
Unification of Feature Scattering and M-Merger as Coalescence

Brian Hsu (hsub@usc.edu)

NELS 46 at Concordia University, Montréal • October 16, 2015

1. Introduction

This paper reconsiders two "bundling" mechanisms that have been proposed to affect heads in syntax, **Feature Scattering** and **Morphological Merger**.

- Feature Scattering (Giorgi and Pianesi 1996): Bundling in the lexicon.
- Morphological Merger (Marantz 1988, Halle & Marantz 1993): Bundling post-syntax.

Claim: Effects of Feature Scattering and Morphological Merger can be captured with a single syntactic operation, **Coalescence**.

- Constraints on bundling need only be postulated in one component of the grammar.
- Coalescence permits new analyses of old problems in syntax.
 - Second position effects and variation in their strictness.
 - Interaction between affixation and movement (English *not*-contraction)

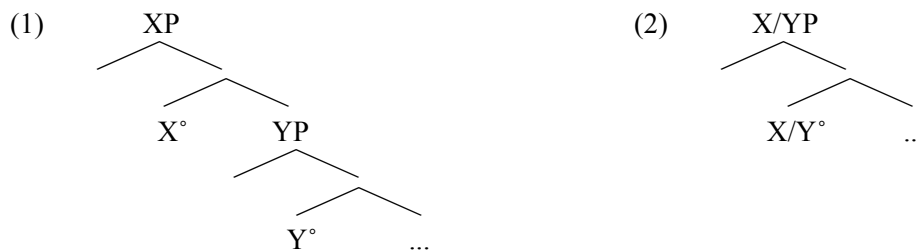
Outline of the talk

- §2 Feature Scattering and Morphological Merger
 - §3 Constraints on Coalescence
 - §4 Variation in the clausal left periphery
 - §5 English negative contraction
 - §6 Conclusion
-

2. Feature Scattering and Morphological Merger

2.1 The Feature Scattering Hypothesis

Giorgi and Pianesi (1996): some functional category features X, Y can enter the derivation as separate heads X°, Y° or as a bundled head X/Y°.



Feature Scattering accounts for apparent variation in the visibility of functional heads, while maintaining a universal feature inventory.

- Infl° and Agr° (Iatridou 1990; Speas 1991; Bobaljik 1995; Thráinsson 1996; a.o.)
- Voice° and Caus° (Pylkkänen 2002).
- SubjectPs in the Infl domain (Poletto 2002).

Metaconditions on bundling:

Features can only be bundled if they would otherwise be on adjacent heads.

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 & Pianesi 1996)

Features are only bundled into hierarchically higher heads if they do not project specifiers or trigger phrasal movement (Bianchi 1999).

- Corollary: Features that can trigger phrasal movement are not bundled into higher heads.

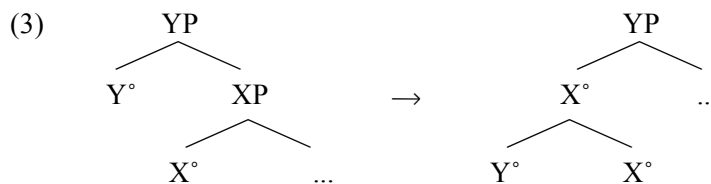
Duplication Problem: Constraints on the ordering of functional heads are required in both the lexicon and in syntax.

- In "one head one feature" syntax, the hierarchy can be implemented via uninterpretable, C-selectional category features (Svenonius 1994; Julien 2002; Di Sciullo and Isac 2008).
 - e.g. T selects for V with a $[uV]$ feature, C selects for T with $[uT]$.

