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Smuggling and Labeling Theory

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Abstract

This paper draws a deep connection between smuggling (Collins, 2005) and labeling (Collins, 2002; Chomsky, 2013, 2015), showing that the movement of the smuggler in a smuggling derivation can be triggered by the labeling algorithm.

Keywords

passive, smuggling, labeling algorithm

1. Smuggling

Smuggling refers to an approach to passives pioneered by Collins (2005) and extensively developed in Collins (2024) (on smuggling more generally, see Belletti & Collins, 2020; Storment, 2025, and much recent work). Axiomatic on this approach is the Merge-based approach to argument structure:

(1) Intuition: The only way to build argument structure is by external Merge.

Collins (2024) formalizes this intuition with the Argument Criterion:

(2) Argument Criterion

a. Each argument is introduced by a single argument-introducing head.
b. Each argument-introducing head introduces a single argument.

We assume that there is a series of argument-introducing heads, including little v and Appl (amongst others). These heads are designated as argument introducing heads as part of UG.

The Argument Criterion has interesting consequences for the analysis of the passive. Since the *by*-phrase is an argument, it must be externally merged into an argument position.

(3) The *by*-phrase of the passive is externally merged (set-Merge) into Spec vP.

Consider a passive sentence like (4) and its derivation (5).

(4) The book was read by Susan.

Within a smuggling approach the external argument EA=*by Susan* gets introduced into SPEC of vP; a Participle Phrase PartP dominates VP, see (5a). Moreover, Voice is introduced as a functional head above vP, see (5b). The internal argument IA=*the book* is smuggled over the EA by its containing PartP (we use <> around XPs which are lower copies) as in (5c). After the smuggling step T is Merged in (5d), and the IA is finally EPP-raised to SPEC of TP in (5e).

(5) a. [EA [$_{vP}$ v [$_{PartP}$ Part [$_{VP}$ V=*read* IA=*the book*]]]]
b. [Voice [EA [$_{vP}$ v PartP]]]
c. [PartP Voice [EA [$_{vP}$ v <PartP>]]]
d. [T [PartP Voice [EA [$_{vP}$ v <PartP>]]]]
e. [IA [T [PartP Voice [EA [$_{vP}$ v <PartP>]]]]]

In the following we show how specific aspects of a smuggling approach to passives can receive a deeper explanation when viewed from the perspective of labeling theory (Chomsky, 2013, 2015). In particular, we show how the movement of the PartP in (5c) can be accounted for in terms of the labeling algorithm of Chomsky (2013, 2015), and therefore, the approach based on stipulating uninterpretable features of Voice (to trigger movement of the PartP) in Collins (2005) is unnecessary.

2. Labeling Theory

Chomsky (2013), henceforth PoP, develops a theory of syntax in which the set-forming operation Merge is independent of projection of a category label (for precedents see Collins, 2002; Seely, 2006; see also Collins & Seely, forthcoming). Merge involves application to two elements α and β yielding {α, β}; if Merge applies to α and β both of which are members of the Workspace, Merge is external (EM). If Merge applies to α and β where α is part of β, Merge is internal (IM).

While projection is eliminated, the notion of a prominent element within a given set is retained. PoP states (see Collins, 2017 for critical discussion):

(6) "For a syntactic object SO to be interpreted, some information is necessary about it: what kind of object is it?" (PoP, p. 43)

(7) "...there is a fixed labeling algorithm LA that licenses SOs so that they can be interpreted at the interfaces, operating at the phase level along with other operations. The simplest assumption is that LA is just minimal search, presumably appropriating a third factor principle, as in Agree and other operations." (PoP, p. 43, footnote omitted)

Condition (6) states that a label needs to be found in every SO—it is a requirement by the interfaces (Conceptual Intentional/CI and Sensory Motor/SM) rather than a narrow syntactic requirement. It is arguably a condition specific to the Faculty of Language. (7) addresses how the label is found, namely by the most efficient procedure, Minimal Search. It is not a language specific condition but a third factor, and thus comes for free.

The LA works as follows: Suppose Merge applies to a lexical item X and a previously generated set {Y, ...} so that we get {X, {Y, ...}}=α. LA finds X as the label of α, because search of X's sister requires deeper search, which is hence blocked. This means that whenever we have what was traditionally called head-complement structures X-YP, these are labeled by X.

