

ARGUMENT-MAPPING AND EXTRACTION

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Abstract

In this paper, I propose a unified account for argument-mapping and islandhood in the verbal domain, while casting new light on the notion *external argument*, as well as the interaction of Case and argument-mapping.

I argue that both types of syntactic merger (*set-merge* and *pair-merge*; Chomsky, 2004) are used for the merger of verbal arguments. The type of merger determines the islandhood of the argument at its base position, and along with Case-checking, it determines the internal or external mapping of the argument. Choice of the type of merger is governed by the feature-composition of the thematic role assigned to an argument, using the thematic feature system developed by Reinhart (2000).

This approach is shown to have clear empirical advantages, when compared to existing frameworks. In addition, it provides answers for previously unresolved questions about argument externality.¹

1. Introduction

This paper begins by examining *external arguments* in contemporary linguistic theory. Empirically, I will demonstrate that their distribution is not handled correctly within existing frameworks. Specifically, I will show that for the case of Object-Experiencer verbs and their intransitive alternates, no existing approach correctly predicts which argument will be external and when.

From a theoretical standpoint, I will demonstrate that the most basic question regarding *external arguments* has yet to be answered adequately —the question of what is special about their syntactic mapping.

In addition to these unresolved issues, I will show that some internal arguments behave syntactically as if they were external (a fact also exemplified by Object-Experiencer verbs).

To address these issues, I propose a system in which both types of syntactic merger assumed in minimalist syntax (*set-merge* and *pair-merge*; Chomsky 2004) are used for the merger of verbal arguments. The type of merger determines the islandhood of

¹ This work was originally based upon joint research with Alona Belikova, and has benefited greatly from comments and data provided by Eugenia Birger, Irena Botwinik-Rotem, Alex Grosu, Julia Horvath, Tal Kedar, Marijana Marelj, Aya Meltzer, Tanya Reinhart, and Tal Siloni.

the argument at its base position (arguments that have been moved are discussed separately). In addition, I argue that the interaction of *pair-merge* and accusative Case is what determines which (if any) of the arguments will be external.

This approach provides answers for the unresolved questions above, while also accounting for the surprising behavior of Object-Experiencer verbs.

Next, I will investigate the islandhood of arguments which are no longer at their base position, and argue for the empirical equivalent of the Freezing Principle (Wexler & Culicover 1977, 1980), which can be subsumed under the restriction of *Internal Merge* to *pair-merge*. This has the advantage of allowing the Subject Condition (Chomsky 1986, Huang 1982, Kayne 1984) to be derived instead of being a primitive, while also accounting for surprising facts regarding extraction in the Dative Shift paradigm.

Finally, I will show how this proposal, coupled with the late-merger approach of Fox (2002) and Fox and Nissenbaum (1999), allows *set-merge* and *pair-merge* to be construed as minimally different, contrasting only in extractability, without losing crucial predictions regarding the interaction of adjunction and Condition C of the binding theory.

2. Empirical and Theoretical State of Affairs

The first part of this paper will explore *external arguments*, as they stand in contemporary linguistic theory. I am not dealing here with the notion “subject” in general. Rather, I am referring to *external arguments* as identified by Belletti and Rizzi (1981) and Burzio (1986), *inter alia* —namely, the subjects of transitive verbs and unergatives, but not the subjects of unaccusatives or verbal passives. Of course, the two notions are not unrelated; an external argument, if present, will invariably be the argument that surfaces in subject position.

2.1. The Problem with Externality

Linguistic theory has explicitly recognized the importance of the distinction between external and internal arguments, at least as far back as the seminal work of Williams (1980). So much so, that in contemporary syntactic theory, a separate projection has often been posited for the sole purpose of merging the external argument into syntax: the little-*v* projection.²

Despite rich linguistic literature on external arguments, I will show that the following basic questions regarding argument externality have not yet been given satisfactory answers:

- (1) a. How is the external argument chosen from among the verb’s arguments?
- b. Once merged, what accounts for its particular syntactic behavior?
In other words, what is syntactically special about external arguments?
- c. Why do certain internal arguments pattern with external arguments, in terms of syntactic behavior (see below)?

² As noted by Horvath and Siloni (2002), this projection has gone by many names: vP (Chomsky 1995b), VoiceP (Kratzer 1996), TrP (Collins 1997), and PredP (Bowers 1993). In the course of this work, I will be referring to it simply as “little-*v*”.

2.1.1. *How is the External Argument Chosen?*

2.1.1.1. Some Cross-Linguistic Data

Observe the following paradigm, showing an Object-Experiencer verb and its intransitive alternate, in English and Hebrew:

- (2) a. It worried the children that John was smoking.
 b. *hid'ig et ha-yeladim she-Dan me'ashen* (Hebrew)
worried ACC the-children that-Dan smoking
 'It worried the children that Dan was smoking.'
- (3) a. The children worried (that John was smoking).
 b. *ha-yeladim da'agu (she-Dan me'ashen)* (Hebrew)
the-children worried that-Dan smoking
 'The children worried (that Dan was smoking).'

This alternation provides several insights regarding the question in (1a), namely how the external argument is chosen. However, it is first necessary to establish which of the arguments in (2-3) are external and which are internal.

English does not mark the alternation in (2-3) morphologically. Therefore, it might be unclear which of the two versions is present in a given derivation. Hebrew proves helpful in this respect. The derivation in (3), in which the EXPERIENCER argument surfaces as a subject, is possible only with the form *da'ag(u)*. Conversely, the derivation in (2), in which the EXPERIENCER argument does not surface as a subject, is possible only with the form *hid'ig*. I will therefore use Hebrew to apply diagnostics of argument externality to each derivation.

I will start by examining the derivations in (3).