2.2 Morphological Merger

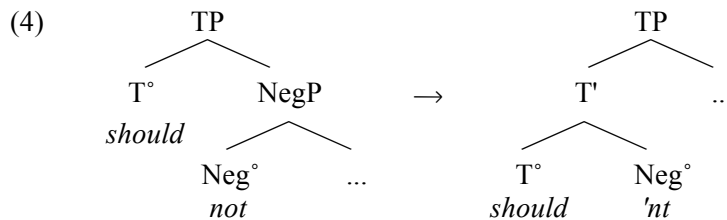
Morphological Merger (Marantz 1988; Halle and Marantz 1993): a proposed post-syntactic (PF) operation that converts structurally adjacent heads into a complex head.

- Applies to terminals that are adjacent at linearization (i.e. no intervening specifier).¹



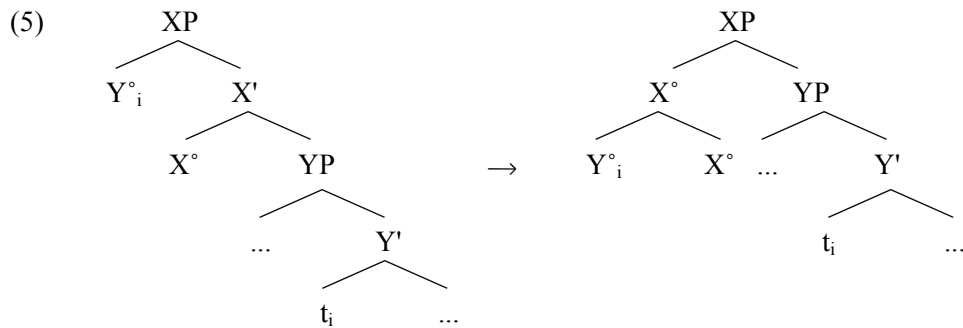
Morphological Merger is typically used to account for mismatches between syntactic and phonological constituency in affixation (Marantz 1988; Halle and Marantz 1993).

- English contractions (e.g. *should not* → *shouldn't*, *will have* → *will've*):



¹ Here, 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*.

Matushansky (2006): A similar operation, *M-Merger*, generates adjunction in head movement.



2.3 Bundling both before and after syntax?

Feature Scattering and Morphological Merger posit similar bundling mechanisms in the *presyntactic lexicon* and *postsyntactic morphology*, respectively.

- Identical structural conditions: bundling affects heads in an asymmetric c-command relation with no intervening specifier.

Bundling appears to uniformly depend on some **prosodic weakness**.

- Morphological Merger provides support for phonological clitics.
- Feature Scattering: Category features are bundled if they are phonologically null or unable to trigger phrasal movement.

Proposal: both phenomena can be unified as single operation that applies during the syntactic derivation, **Coalescence**.

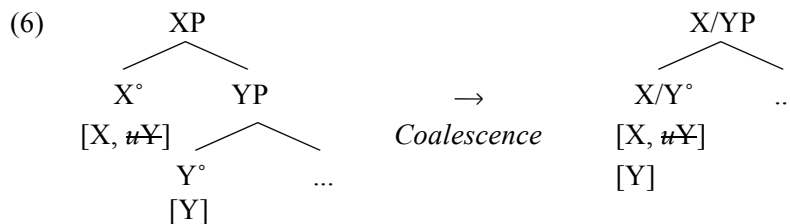
3. Constraints on Coalescence

3.1 Coalescence, Dominance, and Recession

Assumption: in all languages, each category feature enters the derivation on a separate head that C-selects for its complement.

Coalescence takes an input of two adjacent heads X° and Y° and creates a bundled head X/Y°.

- X/Y° inherits all features of the individual heads.



What motivates Coalescence? Recall that bundling occurs when a lower head would be weak or null in prosodic realization.

Claim: Coalescence eliminates heads that are deficient for interpretation at PF.

- We define distinctions between **dominant vs. recessive category features**, and **dominant vs. recessive heads**.
- Category features are lexically specified as dominant or recessive (subscript _D or _R).

A category feature [F] is *dominant* if:

A head containing only [F] maps to a prosodic word in phonological representation
Or, a head containing only [F] can trigger movement to its specifier.

