Two Notes on Possible Approaches to the Unification of Theta Relations*

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1. Introduction

At least as early as Chomsky (1981) an interesting problem was revealed and placed on the "research agenda"–the problem being the postulation of a non-unified theory of theta relations. As he put it (working then in a VP-external subject framework in which subjects are immediately dominated by S):

> Clearly, theta marking is closely related to subcategorization. The two notions are not identical however. (Chomsky 1981:37)

This is of course because subjects can be theta marked, yet they are not complements of a head. In more recent approaches hypothesizing VP-internal subjects (e.g., Fukui and Speas 1986, Sportiche 1988), the problem persists since subjects analyzed as SPEC-VP are theta marked, but so are complements of a head. Thus theta marking occurs in two distinct non-unified syntactic relations, namely Spec-Head *and* Head-complement relations. By contrast as early as Chomsky (1993), it was hypothesized that the three disparate configurations in which structural Case is licensed (i.e., Spec-Head, Head-Complement and Spec of Complement for ECM) are unifiable under the single Spec-Head relation, and by hypothesis, this single Case relation might be unifiable with Agreement. These proposals, however, presumed m-command. More recent proposals (e.g., Chomsky 2000 and subsequent work) unify structural Case and Agree as c-command relations, realized under probe-goal matching, reducible to third factor[1] minimal search (see also Epstein 1999 and Epstein *et. al*. 1998 for

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[1] Although our analysis does not hinge on labels, we will indicate them for expository purposes.

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an analysis trying to deduce representationally defined c-command (and syntactic relations more generally) from the mode of application of cyclic bottom-up Merge).

This problem of a disunified theta theory persists in current "minimalist" analyses under which theta marked subjects are first merged in Spec-v*P, while theta marked objects are first merged with a head, i.e., merged "as" complement. This non-unification revealed by Chomsky at least 30 years ago remains on the research agenda (see, for example, Chomsky 2009: 53, discussion of Boeckx (2009) which notes the anomaly of external argument theta-markings).

The purpose of this paper is to explore possible unifications of theta marking. Specifically, we tentatively reject the existence of a Spec-Head theta relation and thereby seek to reduce syntactic relations to c-command, eliminating m-command and non-unified theories appealing to both c-command and m-command, including "government"-based theories. If c-command, a representational definition (see Reinhart 1976), hence unexplained, can be reduced to the independently motivated computationally efficient generative procedure as in the so-called Derivational Approach (Epstein 1999, Epstein *et. al.* 1998), then there is all the more explanatory motivation for excluding the Spec-Head relation from theta theory and perhaps eliminating the Spec-Head relation altogether (Chomsky 2013). In turn, if derivational c-command can be reduced to Minimal Search (Chomsky 2008) with search depth localized by (yet another potentially partially third factor principle) Phase Impenetrability, then even deeper third-factor explanation (Chomsky 2005), partly independent of UG, would result.

2. Transfer renders Spec-v*P a complement

Let's begin first by "following up" on an observation made in Epstein (2007, fn. 6):

(1) After Transfer of a Phase Head complement, here VP, we are left with a non-term/non constituent, namely,
[v*P EA [v*' [v* [VP]]]]
⇒ Transfer

Epstein (2007) intimates that this is a serious problem for phase-based Transfer. Specifically, the residue of Transfer in (1) is not a syntactic

constituent—in more recent parlance, it is not a term or contains a non-term.[2] If only terms or representations consisting entirely of terms can be operated on by the Narrow Syntax (NS), then the derivation should halt and the incorrect empirical prediction is then that no multi-phase derivations are generable and to make matters worse, a derivationally terminal v*P like (1) will crash since the External Argument (EA) bears an unvalued case feature.