The default word order in Hebrew is SV(O). As shown by Reinhart and Siloni (2005) and Shlonsky (1987), the verb can precede the subject in one of two cases: *triggered inversion*, in which some clause-initial XP licenses the inverse order ([XP V S]), or *simple inversion*, in which nothing precedes the verb ([V S]). Simple inversion is possible only when the subject is an internal argument. Thus, verbal passives (4a) and unaccusatives (4b) allow it, while unergatives (4c) do not:

- (4) a. *putru shlosa morim* (Hebrew)
fired.PASV three teachers
 'Three teachers were fired.'
- b. *higi'u shlosa necigim*
arrived three representatives
 'Three representatives arrived.'
- c. **rakdu shlosa yeladim*
danced three children

As shown below, the verb in (3b) (*da'agu* 'worried') patterns with the unergative in (4c) —it does not allow simple inversion, indicating that its EXPERIENCER argument is external:

- (5) **da'agu shlosa studentim* (Hebrew)
worried three students

Another diagnostic for argument externality in Hebrew is modification by a possessive dative constituent. As noted by Borer and Grodzinsky (1986), a dative consti-

tuent can serve as the possessor for the subject only if the subject is an internal argument. Therefore, it can serve as the possessor for the subjects of verbal passives (6a) and unaccusatives (6b), but not for the subjects of unergatives (6c):

- (6) a. le-mi butal ha-shi'ur? (Hebrew)
to-who cancelled.PASVt he-lesson
 'Whose lesson was cancelled?'
 b. le-mi nishbera ha-kos? c. *le-mi axlu ha-'orxim?
to-who broke the-glass to-who ate the-guests
 'Whose glass broke?'

As shown below, the verb in (3b) (*da'agu* 'worried') patterns with the unergative in (6c) —the dative constituent cannot be the possessor of the EXPERIENCER argument, indicating once again that the EXPERIENCER argument is external:

- (7) * le-mi da'ag ha-student (me-ha-macav) (Hebrew)
to-who worried the-student from-the-situation

The picture that emerges is therefore that in the derivations in (3), the EXPERIENCER argument is an external argument.

I will now turn to the derivations in (2).

When an argument is a clause instead of a DP, it is exempt from the (overt) Case requirements that apply to DP's. If the argument is also internal, it can form an expletive-associate chain with an expletive in subject position. In such a configuration, the argument remains in-situ in its internal position. Crucially, this option is not available for an external argument, whether it is clausal or not. Thus, this option is available with verbal passives (8a) and raising predicates (8b), but unavailable when the clause is an external argument (8c-d) (Reinhart 2001):

- (8) a. It was said [that John would be late].
 b. It seems (to Mary) [that John is late].
 c. *It biased the judge [that the defendant was wealthy].
 d. *It broke the window [that we were throwing rocks at it].

As shown by Reinhart (2001), the SUBJECT MATTER argument in (2) (*that John was smoking*) patterns with the arguments of verbal passives and raising predicates (8a-b), allowing the expletive-associate construction:

- (9) It worried the children [that John was smoking].
 This indicates that the SUBJECT MATTER argument is internal.

Another diagnostic, used by Reinhart (2001), involves so-called "backward anaphora":

- (10) a. ?? [His_i doctor] visited [every patient]_i.
 b. [His_i health] worried [every patient]_i.

The marginality of (10a) is a standard case of weak-crossover. Following Reinhart (2001), what salvages (10b) is that the SUBJECT MATTER argument (*his health*) is an internal argument. This can bleed weak-crossover effects, since as an internal argument, *his health* is base-generated in a position which is c-commanded by *every*

patient, and it can then reconstruct to that position to receive its bound-variable interpretation at LF. In that case, *every patient* no longer needs to undergo Quantifier Raising, and weak-crossover is averted.

The picture that emerges is that in the derivations in (2), the SUBJECT MATTER argument is internal. As for the post-verbal accusative-marked EXPERIENCER argument in (2), it is internal as well. Its accusative marking may be sufficient evidence of this, but the same can be shown using the possessive dative test (similar to (6)):

- (11) le-mi ha-macav hid'ig et ha-yeladim (Hebrew)
to-who the-situation worried ACC the-children
 'Whose children did the situation worry?'

The felicity of the possessive dative construction indicates that the possessed argument (in this case, the EXPERIENCER argument *ha-yeladim* 'the children') is indeed an internal argument.

To summarize, the derivations in (2) lack external arguments. Specifically, the EXPERIENCER arguments in (2a-b) are internal. The EXPERIENCER arguments in (3a-b), on the other hand, are external.

2.1.1.2. Possible Explanations

In this section, I will examine several possible explanations for the data presented above. Specifically, the aim is to predict the distribution of *argument externality*: under which conditions a given argument will be mapped as external, and under which conditions it will be mapped as internal.

2.1.1.2.1. Thematic Explanations

The thematic roles involved in (2) and in (3) are the same (presumably, EXPERIENCER and SUBJECT MATTER; see Pesetsky 1995, Reinhart 2001). This means that question (1a) (how the external argument is chosen) cannot be answered in terms of thematic information alone.

First, consider positing a projection such as little-*v*, and restricting the set of thematic roles it can assign to the argument it merges (the external argument). In such a system, if a thematic role is part of the given set, it will be merged by little-*v*, and if not, it will be merged by the verb itself. For example, the AGENT thematic role will almost certainly be part of this set, as AGENT arguments are invariably mapped as external arguments. However, as pointed out by Horvath and Siloni (2002), the EXPERIENCER role is either part of this set or not, so such an approach cannot explain why the EXPERIENCER argument is internal in (2), but external in (3).³

Second, since there is no difference between (2) and (3) in any of the thematic roles involved, even accounts in terms of thematic hierarchies will fail to explain these facts.