Otherwise, [F] is *recessive*.

Whether a head is dominant or recessive depends on its featural composition:

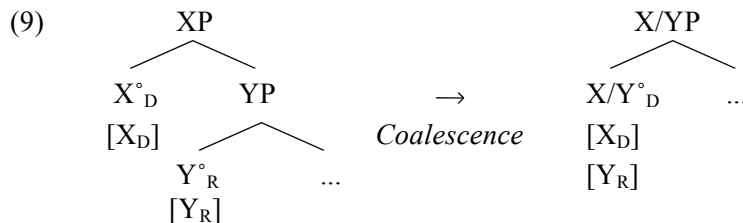
- Heads with at least one dominant category feature are dominant.
- Heads with only recessive category features are recessive.

(7) X/Y_D
 $[X_D]$
 $[Y_R]$

(8) X_R
 $[X_R]$

Restriction: Recessive heads are deficient for PF interpretation, and must be eliminated during the course of the derivation.

- This is achieved by bundling with a higher dominant head.
- Coalescence applies when a dominant head immediately c-commands a recessive one.

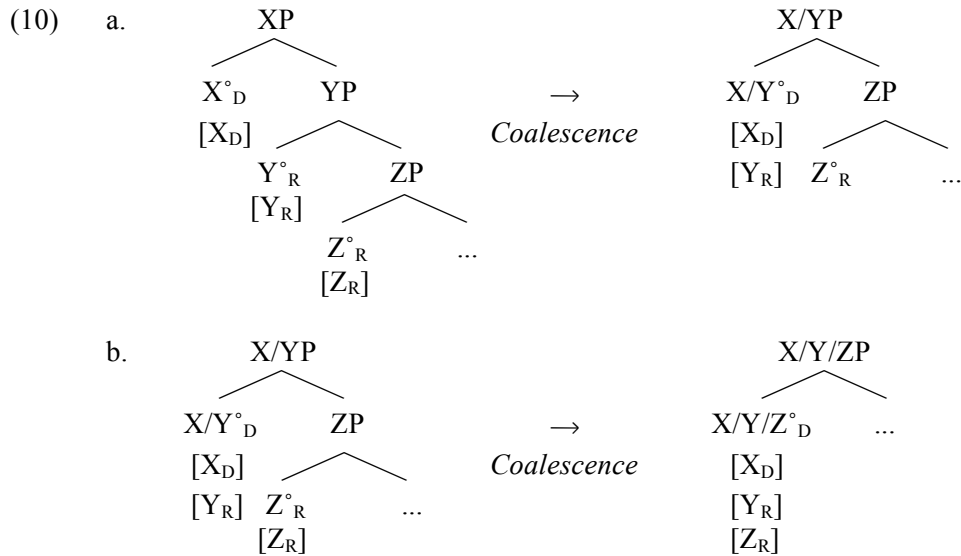
(9) 

- The configurational restriction captures Bianchi's (1999) constraints on bundling.
- **Consequences:** Pairs of dominant heads can not be bundled. Recessive heads do not trigger Coalescence with each other.

Constraints on the distribution of dominance:

- Category features associated with *lexical heads* and *phase heads* are always dominant.
- They either project specifiers or are associated with an Edge/EPP Feature (Rackowski and Richards 2005; Chomsky 2008; Kandybowicz 2009; a.o.).

Given the above restrictions on Coalescence, heads with more than 2 category features are bundled iteratively from the top down.



4. Variation in the clausal left periphery

4.1 The expanded left periphery and second-position effects

Rizzi (1997): The complementizer phrase (CP) is split into a series of projections encoding various discourse functions (structure based on Benincà and Poletto 2004).

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

While some languages allow simultaneous realization of these positions (e.g Italian - Rizzi 1997; Gungbe - Aboh 2006), they are substantially restricted in others.

