factor principles are principles of efficient computation, which require that the computational system should be restricted to a minimum. According to the SMT, the structure-building operation of the computational system should be simple. The simplest possible formulation is a set-formation that takes syntactic objects (SOs) X and Y, and forms {X, Y}, which is called Merge (see, among others Chomsky 1995). Chomsky (2019), Chomsky (2020), and Chomsky, Gallego, and Ott (2019) argue, however, that when we form exocentric constructions like the subject-predicate construction, Merge must be allowed to construct syntactic objects (SOs) in parallel and bring them together somewhere. This tacitly assumes that there is a workspace (WS) in which operations are carried out. They propose that the right and simplest version of Merge should be on a workspace (WS) not on particular SOs. They reformulate Merge as MERGE (2) as an operation on WS, where WS is taken to be the stage of a derivation at any given point:

(2) MERGE maps WS = [X, Y] to WS' = [{X, Y}]

Chomsky (2020) argues that not only the computational system should be restricted to a minimum but the resources available to the computational system, *i.e.*, the set of elements accessible to operations, should also be restricted to a minimum, which is called Resource Restriction (RR). Chomsky claims that RR includes both minimal search and the Phase Impenetrability Condition (PIC). He also argues that RR forces operations including MERGE to be subject to the principle of Determinacy (3), but its exact formulation and consequences are left untouched:

(3) The Principle of Determinacy
If the structural conditions for a rule holds for some workspace, then the structural change must be unique. (Chomsky 2019: 275)

* This is an extended and revised version of Goto and Ishii (2018, 2019, 2020). I thank the audience at WECOL 2020 and in particular, Brian Agbayani and Chris Golston for comments and discussions. I am also grateful to C.-T. James Huang, Kyle Johnson, Mamoru Saito and the Keio Study Group of Generative Grammar for comments and suggestions on earlier versions of this paper. This work is supported by JSPS KAKENHI Grant Number 19K00692a.

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Goto and Ishii (2018, 2019, 2020) therefore explicate the principle of Determinacy, proposing that Determinacy should be formulated as a condition on the *input* of MERGE. We also argue that RR should only include the PIC but not minimal search. It is shown that the *input*-based principle of Determinacy coupled with the PIC gives us a *unified* account of various movement phenomena, which have been explained by different constraints or principles. Th paper is concerned with exploring a further consequence of Goto and Ishii's theory, *i.e.*, a unification of locality and anti-locality constraints on movement. The organization of this paper is as follows. Section 2 overviews Goto and Ishii's Determinacy theory of movement. Section 3 discusses a Determinacy-based approach to anti-locality. Section 4 makes concluding remarks.

2 Goto and Ishii's (2018, 2019, 2020) Determinacy Theory of Movement

2.1 *The Output-Based Principle of Determinacy (Chomsky 2018, 2019, Chomsky, Gallego and Otto 2019)*

Before turning to the principle of Determinacy, let us briefly consider the notion of recursion, which is crucial in the discussion to follow. Chomsky (2019, 2020) and Chomsky, Gallego, and Ott (2019) adopt the notion of general recursion, which states that any syntactic object (SO) once generated in WS remains accessible to further operations. Let us consider WS (4) as an example:

(4) WS = [{a, {b, {c, d}}}]

According to general recursion, *a*, *b*, *c*, *d*, *{c, d}*, *{b, {c, d}}*, and *{a, {b, {c, d}}}* in WS (4) are all accessible to further operations including MERGE. Chomsky (2019, 2020) argue, however, that recursion for language is different from general recursion in that recursion for language is subject to Resource Restriction (RR), which limits resources, *i.e.*, elements accessible to operations, to be restricted to a minimum. He claims that RR includes both minimal search and the Phase Impenetrability Condition (PIC).

Chomsky (2019, 2020) also argues that RR forces operations including MERGE to be subject to the principle of Determinacy (5) (Chomsky 2019: 270):

(5) If the structural conditions for a rule are met, then the structural change has to take place in a fixed and determinate manner.

Chomsky (2019, 2020) and Chomsky, Galego, and Otto (2019) claims that the principle of Determinacy (5) requires subsequent rules to apply in a deterministic way, which ensures that WS should be kept minimal throughout a derivation. In other words, the principle of Determinacy applies at the *output* of MERGE. Under their notion of Determinacy, if MERGE creates WS that could potentially lead to an ambiguous rule application at a *subsequent* stage of a derivation, a Determinacy violation occurs. Suppose that MERGE takes WS1 as its input and then maps it to WS2, which is the case of Internal Merge (IM) of *c*, as shown in (6):

(6) a. WS1 = [{a, {b, c}}, d]
b. WS2 = [{**c**, {a, {b, c}}}, d]

It should be noted that according to general recursion, any SO generated in (6) is accessible to MERGE. Under their system, Determinacy applies at the *output* of MERGE, *i.e.*, at WS2. In WS2, there are two copies of *c*. This could induce an ambiguous rule application at a *subsequent* stage of the derivation. This is because if we apply IM to *c* in subsequent derivation, for example, there would not be a unique way to apply IM to *c* due to its two copies. Hence, under their notion of Determinacy, no IM is ever allowed, which is clearly an undesirable result. Chomsky (2019, 2020) presents a way out of this problem; such an ambiguous rule application problem can be resolved by minimal search, part of RR. In (6b), for example, although there are two copies of *c*, minimal search selects the higher copy of *c*. The higher copy of *c* is accessible whereas the lower copy of *c* is not. Hence, there would not be any violation of the principle of Determinacy.

2.2 *The Input-Based Principle of Determinacy (Goto and Ishii 2018, 2019, 2020)*

There are, however, conceptual difficulties connected with the *output*-based principle of Determinacy together with minimal search and the PIC advocated by Chomsky (2019, 2020) and Chomsky, Galego, and Otto (2019). First, their *output*-based principle of Determinacy has a look-ahead property in that we have to look at a subsequent stage of a derivation to decide whether Determinacy gets violated or not. Such a look-ahead property, which necessarily increases computational burden, should be eliminated (see, among others, Chomsky 2000, 2004). Second, under their view of RR, there is a redundancy between minimal search and the PIC regarding accessibility of an element. If there are two copies of an element in WS, minimal search always makes its higher copy accessible and its lower copy inaccessible. The PIC makes accessible the elements in the edge of a phase head and inaccessible the elements within a Transfer domain, *i.e.*, the elements in the complement of a phase head. Since a copy in the edge of a phase head always appears in a higher position than a copy in the Transfer domain, minimal search would make the effects of the PIC vacuous when we decide whether or not a copy is accessible. As an illustration, let us consider (7):

(7) [X [PH [... X ...]]]

In (7), PH is a phase head, and X undergoes IM from within the complement of the phase head, *i.e.*, the Transfer domain, to the edge of the phase head. The PIC makes the lower copy of X, which is within the Transfer domain, inaccessible. If we also assume minimal search as part of RR, this effect of the PIC is vacuous, since minimal search makes inaccessible the lower copy of X within the Transfer domain. Since the need to eliminate redundancies has been a working hypothesis in the linguistic inquiry, such a redundancy should be eliminated (Chomsky 1995:152).

Contrary to their approach, Goto and Ishii (2018, 2019, 2020) propose that the principle of Determinacy should apply at the *input* of MERGE and that RR should only include the PIC, which is an independently motivated condition for Transfer:

(8) The *Input*-Based Principle of Determinacy
The principle of Determinacy applies at the *input* of MERGE.
(9) Resource Restriction (RR) only includes the PIC.

According to our *input*-based principle of Determinacy (8), if there is an ambiguous rule application at the *present* stage of a derivation, a Determinacy violation occurs. We can decide whether or not Determinacy gets violated only based on the information available at the present stage of a derivation; our *input*-based principle of Determinacy does not have a look-ahead property. Under our view that RR only includes the PIC as stated in (9), there does not exist any such redundancy regarding accessibility of an element. Hence, Goto and Ishii's approach has the conceptual advantages over the one advocated by Chomsky (2019, 2020) and Chomsky, Galego, and Otto (2019).