³ As Horvath and Siloni (2002) point out, this state of affairs represents more than just a case that little-*v* cannot account for. It is in fact a counter-argument for the Little-*v* Hypothesis altogether — the two verbs in (2-3) are clearly derivationally related, and it would be completely ad-hoc to assume that in (2), the Experiencer role is associated with the verbal head, while in (3), the same role is introduced by a separate head (little-*v*).

2.1.1.2.2. *Burzio's Generalization*

Since the formulation of Burzio's generalization (Burzio 1986), the presence of an external argument has been tied to the existence of accusative Case on the verb. In some cases, the little-*v* projection has been the mechanism used to encode this generalization in the grammar (cf. *v**P vs. *v*P; Chomsky 2001, 2004).

However, as noted by Reinhart (2001), the picture that emerges in (2-3), repeated below, constitutes an exception to Burzio's generalization:

- (12) a. It worried the children that John was smoking.
 b. hid'ig et ha-yeladim she-Dan me'ashen (Hebrew)
worried ACC the-children that-Dan smoking
 'It worried the children that Dan was smoking.'
- (13) a. The children worried (that John was smoking).
 b. ha-yeladim da'agu (she-Dan me'ashen) (Hebrew)
the-children worried that-Dan smoking
 'The children worried (that Dan was smoking).'

The verbs in (12) lack external arguments but have accusative Case (overtly manifested in Hebrew (12b)), while the verbs in (13) have external arguments but lack accusative Case. Therefore, an approach which associates externality with the presence of accusative Case, while capturing an important linguistic tendency, will fail to account for the facts above.

2.1.1.2.3. *The Theta System*

In the Theta System, as developed by Reinhart (2002), arguments are given syntactic mapping based on thematic information and derivational relations between lexical entries. Without going into the details of the analysis here, the result is that EXPERIENCER arguments are mapped as external arguments, unless some other argument preempts this mapping. In the Theta System, the thematic roles which can preempt an EXPERIENCER's external mapping are AGENT, CAUSE, and SENTIENT — none of which are present in the derivations in (2-3). Thus, the different behavior of the EXPERIENCER argument in (2) and in (3) poses a problem for the Theta System as well (as Reinhart herself notes; see Reinhart 2001).

2.1.1.3. Intermediate Summary

It therefore appears that there is no analysis currently available which is capable of dealing with the mapping facts exemplified in (2-3). This, despite the fact that the constructions in (2-3) would hardly be considered cumbersome or uncommon.

2.1.2. *What is syntactically special about External Arguments?*

Another problem facing the notion of argument externality is that of the syntactic encoding of this property. Namely, once syntactic structure is formed, what is the inherent difference between the mapping of an external argument and an

internal one, which causes the two to react differently to various syntactic operations?

The framework of Bare Phrase Structure (Chomsky 1995a) aims to eliminate stipulated levels of X-bar structure. Thus, it abandons the primitive distinction between specifier and complement, viewing them instead as derivative structural observations.

Horvath and Siloni (2002) argue for the rejection of the Little-*v* Hypothesis. However, as they point out, this leaves open the question of how to map the sole argument of an unergative verb in a position different from the sole argument of an unaccusative verb (given the assumptions of Bare Phrase Structure), as the behavior of external and internal arguments is known to differ. Consider two simple cases:

- (14) a. John ran. b. John arrived.

Linear order is not considered to be part of narrow-syntax. Thus, given the rejection of Little-*v* Hypothesis, the VP in each of the cases (14a-b) would be as shown in (15a-b), respectively:

- (15) a. [_{VP} John [_V run]] b. [_{VP} John [_V arrive]]

What differentiates *John* in (15a) from *John* in (15b), in terms of their syntactic status? If both are the only argument of V^0 , what accounts for the difference in syntactic behavior between the two?

2.2. Extraction: More Data

Yet another piece of the puzzle, which turns out to be related to argument-mapping, can be found in some subtle properties of extraction from verbal arguments.

It is well known that external arguments block extraction. This is covered, though not exhaustively of course, by the Subject Condition (Chomsky 1986, Huang 1982, Kayne 1984). The picture regarding internal arguments, however, is more complex:

- (16) a. Who₁ did the counselor meet [teachers of t₁]?
 b. *Who₁ did the situation worry [teachers of t₁]?
 (adapted from Johnson 1992, and Landau 2001)
- (17) a. [Iz kakogo universiteta]₁ vy priglasili [studentov t₁]? (Russian)
from which university you.PL invited students
 ‘Which university did you invite the students of?’
 b. *[Iz kakogo universiteta]₁ novosti vzvolnovali [gostej t₁]?
from which university news worried visitors
 (adapted from Belikova & Preminger 2004)

Surprisingly, both in (16b) and in (17b), an EXPERIENCER argument blocks extraction despite being internal.⁴

⁴ Johnson (1992), who is also quoted by Landau (2001), states that this is only true when the subject is non-agentive. English speakers that I have checked with do not share this judgment. The same is true of Russian speakers consulted by Belikova and Preminger (2004). Moreover, even if Johnson is co-

One could conceivably seek an explanation for this in terms of structural configuration. Object-Experiencer verbs are three-place predicates (their thematic roles are CAUSE, EXPERIENCER, and SUBJECT MATTER; see Pesetsky 1995, Reinhart 2001). As such, they can be argued to project a VP-shell structure (Larson 1988). As a result, the EXPERIENCER argument would be mapped to a specifier position.

As observed by Huang (1982) and Kayne (1984), most specifiers block extraction. This has been captured by various theoretical mechanisms, such as the Condition on Extraction Domains (CED; Huang 1982). Hence, one could argue that the reason for the islandhood of the EXPERIENCER argument in (16b) and (17b) is structural —namely, that the EXPERIENCER argument occupies a specifier position.