Verb second (V2) languages: the verb obligatorily follows exactly one constituent, independent of clause type (i.e. in all finite main clauses).

- (12) *Kashmiri V2*

- 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; 93)

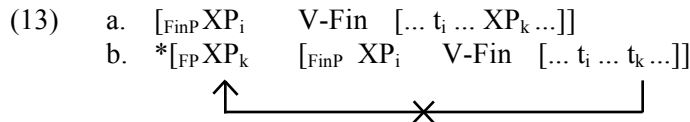
- General consensus: Second-position verbs occupy a C-domain head (den Besten 1983; Travis 1984; Holmberg 1986; Vikner 1995; Roberts 2004, 2012; a.o.).

Deriving V2 within the expanded left periphery poses numerous challenges (Haegeman 1996, 2012; Benincà and Poletto 2004; Manetta 2011; Roberts 2004, 2012; a.o.)

4.1 The bottleneck effect

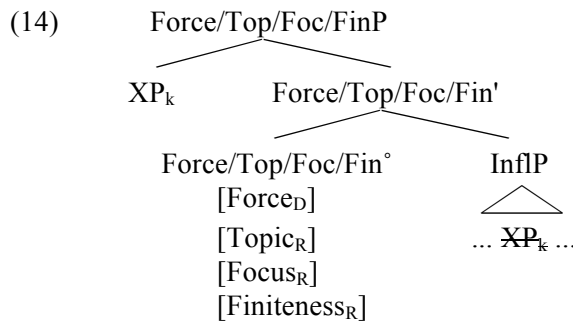
Assuming a universal inventory of left-peripheral projections, V2 can be attributed to a **bottleneck effect** restriction on movement (Haegeman 1996; Roberts 2004):

- All left-peripheral fronting passes through Spec, FinP due to an EPP feature on Fin°.
- Once one XP has moved, further movement is blocked by Relativized Minimality (Rizzi 1990).
- Deviations from V2 are possible only through base-generation of XPs above FinP.



The bottleneck effect hypothesis is **overly restrictive**, failing to account for many attested deviations from V2 (Manetta 2011; Haegeman 2012; Casalicchio and Cognola 2015).

Claim: Strict V2 arises when all but the topmost left-peripheral category feature is recessive, forcing Coalescence to bundle all heads into a single projection.



Prediction: As the number of dominant category features increases, more positions become available for fronting. P2 requirements become increasingly "loose."

4.2 Old English V3

Old English (OE) had a general V2 requirement in main clauses (exs. from Trips 2002).

(15) His mynster **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.' (ChronA,;565.8.218)

(16) On his dagum **sende** Gregorius us fulluht
 On this day sends Gregorius us Christianity
 'On this day, Gregorius sends us Christianity.' (ChronA,;565.1.207)

OE permitted V3 if the main verb was preceded by a DP subject. V3 is crucially unattested for non-subject XPs (exs. from Haerberli 2000).

- (17) ...& fela ðinga swagerad man **sceal** don
 and many things so wise man must do
 '...and such a wise man must do many things.' (Law4, 448.5.4)
- (18) 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.' (Bo, 133.21)

If subjects target a low C-domain position like FinP (Aboh 2006; Ledgeway 2010; Cognola 2013), $[XP_{\text{top/foc}} XP_{\text{subj}} V]$ has a structure like (19):

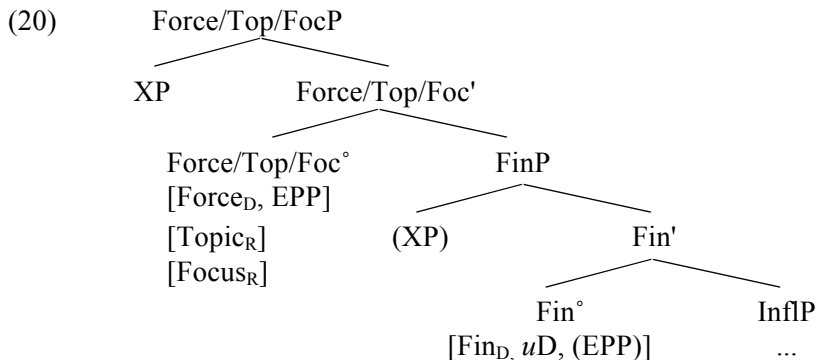
- (19) $[_{\text{TopP/FocP}} XP_{\text{top/foc}} [_{\text{FinP}} (XP_{\text{subj}}) V [_{\text{IP}} \dots \Psi]$

