

Unification of Feature Scattering and M-Merger as Coalescence*

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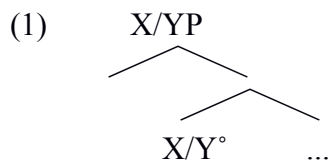
1. Introduction

This paper reconsiders two "bundling" mechanisms that have been proposed to affect syntactic structures, Feature Scattering (Giorgi and Pianesi 1996) and Morphological Merger (Marantz 1988; Halle and Marantz 1993; Matushansky 2006), and proposes a unified account for them within a Minimalist grammar. Although these mechanisms have been situated in the presyntactic lexicon and postsyntactic module, respectively, I argue that their effects should be analyzed as the result of an operation that applies during the syntactic derivation, Coalescence. I propose that Coalescence is properly motivated and constrained by a need to eliminate structures that are deficient for interpretation at PF. The proposal is illustrated in the analysis of several cases of cross-linguistic variation in the instantiation of the clausal left periphery, with a focus on relaxed verb-second effects.

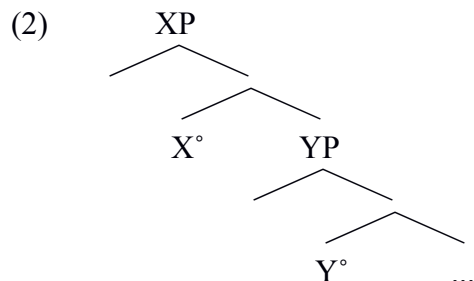
2. Feature Scattering and M-Merger

2.1 The Feature Scattering Hypothesis

The key claim of the Feature Scattering Hypothesis is that languages can permit certain category features to head their own projections or bundle them with other category features on a single head. As a schematic example, the two features [X] and [Y] can enter the derivation either bundled on a single head X/Y° or on separate heads X° , Y° .



*This work is much indebted to feedback from Andrew Simpson, Maria Luisa Zubizarreta, Roumyana Pancheva, and Hajime Hoji. I additionally thank Gereon Müller, Rajesh Bhatt, Philipp Weisser, Itamar Kastner, Nico Baier, and audiences at NELS 46 and Syntax Plus at USC for their questions and input.



Although not always explicitly discussed, this variation is assumed to be a property of the lexicon, since bundled heads enter directly into the derivation. Feature Scattering accounts for cross-linguistic variation in the visibility of functional heads while maintaining the claim that all languages have a universal inventory of category features, as argued within the Cartographic Program. While not always framed in terms of Feature Scattering, the approach has been applied to variation in the realization of various functional heads, including Infl° and Agr° (Iatridou 1990; Speas 1991; Bobaljik and Thráinsson 1998; a.o.), and Voice° and Caus° (Pylkkänen 2002).

Limitations on possible bundlings are required, however, for the Feature Scattering Hypothesis to be adequately restrictive. One principle constraint is that category features can only be bundled together if they would otherwise surface on adjacent heads within an extended projection. In other words, bundling must respect the universal order of feature checking. This restriction can be maintained by proposing a metacondition on the distribution of features, such as Giorgi and Pianesi's UNIVERSAL ORDERING CONSTRAINT.

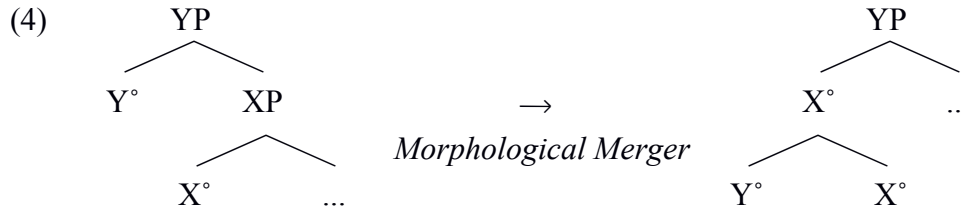
- (3) UNIVERSAL ORDERING CONSTRAINT: Features are ordered so that given $F_1 > F_2$, the checking of F_1 does not follow the checking of F_2 . (Giorgi and Pianesi 1996)

One concern arises from the fact that restrictions on the order of feature checking are independently required in syntax. For instance, in a theory where category features are always realized on separate heads, the order in which they are merged is typically accounted for as a type of category selection (Adger 2003; Di Sciullo and Isac 2008). In this approach, each head contains an interpretable category feature, and optionally an uninterpretable feature that selects the category of its complement. The Feature Scattering Hypothesis requires ordering constraints to be separately stipulated in the lexicon, creating a redundant specification in separate modules of the grammar.