However, such an account is insufficient, as can be seen below:

- (18) a. Who₁ did you give [a picture of t₁] to John?
 b. Who₁ did you give a picture [to acquaintances of t₁]?
 (adapted from Landau, 1994)

For (18a-b), any phrase-structure which assumes Binary Branching (Kayne 1984) (including Larsonian VP-shells) will have at most one complement position in which an argument of *give* can be merged.⁵ Therefore, explaining the blocking of extraction in (16b) and (17b) in terms of structural configurations (i.e. specifier vs. complement) is at odds with the data in (18a-b), which constitutes an obvious exception to the generalization that the CED attempts to capture.

The conclusion is that neither the external vs. internal argument distinction, nor the specifier vs. complement distinction, are able to predict extractability in these cases (for a discussion of Dative Shift, see section 3.4).

2.3. Towards a Generalization

So far, I have shown that both the distribution of argument externality and the status of arguments in terms of islandhood defy explanation using currently available frameworks.

To reach a satisfactory account, let us start by taking another look at the empirical facts at hand. Given the data presented in sections 2.1-2.2, three groups of verbal arguments can be identified:

- (19) a. *A-arguments*: arguments which are always mapped externally (e.g. AGENT)
 b. *B-arguments*: arguments which are sometimes mapped externally and sometimes mapped internally (e.g. EXPERIENCER; see (2-3))

rect, this would still be a result that demands explanation, given that the Experiencer argument is internal in both cases.

⁵ To be exact, the structure will have at most one “pure complement” position. I use the term “pure complement” to denote a node from which a path to C⁰ exists, such that this path crosses only nodes of complementation. Obviously, even given Binary Branching, adjunction can introduce a complex constituent which contains other complement nodes. However, none of these will qualify as “pure complements”, given this definition.

- c. *C-arguments*: arguments which are always mapped internally (e.g. THEME)⁶

Consider the interaction between externality and accusative Case, for each of the groups defined above:

- *A-arguments* never check accusative Case
- *B-arguments* are mapped externally when they do not check accusative Case (recall (2-3), in 2.1.1)
- *C-arguments* are never mapped externally

This is normally taken to be a result of some principle along the following lines (which may or may not be derived from other properties of the verbal Case-checking system):

- (20) Only when an argument is internal, can it check accusative Case.

However, consider the possibility that cause and effect are actually reversed:

- (21) When a *B-argument* does not check accusative Case, it is external.

In fact, since *A-arguments* never check accusative Case, the generalization stated in (21) can be expanded somewhat:

- (22) When an *A/B-argument* does not check accusative Case, it is external.

Next, consider extraction, taking into account the data from section 2.2.

The Subject Condition (Chomsky 1986, Huang 1982, Kayne 1984) covers the blocking of extraction from two of the groups defined above:⁶

- from arguments that are always mapped externally (*A-arguments*)
- from arguments that can be external (*B-arguments*), when they are indeed external

However, *B-arguments* block extraction regardless of external/internal mapping (recall (16b) and (17b) in section 2.2, in which an EXPERIENCER argument blocks extraction even when mapped internally).

Therefore, splitting verbal arguments into these groups is advantageous in capturing the properties of two seemingly distinct phenomena — argument-mapping and extraction:

⁶ The actual picture regarding Theme arguments is a bit more complex. There is a class of verbs known as Emission Verbs or Theme Unergatives (Horvath & Siloni 2002, Levin & Rappaport-Hovav 1995, Reinhart 2000, 2002), which are one-place unergatives that select a Theme argument.

The existence of external Theme arguments poses a problem for the proposed framework. This can be handled by restricting the discussion to multi-place predicates (i.e. verbs with two or more arguments), or verbs derived from multi-place predicates (such as the unaccusative alternate of a transitive verb; see Reinhart 2000, 2002).

It is important to note, however, that the existence of such verbs is equally problematic for other frameworks, including those discussed in section 2.1.1.2, and would therefore require a similar caveat.

— *A/B-arguments*:

- block extraction (regardless of mapping)
- mapped externally when they fail to check accusative Case

— *C-arguments*:

- allow extraction⁷
- never mapped externally

Given an accurate definition for *A-arguments*, *B-arguments*, and *C-arguments*, a unified account of argument-mapping and extraction could be formulated.⁸

3. Proposal

3.1. Background: Feature Composition of Thematic Roles

Reinhart (2000) proposes decomposing thematic roles into features. Under this view, the standard thematic roles (AGENT, THEME, EXPERIENCER, etc.) are not primary entities of the grammar, but rather labels for feature clusters.

(23) *Feature composition of thematic roles* (Reinhart 2000):

- ±c: whether or not the argument in question is responsible for causing change (in the context of the given event)
- ±m: whether or not the mental state of the argument in question is relevant (to the given event)

Every thematic role is a cluster of these features. In a given cluster, each feature can be valued for /+ or /-, or unvalued (in which case both interpretations of the feature are possible).

The conventional thematic roles are composed as follows:

(24) *Thematic roles* (Reinhart 2000):

	+m	no /m	-m
+c	Agent	Cause	Instrument
no /c	Sentient	∅	Subject Matter
-c	Experiencer	Goal/Source	Theme

As shown by Reinhart (2000, 2001, 2002), this system proves advantageous in predicting various grammatical properties which otherwise defy explanation.

As an example, consider the case of unaccusative verbs. As argued by Reinhart (2000), precise definition of the set of unaccusative verbs is a desideratum, both in terms of theoretical completeness, and more importantly, in terms of learnability. Though the set of

⁷ Of course, this does not exhaust the cases covered by the Subject Condition. Even *C-arguments* may block extraction when they appear in subject position. As I will argue later, this is a separate issue, which has to do with the islandhood of moved constituents. See section 3.4.