That leaves us with two other configurations: XP-YP and X-Y. We abstract away here from the latter case, concentrating on the former illustrated by an EA and vP shown in (8). In a language like English, the EPP holds, that is, EA needs to raise out of β and come to occupy "SPEC" of TP, see (9) and (10) (from here on we put SPEC in quotation marks, intended for exposition only. The notion is informulable in the symmetric Merge-framework).

(8) {EA, {v, VP}}=β

(9) Susan has read the book.

(10) (Bill claims that) *has Susan read the book

How is β labeled? PoP suggests this: First T and β EM forming {T, β} which we call TP for exposition.[1] Next, EA undergoes IM with TP, forming EA-TP. EA now is a discontinuous SO. This solves the labeling problem for β={EA, vP}, because, by assumption, the lower

1) This label will be found at the CP-phase level in accordance with (7). We also abstract away here from further issues the notion "weak T" introduces, cf. Chomsky (2015).

copy of EA is invisible whereas the topmost one in EA-TP is visible. That is, the label of {<EA>, vP} is v, and so {<EA>, vP} counts as a vP.

Moreover, the labeling-based approach gives a partial account for the EPP: EA is forced to raise, otherwise labeling of β is impossible. We leave that picture intact and refer the reader to Epstein et al. (2020) who develop an important extension of labeling theory consistent with the current framework, based on the notion of paths (cf. Pesetsky, 1982).

3. Smuggling and Labeling Theory

How about smuggling? The representation (5c), repeated here as (11), is reminiscent of one of the subtler points PoP (2013, p. 44) adumbrates if in different context.

(11) [PartP Voice [$_{\alpha}$ EA [$_{vP}$ v <PartP>]]]

(12) The book was read by Susan.

Given a structure [$_{\beta}$ (EA) [v* [R IA]]], where R is a categoryless root neglected by the LA, how is β labeled? Next to raising EA, there is the option that

> "IA raises. Then the part of the structure visible to LA is EA-v*, with EA the ''complement'' of v*, and the structure is again labeled v*. Alexiadou and Anagnostopolou (2001) have proposed that in structures of the form β, either EA or IA must raise. If that thesis can be sustained, then the conclusion could simply follow from labeling." PoP (2013, 44, footnotes omitted)

How is raising IA a solution to the problem of labeling β? After all, upon raising IA v* is a member of a set excluding EA. Footnote 34 in PoP elaborates on the matter:

> "Technically, what is visible to LA is {EA, {v*}}, v* the complex element formed by head-raising of V (or, perhaps, {v, R}, along lines discussed earlier), and the internal argument part of a discontinuous element, hence invisible to LA. The labeling algorithm has to be designed so that search into a singleton set is minimal".

Chomsky (2020, pp. 37–38) makes similar remarks in a different context. Merge and the way the LA operate differ in this regard. The intuition is that Merge forms relations between two elements: Merge(A,B) relates the two elements by putting them in a set. {A} will not be formed by Merge, because no two elements are related in this set. Relatedly, c-command can be "read off" the Merge-procedure insofar as any newly Merged element c-commands the rest (as per Epstein et al.'s, 1998 foundational work on the matter). The search procedure is different from Merge in this respect. It searches {PartP ...{EA,

{v, <PartP>}}}. Search finds the upper copy of PartP which means that the lower one is invisible. It follows that {v} is the relevant set found by search—whose element will be chosen as the label for the relevant set search sees: {EA, {v}}. One rationale for why the singleton amounts to the same as the element itself is that search is feature-sensitive (for remarks to this effect, cf. PoP, p. 45; Blümel, 2017, pp. 78–79). It peruses sets in search for a feature. Short of such a feature, search continues. {v} does not contain a feature, it contains a lexical item. It follows that search continues. Once v is found, search terminates, because v is a feature bundle.

We here directly carry over PoP's observation to the smuggling approach to passives shown in (11).[2] EA is base generated in "SPEC"-vP. The EA=*by Susan* must not vacate {EA, vP}=α in an EPP-style, i.e., the derivation from PoP intended for EA's in active sentences cannot possibly apply:

(13) *By Susan was read the book.