2.2 Morphological Merger and M-Merger

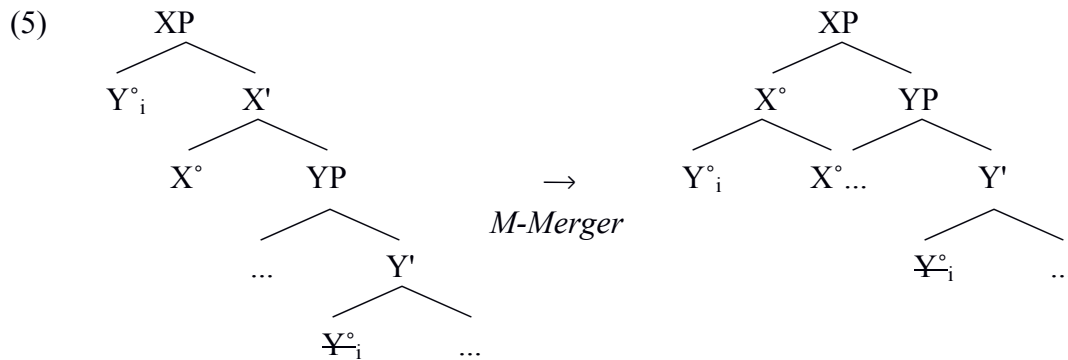
Numerous works on the interface between syntactic structures and their morphological exponence discuss the need for an operation that converts structurally adjacent heads into a single complex head. For instance, the operation known as Morphological Merger (Marantz 1988; Halle and Marantz 1993) is proposed to account for mismatches between syntactic and phonological constituency created by affixation.

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Morphological Merger applies to heads that are adjacent at linearization (i.e. with no intervening specifier), and converts them into an affixal structure that is interpreted by the phonological component.¹ Within Distributed Morphology (DM), Morphological Merger is analyzed as a postsyntactic operation that applies on the PF branch of the grammar (Embick and Noyer 2001).

Matushansky (2006) proposes that a similar operation, *M-Merger*, is responsible for adjunction in head movement. In her proposal, traditional head movement takes place in two steps. First, a lower head is attracted to the specifier position of the highest head in the derivation. At this point, M-Merger applies to the adjacent heads, combining them into a complex head. The complex head, but not its subparts, can undergo further head movement. In terms of the structural conditions on its application and the structure that it produces, M-Merger is identical to Morphological Merger.



Matushansky argues that M-Merger should be analyzed as a morphological operation that applies after syntax, rather than a syntactic one. The key motivation for this is the fact that it is impossible for subparts of a complex head to move after head adjunction has taken place (a.k.a. excorporation). In other words, the internal structure of the complex head is opaque to later syntactic operations. This opacity is proposed to reflect the fact that M-Merged heads have undergone Spell-Out to PF, rendering their internal structure inaccessible for the remainder of the derivation.

2.3 Bundling before and after syntax?

Feature Scattering and Morphological Merger posit similar bundling mechanisms in the presyntactic lexicon and postsyntactic morphology, respectively. While it may be the

¹Here, we are concerned with *Local Dislocation* in the terminology of Embick and Noyer (2001), distinct from a proposed variety of Morphological Merger that does not require linear adjacency, *Lowering*.

case that similar operations can take place in distinct components of the grammar, as sometimes claimed in DM, the pursuit of a theory that minimizes the complexity of grammatical derivations motivates a unified analysis. Here, I discuss structural similarities between the two types of bundling that suggest that both can be attributed to a unique operation that applies in a single component of the grammar.