Let us look at how Goto and Ishii's *input*-based principle of Determinacy coupled with the PIC works, taking (6) (repeated here as (10)) as an example:

(10) a. WS1 = [{a, {b, c}}, d]
b. WS2 = [{**c**, {a, {b, c}}}, d]

According to our notion of Determinacy (8), Determinacy applies at the *input* of MERGE, *i.e.*, at WS1. Since there is only one copy of *c* in WS1, we have only one option to create WS2, *i.e.*, to move *c* in the base position; there is no violation of the *input*-based principle of Determinacy (8). Suppose further that MERGE takes WS2 as its input and then maps it to WS3, *i.e.*, multiple applications of IM to *c*, as represented in (11):

(11) a. WS2 = [{**c**, {a, {b, c}}}, d]
b. WS3 = [{**c**, {c, {a, {b, c}}}}, d]

In (11), we have two copies of *c* at the input of MERGE, *i.e.*, at WS2. We have two options to create WS3, *i.e.*, either to move the higher copy of *c* or the lower copy of *c*. There is an ambiguous application of MERGE

to *c* at the present stage of the derivation, *i.e.*, at WS2, which violates the *input*-based principle of Determinacy (8). This shows that under the *input*-based principle of Determinacy (8), if we apply IM to the same element more than once, it always results in a Determinacy violation. This incorrectly predicts that no successive-cyclic movement is ever allowed. Goto and Ishii argue that such an ambiguous rule application problem induced by multiple applications of MERGE can be resolved by RR, *i.e*, the PIC as shown in (12):

(12) **What** did you say that John bought ***t***?
- a. [RP **what** [R(BUY) what]]
- b. [CP **what** [C [TP John [T [*v*P John [*v*-R(BUY) [RP what [R(BUY) what]]]]]]]]
- c. [*v*P you [*v*-R(SAY) [RP **what** [R(SAY) [CP what [C-that [TP John [...
- d. [CP **what** [C-that [TP you [T [*v*P you [*v*-R(SAY) [RP what [R(SAY) [CP what ...

(12) represents successive cyclic movement of the *wh*-phrase *what*. In (12a), we apply IM to *what*; *what* moves from its base position to the Spec of Root (R). In (12b), we apply IM to *what* again. We assume with Chomsky (2013, 2015) that *v* becomes invisible because of pair-Merge with R. R inherits phasehood from *v*, and R-complement undergoes Transfer. Although there are two copies of *what, i.e.*, the one in the Spec of R and the other in the base position, the latter, which is within R-complement, is not accessible due to the PIC. There is only one accessible copy of *what, i.e.*, the one in the Spec of R; there is no violation of the *input*-based principle of Determinacy (8). In (12c), we apply IM to *what* again. The copy of *what* in the Spec of C is accessible whereas all the other copies of *what* are not due to the PIC; there is no violation of the *input*-based principle of Determinacy (8). Hence, RR, *i.e.*, the PIC, resolves the problem of an ambiguous rule application induced by multiple applications of MERGE to the same element. Goto and Ishii (2018, 2019, 2020) argue that the *input*-based principle of Determinacy (8) coupled with the PIC gives us a *unified* account of various movement phenomena like the subject condition, *that*-trace effects, no vacuous topicalization, the freezing effects with topics, further raising, and no superfluous steps in a derivation, which have been accounted for by different constraints or principles. Due to the limitations of space, the following subsections only touch on the core cases of the subject condition and the *that*-trace effect. See Goto and Ishii (2018, 2019, 2020) for more detailed discussions.

2.2.1 *The Subject Condition* The subject condition effect (13) (see, among others, Chomsky 1973; Huang 1981) follows from the *input*-based principle of Determinacy (8) coupled with the PIC. The derivation of (13) is represented in (14):

(13) * **Who** did [pictures of ***t***] please you?
(14) [CP **who** [C-did [TP [pictures of who] [T [*v*P [pictures of who] [*v* …

In (14), when we are to move *who* to the Spec of C, there are two accessible copies of *who, i.e.*, the one in the Spec of T and the other in the Spec of *v*. There is an ambiguous application of MERGE to *who* at the present stage of the derivation; this violates the *input*-based principle of Determinacy (8). Extraction out of an object, on the other hand, is allowed as shown in (15). The derivation of (15) is represented in (16):

(15) **Who** did you see [a picture of ***t***]?
(16)
- a. [RP [a picture of **who**] [R(SEE) [a picture of who]]]
- b. [CP **who** [C-did [TP you [T [*v*P you [*v*-R(SEE) [RP [a picture of who] [R(SEE) [a picture of who]]]]]]]]]

In (16), when we are to move *who* to the Spec of C, there are two copies of *who, i.e.*, the one is within the Spec of R and the other within the complement of R. The latter, however, is not accessible due to the PIC after R-complement Transfer; there is no Determinacy violation. The principle of Determinacy (8) together with the PIC correctly predicts the subject-object asymmetry with respect to extraction. The principle of Determinacy (8) together with the PIC also explains the absence of the subject condition effect in Japanese as shown in (17) (see, among others, Kayne (1984), Lasnik and Saito (1992), and Ishii (1997, 2011)). In (18), where *dare-ni* 'who-Dat' is scrambled out of the subject phrase. If we assume with, among others, Fukui (1986) and Kuroda (1988) that subjects in Japanese stays in the Spec of *v* throughout a derivation, the

derivation of (17) is represented in (18). In (18), there is only one copy of *dare-ni* 'who-Dat' within the Spec of *v*; there is no Determinacy violation:

(17) ? **Dare-ni** [John-ga [[Mary-ga ***t*** atta] koto]-ga mondai-da to] omotteru] no
who-Dat John-Nom Mary-Nom met fact-Nom problem-is C think Q
Lit. 'Who, John thinks that [the fact that Mary met *t*] is a problem.'

(18) [CP **dare-ni** [C [TP T [*v*P [Mary-ga dare-ni atta koto]-ga [*v** [...
who-Dat Mary-Nom who-Dat met fact-Nom

2.2.2 *The That-trace Effect* The *that*-trace effect (19) (see, among others, Kayne 1984; Chomsky 1986; Lasnik and Saito 1992, Ishii 1999, 2004) follows from the principle of Determinacy (8) coupled with the PIC. The derivation of (19) is represented in (20):

(19) * **Who** do you think that ***t*** saw Bill?
(20) [CP **who** [that [TP who [T [*v*P who [*v* …

In (20), when we are to move *who* to the Spec of C, there are two accessible copies of *who*, *i.e.*, the one in the Spec of T and the other in the Spec of *v*. There is an ambiguous application of MERGE to *who* at the present stage of the derivation; this violates the principle of Determinacy (8). If the complementizer *that* does not appear, the *that*-trace effect is canceled as shown in (21). We assume with Chomsky (2015) that when the complementizer *that* does not appear, C is deleted and *v*P undergoes Transfer via phasehood inheritance from C to T. The derivation of (21) is represented in (22):

(21) **Who** do you think ***t*** saw Bill?
(22) [RP **who** [R [CP C → Ø [TP who [T [*v*P who [v …

In (22), when we are to move *who* from the Spec of T to the matrix Spec of R, there are two copies of *who*, *i.e.*, the one in the Spec of T and the other in the Spec of *v*. The latter, however, is not accessible due to the PIC. There is only one accessible copy of *who*; there is no violation of the principle of Determinacy (8).

The principle of Determinacy (8) coupled with the PIC also accounts for the absence of the *that*-trace effect in Japanese. As pointed out by Ishii (2004), there is no *that*-trace effect in Japanese as shown (23), where the subject null operator OP is moved out of the *that*-clause (Ishii 2004: 212):

(23) [**OP** [John-ga [***t*** Mary-ni hanasikaketa to] omotteiru] yorimo] harukani ookuno hito-ga
John-Nom Mary-Dat talked to C think than far more people-Nom
Susy-ni hanasi tagatte ita
Susy-Dat wanted to talk
'Far more people wanted to talk with Susy than John thinks that talked to Mary.'