Here we would like to "allay the (arguably misplaced) fear" expressed in Epstein (2007) and provide an answer to his question - "How can the syntax possibly operate on representations containing non-terms which are the representational output of Transfer?" We will argue that the output of Transfer is not empirically problematic and moreover it in fact facilitates the postulation of a unified theory of theta configurations under symmetric c-command. Thus, this suggests that, given the (non-theta-based) independently motivated operation of Transfer (proposed to capture certain cyclicity phenomena by empirically desirable third factor assumptions regarding "chunking"), the edge position Spec-v*P (and if DP is a phase, Spec-DP) is in fact transformed into a complement by application of Transfer.[3] This then allows the EA argument to be theta-marked in the Head-complement configuration it comes to occupy, which in turn may allow us to maintain, or more closely approach a unified theory of theta-marking configurations, namely,

[2] In this paper, we adopt Seely's (2006) derivational explanation of Collins' (2002) label-free syntax. In Seely's analysis, Chomsky's (1994) definition of "term," explicitly excluding labels, is simplified to primitives of set theory (Epstein 2013). Since "members of a member" in Chomsky (1994: 5) need not be specified in order to exclude labels as terms, given the elimination of labels, Seely proposes:

(a) K is a term of K.

(b) If L is a term of K, then the members of L are terms of K.

[3] This analysis is presented in detail in Section 3 of this article and was first written as Epstein (2009). Narita (2009) independently postulated that the Spec of a phase head is reanalyzed as the complement of the phase head in the representational output of Transfer. Assuming c-command is a relation necessary for theta-assignment, the head-to-spec relation (m-command) is reduced to c-command once the complement of the head is Transferred. See also Epstein (1999) who argues that the head-to-spec (m-command) relation reduces to c-command if, as in Chomsky (1994) the label of an X-bar projection "is the head." As concerns representational vs derivational (Merge-based) analyses of the c-command relation, see Section 3 "versus" 4 below. As suggested by a reviewer, see e.g., Lohndal (2012) and (2014), for a far-more detailed and comprehensive analysis of the relation between phrase structure and argument structure than is presented here. As specifically concerns the syntactic analysis we present in Section 3, see especially Lohndal (2014) Section 4.4, including its overview and discussion of the analyses presented in Narita (2009) and Epstein (2009).

(2) The (only) theta-marking configuration is Head-Complement.

We now present two different approaches to this unification of theta marking, one representational, another derivational.

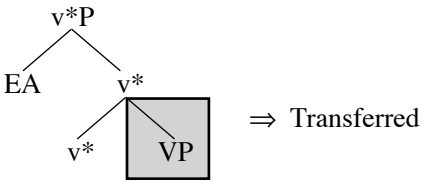
3. Alternative I: A Representational Approach

Suppose that iterated application of External Merge (EM) has created v*P:

(3) {EA, {v*, VP}}

If VP is now transferred, then the representational output as noted above is a non-term, or contains a non-term, which can be illustrated in the tree diagram below:

(4)



What is the "problem" with the representational output of VP-Transfer? There are a number of ways to analyze this. First, the representation displays a non-branching projection in that v* projects only to v*. Under the hypothesis that a non-branching projection is not generable by Merge (Chomsky 1995), we might stipulate that the NS can recognize only objects generated by (partially third factor) recursive binary Merge. Diagram (4) would then be unrecognizable to the syntax, halting the derivation. Second, under the definition of *term* in Seely (2006, see fn. 1), we have three terms in (4) as follows:

(5) a. v*P, since K (=v*P) is a term of K (=v*P).
b. EA and the higher v*, since they are members of v*P.