Problems for the bottleneck effect hypothesis:

- If subjects move to Spec,FinP, further XP-movement to TopP or FocP should not be possible.
- If TopP or FocP can be filled by base-generation, why is this possible only if SubjP is filled?

Proposal: [Finiteness_D] is dominant in OE, allowing it to realize its own head.

- All higher functional heads are bundled in a single head with one EPP feature.
- Fin° has an optional EPP feature that attracts subjects.
- V° moves to Fin°.



4.3 Kashmiri V3

Kashmiri has a V2 requirement in main clauses (Bhatt 1999; Manetta 2011).

Interpretational restriction in V2: First position non-subjects must be focused, not topicalized.

- Non-topics (e.g. bare quantifiers) are allowed in 1P.
- 1P is the only position that allows suffixation by focus-sensitive particles (e.g. *ti* 'even').

- (21) sooruyikeNh **khyav** rameshan
 everything ate Ramesh
 'Ramesh ate everything' (Bhatt 1999; 87)

- (22) huun-ti **chu** behna broNh panin jaay goD saafkaraan
 dog-even is seat before self's place firstclean do-PERF
 'Even the dog cleans his place before sitting.' (Bhatt 1999; 88)

Exceptional V3 in interrogatives: If the verb is preceded by a *wh*-word, the *wh*-word is preferably preceded by one topicalized phrase: [XP_{TOP} *Wh* V ...] (Bhatt 1999, Manetta 2011).

- (23) 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; 107)

- This is particularly unexpected since topics are banned in first position in declaratives.

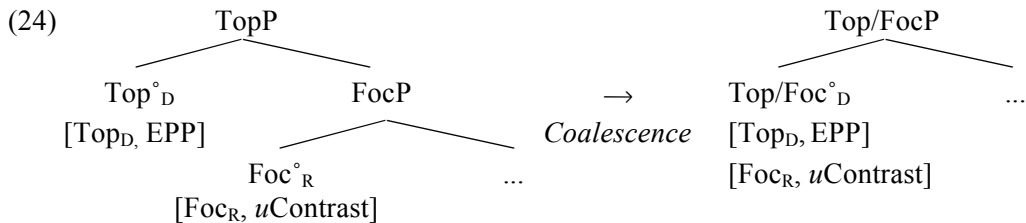
Problems for a bottleneck effect analysis:

- If the *wh*-word is moved through FinP, the initial topic must be base-generated in TopicP
- This requires stipulation that a topic must be base-generated if *wh*-movement occurs.

Proposal: Kashmiri has two Focus° heads that differ in dominance vs. recession.

- Non-*wh*, contrastive [*uContrast*] Focus° is recessive.
- Interrogative [*uWh*] Focus° is dominant.