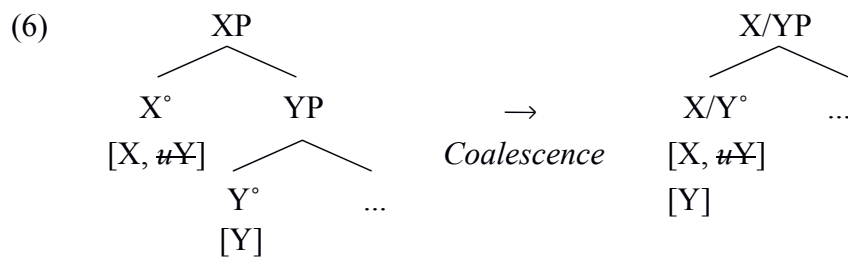
First, consider the locality conditions that constrain bundling in both Feature Scattering and Morphological Merger. Under the Feature Scattering Hypothesis, category features can be bundled only if they would otherwise be realized on adjacent heads. Similarly, Morphological Merger applies to adjacent heads in an asymmetric c-command relation, with no intervening specifier. The bundled heads permitted within Feature Scattering are restricted by the same condition of structural adjacency that constrains the application of Morphological Merger.

There are further similarities in the motivation for both types of bundling. For Morphological Merger, it is clear that the bundling of heads takes place if one of them is a prosodic clitic (its exponent is not a prosodic word). While it may not be initially obvious to look at Feature Scattering in these terms, category features that are bundled into featurally complex heads are those that have no independent phonological exponent (i.e. no audible head), or cannot attract another constituent via phrasal movement. In other words, bundled features are those that are phonologically null, another type of phonological deficiency.

Given the identical structural constraints on bundling proposed for Feature Scattering and Morphological Merger/M-Merger, I propose that their effects can be unified as a single syntactic operation, which I will term *Coalescence*.

3. Coalescence, Dominance, and Recession

In terms of its structural definition, Coalescence takes an input of adjacent heads X° , Y° and creates a single head that contains all features associated with the individual heads.



Departing from prior proposals on Morphological Merger and M-Merger, I do not assume the existence of internal branching structure within the newly formed head.² There are two motives for this move. The first draws from evidence that morpheme realization and morpheme ordering can be determined by phonological constraints on

²This collapses a distinction made in DM between Morphological Merger, a variant operation Local Dislocation that alters the linear ordering between the heads, and Fusion, which collapses adjacent heads into a single terminal (Halle and Marantz 1993).

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segmental and prosodic structures, which are likely built relatively late on the PF branch (see Ussishkin 2007, Rice 2011 for an overview). This obviates the need for affix ordering to be determined by syntax. The second motivation for positing no branching structure within a bundled head is that it directly accounts for the impossibility of excorporation without having to assume that bundling triggers PF Spell-Out, as required in Matushansky's M-Merger proposal.

We now turn to the question of what triggers Coalescence. Recall that bundling uniformly depends on the presence of an item that would be weak or null in prosodic realization. In other words, a head must be bundled if it would be in some way deficient for interpretation at PF. I propose that information about this deficiency is present in the syntactic derivation, and that Coalescence makes reference to this specification.

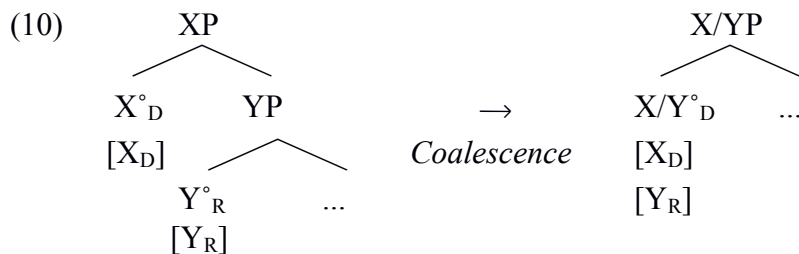
To formalize this within the grammar, I define a distinction between *dominant* versus *recessive category features*, and *dominant* versus *recessive heads*. I propose that category features are specified in the lexicon as being either dominant or recessive, and that this specification in a given language is determined by the following criteria:

- (7) A category feature [F] is *dominant* if:
- a. A head containing only [F] maps to a prosodic word in phonological representation,
 - b. A head containing only [F] can trigger phrasal movement to its specifier.
- Otherwise, [F] is *recessive*.

I propose that whether a head is dominant or recessive depends on its featural composition. A head that contains at least one dominant feature is dominant, whereas a head that contains only recessive features is recessive. In all following examples, dominance is indicated with subscript _D, recession with subscript _R.