Notice, however, that the lower v* is NOT a term. Although the higher v* is a term, the definition states that the member*s* of a term are also terms. However, the higher v* does not have member*s*, but rather

only *one* member. Third, (the higher) v* in (4) immediately dominates only (the lower) v*. Thus, this yields a case of non-branching projection or "self-projection." If this aspect of the representation in (4) encodes the "*is-a*" relation (i.e., v* *is a* v*), then this is arguably tautological and equivalent to a representation in which only one v* appears, arguably as a sister to EA, which is precisely the result we desire, as EA becomes a complement and could be theta marked by v* as such in the unified theory of theta marking in (2). Fourth, divorcing precedence and dominance, by hypothesis the NS representation is an (unlinearized) set representation. Assuming labels, it is simply {v*P, {EA, {v*, {v*}}}}. Now, let's suppose that there are no labels (Collins 2002; Seely 2006; Chomsky 2013, 2014); in other words, let's delete the labels, v*P and the non-branching projection v*, as follows:

(6) {~~v*P~~, {EA, {~~v*~~, {v*}}}}

We then delete the brackets that indicated set membership of the (now eliminated) labels, yielding the label-free representation:

(7) {EA, {v*}}

We propose, then, that the immediate (but not final) output of VP-Transfer is:

(8 = 7) {EA, {v*}}

Thus (8) is distinguished from (3) in that the VP is absent from the latter. The set-representation in (8), as noted above, is still problematic in that we have a one-membered set, not generable by binary Merge. In addition, v* itself is not a term in (8), given the definition of *term*: "if L is a term, then the member*s* of L are terms." That is, the set {v*} is a term of (8) but the v* itself is not, since the term {v*} does not have "member*s*," but rather only one member, v* itself. So (8) is not a term consisting only of terms under the formal definition of *term*. Nor is it generable by the application of Merge when it is constrained by a third factor as a binary operation, i.e., binary Merge[4] cannot generate the sub-representation, i.e., set (9).[5]

[4] See (11) below for our definition of "Merge."

[5] See, however, Fry (2014) for arguments in favor of what he calls "Set Merge," yielding unit sets like (9).

(9) {v*}

How then can the derivation continue if Transfer has generated a non-term? We believe the most natural "solution" to this generative bottleneck is to simply reanalyze "the offending set" {v*} as the non-set v* (this "transformation" being performed by Transfer), yielding the following two-membered set representation, in which, *contra* (8), no set member is itself a set.

(10) {EA, v*}

In this representation, the EA, which, we will recall was a Spec, has "become" a complement, that is, a complement of v*, as a result of VP Transfer (motivated independently of theta marking considerations). If this analysis is on track, the EA now is in the only theta configuration there is, namely, Head-Complement, and so can receive its (external) theta role in this configuration, under the unified theory in (2).[6, 7]

Many questions of course remain. As pointed out by Daniel Seely (p.c.), if the theta role assigned to EA is in fact compositional, thereby involving VP-internal material, there is a problem since VP having been transferred is unavailable to participate in theta assignment of EA. Indeed if theta role assignment is compositional (see Marantz

[6] An anonymous reviewer suggested that our reanalysis of Spec as Complement may be unifiable with Hornstein and Uriagereka's (2002) "reprojection," where a maximal projection XP is moved to Spec-YP is reanalyzed as head X and thus projects. As a result of this reprojection, YP is reanalyzed as a complement of X. We do not see a way to unify reprojection and our reanalysis of {v} to v* (i.e., the mapping from (8) to (10) above). Rather, we think our reanalysis would be an example of de-projection because we eliminate the non-branching self-projection of v* to v*; we don't change labels, we eliminate them. Moreover if there are no labels as suggested in Collins (2002), Seely (2006) and Chomsky (2013, 2014), then there is no projection, hence re-projection is unimplementable (although, in Chomsky (2014), the root R raising to v* projects R under Pair-Merge (see also Epstein 1998 for a similar analysis in which the moving head projects. Specifically, the moving V projects when V raises to AGR and AGR deletes).

[7] A reviewer points out a possibly serious problem for this analysis. Since Spec-v*P is reanalyzed as a complement, perhaps constraints on extraction from "subject"/"specifiers" become incorrectly inapplicable after Transfer applies. The problem is of no concern if subextraction from Spec-v*P is in fact allowed, as seems to be the case, illustrated by e.g., the following contrast from Lasnik and Park (2003):

(i) Which candidate were there [posters of t] all over town?