Given that subjects in Japanese stay in the Spec of *v*, the derivation of (23) is represented in (24):

(24) [CP **OP** [TP [*v*P OP [RP Mary-ni R(HANASIKAKE)] *v*-R(HANASIKAKE)] T-*ta*] C-*to*]
Mary-Dat talk to talk to Past that

In (31), there is only one copy of *OP* within the Spec of *v*; there is no violation of the principle of Determinacy (8). Hence, the absence of the *that*-trace effect in Italian and Japanese follows form the principle of Determinacy (8) coupled with the PIC.

3 Anti-Locality and the *Input*-Based Principle of Determinacy

Goto and Ishii's *input*-based principle of Determinacy is reminiscent of anti-locality. Standard locality constraints state an upper-bound restriction on the maximum distance an element may move. It has been claimed by, among others, Bošković (1997), Ishii (1999, 2004), Saito and Murasugi (1999), Grohmann (2000, 2003, 2011), and Abels (2003) that apart from standard locality constraints, there is an anti-locality constraint which imposes a lower bound of distance on legitimate movement dependency. Grohmann (2003)

states anti-locality as shown in (25):

(25) Anti-Locality
Movement must not be too local. (Grohmann 2003: 26)

These previous approaches to anti-locality vary with respect to evaluation metrics, *i.e.*, what counts as 'too local'. I will first review three representative approaches to anti-locality, *i.e.*, Saito and Murasugi (1999), Abels (2003), and Grohmann (2000, 2003), and then clarify differences between these previous approaches and our determinacy-based approach.

3.1 *Previous Approaches to Anti-Locality*

3.1.1 *Saito and Murasugi (1999)* Saito and Murasugi (1999) propose the constraint on chain links (CCL) (33), which bans adjunction of a specifier within the same maximal projection XP:

(26) Constraint on Chain Links (CCL)
a. A chain link must be at least of length 1.
b. A chain link from A to B is of length n iff there are n "nodes" (X, X' or XP, but not segments of these) that dominate A and exclude B. (Saito and Murasugi 1999: 182)

For instance, the CCL rules out vacuous topicalization (27) and complementizer-less subject relatives (28):

(27) * **John**, ***t*** came yesterday.
(28) * the man [$_{IP}$ OP [$_{IP}$ *t* likes Mary]]

Given that topicalization is derived by adjunction to IP, vacuous topicalization (27) is ruled out by the CCL, since movement of *John* from the Spec of I to the IP-adjoined position crosses only one segment and the chain link is of length 0. Similarly, (28) violates the CCL due to movement of *OP* from the Spec of I to the IP-adjoined position on the assumption that complementizerless subject relatives are not CPs but IPs (Bošković 1997). Since the *input*-based principle of Determinacy can also account for vacuous topicalization and complementizerless subject relatives (see Goto and Ishii (2018, 2019, 2020) for relevant discussions), however, CCL can be subsumed under our Determinacy-based approach to anti-locality. There is thus no need to assume the CCL as an independent constraint.

3.1.2 *Abels (2003)* Abels (2003) extends Saito and Murasugi's (1999) CCL, proposing the Stranding Generalization (29):

(29) Given a phase head α^0 and a constituent X in α^0's c-command domain
a. $\Diamond\surd$[X...[α^0 [... t_X ...]] ...] and
b. $\neg\Diamond\surd$[X... [α^0 t_X] ...] (Abels 2003: 9)
(30) What do you think that Mary has read?
(31) a. Nobody thought that anything would happen.
b. That anything would happen, nobody thought.
c. * Anything would happen, nobody thought that. (Abels 2003: 116)

The Stranding Generalization (29) says that while any element within the complement domain of a phase head α^0 may move out of the c-command domain of α^0, the complement of a phase head α^0 may not move out of the c-command domain of α^0. The Stranding Generalization (29), for example, rules in successive cyclic *wh*-movement like (30). In (30), since *what* is within the complement domain of the phase head C *that*, it may be extracted across the phase head C. The Stranding Generalization (29) also captures the fact that CP is mobile whereas TP, the complement of the phase head C, is not. Thus, while topicalization of the whole CP is allowed as shown in (31b), topicalization of TP out of CP with the phase head C being stranded is not, as shown in (31c).

Abels claims that the Stranding Generalization (29) follows from Last Resort (32) and feature-driven

Merge. It should be noted that he assumes that movement is a composite operation of Copy and Re-Merge:

(32) Last Resort
A constituent may only be merged, *i.e.*, base-merged or re-merged, if that leads to the immediate satisfaction of a previously unsatisfiable feature. (adapted from Abels 2003: 92)

There are two possible derivations for the illicit structure (29b). In one derivation, X directly moves out of αP without stopping over in the Spec of α, *i.e.*, the edge of α. This derivation is ruled out by the PIC, which Abels claims should be subsumed under the intervention effect on the assumption that a phase head is a universal intervenor. In the other derivation, X first moves to the Spec of α, *i.e.*, the edge of α, and then moves out of αP. The first step of this derivation, however, would violate Last Resort (32) on the assumption that Merge is feature-driven. This is because when X is merged into the complement of α, X is already in the relevant structural configuration with α to license any formal feature that needs checking. Movement from the complement of α to the Spec of α is therefore ruled out by Last Resort (32). In the licit structure (29a), on the other hand, X may move out of αP through the edge of α, since its base position is not in the checking domain of α. Hence, the Stranding Generalization (29) follows from Last Resort with feature-driven Merge. Abels further claims that if the Stranding Generalization (29) follows from Last Resort (32) coupled with feature-driven Merge, (29) should be not be limited to a phase head, but more general in that it applies to all heads and their complements. It then follows that the movement operations in (33) are all banned within a phrase It should be noted that (33b) is the case which Saito and Murasugi's (1999) CCL rules out. Hence, the CCL can be subsumed under Abels' analysis:

(33) a. Movement of a specifier to another specifier
b. Movement of a specifier to an adjoined position
c. Movement of a complement to an adjoined position.

As pointed out by Grohmann (2011), Abels' analysis crucially relies on the legitimacy of assumed checking configuration and the assumption that Merge, whether Base-merge or Re-merge, is feature-driven. His analysis is thus incompatible with Chomsky's (2013, 2015) Free Merge system, which is adopted in this paper. Furthermore, contrary what Abels claims, his anti-locality constraint does not completely follow from Last Resort (32). This is because if the feature to be licensed by complement-to-specifier movement, *i.e.*, re-merge in the specifier position, is a feature like the EPP-feature that could not have been licensed in the complement position, a complement should in principle be able to move into the specifier position.

3.1.3 *Grohmann (2000, 2003)* Grohmann (2000, 2003) claims that a clause can be split into three Prolific Domains as in (99), subparts of a derivation relevant for Transfer:

(34) Clausal Tripartition (Grohmann 2003: 74)
i. θ-Domain: part of derivation where thematic relations are created
ii. Φ-Domain: part of derivation where agreement properties are licensed
iii. Ω-Domain: part of derivation where discourse information is established

Grohmann then proposes the Condition on Domain Exclusivity (35):

(35) Condition on Domain Exclusivity (CDE) (Grohmann 2011: 275; cf. Grohmann 2003: 78)
An object O in a phrase marker must have an exclusive Address Identification AI per Prolific Domain ΠΔ unless duplicity yields a drastic effect on the output.
i. An AI of O in a given ΠΔ is an occurrence of O in that ΠΔ at LF.
ii. A drastic effect on the output is a different realization of O at PF.

What Grohmann's anti-locality claims is that each Prolific Domain sends information in it to the interfaces through Transfer, and that any given XP may only have one occurrence within a single Prolific Domain. Grohmann's anti-locality therefore bans phrasal movement within a single Prolific Domain unless a multiple

occurrence of XP involves two phonetically distinct copies of XP by spelling out of a copy with a different PF-matrix.