- (8) X/Y_D
 $[X_D]$
 $[Y_R]$
- (9) X_R
 $[X_R]$

A crucial property of recessive heads is that they must be eliminated during the derivation. This is the motivation for Coalescence. Coalescence is restricted to apply in a configuration of structural adjacency where a dominant head c-commands a recessive one.



Two consequences of this restriction are that recessive heads can not trigger Coalescence with lower adjacent heads, and pairs of dominant heads can not be bundled. In Section 5, I argue the distinction between dominance and recession is supported by languages that contain both dominant and recessive variants of the same category feature.

To generate more complex heads that contain two or more recessive features, it is necessary for Coalescence to take place iteratively from the top down after all recessive heads have been merged. At each step, the topmost dominant head in the workspace undergoes Coalescence with the immediately lower recessive head.

Several universal constraints on the distribution of dominance and recession across categories are expected, given the understanding that dominant heads are those that either map to prosodic words, or are able to have a specifier. Lexical category features should be universally dominant, as they are uniformly mapped to prosodic words (Selkirk 1995 and references therein). Phase heads are also expected to be dominant by virtue of being associated with an EPP/Edge feature (Rackowski and Richards 2005; Chomsky 2008).

4. Variation in the clausal left periphery

4.1 The expanded left periphery and verb-second effects

Following Rizzi (1997) and subsequent research in the Cartographic Program, the traditional complementizer phrase (CP) is argued to contain a series of functional projections in which each head is associated with one feature related to clause typing or the encoding of information structure. While this research program has produced many proposed structures, this paper assumes a basic structure of the left periphery based on the proposal of Benincà and Poletto (2004).

(11) [ForceP [TopicP [FocusP [FinitenessP [InflP ...

This expanded inventory of functional projections has proven instrumental in explaining cross-linguistic constraints on the relative orderings of focused and topicalized phrases and of individual complementizers. It also accounts straightforwardly for languages that simultaneously realize multiple left-peripheral heads (see for instance Aboh 2006).

However, the Cartographic approach faces difficulties in accounting for languages where the realization of certain functional heads is restricted. Here, we consider the challenge posed by verb-second requirements (V2). Informally stated, the V2 restriction is one in which the main verb or highest tensed auxiliary of a clause must be preceded by exactly one phrase.³ The pattern is illustrated below for Kashmiri, which is somewhat unusual among Indo-Aryan languages in having a robust V2 requirement in declarative main clauses (Bhatt 1999; Manetta 2011).

³Generally, languages are described as having a V2 requirement if it holds within finite, declarative main clauses. However, even among such languages there is substantial variation in whether V2 also holds within main and embedded clauses of various types.

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- (12) a. rameshan **dyut** raath laRk-as kalam
 Ramesh gave yesterday boy pen
 'It was Ramesh who gave a pen to the boy yesterday.'
- b. laRk-as **dyut** rameshan raath kalam
 boy gave Ramesh yesterday pen
 'It was a boy to whom Ramesh gave a pen yesterday'
- c. *tem raath **dyut** akh laRk-as kalam
 he yesterday gave one boy pen (Bhatt 1999)

Traditional analyses of V2 claim that V2 clauses have two main properties: verb-movement to a left-peripheral head, and the movement of exactly one phrase to a higher specifier, in a structure like $[_{CP} XP_i V-C^{\circ} [_{InflP} \dots XP_j \dots V^{\circ} \dots]]$ (den Besten 1983; Travis 1984; Roberts 2004; among many others).

If the full inventory of left-peripheral projections is present in all languages, strict V2 must amount to a requirement for phrasal movement to target exactly one position above the landing site of the verb. However, this comes with the task of explaining why only one position is available before the second-position element, and which functional projection(s) the first-position and second-position items occupy.