(ii)*Which candidate were [posters of t] all over town?

See also e.g., Boeckx (2008:80). Application to other phasal specifiers requires further research.

1984: 29), there may be no problem concerning unification of theta marking, as it would occur always under sisterhood, (generated by Merge) be it head-complement, or EA and v*-bar. But the latter still exhibits non-unification, in particular there exist both head and phrasal theta markers. This might be the case, but here we explore the current assumption that all theta-markers are heads.[8]

It is important to note that the analysis suggested here, if it is correct, provides more evidence against a D-Structure level of pure theta-marking and against the hypothesis that First-Merge into a theta position is required of an argument (Chomsky 2000). The analysis outlined here is also inconsistent with the Derivational Approach to Syntactic Relations mentioned above (Epstein *et al*. 1998; Epstein 1999; Epstein and Seely 2002, 2006). That is, the theta relation between v* (or the amalgam v*+V if head movement is syntactic and precedes theta "assignment") and the EA is NOT established by Merge at the point of Merge, hence relations, specifically the external theta role relation under the analysis that is proposed here is not reducible to relations created by Merge. This, again, leads to non-unification in the following sense: "all theta-marking is head complement, but some head complement configurations are created by Merge, while others (involving EA) are created not by Merge but by Transfer." This arguably suffers from a loss of explanatory power in seeking to reduce all relations to those established by (cyclic) Merge. Rather, under the analysis outlined above, theta relations can be created not only by Merge but also in derived representations output by the application of Transfer. From the perspective of the Derivational Theory of Relations then, it seems the analysis presented here has provided configurational unification of theta relations (Head complement only, see (2)) but at the "price" (perhaps zero, if the Derivational Approach is incorrect) of sacrificing an arguably natural theory of all syntactic relations reducible to properties of Merge (the syntactic relationship-creator) and its iterated cyclic (efficient) application.

Far more detailed analysis (including that of other phase heads such as C and D) is necessary to determine the extent to which the output of the independently motivated (and third factor "chunking")

[8] As Hisatsugu Kitahara (p.c.) notes, there are also possible complications involving possible V-to-v* raising in the syntax, complicating the simplified representation in (10). This, however, might be an approach to a solution to the problem just noted. That is, if V moves to v* and EA is the sister or co-member of this amalgam, this might implement compositional theta role assignment, or a form of it, and involve only heads as theta-markers.

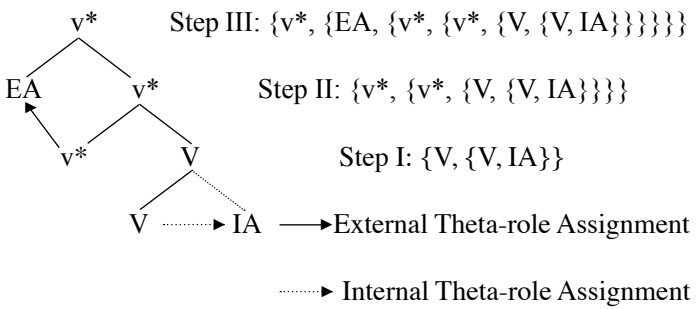
Transfer operation might be exploited explanatorily and what the associated costs, if any, of doing so might be. The reduction of (derivational) c-command to third factor minimal search (bounded by the Phase Impenetrability Condition) also requires further investigation.

4. Alternative II: A Derivational Approach[9]

Another possible solution to the problem of asymmetry in theta relations is to reconsider the way structure-building proceeds and to propose an analysis in which all theta relations are head complement and *all theta relations are created by Merge*. In Chomsky 1995 *et seq*., structure-building proceeds in a bottom up fashion, as shown in (12), by recursive application of Merge defined in (11), where EA and IA refer to External and Internal Argument, respectively. [10]

(11) Merge
Merge takes two objects[11] α and β and forms a set {α, β}.