Grohmann's anti-locality rules out in a unified way the hypothetical expressions (36-39a) with their intended interpretations in the corresponding (36-39b) examples. The derivations of (36-39a) are represented in (36-39c) respectively (Grohmann 2003: 241):

(36) a. * John likes
b. John likes himself.
c. [vP John v^0 [VP likes ~~John~~]

(37) a. * Him softly kissed her.
b. He softly kissed her.
c. [IP him I^0 [AgrOP ~~him~~ $AgrO^0$ [vP softly [vP ~~him~~ v^0 [VP kissed her]

(38) a. * Who, Mary detests?
b. It is who, and who does Mary detest?
c. [TopP who Top^0 [FocP ~~who~~ Foc^0 [IP Mary I^0 detests ... ~~(who)~~]

(36) shows that an argument is not allowed to move from one thematic position to another, illustrating the anti-locality effect within the θ-Domain. According to the CDE (35), since there are two occurrences of *John* within the θ-Domain at LF as shown in (36c), *John* does not have an exclusive AI within the θ-Domain. Hence, (36a) violates the CDE (35), even though the lower copy of *John* undergoes deletion at PF. It should be noted that (36b) does not violate the CDE (35) because of a drastic effect on the output, *i.e.*, the lower copy of *John*, which undergoes Copy Spell-Out, is realized as the reflexive pronoun *himself*. (37) illustrates the anti-locality effect within the Φ-Domain, *i.e.*, an element cannot move from one Case agreement position to another Case position. In (37), the external argument *him* is inserted into the derivation with an accusative case feature, moving to the accusative-licensing position such as the Spec of AgrO and then to the Spec of T in order to satisfy the EPP. The in-situ object *her* receives accusative case as a default option. Since there are two occurrences of *him* within the Φ-Domain at LF as shown in (37c), *him* does not have an exclusive AI within the Φ-Domain; this violates the CDE (35). (38) indicates that the fronted *wh*-phrase *who* cannot serve simultaneously as a topic and a focus, which illustrates the anti-locality within the Ω-domain. Assuming the split CP-hypothesis, where the Spec of Foc and the Spec of Top license an interrogative *wh*-phrase and a topic phrase respectively, *who* moves from the Spec of Foc to the Spec of Top. This creates the two occurrences of *who* within the Ω-domain, which violates the CDE (35).

Boeckx (2008) points out, however, that the difference between symmetric and asymmetric applicatives provides an argument against Grohmann's anti-locality. In a symmetric applicative construction, either the applied (indirect) object or direct object can be passivized. In an asymmetric applicative construction, on the other hand, only the applied (indirect) object can be passivized. Boeckx adopts McGinnis' (2001) analysis, which claims that symmetric and asymmetric applicatives correspond to Plykkänen's (2008) high-applicatives (39) and low-applicatives (40) respectively:

(39) [vP v [HApplP IO HAppl [VP V DO]]]
(40) [vP v [VP V [LApplP IO LAppl DO]]]

In both (39) and (40), the higher object IO counts as the closest element to move to the subject position; the applied (indirect) object can be passivized in both symmetric/high and asymmetric/low applicatives. In symmetric/high applicatives, the lower object DO is allowed to move to the outer Spec of HAppl and then to the subject position; DO can also be passivized. Grohmann's anti-locality, however, would rule out movement of DO to the outer Spec of HAppl, since it is a movement within the θ-Domain. Under Grohmann's anti-locality, therefore, there is no way of capturing the contrast between symmetric/high and asymmetric/low applicatives regarding passivization. Under our determinacy-based approach to anti-locality, on the other hand, the contrast between symmetric/high and asymmetric/low applicatives can be accommodated if we assume that HAppl is a phase head while LAppl is not:

(41) [TP **DO** [T [*v*P *v* [HApplP DO [HApplP IO HAppl [VP V DO]]]]]]
(42) [TP **DO** [T [*v*P *v* [VP V [LApplP DO [LApplP IO LAppl DO]]]]]]

In the symmetric/high applicative (41), DO first moves to the outer Spec of HAppl. When DO further moves to the subject position, there are two copies of DO, *i.e.*, the one in the outer Spec of HAppl and the other in the base position. The latter, however, is not accessible due to the PIC; there is no violation of the principle of Determinacy (8). In the asymmetric/low applicative (42), DO first moves to the outer Spec of LAppl. When DO further moves to the subject position, there are two accessible copies of DO, *i.e.*, the one in the outer Spec of LAppl and the other in the base position; this violates the principle of Determinacy (8).

Grohmann (2003) argues that his approach to anti-locality has a theoretically desirable in that it unifies the two locality notions, *i.e.*, standard locality and anti-locality, based on Prolific Domains. He proposes two generalizations over movement (43a, b) (Grohmann 2003: 227-8):

(43) a. The Intra-Clausal Movement Generalization
Clause-internal movement always targets the next higher Prolific Domain.
b. The Inter-Clausal Movement Generalization
Movement across clauses targets a position within the same type of Prolific Domain in the next higher clause.

According to the inter-clausal movement generalization, the following three types of successive-cyclic movement are allowed: (i) successive-cyclic Θ-movement from a position within one Θ-Domain to a position in the next higher Θ-Domain, (ii) successive-cyclic A-movement from a position within one Φ-Domain to a position in the next higher Φ-Domain, and (iii) successive-cyclic A'-movement from a position within one Ω-Domain to a position in the next higher Ω-Domain. Grohmann argues that intra-clausal movement (43a) is forced by anti-locality while inter-clausal movement (43b) is forced by standard locality. Hence, anti-locality is integrated with standard locality based on Prolific Domains.

3.2 *A Determinacy-Based Approach to Anti-Locality*

As mentioned in the previous section, the evaluation metrics for anti-locality vary among these previous approaches. Grohmann (2011) points out that there are two types of evaluation metric, *i.e.*, a domain-based evaluation metric (44a) and a length-based evaluation metric (44b):

(44) Previous Approaches to Anti-Locality
a. An evaluation metric concerning the domain in which movement is ruled out:
(i) XP (Saito and Murasugi 1999; Abels 2003)
(ii) Prolific Domain (Grohmann 2000, 2003)
b. An evaluation metric concerning the length to be measured is based on:
(i) A representational measurement of length in terms of chain links (Saito and Murasugi 1999)
(ii) A derivational measurement of length in terms of Last Resort (Abels 2003)
(iii) An interface-based measurement of length in terms of occurrences of an element (Grohmann 2000, 2003)

The first metric (44a) is concerned with what is the relevant domain in which movement is ruled out as an anti-locality constraint violation. According to Saito and Murasugi (1999) and Abels (2003), the relevant domain for anti-locality is XP; all kinds of phrase-internal movement are banned. Grohmann (2000; 2003) claims, on the other hand, that a chunk of phrases larger than a single XP, *i.e.*, what he calls a Prolific Domain, counts as a relevant domain for anti-locality, which bans prolific-domain-internal movement. The second metric (44b) is concerned with how we measure the length of movement. Saito and Murasugi measure the length of movement representationally in terms of chain links. Abels adopts a derivational measurement of length, where movement steps within a single XP are inadmissible due to Last Resort. Grohmann measures the length of movement based on occurrences of an element at the interfaces.

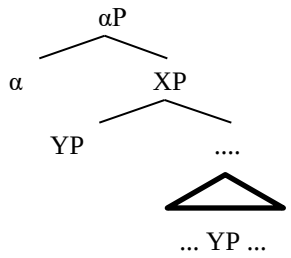
According to our Determinacy-based approach, the evaluation metric concerning the relevant domain of

anti-locality is not based on XP or Prolific Domain but on Phase, which is an independently motivated notion for Transfer as stated in (45a). More precisely, the relevant domain is a transferred domain, *i.e.*, the complement of a phase head. As for the evaluation metric concerning the length to be measured, our Determinacy-based approach measures the length of movement derivationally just like Abels' approach as stated in (45b):

(45) Our Determinacy-Based Approach to Anti-Locality
- a. The evaluation metric concerning the domain in which movement is ruled out is based on Phase, more precisely a transferred domain.
- b. The evaluation metric concerning the length to be measured is based on a derivational measurement in terms of the principle of Determinacy (9).