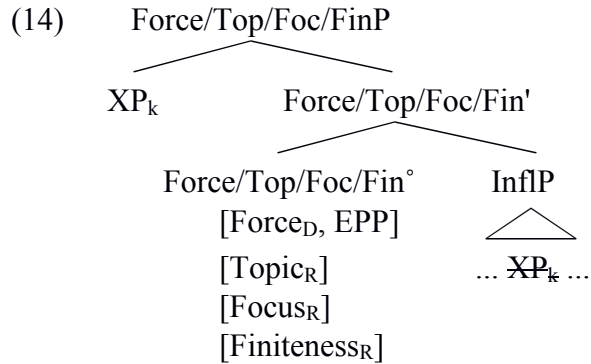
4.2 The bottleneck effect

One way of deriving V2 within the expanded left periphery proposes that while left-peripheral positions are universally present, phrasal movement in some languages is restricted to exactly one position due to a "bottleneck effect" (Haegeman 1996; Poletto 2002; Roberts 2004). The proposal is that in languages with V2, all left-peripheral fronting passes through Spec, FinP, due to an EPP property of the Fin° head. Once one phrase has moved through FinP, movement across this position is blocked, thus restricting fronting to one constituent. This blocking is proposed to be an effect of Relativized Minimality (Rizzi 1990); Any phrase attracted to Spec, FinP contains features that are general enough to be the closest goal for any attractor in a higher projection, blocking all movement across FinP. Under this proposal, deviations from V2 are permissible only through the base-generation of XPs above FinP.

- (13) a. $[_{FinP} XP_i V-Fin^{\circ} [\dots t_i \dots XP_k \dots]]$
 b. $*[_{FP} XP_k [_{FinP} XP_i V-Fin^{\circ} [\dots t_i \dots t_k \dots]]]$
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Because V2 requirements are a restriction on possible movement, the theory does not need to propose cross-linguistic variation in the inventory of functional projections, keeping intact a key tenet of the Cartographic approach. However, subsequent works have shown that the bottleneck effect is overly restrictive, failing to account for many attested deviations from V2 (Manetta 2011; Haegeman 2012). This paper focuses on the challenge of explaining "relaxed" V2 languages that allow V3 or V4 orders.

I propose that V2 emerges in part as the result of the bundling of functional projections. Specifically, strict V2 arises under the following conditions: [1] All but the topmost left-peripheral category features are recessive, causing Coalescence to bundle them into a single projection, [2] the verb moves to this left-peripheral head, and [3] the bundled head contains exactly one movement-triggering EPP/Edge Feature.



This predicts that V2 requirements become increasingly relaxed as the number of dominant left-peripheral category features increases. If fewer category features are bundled, more positions become available for phrasal movement. In the next section, I argue that this possibility accounts for V3 patterns in Old English and Kashmiri, which have proven problematic for analyses in terms of the bottleneck effect.

4.3 Old English V3

Like other Germanic languages, Old English had a general V2 requirement within main clauses, where the first position could be occupied by a variety of phrasal constituents.

- (15) a. Hismynster **ys** Hwiterne on Sanctus Martines naman gehalgod
 his minster is Hwitern on Saint Martin's name consecrated
 'His mynster, Whitern, is consecrated in Saint Martin's name.'
- b. On his dagum **sende** Gregorius us fulluht
 On this day sends Gregorius us Christianity
 'On this day, Gregorius sends us Christianity.' (Trips 2002).

As noted in particular by Haeberli (2002), however, Old English permits a type of V3 order where full DP subjects immediately precede the main verb. Crucially, this is not attested for non-subject DPs in the preverbal position.

- (16) a. ...& fela ðinga swagerad man **sceal** don
 and many things so wise man must do
 '...and such a wise man must do many things.'

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- b. Sumum monnum God **seleð** ægðer ge good ge yfel gemenged, ...
 Some persons God gives both and good and bad mixed
 'God gives some people both good and bad things.' (Haeberli 2002)

This pattern of V3 shows that Old English allows an optional landing site above the verb for subjects. While the pattern has been taken as evidence that Old English verb movement targets a position below the complementizer domain like AgrSubjP (Haeberli 2002), if V2 requires verb movement to Fin° (Roberts 2004), this suggests that subjects occupy Spec, FinP or a higher subject position (cf. Poletto 2000, Aboh 2006, Ledgeway 2010). Under this view, $[\text{XP}_{\text{top/foc}} \text{XP}_{\text{subj}} \text{V}]$ V3 reflects a structure like (17):

- (17) $[\text{TopP}/\text{FocP} \text{XP}_{\text{top/foc}} [\text{FinP} (\text{XP}_{\text{subj}}) \text{V}-\text{Fin}^\circ [\text{IP} \dots \text{V}^\circ]$

Given this structure, the subject exception is difficult to explain while maintaining the bottleneck effect hypothesis. If subject DPs move to FinP, one expects the movement of any other phrase above the subject to be blocked. One might propose that the first item in these V3 examples is a topic that is base-generated in the left periphery. However, why this sort of base-generation is possible only when the main verb is preceded by a subject would remain unexplained.