⁸ To be exact, *C-arguments* can block extraction, but only in case they move to subject position. See note 7.

unaccusative verbs is obviously finite, it is quite large. Therefore, acquiring each member of the set separately seems extremely cumbersome. Furthermore, in English, there is neither morphological marking of unaccusative verbs, nor very substantial syntactic evidence to distinguish verbs in this set (25a) from one-place unergative verbs (25b):

- (25) a. She₁ moves t₁ gracefully. b. She dances gracefully. (Reinhart 2000)

Reinhart demonstrates that attempts to define the set of unaccusative verbs in terms of their aspectual properties (Borer 1994, Van Hout 1995, Van Valin 1990, *inter alia*) cannot be considered successful, while other prevailing accounts (Levin & Rappaport-Hovav 1994, 1995, Pesetsky 1995) also fail to account for the full range of facts (see Reinhart, 2000, for the precise argumentation in each case).

However, as Reinhart shows, the feature system in (23-24) does allow precise definition of the set of unaccusative verbs. The definition is given below:

- (26) A verb is unaccusative *iff* its concept includes a CAUSE ([+c]) role, and that role is reduced (not realized).

Under normal circumstances, (26) means that the verb has an alternate which has an additional CAUSE role, as in (27):

- (27) a. [The vase]_{THEME} broke. b. [The wind]_{CAUSE} broke [the vase]_{THEME}.

However, there may be instances in which a specific entry is non-existent in a given language (to be exact, it is frozen, existing in the lexicon but not usable in a syntactic derivation; Chierchia 1989). Consider *fall*, which is unaccusative but lacks an English counterpart which has an additional CAUSE ([+c]) role. It turns out that such a lexical entry does exist in Hebrew:

- (28) a. ha-cincenet₁ nafla t₁ (Hebrew)
 the-jar *fell*
 ‘The jar fell.’
 b. ha-ruax hipila et ha-cincenet
 the-wind ‘made fall’ ACC *the-jar*
 ‘The wind made the jar fall.’

As can be seen in (28b), Hebrew has a transitive alternate of *nafal* ‘fell’, which has an additional CAUSE ([+c]) role.

Now recall (25a-b), repeated below:

- (29) a. She₁ moves t₁ gracefully. b. She dances gracefully. (Reinhart 2000)

Given Reinhart’s system, the child knows that (29a) is unaccusative, since the concept *move* has a CAUSE ([+c]) role which is unrealized here. The concept *dance*, however, does not have a CAUSE ([+c]) role. Therefore (29b) must have an unergative derivation.

Notice that while *dance* does have a causative form, as in (30a), the additional role in this form is an AGENT ([+c +m]), and not a CAUSE ([+c]), as shown by the ungrammaticality of (30b):

- (30) a. John danced Mary around the room.
 b. *[The enthusiasm]/[Her enthusiasm] danced Mary around the room.

The feature system presented in (23) thus allows a precise definition of the set of unaccusative verbs. Many other cases where linguistic analysis can benefit from this system are cited by Reinhart (2000, 2001, 2002).

3.2. The Proposed System

To account for the generalizations reached in section 2.3, I propose the following system:

- (31) *Lexical Determination of Merger:*
- a. *uniform [-] clusters:* merged into syntax via *set-merge*, the structure-building operation standardly assumed for canonical complementation (i.e. complements of functional heads, canonical direct objects, etc.) (Chomsky 2004)
 - creating a domain which is accessible for extraction
 - b. *other clusters:* merged into syntax via *pair-merge*, the structure-building operation standardly assumed for adjuncts (Chomsky 2004)
 - creating an island for extraction

In other words, the feature-composition of the thematic role discharged on a given argument determines the type of syntactic merger which inserts that argument into the derivation.

THEME ([-c -m]), GOAL/SOURCE ([-c]) and SUBJECT MATTER ([-m]) roles are uniform [-] clusters, and therefore arguments receiving these roles will be merged via *set-merge*. All other arguments will be merged via *pair-merge*.⁹

Note that the fact that an argument is *pair-merged* does not mean it is late-merged (Fox & Nissenbaum 1999, Fox 2002). On the contrary, *pair-merge* is subject to the same cyclicity conditions as *set-merge*. The issue of late-merger is orthogonal to the *set-merge/pair-merge* dichotomy. See 3.6 for further discussion.

3.3. The Predictions

In this section, I will show that the proposal above correctly predicts the facts presented in sections 2.1-2.2, regarding argument-mapping and extraction —facts which previously defied explanation.

3.3.1. Extraction

Let us examine how the proposed system accounts for the extraction-related facts shown in section 2.2. Recall (16a-b), repeated below:

- (32) a. Who₁ did the counselor meet [teachers of t₁]?
 b. *Who₁ did the situation worry [teachers of t₁]?

⁹ Ideally, this account would also explain the difference between A-arguments and B-arguments more clearly —namely, why A-arguments never check accusative Case (and are therefore always external). See Preminger (2005) for a detailed account.

The bracketed argument in (32a) receives the role of THEME ([-c -m]), which is a uniform [-] cluster. It is therefore merged via *set-merge*, predicting its accessibility to extraction. The bracketed argument in (32b), however, receives the role of EXPERIENCER ([-c +m]), which is not a uniform [-] cluster. It is therefore merged via *pair-merge*, predicting its islandhood. Compare this with (18a-b), repeated below:

- (33) a. Who₁ did you give [a picture of t₁] to John?
 b. Who₁ did you give a picture [to acquaintances of t₁]?

The bracketed arguments in (33a) and in (33b) receive the roles of THEME ([-c -m]) and GOAL ([-c]), respectively. Both are uniform [-] clusters. Therefore, both are merged via *set-merge*, predicting their accessibility to extraction (for a discussion of Dative Shift, see section 3.4).

The advantage of divorcing accessibility to extraction from the external/internal mapping of arguments, and from their structural configuration (i.e. specifier vs. complement), becomes clear. Both of the bracketed arguments in (32a-b) are internal, but their extraction-related properties differ. At most one of the two bracketed arguments in (33a-b) can be in complement position, but their extraction-related properties are the same. Therefore, CED-inspired accounts for extractability, which are based on either argument externality or the specifier/complement distinction (Huang 1982, Kayne 1984) cannot deal with the data presented here. Unlike such accounts, the proposed system correctly predicts this behavior.