(12)



[9]The material discussed in this section has been partly presented at the 2013 Seoul International Conference on Generative Grammar and at the 14th Texas Linguistic Society, University of Texas, Austin. Its most recent version appears in Studies of Generative Grammar (see Shim 2014). Neither version, however, includes a discussion of theta relations presented here.

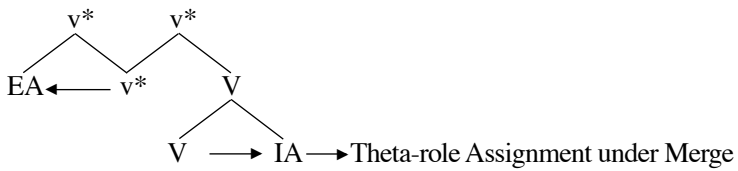
[10] The C-/T-domain is omitted for simplicity. So are many other operations such as the movement of EA to Spec of T.

[11] Here "object" refers to either a lexical item drawn from the Lexicon (i.e., a head) or a syntactic object generated by application of Merge (i.e., a set).

Proceeding bottom-up, in Step I in (12),[12] V and its complement IA undergo Merge to form the set, {V, IA}. Then, in Step II, v* merges with the existing set to form another set, {v*, {V, IA}}. Finally, in Step III, EA merges with the existing set to from yet another set, {EA, {v*, {V, IA}}}.

As noted, a problem with this conventional derivation and structure as illustrated in (12) is that it creates or necessitates an asymmetry with respect to theta-role assignment. That is, the internal theta-role of V in (12) is assigned to its complement IA under symmetric c-command,[13] whereas (under non-compositional theta role assignment) the external theta-role of v* (or perhaps v*+V, see fn. 8 above) is assigned to its specifier EA under m-command[14] (or government incorporating m-command). This entails not only a non-unified theory of theta configurations but a non-unified and representationally defined, hence unexplained, analysis of syntactic relations more generally. What we will eventually propose in order to deal with these problems from the grammar is (13), where both external and internal theta-roles are assigned under Merge. The remainder of this article is concerned with how we generate the structure in (13).

(13) Theta-role Assignment under symmetric c-command



Now that the endpoint of our argument has been specified, let us begin our journey (which will end at (13)), by first considering Chomsky's (2008:143-144) generalization that "… along with Transfer, all other operations [e.g., EM, IM] will also apply at the phase level.... If only phase heads [i.e., C and v*] trigger operations...". Notice that the standard "bottom-up" derivation as in (12) is in fact inconsistent with this generalization. That is, Merge of V and IA (Step 1 of (12))

[12] Although our analysis does not hinge on labels, we will indicate them for expository purposes.

[13] Defined on output representations, α c-commands β iff α does not dominate β and the first branching node dominating α also dominates β (Reinhart 1976).

[14] α m-commands β iff α does not dominate β and the first maximal projection dominating α also dominates β (Chomsky 1986, Koopman and Sportiche 1983).

is indeed an operation that is, by hypothesis, the first to apply in the derivation of (12), but it is not triggered by (nor does it involve) a phase head.[15] If all operations in the NS are indeed triggered only by phase heads, it should be (at least) conceptually necessary to assume that structure-building, an operation in the NS, is also initiated only by phase heads.[16] Suppose then that the trigger of structure-building is also a phase head, meaning that phase heads, v* or C, are the only lexical items (i.e., heads) that can be initially accessed for the purpose of EM (presumably for IM as well). Hence, we begin a derivation by selecting a phase head.

As suggested in Chomsky (1995:226), we call the operation that accesses the lexicon "SELECT" which first chooses a phase head and puts it into a workspace. The difference between our SELECT and Chomsky's (ours also requires that First-Selection must be a phase head) is that the former directly accesses the lexicon, whereas the latter accesses the intermediate buffer called the "Numeration." Despite the difference, both come free as suggested in Chomsky (1995:226).