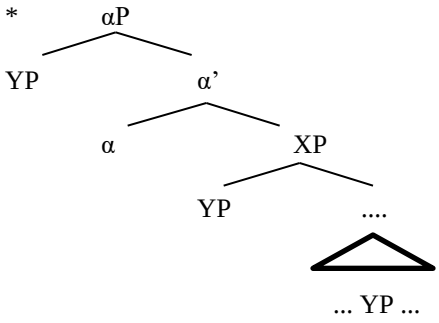
It is important to point out that there is a significant difference between the previous approaches and our Determinacy-based approach (45). Although the previous approaches vary with respect to the two types of evaluation metric, they all agree that movement within a relevant domain, whether it is XP or Prolific Domain, is banned however the length of movement is measured. Contrary to their views, our Determinacy-based approach to anti-locality (45) claims that movement within the complement of a phase head, *i.e.*, a transferred domain, is allowed as shown in (46):

(46)



In (46), where α is a phase head, YP undergoes movement within XP, which is the complement of the phase head α, *i.e.*, the transferred domain; there is no violation of the principle of Determinacy (8). Further movement out of the transferred domain, however, is banned as a violation of the principle of Determinacy (8) as represented in (47). In other words, unless there is further movement operation out of the transferred domain, "too short movement" within the transferred domain, the domain relevant for anti-locality, is permissible:

(47) *



Grohmann (2011) points out that there are two questions to which any theory of anti-locality has to provide answers (48):

(48)
- a. Why is that specific domain relevant for anti-locality?
- b. How can locality and anti-locality constraints be unified?

Under the approaches by Saito and Murasugi (1999) and Abels (2003), where XP is the relevant domain for anti-locality, there is no explanation as to why XP is the relevant domain for anti-locality or there is no unification between locality and anti-locality constraints. Grohmann (2000; 2003) gives answers to these two questions in terms of the two generalizations in (43), *i.e.*, the intra-clausal movement generalization and the inter-clausal movement generalization, both of which are based on the notion of Prolific Domain. Among the two generalizations, the intra-clausal movement generalization (43a), which prohibits movement from applying within one and the same Prolific Domain, captures an anti-locality constraint. The intra-clausal movement generalization (43a) is theoretically plausible in that it can be derived from the CDE (35), the reasonable requirement on the interfaces that an element in a phrase marker should have a unique/exclusive interpretation per Prolific Domain. It is not entirely clear, however, whether the inter-clausal movement generalization (43b) captures standard locality constraints and how it is derived from deeper principles. Although the inter-clausal generalization (43b) describes successive cyclicity by requiring movement to proceed through a position within the same type of Prolific Domain, a question still remains why movement must proceed in such a uniform way. Furthermore, it remains unclear how the inter-clausal generalization (43b) captures syntactic island constraints, the essential part of standard locality. Since Grohmann's analysis does not assume any opaque domain or "escape hatch" for movement, it would wrongly predict that any element may be moved out of a certain domain as far as it goes through positions within the same type of Prolific Domain. Our determinacy-based approach to anti-locality (45) has conceptual advantages over previous approaches in that the former can give principled answers to these two hitherto unresolved questions on anti-locality. Our approach provides an answer to the second question (48b) in that standard locality and anti-locality are unified based on Phase, which is an independently motivated notion for Transfer. This also provides an answer to the first question (48a), *i.e.*, why Phase is the relevant domain for anti-locality, since it is operative in all kinds of locality, whether it is standard locality, which imposes an upper-bound distance on movement, or anti-locality, which restricts a lower-bound distance on movement.

5 Conclusion

This paper has first overviewed Goto and Ishii's (2018, 2019, 2020) *input*-based principle of Determinacy. It was shown that the *input*-based principle of Determinacy has conceptual advantages over the *output*-based principle of Determinacy advocated by Chomsky (2019, 2020) and Chomsky, Gallego, and Ott (2019). It was also pointed out that the *input*-based principle of Determinacy coupled with the PIC gives us a *unified* account of various movement phenomena, though the limitations of space only allow us to discuss the Subject Condition and the *that*-trace effect. I have then explicated our Determinacy-based approach to anti-locality, showing that our approach has theoretical advantages over the previous approaches in that the former can provide an principled answers to the two hitherto unresolved questions on anti-locality: (i) Why is that specific domain relevant for anti-locality?; (ii) How can locality and anti-locality constraints be unified? Under our Determinacy-based approach, standard locality and anti-locality are unified based on Phase, and Phase is the relevant domain for anti-locality, since it is operative in all kinds of locality, whether it is standard locality or anti-locality.

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Acceptability of the English Resultative and Depictive Construction by Spanish Native Speakers Learning EFL

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1. Introduction

The work presented below is part of a PhD project that deals with the acquisition of the English Resultative Construction (ERC hereafter) by Spanish native speakers who learn English as a foreign language (EFL). Our main interest is to explore whether there is a sequence in the acquisition of different ERC types correlated with the proficiency level of Spanish speakers.

There is a substantial amount of research carried out on the English-Spanish acquisition of the lexicalization of manner of motion and path in boundary crossing events, as stated by Cadierno (2004), Cadierno & Ruiz (2006), Robinson, et al. (2009), Larrañaga, et al. (2012), Alonso (2015), among other. Interestingly, these papers analyze the differences in foreign language acquisition in terms of Talmy's typological classification into Satellite-framed and Verb-framed languages (2000) and suggest that L1 has a significant effect on L2, especially if typologically different languages are at stake.

There is also a variety of research conducted on the acquisition of ERC by different languages as L1 such as Chinese (Cao & Zhou, 2014), Portuguese (Oliveira, 2016) and Korean (Kim, et al, 2019). Again, these works support the claim that L1 affects the acquisition of a specific structure in English as L2. Yet, to our knowledge, no work has been published on the acquisition of ERC by native speakers of Spanish who learn EFL. Therefore, we elaborated an Acceptability Judgement Task that enabled us to explore to what degree Spanish subjects accept the different types of ERC and how they identify non-acceptable combinatory of unlicensed ERC.

This paper is organized as follows. The next section describes the general differences between the Spanish-English contrast in event representations, followed by the detailed description of the different subtypes of ERC considered in this work. In addition, the English Depictive Construction (DC, now onwards) are described and exemplified, and the objectives and predictions are stated. Next, we present the Methodological Design of the AJT, followed by the results obtained and the general conclusions drawn from this data.

2. Theoretical Framework

2.1 *Spanish English Contrast* The major typological contrast between English and Spanish lies on the design of the simple Event (Talmy, 2000), which has a significant impact on the acquisition of English by Spanish native speakers (Alonso, 2015). That is, English is an instance of a Satellite-framed language whose more frequent strategy to build the representation that underlies a colloquial depiction of a motion event is by means of a main verb that tends to codify manner. If result needs to be codified, English resorts to the

* This research is currently conducted thanks to the financing support of CONICET by means of the PhD and Postdoctoral Scholarships provided to some members of our team. Special acknowledgements need to be emphasized to the work carried out by PhD. Prof. Mahayana Godoy, researcher from the Centro de Ciências Humanas, Letras e Artes, Universidade Federal do Rio Grande do Norte, Brazil, a generous participant of our project who has kindly provided uncountable tools to make our statistical analysis possible and well grounded. In addition, we appreciate the comments received from the audience during the conference, which made possible the revision of the effect of key variables such as transitivity and frequency, later included in this paper.

'Proceedings of *WECOL 2020*'

Resultative Construction (ERC), a complex predicate structure in which the main verb codifies manner and a satellite phrase (either a Prepositional Phrase PP or an Adjectival Phrase AP) codifies result as in (1). Crucially, manner and result in ERC are causally related, namely, they are in the same causal path so that manner (partially) precedes result.

(1) Mary danced John tired.

On the other hand, Spanish is an instance of Verb-framed languages in which the main verb tends to codify result, and manner (if required) is lexicalized in an adjunct as in (2)

(2) María cansó a Juan bailando
'Mary tired John by dancing'
Mary danced John tired

Although Spanish does not have resultative constructions as English does -since Spanish speakers tend to codify result on the verb and not by means of a satellite-, it does have a structure that is only formally similar, namely, the Spanish Depictive Construction (SDC) as illustrated in (3). The SDC has a mirror structure in English, namely, the English Depictive Construction (DC hereafter) as shown in (4).