Notice that this proposal essentially incorporates Kayne's (1994) intuition that specifiers are an instance of adjunction, since given the proposed system, most verbal arguments that occupy a specifier position will indeed be *pair-merged*. The two approaches diverge precisely on cases such as (33a), above, which represents felicitous extraction from a specifier position. Under this proposal, (33a-b) contain a specifier which is not *pair-merged*, and therefore does not pattern with adjuncts, in terms of islandhood.

We are now in a position to answer question (1c):

Question (1c): Why do certain internal arguments pattern with external arguments, in terms of syntactic behavior (i.e. accessibility to extraction)?

Answer: Such internal arguments behave this way because they are *pair-merged* (on par with external arguments —as discussed in 3.3.2, below).

3.3.2. Externality

Let us now turn to the facts relating to argument-mapping, as presented in section 2.1. Recall the argument groups identified in section 2.3:

— *A/B-arguments:*

- block extraction (regardless of mapping)
- mapped externally when they fail to check accusative Case

— *C-arguments:*

- allow extraction
- never mapped externally

The system proposed in 3.2, in addition to handling the extraction data presented in section 2.2, necessarily fixes the classification of arguments into these groups. For example, arguments receiving thematic roles which are uniform [-] clusters are *set-merged*, allowing extraction. Therefore, they must be *C-arguments*. Likewise, all other arguments (which are *pair-merged*, blocking extraction) must be *A/B-arguments*.

Since *A/B-arguments* and *C-arguments* have not only extraction-related properties, but also mapping-related properties, this classification results in precise predictions regarding how these arguments will be mapped:

- Arguments receiving roles which are uniform [-] clusters (i.e. *C-arguments*) must always be mapped internally.
- Arguments receiving other roles (i.e. *A/B-arguments*) must be mapped internally if and only if they check accusative Case.

One can now check if the mapping of these arguments to external/internal positions is in fact consistent with these predictions. Recall (2-3), repeated below:

- (34) a. It worried the children that John was smoking.
 b. hid'ig et ha-yeladim she-Dan me'ashen (Hebrew)
worried ACC the-children that-Dan smoking
 'It worried the children that Dan was smoking.'
- (35) a. The children worried that John was smoking.
 b. ha-yeladim da'agu she-Dan me'ashen (Hebrew)
the-children worried that-Dan smoking
 'The children worried that Dan was smoking.'

As shown in 2.1.1, the EXPERIENCER arguments in (35a-b) are external, while the derivations in (34a-b) do not contain external arguments. Given the thematic feature system in 3.1, the thematic roles involved in (34-35) are composed as follows:

- EXPERIENCER: [-c +m]
- SUBJECT MATTER: [-m]

The SUBJECT MATTER role is a uniform [-] cluster. The argument receiving this role is therefore a *C-argument*. As such, it should never surface as external, regardless of whether or not it checks accusative Case.

The EXPERIENCER role is a mixed cluster. The argument receiving this role is therefore an *A/B-argument*. Thus, it should be mapped externally precisely when it does not check accusative Case.

This is exactly the picture that emerges in (34-35). The SUBJECT MATTER argument is internal in both (34) and (35). As for the EXPERIENCER argument, its mapping is indeed dependent on accusative Case. The verb in (34) has accusative Case, which is checked by the EXPERIENCER argument (as can be seen overtly in (34b)). The EXPERIENCER argument is therefore mapped internally in (34). The verb in (35), on the other hand, does not have accusative Case. This allows the EXPERIENCER argument to be mapped externally (see 2.1.1 for the relevant diagnostics).

One can now answer the two remaining questions, (1a-b):

Question (1a): How is the external argument chosen?

Answer:

(36) *External Argument:*

A *pair-merged* argument that does not check accusative Case.

Question (1b): What is syntactically special about external arguments? Specifically, what is the syntactic difference between how the sole argument of an *unergative* verb is mapped and how the sole argument of an *unaccusative* verb is mapped?

Answer: The difference is in the type of operation that attaches the argument to the syntactic tree: *set-merge* vs. *pair-merge*.

The formulation of externality without reference to the specifier/complement distinction allows different mapping for external and internal arguments without stipulated X-bar structure or little-*v*, which as discussed in 2.1.2, is a desirable result.¹⁰

3.4. Movement and Islandhood: Completing the Picture

The brief discussion of ditransitive verbs in sections 2.2 and 3.3.2 did not deal with the phenomenon of Dative Shift. This section will deal with Dative Shift and related issues.

3.4.1. Dative Shift and Extraction: The Data

In the interest of perspicuity, I will adopt the terminology used by Larson (1988), i.e. *Dative Construction* to refer to the derivation containing overt dative marking (as in (37), below), and *Double Object Construction* to refer to the result of Dative Shift, where no overt dative marking is visible (as in (38), below).

Recall the data regarding extraction in the Dative Construction (18), as presented in 2.2 and repeated below:

- (37) a. Who₁ did you give [a picture of t₁] to John?
 b. Who₁ did you give a picture [to acquaintances of t₁]?
 (adapted from Landau 1994)

As shown above, in the Dative Construction, both the *THEME* and the *GOAL* arguments are possible domains for extraction. As argued in 2.2, this is important counter-evidence for the validity of a generalization on extraction which relies on the specifier/complement distinction, such as the CED (Huang 1982).

¹⁰ The insight that uniform [-] clusters form a natural class, and that this class behaves in a distinct fashion with respect to merger, is due to Reinhart (2002). In her system, however, belonging to this class of thematic roles has different consequences than in the system proposed here. Also, her system further sub-divides the other thematic roles, so the result is a system with three natural classes, and not two, as proposed here.