Why is that so? Why isn't the EA in a passive forced to vacate α just as it is in the corresponding active structure? After all, EA occupies the same position within the approach to passives advocated by Collins (2005, 2024). How can labeling of α be accomplished in a passive without IM-ing EA? The partial derivation in (11) provides an answer without additional assumptions or postulates: PartP undergoes IM to "SPEC" of Voice. What this means is that in (11), the lower copy of PartP is invisible. Therefore, [v <PartP>] is labeled as v for the purposes of search for the label, in line with the rationale given above. As a consequence, LA only discovers {EA, v} when inspecting α. Therefore, α is labeled vP by Minimal Search. In effect, EA is the newly derived "complement" of v upon the smuggling step. Notice that this way of stating things is for the identification of the label only: v does not c-command EA where syntactic derivation (i.e. Merge) is crucial to establishing the relation (cf. Epstein et al., 1998): Plainly EA is not the first element to Merge with v; PartP is. As such, conventional operations contingent on c-command (e.g. Agree) do not hold in the resultant structure of vacating PartP from vP. The end result is that EA is not forced to move in the passive, because movement of PartP has resolved the labeling problem imposed by the structure [EA vP]. See Roberts forthcoming for a similar intuition, but a different implementation (vP movement instead of PartP movement).

Furthermore, this approach gives a novel motivation for the movement of the PartP phrase in the passive. If it were not moved, the [EA vP] would not be able to be labeled, failing to meet condition (6). In effect, movement of the PartP breaks the symmetry

2) Similar effects of "collapsing" structure have been suggested to result from the phase-based notion of Transfer, cf. Narita (2011); Ott (2011); Takita et al. (2016); Bode (2020). New labeling options derived from Transfer vs. new labeling options derived from movement are distinct and rest on differing assumptions, cf. PoP, fn. 45. For critical discussion, cf. Obata (2017).

of the structure (see Roberts, 2024 on smuggling and symmetry breaking), because of the definition of the labeling algorithm. This is an improvement over the analysis in Collins 2005, where the movement of the PartP is motivated by uninterpretable features of VoiceP.

To summarize, we retain the trigger of IM EPP-style in active constructions along the lines of PoP. Both in active and passive structures, EAs are introduced by EM into the invariably thematic position "SPEC" of vP given the Argument Criterion (Collins, 2024). The resulting thematic core in both active and passive sentences each receive an account in terms of labeling as far as the necessity or the impossibility of the EA to IM into the "SPEC" of TP-position is concerned. There is a "seesaw" effect involved in solving the labeling problem for {EA, vP}, solved differently in actives and passives:

(14) Active

a. {EA, vP}=α

b. {T, {EA, vP}}

c. {EA, {T, {<EA>, vP}}} LA finds vP as the label of α

(15) Passive

a. {EA, {v, PartP}}=α

b. {Voice, {EA, {v, PartP}}}

c. {PartP, {Voice, {EA, {v, <PartP>}}}} LA finds vP as the label of α

In both cases an XP must vacate α to ensure labeling of α. Simplifying somewhat, in both cases this XP targets the head that selects α (T in actives, Voice in passives).

This "seesaw" effect offers a completely new way to look at voice alternations. On this new perspective, voice alternations (such as the passive) involve a common underlying argument structure. But the structure is symmetric, and blocks the calculation of the label. As a result, either an argument undergoes movement (EA moves in the case of the active), or there is a smuggling operation (PartP moves in the case of the passive). It remains to be seen how much voice alternations in general can be looked at in this new light (see Stegovec, 2024 on a similar labeling analysis of the dative alternation).

4. Conclusion

In this short paper, we have established a link between smuggling derivations, as defined by Collins (2005), and the labeling algorithm of Chomsky (2013, 2015). We have shown that the labeling algorithm triggers movement of PartP in the passive, in order to resolve a labeling problem.

New questions arise, of course, as is common when reinterpreting established phenomena and analyses, like: How is {PartP, VoiceP} labeled? Is this a criterial configuration with shared features? To what category of movement does the smuggling step belong (A vs. A')? What is it that forces the IA to raise to "SPEC" of T? And why doesn't the smuggling step render the IA frozen (EPP-raising IA to "SPEC" of T is not just a possibility but required)? How is Case absorbed in the passive? We leave all of these questions for future work.

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