(3) Él devolvió el libro dañado
'He returned the book damaged'
(4) John came home exhausted.
'John llegó a casa exhausto'

This type of double predicate construction is syntactically similar to one type of ERC, the ERC-Property (explained below), although it lacks the result meaning of the ERC. Indeed, DCs consist of the combination of a main verb and an Adjectival Phrase that do not codify result and that are not causally related. Instead, the AP lexicalizes the state of affairs of one of the arguments in the sentence and it is related to the main verb as an overlapping event (i.e., the event codified by the AP does not causally follow the manner verb, but they tend to overlap). The previous examples, for instance, consist of object-oriented DC as the AP modifies the state of affairs of the Argument in Direct Object position. This type of structures differs from the syntactic-semantic features of the ERCs described below.

2.2 *The English Resultative Construction* A closer inspection shows that ERCs encompass a rather large family of constructions (Goldberg, 2004) in which the meaning of the sentence cannot be derived from the composition of meanings of the lexical items it contains. Rather, the ERC behaves as a complex verb (Wachsler, 2005) that follows the Direct Object Restriction (DOR) proposed by Levin & Rappaport (1995, 2001). This restriction states that the result of ERC is predicated from the argument that corresponds to the DO instead of being predicated from the Subject. Therefore, the ERC with intransitive verbs can introduce a non-lexically licensed DO which in turn controls the predicative phrase -as in the case of "John" predicated from an intransitive verb "dance" in (1) repeated below in (5). This example corresponds to the ERC subtype named ERC-Property (Goldberg, 2004). It consists of a main predicate (the verb "dance") that combines with an AP ("tired") that is interpreted as the predication of the DO participant and delimits the change of state of the event. This final state [John-be-tired ($e_{5''}$)] is the result of the activity [Mary-dance-John ($e_{5'}$)] and both situations are causally related as captured by (6) (Paris, 2019). In fact, this sentence codifies an event (e_5) that is described as a causal relation between two sub situations -($e_{5'}$) and ($e_{5''}$)- so that the former is the causing situation and the latter is the result.

(5) Mary danced John tired.
Mary cansó a John bailando
(6) [CAUSE ([Mary-dance-John ($e_{5'}$)], [John-BECOME-tired ($e_{5''}$)], (e_5))]

In addition, there is another type of ERC that is the ERC-Path subtype in which the main verb denotes a manner of motion situation ("roll") that results in a change of location referred to by a PP ("up the hill"). The consensus is that the satellite introduces a delimited Path traversed by the Theme (the subject) as in (7).

(7) Bill rolled the ball up the hill
'Bill rodó la pelota arriba de la colina'
Bill subió la pelota a la colina rodando.

This type of ERC-Path seems to be quite ubiquitous in colloquial English and can be easily translated to Spanish. However, this structure does not seem to be equivalent to our Spanish versions since, whereas English permits a change of location events with a traverse Path codified by manner verb with boundary crossing as in (8), Spanish only allows manner verbs with a delimited Path, that is, with no boundary crossing as in (9).

(8) He walked into the room
(9) 'El caminó hasta/a la habitación'

Finally, ERC-Fake reflexive is the last major subtype we shall consider in this paper. It involves a reflexive pronoun that is not lexically demanded and, indeed, does not have the semantic role typically played by reflexives, namely, that of fulfilling an argument position of the verb -and, hence, a semantic role- while indicating co-referentiality with a higher up argument. Similarly, to the ERC-Property, the reflexive pronoun in (10) does not saturate an argument of the intransitive verb "cry" so that they cannot constitute a grammatical combination outside ERC as can be seen in (11).

(10) The baby cried himself asleep
'El bebé lloró a si mismo dormido'
El bebé se durmió llorando
(11) *The baby cried himself

The necessary presence of the reflexive pronoun is explained by the DOR (Rappaport and Levin 2001), in which the construction needs DO that controls the predicative phrase.

Crucially, all these examples correspond to Strong ERC (Washio, 1997), namely, ERCs that encompass a change of state or location that is not entailed by the main verb meaning and thus, is not lexically introduced. However, there are some Weak ERC in which the result is either lexically entailed or strongly implicated. For instance, the change of state of the DO "the house" is entailed by the meaning of "paint" in (12) as the AP description [house-become-green ($e_{11"}$)] only specifies that result.

(12) My neighbor painted his house green.
(13) 'Mi vecino pintó la casa verde.'

This example is one of the weak ERC that can be mirrored in Spanish as shown in (13). Spanish can only encode those constructions where the result is *entailed* by the main verb meaning while it cannot express those weak ERCs where the verb just *implicates* it (Paris, 2019) as shown in (14).

(14) Mary wiped the table clean
*'Mary repasó la mesa limpia'.

Taken together, that fact that ERC-Property only formally resembles the Spanish Depictive Construction; that the ERC-Path has only a partially equivalent in Spanish at the risk of losing the boundary crossing meaning of the English sentence; that there is nothing similar to a ERC-Fake Reflexive construction in Spanish,; and that Spanish only allows for Weak resultatives that entail the result meaning within the verb, it seems fair to assume that Spanish lacks a structure fully comparable to the three subtypes of ERC presented above.

3. Objectives

In the light of this Spanish-English contrast, we wonder to what extent native speakers of Spanish who have learnt EFL at different proficiency levels accept the different types of ERC in contrast to the EDC,

structure present in both languages. In order to address this question, we delimited three objectives to describe the acquisition of two different ERC subtypes by Spanish native speakers. First, i) we aim at analyzing if DC are acquired at an earlier stage than ERC. Second, ii) we want to identify if the different subtypes of ERC are acquired in a given sequence, and if this sequence occurs, iii) to identify if it is modulated by proficiency level and the departure of each structure from the Spanish pattern of event representation.

We predict that i) DC would be more acceptable than ERC; ii) Proficiency level would improve acceptability of ERC in general, but this effect would interact with type of ERC; and iii) If L1 to L2 effects are expected, constructions that are closer to Spanish, like DC, should be easier to acquire even for low proficiency speakers when compared to ERCs, that do not have a parallel construction in Spanish. Therefore, proficiency effects should be larger for ERCs.

4. Methodological Design

By means of an acceptability judgement task (AJT), we investigated whether native speakers of Spanish with different levels of proficiency in English as L2 would differ in the acceptability ratings of unlicensed and unlicensed ERC and DC. It is worth mentioning that, on the one hand, this experiment was designed in order to further corroborate the results obtained in a non-standardized pilot Sentence Comprehension Experiment carried out by our team. The results of this previous experiment are in line with our current data. On the other hand, although we do not test for production of the ERC, we address our goals in terms of the acquisition of the ERC as we consider comprehension and acceptability to be sufficiently informative on the internalization of a foreign structure by non-native speakers of a language.

In order to access the implied knowledge of the combinatory of a given structure (what is licensed and what is not), the experiment consists on an online questionnaire format of an Acceptability Judgement Task (AJT) with a 1-7 Likert Scale (1= totally unacceptable to 7 =totally acceptable) explained below.

4.1 *Participants* A total of 90 Spanish native speakers learners of EFL with different proficiency levels (61 of them female, Mean age: 34.77 ± 10.46 years) participated in the study. Most of the participants had completed tertiary or university studies (67.77%), while the rest had not finished them yet (33.23%). Subjects reported their proficiency level in English in terms of international exams and formal instruction (CEFR). In addition, the Vocabulary LexTALE questionnaire was applied (Lemhöfer, K & Broersma, M., 2011) consisting on a lexical discrimination task of a list of 60 items (words and non-English words). International Certificate (CEFR) exams and a Vocabulary LexTALE questionnaire were considered as English proficiency measures. No significant differences in age ($T(64) = 1.039$, $p = 0.303$), sex or education level ($\chi^2 < 0.418$, $p > 0.518$) were observed between these groups. In addition, LexTALE scores had a mean of 46.65 ± 7.53. As not all subjects reported proficiency level (only 66 of them did) and due to time constraints, results reported here correspond only to the analysis of LexTALE scores. In that sense, we consider subjects' lexical knowledge to measure general proficiency. However, results from self-reported proficiency data (CEFR) encompasses our LexTALE results. In addition, the Language History Test (Li, Zhang, Tsai & Puls, 2014) to evaluate frequency of use and immersion on L2 was applied, although no significant effects were found.