A question that immediately arises at this point is, how are non-phase heads ever chosen from the lexicon for the purpose of EM? We propose the following condition on the operation SELECT.

(14) **Summoning Condition on Select**
A non-phasal head H can be accessed by the operation SELECT only if H is required to satisfy a selectional requirement of another head that has already been introduced into the workspace.

What is created by SELECT, as constrained by Condition (14), is similar to the Numeration (Chomsky 1995) or Lexical Array (Chomsky

[15] In fact, Chomsky (2007, 2013) explicitly claims that EM is an exception to the generalization that all operations are triggered by a phase head. This is because there is no phase head introduced when Merge of e.g., V and IA takes place. An anonymous reviewer pointed out that EM of V and IA in (12) is indeed triggered by a phase head in Gallego's (2014) analysis, which argues that the so-called phase head complements (e.g., V and T) are in fact a copy of a phase head and thus the first Merge between V and IA in (12) is also triggered by a phase head in this system. Whether or not all instances of EM (not just EM of phase head complements) can be analyzed as involving a phase head requires further research.

[16] Technically speaking, the entity that Chomsky's (2008) generalization above applies to is different from the entity where we point out that the generalization needs to extend to. More precisely, what is triggered by a phase head in Chomsky is an "operation" itself, while what we argue to be also triggered by a phase head is concerned with "derivation." In other words, what is initiated by a phase head in our system is, strictly speaking, "structure-building" (i.e., derivation), not the "operation" SELECT itself (for SELECT, see below).

2000) in that all the lexical items that will be used for a derivation are introduced. But unlike the Numeration or Lexical Array, the lexical items that are introduced by SELECT and Condition (14) do not form a derivation-initiating set.

Once a phase head and subsequently required non-phasal heads are introduced into the workspace by SELECT and the Summoning Condition (14), EM begins to operate on them to satisfy selectional features of either a phase head or a non-phasal head. From this perspective, the function of EM can be taken to construct a structure where all the selectional requirements of a head are satisfied.

Consider now how the selection structure of a typical transitive construction such as *John loves Mary* is built under the conditions we have proposed so far.[17] First, v* is introduced into a workspace as we assume that the only lexical items that are visible to the initial search by SELECT are phase heads.[18] Subsequently, non-phase heads are introduced into the same workspace under SELECT constrained by Condition (14): V and D_{John} are introduced since they are both required by selectional features of v*. D_{Mary} is also introduced into the workspace as it is required by the selectional feature of V. We now have four lexical items in our workspace, namely, v*, V_{love}, D_{John}, and D_{Mary}.[19]

Before we further examine how each of these lexical items undergoes EM with one another, let us consider the following condition in (15) which will play an important role in the way structure-building proceeds.

[17] We assume the categorical status of proper nouns (e.g., John, Mary) to be D in tree diagrams.

[18] One may wonder why SELECT chooses v* first rather than C. For a possible explanation of why v* is first chosen, see Epstein, Kitahara and Seely (2012a).

[19] An anonymous reviewer pointed out that this type of introduction of multiple lexical items into the workspace would pose a problem in terms of efficiency because a lexical item, say, v*, that has already been introduced must wait until all other required lexical items are put into the (same) workspace. We think, however, that this "delay" is just apparent. Given what Chomsky (1995:226) suggests, the operation SELECT is costless (or free) and thus efficiency, we think, can hardly be computed on how many times SELECT applies (i.e., how many lexical items are introduced into the workspace).

(15) **Repulsion Principle**[20, 21]

Two selectors, each bearing one or more unsatisfied selectional features, cannot undergo EM with each other.