On the other hand, the Old English pattern is accounted for in a theory that allows variation in the bundling of functional projections. In terms of Coalescence, the pattern arises if the language differs from the strict V2 case by having a dominant $[\text{Finiteness}_D]$ feature, allowing Fin° to be realized as an independent head. If Fin° carries an optional EPP feature that attracts subjects, the Old English pattern, where subjects can optionally precede the verb in addition to another constituent, is predicted.

- (18)
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- ```

 graph TD
 A[Force/Top/FocP] --- B[XP]
 A --- C[Force/Top/Foc']
 C --- D[Force/Top/Foc°]
 C --- E[FinP]
 D --- F["[Forced, EPP]
[TopicR]
[FocusR]"]
 E --- G["(DP)"]
 E --- H[Fin']
 H --- I[Fin°]
 H --- J[InflP]
 I --- K["[FinD, uD, (EPP)]"]
 J --- L["..."]

```

### 4.4 Kashmiri V3

Kashmiri permits a different case of V3, which poses a particular challenge because it only occurs with a certain combination of discourse-marked preverbal items. In V2 declarative clauses, non-subjects fronted to first position must be interpreted as focused, not topicalized. Quantified objects that are ineligible topics are freely fronted to first

position. Furthermore, only phrases in first position can be suffixed by the focus-sensitive particles *-ti* and *-yioot*, which resemble *even* and *only* respectively.

- (19) a. sooruyikeNh **khyav** rameshan  
 everything at Ramesh  
 'Ramesh ate everything'
- b. huun-ti **chu** behna broNh panin jaay goD saaf karaan  
 dog-even is seat before self's place first clean do-perf  
 'Even the dog cleans his place before sitting.' (Bhatt 1999)

As typical of V2 languages, *wh*-phrases immediately precede the verb in interrogative main clauses. However, if the clause includes a possible topic, it is preferably placed in a clause-initial position preceding the *wh*-phrase, yielding [ $XP_{top}$  *Wh* V ...] orders. This pattern is particularly unexpected due to the fact that topics do not front to the first position in declarative V2 main clauses (Bhatt 1999, Manetta 2011).<sup>4</sup>

- (20) a. tse kyaa **dyutnay** Rameshan  
 you what gave Ramesh  
 'As for you, what is it that Ramesh gave?'
- b. ?kyaa **dyutnay** Rameshan tse  
 what gave Ramesh you (Bhatt 1999)

Under the bottleneck effect hypothesis, if the *wh*-phrase moves to the left periphery from the lower part of the clause, as commonly assumed, the initial topic must be placed above the *wh*-phrase by base-generation. This is consistent with the proposal of Poletto (2002), who argues that Spec, TopicP and higher positions can be filled by base-generation, making them irrelevant to the bottleneck restriction that holds within FocusP and FinP. However, it would have to be stipulated that Kashmiri requires a base-generated topic only if it is followed by a *wh*-phrase, an unusual restriction.

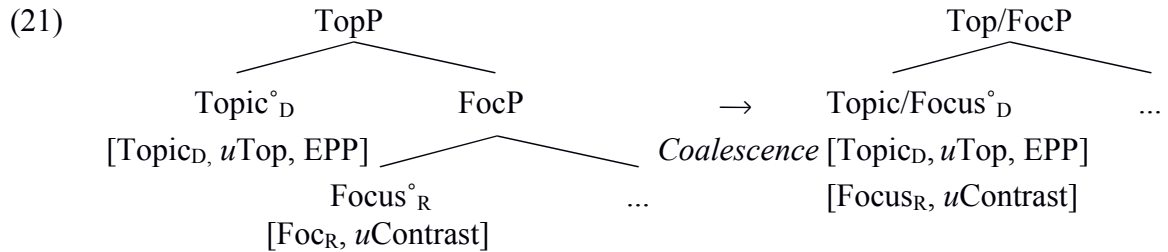