4.2 *Stimuli and Task* Experimental items consisted of 48 sentence frames, distributed among the following experimental conditions (16 from each one): 1) object-oriented DC, 2) ERC-Property, and 3) ERC-Fake Reflexive. ERC- Path ERC were left aside in this experiment due to length and time constraint for participants to complete the task. In addition, our previous Sentence Comprehension Experiment showed that ERC-Path were no more difficult than DCs at all proficiency levels (who exhibited worse performances for ERC-Property and ERC-Fake Reflexives).

For each experimental item, two versions were created: a licensed and an unlicensed one with anomalies within the AP (the AP was replaced by another AP that violates the sentence restriction selections) as shown in Table 1 below. Items were organized in two lists with 16 experimental items from each condition, one list containing the acceptable version of the sentence frame and the other the unlicensed one in a Latin square design. The presentation of the lists was counterbalanced among subjects. In addition, 32 filler sentences were included, half of them correct, 25% containing semantic violations and 25% containing syntax violations. Subjects were asked to rate how acceptable the sentences sound to a native speaker of English, and they were encouraged to respond as fast as they could.

Experimental sentences had a mean length of 8.35 ± 1.74 words, and no significant length differences were observed among conditions ($F(2,45) = 0.822$, $p = 0.446$). In order to control for frequency

biases, we compared the frequency of experimental items (verb + particle) estimated by a Google search and by the *Corpus of Contemporary American English* (COCA). A Kruskal Wallis test showed no frequency differences between experimental conditions (EDC, ERC-P, ERC-FR) in any of the estimates ($\chi^2 < 1.466$, p's > 0.481).

Table 1
Exemplification of Items Used in AJT

Condition	Licensed Item	Unlicensed items
DC	John returned the book damaged yesterday	John returned the book old yesterday
ERC-Property	Nicole danced Peter tired at the party	Nicole danced peter famous at the party
ERC-Fake Reflexive	The baby cried himself asleep again	The baby cried himself annoyed again
Filler	Ann published my novel from last year	We ate the granite with our hands (Sem. Viol.) Car keys has a way of getting lost. (Synt. Viol.)

Note. Exemplification of items used in experiment 2 including the three conditions (DC, ERC-Property, and ERC-Fake Reflexive) and fillers, both in their licensed and unlicensed versions.

4.3 *Proficiency level* The LexTALE variable (proficiency) was created by dividing the score in 3 groups (high 55, intermediate 45, low 35) (mean = 46.65, sd = 7.49, range: 29 to 60) and then placing subjects in each of them according to their scoring.

In order to assess the relation between Construction Type and vocabulary proficiency, LexTALE scores were included in a mixed –effects linear regression model as a continuous predictor, along with Construction Type (dummy-coded with *depictive* as the reference level). The model also included random intercepts for participants and items.

For the sake of simplicity and interpretability of the results, the models were conducted on correct and incorrect items separately. We considered acceptability as the dependent variable and included Construction Type (*DC* (reference level), *ERC-Property* and *ERC-Fake Reflexive*), LexTALE (*35* (reference level),45 and 55) and their interaction as dummy-coded predictors. The model also included random intercepts for participants and items.

In order to investigate how LexTALE interacted with Construction Type to predict the dependent variable, we ran *post-hoc* analyses comparing acceptability scores of each Construction Type in three different scores across the range of the LexTALE distribution (35, 45, 55).

5. Results

The results displayed below correspond to the analysis of the acceptability of target items for licensed and unlicensed sentences separately. In the correct items' analysis, the nested model comparison showed that model fit was significantly improved by the Construction Type x LexTALE interaction ($\chi^2(2) = 8.340$, p = 0.015). For the licensed items, all three levels of vocabulary proficiency (35, 45 and 55) displayed the same pattern: higher acceptability ratings for DC compared to both ERC-Property and ERC-Fake Reflexive (T's > 4.578, p's < 0.001), with no significant differences between the latter (see Table 2). In addition, acceptability increased with LexTALE scores for ERC-Property (t = -2.604, p = 0.027) and ERC-Fake Reflexive (t = -3.424, p < 0.002), but not for DC (t = -1.06, p = 0.5).

Table 2
Post-hoc Analyses LexTALE per Construction Type in Licensed Sentences

LexTALE	Comparison	estimate	SE	t.ratio	p.value
35	Depictive vs Property	1.9199	0.293	6.556	<.0001
	Depictive vs Fake Reflexive	2.0657	0.296	6.976	<.0001
	Property vs Fake Reflexive	0.1458	0.255	0.572	0.8352
45	Depictive vs Property	1.6491	0.24	6.866	<.0001
	Depictive vs Fake Reflexive	1.6498	0.242	6.804	<.0001
	Property vs Fake Reflexive	0.0007	0.189	0.004	1
55	Depictive vs Property	1.3784	0.269	5.128	<.0001
	Depictive vs Fake Reflexive	1.234	0.27	4.578	<.0001
	Property vs Fake Reflexive	-0.1444	0.221	-0.653	0.791

Note. Post-hoc analyses LexTALE scores (35, 45, 55) per construction type (DC, ERC-Property and ERC-Fake Reflexive) in licensed sentences; p-values adjusted by Tukey Method.

In order to control verb transitivity as a potential confounding variable, we classified the sentence verbs as "transitive" or "intransitive" and repeated the analysis including "transitivity" as an additional factor. Nested model comparisons showed that the inclusion of verb transitivity as a fixed effect ($\chi^2(1) = 1.023$, $p = 0.311$) or as a factor in the interaction ($\chi^2(3) = 1.653$, $p = 0.647$) did not lead to significant improvements of fit. Therefore, while our study was not designed to test the specific effects of transitivity on the AJT, statistical analysis showed no evidence of such an effect interfering with construction type and LexTALE scores.

In the unlicensed items' analysis, the nested model comparison showed significant improvement of fit after adding the interaction ($\chi^2(2) = 17.359$, $p < 0.001$). Post-hoc analysis within LexTALE scores (Table 3), showed that the acceptability ratings for DC and ERC-Property with semantic anomalies were higher than those of ERC-Fake Reflexive violations at low LexTALE scores, while this pattern was reversed at high LexTALE scores. No significant differences were observed at intermediate LexTALE scores. In addition, post-hoc comparisons with p-values adjusted by Tukey showed that acceptability of DC with semantic anomalies (Estimate: 0.526, std error: 0.193, T = 2.733, p = 0.019) and ERC-Property (Estimate: 0.462, std error: 0.193, T = 2.398, p = 0.047) decreased with LexTALE scores, while no significant changes are observed for ERC-Fake Reflexives. Once again, the addition of verb transitivity as a fixed factor ($\chi^2(1) = 0.206$, $p = 0.65$) or in the interaction ($\chi^2(3) = 1.109$, $p = 0.774$) did not improve fit.

Table 3
Post-hoc Analyses LexTALE per Construction Type in Unlicensed Sentences

LexTALE	Comparison	estimate	SE	t.ratio	p.value
35	Depictive vs Property	-0.0450	0.190	-0.237	0.9696
	Depictive vs Fake Reflexive	0.4706	0.190	2.473	0.0359
	Property vs Fake Reflexive	0.5157	0.190	2.710	0.0186
45	Depictive vs Property	-0.1097	0.105	-1.041	0.5511
	Depictive vs Fake Reflexive	0.4706	0.105	-0.597	0.8215