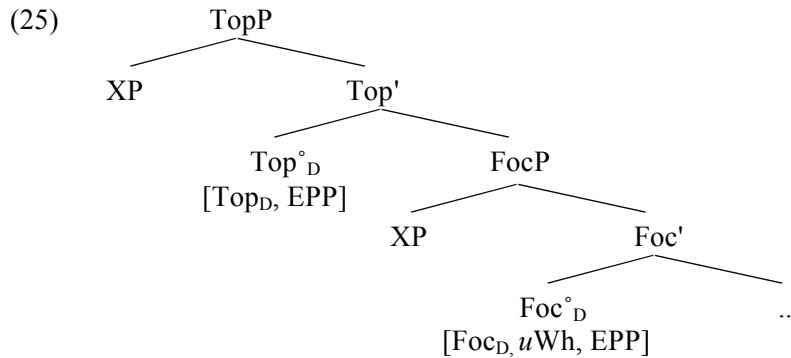
If the recessive, non-*wh* Focus° head is selected, Coalescence must bundle Topic° and Focus° into a single head that admits one specifier.²



² While a one-specifier restriction is proposed for Kashmiri, it appears that some languages exhibit "relaxed" V2 by allowing multiple specifiers per head (cf. Pesetsky 2000). This seems to be the case in Rhaetoromance dialects that permit multiple, freely ordered fronted topics (Casalicchio and Cognola 2015).

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

Because [*uwh*] Focus° is dominant, Coalescence does not apply between Topic° and Focus°.



- Since [*Foc_D, uWh, EPP*] and [*Top_D, 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' negation morpheme (orthographic *not*) and a contracted form (*n't*).

- In some contexts, the two appear to be in free variation.
- *n't* is prosodically weak - it lacks a full vowel and cannot be stressed.

- (26)
- Michael did not make a mistake.
 - Michael didn't make a mistake.

Use of a particular form becomes obligatory in some contexts (Zwicky and Pullum 1983):

- If negation raises with an auxiliary in Subject-Auxiliary inversion, the affixal form is required.

- (27)
- Didn't Michael make a mistake?
 - *Did not Michael make a mistake?

- Only the full form is possible if the negative morpheme remains in a post-subject position.

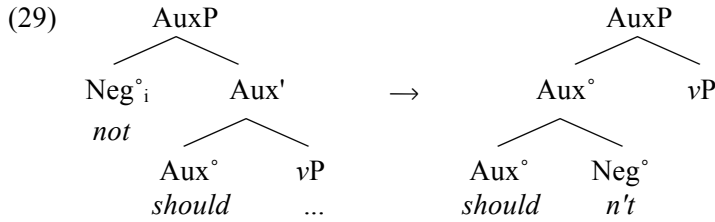
- (28)
- Did Michael not make a mistake?
 - *Did Michael n't make a mistake?

If the contracted form is derived by an optional postsyntactic operation, obligatory use of the affixal negative when it raises with the auxiliary (27) is unexpected.

5.1 Matushansky's (2006) M-Merger approach

Key insight: the patterning of *n't* is explained if contraction takes place during the derivation.

- M-Merger optionally applies when Neg^{max/min} is merged in Spec, AuxP. M-Merged Neg is pronounced *n't*.

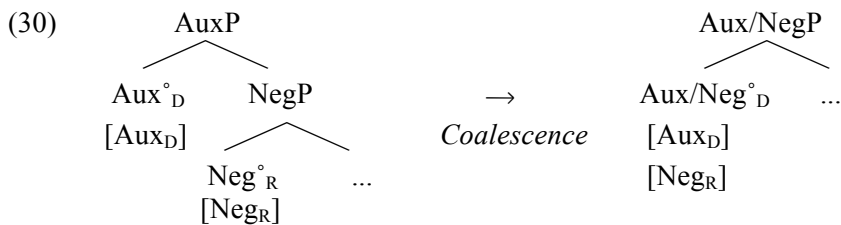


- In inversion contexts, Aux° is attracted to C° .
- If Aux°/Neg° have been M-Merged, the complex head raises.
- If M-Merger has not applied, Aux° raises alone.

If M-Merger is a postsyntactic morphological operation, it requires that transfer to PF occur after Aux° and Neg° are merged and before possible head movement to C° .

5.2 The Coalescence account

- The full form carries a dominant category feature [Neg_D], while the affixal form contains a recessive feature [Neg_R].
- Recessive Neg_R° undergoes Coalescence with Aux_D° once it is merged. If the auxiliary is attracted to a C-domain position, the affixal negative raises alongside.