Condition (15) suggests that EM cannot operate on two selectors.[22] That is, at least one of the two lexical items must have no unsatisfied selectional features for EM to take place between the two. Therefore, EM between v* and V is blocked unless one of the two has no selectional feature left. A similar condition is proposed in Collins (2002) which he calls "the Locus Principle":

(16) **Locus Principle**

Let X be a lexical item that has one or more probe/selectors. Suppose X is chosen from the lexical array and introduced into the derivation. Then *the probe/selectors of X must be satisfied before any new unsaturated*[23] *lexical items are chosen from the lexical array*. Let us call X the locus of the derivation. (italics ours)

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[20] An anonymous reviewer pointed out the legitimacy of this Repulsion Principle as well as the Summoning Condition (14) with respect to interface/third-factor conditions. The Summoning Condition, we argue, should be conceived as an attempt to extend the independently-motivated pivotal role of phase heads as the trigger of operation in the NS to the domain of the Lexicon. As for the Repulsion Principle, suppose that we do not have it so that, say, v* and V can undergo EM in (18) below. After this EM, v* will still have one more selectional feature (i.e., requiring a DP) and so will V (i.e., requiring a DP). That is, we will have two selectional features to be satisfied as a result of EM between v* and V. Suppose now that we do have the Repulsion Principle. Then, v* will EM with a DP and so will V. As a result, we now have one, not two, selectional feature left, namely, the selectional feature of v* for V- less feature to deal with, so more efficient.

[21] A reviewer points out some similarity between our Repulsion Principle and the "Survive Principle" proposed in Stroik (1999, 2009):

Survive Principle (Stroik 2009: 37)

If YP is an SO in an XP headed by X and YP has an unchecked feature [F] that is incompatible with the features of X, YP must [survive and] Move to the Spec position of the ZP immediately dominating the XP.

Put differently, YP is "repelled" from XP if YP possesses features that are incompatible with the features of X. Although our Repulsion Principle (15) may share with the "Survive Principle" the idea of "repulsion" between two SOs, the former does not concern Move/IM (or what Stroik calls "Remerge") as the latter does.

[22] Such a condition is familiar from Categorial Grammars employing functors and arguments.

[23] A lexical item that contains at least one probe or selector is unsaturated. (Collins 2002).

By assuming the Locus Principle, Collins (2002) blocks (in the framework within which his analysis is couched) the combination of a head (i.e., C in (17)) with an intermediate projection (i.e., I' in (17)):

(17) a. {I' will {VP John arrive}}

b. (C, {I' will {VP John arrive}})

Suppose that the derivation reaches the stage in (17a), where EM of I with VP creates I'. Suppose further that at the next stage in (17b), C is introduced into the workspace. EM of C with I' is now blocked by the Locus Principle. This is because at this stage I' still has one more feature to be satisfied (i.e., its EPP feature), and C also has its own features to be satisfied (e.g., its subcategorization feature). In Collins' terms, both C and I' are "unsaturated." By assuming the Locus Principle, Collins (2002) blocks such unwanted Merge between a head and an intermediate projection without reference to maximal projection.[24]

Our Repulsion Principle (15) can be viewed as a "weaker" version of Collins' Locus Principle because (16) allows more than one lexical item with an unsatisfied feature to be introduced into the same workspace, but the Locus Principle preempts this possibility. The result from both, however, is quite the same, i.e., they both block the possibility of Merge between two lexical items with their own selectional features unsatisfied ("unsaturated" lexical items in Collins' terms).

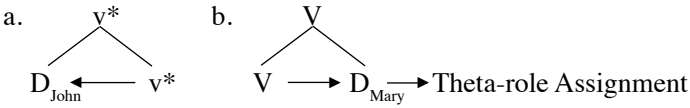
With Condition (15) in mind, let us now return to the question of how EM operates between the four lexical items in the workspace, i.e., v*, V_{love}, D_{John}, and D_{Mary}. According to Condition (15), the only lexical items that can undergo EM with each other are v* and D_{John}, and V and D_{Mary}.[25] The structure that has been constructed so far by iterative applications of EM is (19):

[24] But see Epstein, Kitahara and Seely (2012b) for a different approach which seeks to deduce the timing of Transfer and the category transferred, from the application of countercyclic Merge.