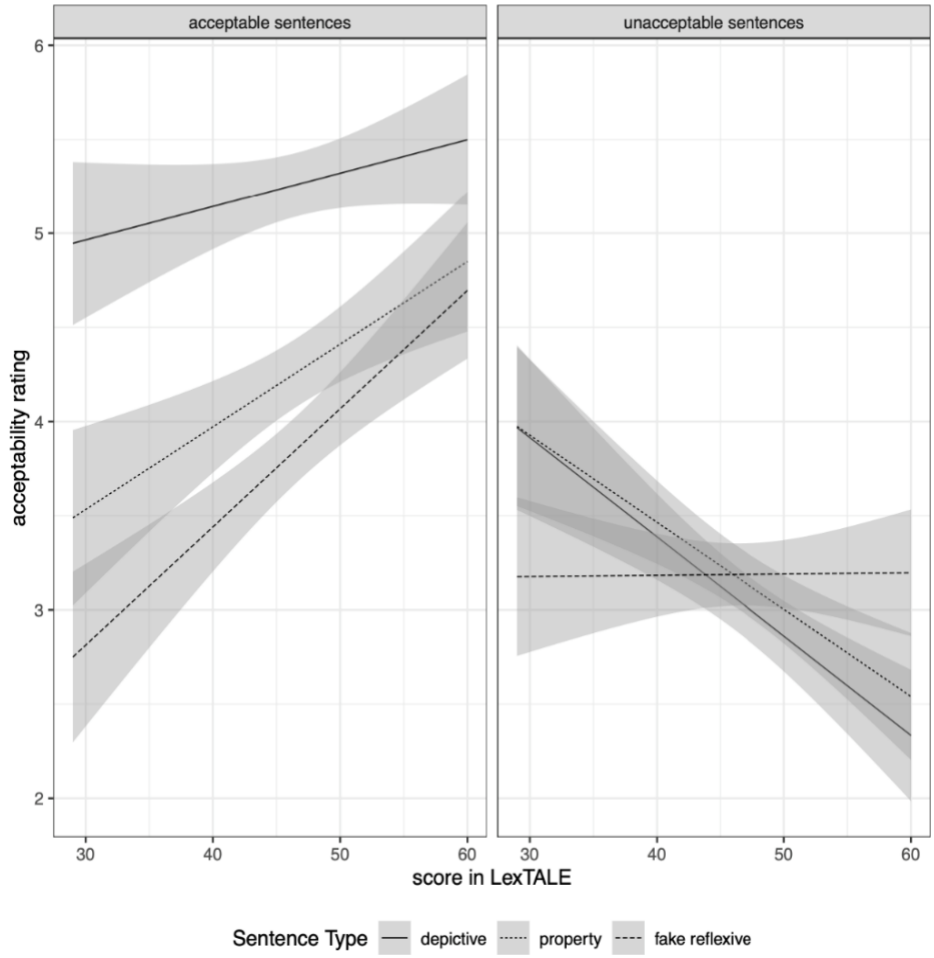
	Property vs Fake Reflexive	0.5157	0.105	0.443	0.8973
55	Depictive vs Property	-0.1743	0.154	-1.132	0.4947
	Depictive vs Fake Reflexive	-0.5966	0.154	-3.873	0.0003
	Property vs Fake Reflexive	-0.4223	0.154	-2.741	0.0170

Note. Post-hoc analyses LexTALE scores (35, 45, 55) per construction type (DC, ERC-Property and ERC-Fake Reflexive) in sentences with semantic violations; p-values adjusted by Tukey Method.

Taken together, these results show that the discrimination of DC and ERC-Property with semantic violations as unlicensed sentences improves with vocabulary scores, while the error saliency of ERC-Fake Reflexive violations remains unchanged. Figure 1 shows this inversion in acceptability scores summarized in Tables 2 and Table 3.

Figure 1

Correlation Between Acceptability Ratings and LexTALE Scores for licensed and unlicensed Sentences



Note. Correlation between acceptability ratings in a 1-7 Likert scale and LexTALE scores (from 1 to 60 scores) for licensed and unlicensed sentences in the three experimental conditions (DC, ERC-Property and ERC-Fake Reflexive).

Analysis by vocabulary proficiency as indexed by LexTALE scores was mainly consistent with the results obtained from the CEFR proficiency measure analysis. Acceptability scores were higher for licensed DC than both types of licensed ERC for all LexTALE scores, while the acceptability of ERC increased with

vocabulary proficiency. On the other hand, the acceptability of unlicensed DC and ERC-Property decreased with LexTALE scores, while unlicensed ERC-Fake Reflexives remained unaffected.

6. Conclusion

As far as we know, this study has been the first attempt to compare the acceptability of DC and different types of ERCs in a Spanish speaking sample of learners of English as a Foreign Language, with varying degrees of proficiency. Taken together, our results are in line with our predictions since statistical analysis indicated that:

1. DCs are more easily accepted by Spanish speakers than both ERCs, at all LexTALE score levels. This effect may be due to the influence of L1 event construction on English L2. Spanish speakers can use their knowledge of Spanish DC to detect English DC even at low proficiency levels, as they are a mirror image of one another.
2. The acceptability of licensed ERC increases with vocabulary proficiency, while this effect was not significant for EDCs. This suggests that EDCs performance reaches an earlier ceiling, since the structure -already present in Spanish- is more readily recognized. ERCs, on the other hand, seem to be acquired gradually, and are more easily recognized by more proficient speakers. Previous Sentence Comprehension studies from our lab showed that ERC-Path, a construction that is closer to Spanish than the other ERCs, was no more difficult to understand than EDCs, even at low proficiency level. Taken together, these results suggest that ERC acquisition is not homogeneous and follows a language distance gradient from Spanish in our sample.
3. The error discrimination improves with vocabulary proficiency for all structures except for ERC-Fake Reflexives. The acceptability ratings of unlicensed DC and ERC-Property decreased with LexTALE scores, while unlicensed ERC-Fake Reflexives remained unaffected. This might be interpreted as a sign of greater processing difficulty, since proficiency did not improve sensitivity to the restrictions that this particular construction imposes for Spanish native speakers.

In general, it seems sensible to assume that Spanish L1 has an effect on the acceptability and, therefore the acquisition, of ERC as a key instance of the event construction of English as L2. As our data shows, this effect seems to be modulated by vocabulary proficiency and syntactic distance of the target structure to the Spanish canonical lexical representation of events.

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Attachment Bias of English Relatives from Second Language Learners

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1 Introduction

Kamide & Mitchell (1997: 248) argued that English relative clauses have a low-attachment bias and summarized that there are two interpretations: (a) the relative clauses are first attached to the closest NP (low attachment); (b) the relative clauses are attached to the entire NP (higher NP), which then leads to two potential attachment NPs. Clahsen & Felser (2006: 32) argues that second language learners have difficulties in employing syntactic or phrasal structures to process sentences, instead they would resort to other information like lexicon, pragmatic or world knowledge.

In this study, a survey including both Chinese relative clauses and English relative clauses is carried out to examine: (a) without any prosodic cues, do Mandarin speakers prefer low attachment or high attachment of relative clauses? (b) how do Chinese-English learners process the second language, i.e. English relative clauses in terms of attachment?

2 Method

The stimuli in this experiment were 10 Chinese targets and 10 English targets, which were mixed with 10 Chinese fillers and 10 English fillers. 40 sentences (20 targets) were presented to the participants. The participants chose one of the two NP choices after reading the questions. The experiment was carried out via Qualtrics survey software. Participants in this experiment were Mandarin speakers in their twenties with English as their second language (N= 85). They were recruited online and volunteered to take this experiment for around 10 – 15 minutes.

3 Results

85 subjects participated in the experiment (English section). The NP low attachment responses take up to 70%; and the NP high attachment responses takes 30% among Chinese speakers who have learned English as their second or foreign language. The logistic regression shows that the lower NPs are significantly favored than the higher NPs, as shown in (1).

85 subjects participated in the questionnaire (Chinese section). The NP high attachment responses take up to 55%; and the NP low attachment responses takes 45% among Chinese native speakers. The logistic regression shows that the higher NPs are significantly favored than the lower NPs, as listed in (2).

(1)

En low	En high
587	252
70%	30%

Proceedings of *WECOL 2020*

(2)

Ch low	Ch high
379	465
45%	55%

4 Discussion

Dekydtspotter et al. (2008: 453) argue that when English French learners process French relative clauses, their attachment judgments were influenced by the length of the relative clauses. In their experiment, longer RCs lead to less low attachment bias. To avoid the influence from length and syntactic position, the target sentences in the present study are equally balanced in terms of sentence length and include RCs at both subject/object positions. Overall, without prosodic cues, there exists a high attachment bias in Mandarin relative clauses, while a low attachment bias has been observed in English relative clauses among Mandarin speakers.

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