6. Conclusion

The bundling of syntactic heads is performed by a single syntactic operation, Coalescence.

- Effects of Feature Scattering are accounted for while maintaining a "one head one feature" restriction on items in the Numeration.
- One structural condition on Coalescence (asymmetric c-command between a dominant and recessive head) derives proposed restrictions on feature bundling in the lexicon.
- Variation in the distribution of dominant category features accounts for cross-linguistic and within-language variation (Kashmiri V2/3) in the instantiation 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 a computational burden on the lexicon.

- **Implication:** Constraints on PF interpretability can inform syntactic operations (Roberts 2005; Richards 2010, 2014).

Remaining questions

- Can Coalescence account for all cases of head movement and head adjunction?
- Does Coalescence permit directionality parameters (i.e. how do we account for proclitic structures?)
- Are dominant heads associated with other types of prosodic strength (e.g. stress, prosodic edges)?

Acknowledgements: Many thanks to Andrew Simpson, Roumyana Pancheva, Maria Luisa Zubizarreta, Hajime Hoji, and audiences at Syntax Plus at USC for their helpful feedback.

References

- Aboh, Enoch Oladé. 2006. Complementation in Saramaccan and Gungbe: The Case of C-type Modal Particles. *Natural Language & Linguistic Theory* 24: 1–55.
- Benincà, Paola, and Cecilia Poletto. 2004. Topic, Focus, and V2. In *The Structure of CP and IP*, ed. Luigi Rizzi, 52–75. Oxford: Oxford University Press.
- Den Besten, Hans. 1983. On the interaction of root transformations and lexical deletive rules. In *On the formal syntax of the Westgermania*, ed. Werner Abraham, 47–131. Amsterdam: John Benjamins.
- Bhatt, Rakesh. 1999. *Verb movement and the syntax of Kashmiri*. Dordrecht: Kluwer.
- Bianchi, Valentina. 1999. *Consequences of Antisymmetry: Headed Relative Clauses*. Berlin: Mouton de Gruyter.
- Bobaljik, Jonathan David. 1995. Morphosyntax: The syntax of verbal inflection. PhD dissertation, Massachusetts Institute of Technology.
- Casalicchio, Jan, and Federica Cognola. 2015. *On the left periphery of relaxed V2 languages: A comparison between Rhaetoromance and Môcheno*. Ms, University of Trento.
- Chomsky, Noam. 2008. On phases. In *Foundational Issues in Linguistic Theory*, ed. Robert Freidin, Carlos P. Otero, and Maria Luisa Zubizarreta, 133–166. Cambridge, MA: MIT Press.
- Cognola, Federica. 2013. *Syntactic Variation and Verb Second: A German Dialect in Northern Italy*. Amsterdam/Philadelphia: John Benjamins.
- Embick, David, and Rolf Noyer. 2001. Movement Operations after Syntax. *Linguistic Inquiry* 32: 555–595.
- Giorgi, Alessandra, and Fabio Pianesi. 1996. *Tense and Aspect: From Semantics to Morphosyntax*. New York: Oxford University Press.
- Haerberli, Eric. 2002. Inflectional Morphology and the Loss of V2 in English. In *Syntactic effects of morphological change*, ed. David L. Lightfoot, 88–106. Oxford University Press.
- Haegeman, Liliane. 1996. Verb second, the split CP, and null subjects in early Dutch finite clauses. *GenGenP* 4: 135–175.
- Haegeman, Liliane. 2012. *Adverbial Clauses, Main Clause Phenomena, and the Composition of the Left Periphery*. Oxford: Oxford University Press.
- Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from Building 20*, ed. Kenneth Hale and Samuel K. Keyser, 111–176. Cambridge, MA: MIT Press.
- Holmberg, Anders. 1986. Word order and syntactic features in the Scandinavian languages and English. PhD dissertation, Stockholm University.
- Iatridou, Sabine. 1990. About Agr(P). *Linguistic Inquiry* 21: 551–577.