[25] Or alternatively, v* and DMary, and V and DJohn (generating Mary loves John, instead of John loves Mary. The possibility of EM between DJohn and DMary is blocked since neither carries any selectional features. As noted, Merge of v* and V is also blocked.

(18) In our workspace, we have: v*, V, D_{John}, D_{Mary}

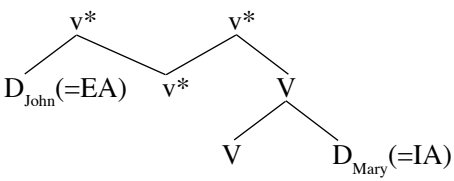
(19) The first structures created by E-Merge (creation of (a) and (b) is unordered):



We propose that theta roles are assigned at the time of Merge between an assigner and an assignee. Therefore, D_{John} and D_{Mary} are each assigned a theta-role when they undergo Merge with v* and V, respectively, as illustrated in (19a,b).[26]

Consider now how the next stage of the derivation proceeds. Notice that v* in (19a) still has one more selectional feature to be satisfied, i.e., its selection for V. In principle, v* can undergo EM with either the head V or the entire set {V, D_{Mary}} but in reality, it can undergo EM only with the latter given Minimal Search conditions (Chomsky 2007, 2008, 2013), i.e., the head V is more deeply embedded in the structure. So the structure we propose is the following,[27] which we presented at the beginning of this section.

(20) = (13)



[26] One may wonder what prevents both v* and V from undergoing EM with the same D, say, DJohn. It seems logically possible for both v* and V to undergo EM with the single noun phrase DJohn because both v* and V have unsatisfied selectional features and DJohn has none. Furthermore, none of the conditions we have proposed so far seem to block this unwanted structure. If theta-roles are assigned at this stage of the derivation (i.e., at the point of an instance of EM) as we assume, we can prevent this unwanted structure being generated because DJohn will be assigned two different theta-roles by v* and V, which is presumably blocked by the principle of Full Interpretation (Chomsky 1995 et seq.).

[27] One noticeable peculiarity about the structure in (20) is that the head v* is simultaneously dominated by two labels. In other words, there is no single node that dominates all the constituents in the structure. This type of two-peaked structure, however, is not unique to our system but is also created in e.g., the structure generated by IM as proposed in Epstein, Kitahara and Seely (20012b). See also Shim (2014) for an in-depth discussion as to how the two-peaked structure can be remedied for C-I interpretation.

In (20), external theta role assignment, like internal theta role assignment, occurs under Merge.[28]

5. Conclusion and Discussion

We have sketched two possible solutions, one representational and the other derivational, to the perennial problem of structural asymmetry in theta relations. In our representational approach, we have suggested that EA become a complement of the phase head v* after independently-motivated Transfer of its complement, VP, so that EA is assigned a theta role in the same Head-Complement configuration as is IA. Our alternative derivational approach has shown that theta roles can be assigned in the same structural configuration (i.e. under symmetric c-command) at the time of Merge between an assigner and an assignee if we assume our proposed phase-head initiated version of structure building.

There are of course, countless theoretical entailments of each analysis presented here, to be determined, and as always an infinite amount of data that could be potentially relevant, but our hope is that this paper at least outlines two possible approaches, each stemming from independently motivated analytical proposals (Transfer and phase-head initiated derivation), to the perennial problem of the disunity of theta role configurations.

[28] One may wonder how the structure in (20) can be interpreted at the C-I interface because there is no single node dominating all the constituents in the structure. Shim (2014) argues that IM of DMary would solve this problem. More specifically, DMary moves to Spec-VP by disconnecting the link between the head v* and the set {V, DMary} after V inherits ϕ-features from v*. Consequently, Feature-Inheritance is motivated as a necessary operation for C-I interpretation and the operation Transfer is reinterpreted as a by-product of IM. For more discussion, see Shim (2014).

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