The facts regarding extraction in the Double Object Construction are different:

- (38) a. *Who₁ did you give [acquaintances of t₁] a picture?
 b. Who₁ did you give John's acquaintances [a picture of t₁?]
 (adapted from Landau 1994)

Somewhat surprisingly, Dative Shift appears to affect the islandhood of the GOAL argument (the bracketed argument in (38a)). I will account for this property in the following sub-section.

3.4.2. *The Interaction of Movement and Islandhood*

There are two issues, related to the current proposal and to islandhood effects, which have remained unexplained so far:

- Dative Shift extraction facts, as shown in 3.4.1, above
 - residual Subject Condition effects —as is well known, even arguments which allow extraction at their base positions, are islands when moved to subject position. Notice the difference between extracting from the bracketed argument in (39a) and in (39b), as shown in (40a) and (40b), respectively:
- (39) a. It seems strange to Mary [that John would enjoy rock music].
 b. [That John would enjoy rock music] seems strange to Mary.
- (40) a. [Which music]₁ does it seem strange to Mary [that John would enjoy t₁?]
 b. *[Which music]₁ does [that John would enjoy t₁] seem strange to Mary?

It is clear what these two issues have in common. If one accepts Larson's (1988) analysis of Dative Shift, the Double Object Construction (38) involves movement of the GOAL argument from its thematic position (on par with verbal passivization; *op. cit.*). Similarly, the difference between (40a) and (40b) is whether or not the bracketed argument is at its base position.

These facts are reminiscent of Wexler and Culicover's Freezing Principle:

- (41) *The Freezing Principle* (adapted from Wexler & Culicover 1977, 1980):
 A constituent which has undergone movement becomes an island.

More recent work has introduced the view that movement is simply *Internal Merge*, meaning the merger of a syntactic object that is already present in the derivation, into the derivation once more (Chomsky 2004, 2005). Given this, the Freezing Principle itself can be derived from the following restriction:

- (42) *Internal Merge* is always *pair-merge*.

Furthermore, as shown below, adopting (42) has the advantage of making the Subject Condition (Chomsky 1986, Huang 1982, Kayne 1984) derivable, instead of being a grammatical primitive.

3.5. Deriving the Subject Condition

As discussed in 2.1.2, the move to Bare Phrase Structure (Chomsky 1995a), means abandoning the primitive distinction between specifier and complement. Given this,

the Subject Condition (Chomsky 1986, Huang 1982, Kayne 1984) can no longer be taken to be an instantiation of the inherent properties of the specifier position.¹¹

In this respect, it is important to note that there is cross-linguistic variation on whether overt movement to subject position (Spec-T⁰) is obligatory.

Accounting for the Subject Condition therefore involves answering two separate questions:

- (43) a. What prevents extraction from an argument that has moved to TP?
 b. What prevents extraction from external arguments at their base positions?

Given the current proposal, an answer to (43b) is readily available. Recall the answer to question (1a) (how the external argument is chosen), namely the definition in (36), repeated below:

- (44) *External Argument*: A *pair-merged* argument that does not check accusative Case.

The fact that an external argument (if one exists) blocks extraction at its base position, is a result of the type of merger that attaches it to the syntactic tree —namely *pair-merge*, which creates a domain that is inaccessible to extraction.

The answer to (43a) can be found in the restriction (42) reached in section 3.4.2, and repeated below:

- (45) *Internal Merge* is always *pair-merge*.

Thus, if an argument has moved to TP, it should become an island by virtue of that movement.

One would therefore predict that if the subject is *set-merged* (as would be the case in unaccusative verbs and verbal passives, given the current proposal), and the language allows the subject to stay in-situ, extraction from it should be possible. This is indeed the case, as can be seen from the contrast in (46a-b), involving the Hebrew verbal passive *ne'emar* 'was said':

- (46) a. *ma₁ [she-Dan oxel t₁] ne'emar li? (Hebrew)
 what that-Dan eats said.PASV to.1sg
 b. ma₁ ne'emar li [she-Dan oxel t₁]?
 what said.PASV to.1sg that-Dan eats
 'What was it said to me that Dan eats?'

The cases in (46a-b) differ in whether or not the subject has moved to TP. The subject (in both cases) receives the role of THEME ([-c -m]), which is a uniform [-] cluster. Given the current proposal, this means it is inserted at its base position via *set-merge*. Hence, extraction from it is possible precisely when it has not been moved (46b).

Unlike Hebrew, English requires subjects to move to TP overtly. However, there are exceptions to this: since clausal arguments are exempt from the Case requirements that apply to DP's, they can remain in-situ, with an expletive pronoun in subject po-

¹¹ The relationship between argument-mapping and accusative Case, besides its evident empirical adequacy, may seem rather arbitrary at this point. This is hardly so, however; see Preminger (2005).

3.6. A New View on the Set-Merge/Pair-Merge Distinction

The discussion in 3.3-3.5 does leave one question open —that of the apparently divergent behavior of adjuncts and other *pair-merged* constituents. Recall that *pair-merge* was invoked by Chomsky (2004) to account for the exceptional behavior of adjuncts with respect to Condition C:

- (50) a. *He_i bought the book [that John_i wanted].
 b. [Which book [that John_i wanted]]₁ did he_i buy [which book [that John_i wanted]]₁?
- (51) a. *He_i liked the picture [of John_i].
 b. *[Which picture [of John_i]]₁ did he_i like [which picture [of John_i]]₁?
 (strikeout indicates unpronounced copies)

The interesting case is (50b): one would have expected the copy of [*which book that John wanted*], which is generated as an argument of *buy*, to cause a Condition C violation.

The generalization is as follows: phrases contained in an adjoined element (50) can only induce a Condition C violation at their “surface” (i.e. phonologically pronounced) position (as in (50a)), while phrases contained in non-adjoined elements (51) induce Condition C violations at their base and intermediate positions as well.