The challenging aspect of the Kashmiri V2/V3 alternation is the generalization that the realization of the topic position *depends* on the presence of a *wh*-phrase. However, it is straightforwardly captured by Coalescence if Kashmiri permits both dominant and recessive variants of the [Focus] category feature. Specifically, I propose that the non-*wh*, contrastive [ $u$ Contrast] Focus<sup>o</sup> head is recessive, while the interrogative [ $u$ Wh] Focus<sup>o</sup> head is dominant. If the recessive, non-*wh* Focus<sup>o</sup> head is selected, Coalescence bundles [Topic<sub>D</sub>] and [Focus<sub>R</sub>] into a single head, which in Kashmiri admits one specifier.<sup>5</sup> The

<sup>4</sup>Similar patterns are found in Yiddish (Diesing 2005) and Badiotto Rhaetoromance (Poletto 2002). Yiddish permits the topicalization of one phrase before *wh*-phrases, while Badiotto permits left-dislocated phrases to precede preverbal *wh*-phrases in interrogatives, but not focused phrases in declaratives.

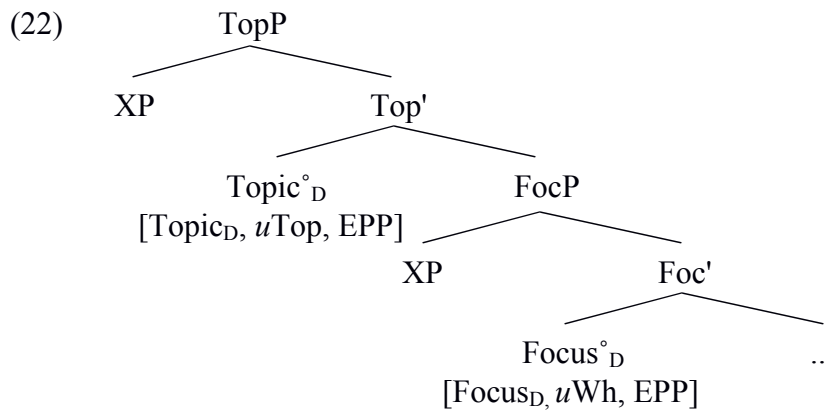
<sup>5</sup>While a one-specifier restriction is proposed for Kashmiri, it appears that some languages exhibit "relaxed" V2 by allowing multiple specifiers per head. This seems to be the case in Rhaetoromance dialects that permit multiple, freely ordered fronted topics (Casalicchio and Cognola 2015).

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fact that only a focus, but not a topic, can move to the specifier of the bundled head appears to reflect a requirement for certain probes within a head to be checked before others (Lahne 2010, Manetta 2011).



If the dominant [ $uWh$ ] is selected, Coalescence does not apply, allowing [ $Topic_D$ ] and [ $Focus_D$ ] to be realized in separate projections.



Because [ $Foc_D, uWh, EPP$ ] and [ $Topic_D, uTop, EPP$ ] are realized on separate heads, phrasal movement targets both Spec, FocP and Spec, TopicP.

### 5. English negative contraction

The distinction between dominant and recessive heads accounts for a contrast in English between full and contracted negation. English has a 'full' negative morpheme (orthographic *not*) and an affixal form (orthographic *n't*). In many contexts, the two forms appear to be in free variation, with the affixal form apparently derived by optional phonological reduction, as it lacks a full vowel and cannot be stressed.

- (23) a. Michael did not make a mistake.  
 b. Michael didn't make a mistake.

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(i) {Luca ala mama / ala mama Luca} ti-à-l cumprè n liber  
 Luca to.the mother to.the mother Luca 3DAT-has-3NOM bought a book  
 'Luca bought a book for his mother.' (Casalicchio and Cognola 2015)



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As Coalescence applies in order to eliminate structures that would be deficient for PF interpretation, the analysis adds to a growing number of proposals that certain prosodic properties can drive syntactic operations (Richards 2010). Variation in the distribution of dominance and recession accounts for both cross-linguistic and within-language variation in the realization of functional projections. While Coalescence is a nontrivial addition to the set of syntactic operations, it allows for a simpler architecture of the grammar by eliminating computational burdens in both the lexicon and post-syntactic grammar.

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