This was handled by Chomsky (2004) by asserting that *pair-merge* attaches constituents on what is essentially a “separate plain”, while *TRANSFER*, the narrow-syntactic preparation for Spell-Out, “flattens” them into *set-merged* structures. Presumably, this means that *pair-merged* structures are entirely exempt from Condition C effects, while the *set-merged* structures that result from their *TRANSFER* lose this property.

However, given the current proposal, arguments receiving thematic roles which are not uniform [-] clusters are also merged via *pair-merge*. Yet these arguments exhibit no such bleeding effects. Consider the following example:

- (52) a. *[Which sister [of Bill_i]]₁ did he_i think [t₁ kissed John]?

Here, [*which sister of Bill*] is originally merged as the AGENT of *kissed*. Since AGENT ([+c +m]) is not a uniform [-] cluster, it is merged via *pair-merge*. The constituent subsequently undergoes wh-movement to the matrix clause, but crucially, this does not exempt the base position from incurring a Condition C violation.

The effects are therefore restricted to actual adjuncts (i.e. unselected modifiers). This appears to contradict the idea that *pair-merge* is the operation responsible for the merger of both types of constituents.

However, recent work by Fox (2002) and Fox and Nissenbaum (1999) has shown that there is a completely different way to account for the Condition C facts in (50-51). Their proposal involves late-merger of adjuncts to (overtly or covertly) moved constituents.

Under Fox and Nissenbaum’s approach, unselected modifiers (i.e. adjuncts) can merge to a constituent at any point in the derivation. Specifically, they can merge to a higher copy which is a result of *Internal Merge* (i.e. movement). Thus, the derivation of (50b), above, would proceed as follows (abstracting away from irrelevant details):

- (53) a. he buy [which book]₁ b. [which book]₁ [he buy [which book]₁]
 c. [which book [that John wanted]] [he buy [which book]₁]

Under this analysis, there is never an instance of *John* within the c-command domain of the pronoun *he*, and therefore no Condition C violation occurs. The same cannot apply to (51), because the relation between *picture* and [*of John*] is thematic:

- (54) a. he like [which picture]₁ b. [which picture]₁ [he like [which picture]₁]
 c. [which picture [of John]] [he like [which picture]₁]

For [*of John*] to merge to *picture*, the latter must be an event-nominal, which has a thematic role of THEME to assign. However, if this is the case, then the lower copy of [*which picture*], where *picture* has no argument, represents a violation of the Theta Criterion. Therefore (54a-c) represent a derivation that will crash at LF.¹²

Thus, unlike Chomsky's *TRANSFER* approach, the late-merger approach captures the difference between arguments and adjuncts in terms of their inherent semantic differences: the former are subject to the Theta Criterion at LF, while the latter are not (Fox 2002). This allows adjuncts to be absent from the lower copies of a moved constituent, while barring the same from applying to arguments. The immediate result is the restriction of late-merger to adjuncts. Hence, even though adjuncts are attached to the syntactic tree via *pair-merge*, it is no longer necessary to postulate that some property of *pair-merge* is what makes them (partially) resistant to Condition C.

As a result, the grammaticality of (52), repeated below, no longer poses a problem to the proposed system:

- (55) *[Which sister [of Bill]]₁ did he_i think [t₁ kissed John]?

The argument [*which sister of Bill*] is *pair-merged* at its base position, but it is most certainly not an adjunct. It is an argument of *kissed*; likewise, [*of Bill*] is an argument of *sister*. Thus, neither can be late-merged to their respective heads (since this would result in a violation of the Theta Criterion at LF). They are therefore merged to those heads at their respective base positions, giving rise to a Condition C violation with respect to the pronoun *he*.

Perhaps the most important consequence of adopting the late-merger proposal, with respect to the current proposal, is the fact that it reduces the difference between *pair-merge* and *set-merge* to one property alone: the blocking of extraction. Since *set-merge* and *pair-merge* are theoretical primitives, it is independently desirable that the difference between them would be one single primitive property, rather than having a collection of differing properties.

4. Conclusion

I started by presenting unexplained data regarding *external arguments*, alongside unresolved theoretical issues pertaining to the notion of argument externality. In addition, I presented the case of certain verbal arguments, which behave with respect

¹² Notice that this is independent of the issue of little-v. As pointed out in 2.1.1.2, I adopt Horvath and Siloni's (2002) arguments for the rejection of the Little-v Hypothesis, as the latter is incompatible with the data presented in 2.1.1 (see note 3). However, even if one adopts the Little-v Hypothesis, it does not provide a clear advantage in explaining the blocking of extraction from subjects, unless an additional stipulation is made regarding the properties of the vP projection in general, and its specifier in particular.

to extraction in a manner that defies explanation in terms of the external vs. internal argument distinction, or the specifier vs. complement distinction.

Having taken these problems as a starting point, I showed that a surprising generalization emerges from the combination of argument-mapping and extraction from verbal arguments. From this generalization I then derived a system which links the type of merger used for a given argument to the thematic role assigned to that argument.

This system is able to account for the previously unexplained data, while also providing answers to the theoretical questions presented at the onset.

Finally, I addressed the issue of extraction from displaced arguments, proposing to subsume Wexler and Culicover's (1977, 1980) Freezing Principle under the restriction of *Internal Merge* to *pair-merge* (given the Copy Theory of Movement; Chomsky 1995b, 2004).

Given the proposal of Fox (2002) and Fox and Nissenbaum (1999), regarding a late-merger account for the bleeding of Condition C effects by adjuncts, the proposed system reduces the difference between the primitive notions *set-merge* and *pair-merge* to extractability alone. In addition to this desirable simplification, and the ability to account for previously unexplained data, the proposed system both clarifies the notion *external argument* and improves our understanding of the conditions on extraction in the verbal domain.

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