- Julien, Marit. 2002. *Syntactic Heads and Word Formation: A Study of Verbal Inflection*. New York: Oxford University Press, USA.
- Kandybowicz, Jason. 2009. Embracing Edges : Syntactic and Phono-Syntactic Edge Sensitivity in Nupe. *Natural Language & Linguistic Theory* 27: 305–344.
- Ledgeway, Adam. 2010. Subject licensing in CP. In *Mapping the Left Periphery*, ed. Paola Benincà and Nicola Munaro, 257–296. Oxford: Oxford University Press.
- Manetta, Emily. 2011. *Peripheries in Kashmiri and Hindi-Urdu: The syntax of discourse-driven movement*. Amsterdam/Philadelphia: John Benjamins.
- Marantz, Alec. 1988. Clitics, Morphological Merger, and the Mapping to Phonological Structure. In *Theoretical Morphology*, ed. Michael Hammond and Michael Noonan, 253–270. San Diego: Academic Press.
- Matushansky, Ora. 2006. Head Movement in Linguistic Theory. *Linguistic Inquiry* 37: 69–109.
- Pesetsky, David. 2000. *Phrasal movement and its kin*. Cambridge, MA: MIT Press.
- Poletto, Cecilia. 2002. The left-periphery of V2-Rhaetoromance dialects: a new view on V2 and V3. In *Syntactic Microvariation*, ed. Sjef Barbiers, Leonie Cornips, and Susanne van der Kleij, 214–242. Amsterdam: Meertens.
- Pylkkänen, Liina. 2002. Introducing arguments. PhD dissertation, Massachusetts Institute of Technology.
- Rackowski, Andrea, and Norvin Richards. 2005. Phase Edge and Extraction: A Tagalog Case Study. *Linguistic Inquiry* 36: 565–599.
- Richards, Norvin. 2010. *Uttering Trees*. Cambridge, MA: MIT Press.
- Richards, Norvin. 2014. *Contiguity Theory*. Ms, Massachusetts Institute of Technology
- Rizzi, Luigi. 1990. *Relativized Minimality*. Cambridge, MA: MIT Press.
- Roberts, Ian G. 2004. The C-System in Brythonic Celtic Languages, V2, and the EPP. In *The Structure of CP and IP*, ed. Luigi Rizzi, 297–328. Oxford: Oxford University Press.
- Roberts, Ian G. 2005. *Principles and Parameters in a VSO Language: A Case Study in Welsh*. Oxford: Oxford University Press.
- Roberts, Ian G. 2012. Phases, head movement and second-position effects. In *Phases: Developing the Framework*, ed. Angel Gallego, 385–440. Berlin: De Gruyter Mouton.
- Di Sciullo, Anna Maria, and Daniela Isac. 2008. The Asymmetry of Merge. *Biolinguistics* 2: 260–290.
- Speas, Margaret. 1991. *Phrase Structure in Natural Language*. Dordrecht: Kluwer.
- Svenonius, Peter. 1994. C-selection as feature checking. *Studia Linguistica* 48: 133–155.
- Thráinsson, Höskuldur. 1996. On the (non)-universality of functional projections. In *Minimal ideas*, ed. Werner Abraham, Samuel David Epstein, Höskuldur Thráinsson, and C. Jan-Wouter Zwart, 253–81. Amsterdam: John Benjamins.
- Travis, Lisa. 1984. Parameters and Effects of Word Order Variation. PhD dissertation, Massachusetts Institute of Technology.
- Trips, Carola. 2002. *From OV to VO in Early Middle English*. Philadelphia: John Benjamins.
- Vikner, Sten. 1995. *Verb movement and expletive subjects in the Germanic languages*. New York and Oxford: Oxford University Press.
- Zwicky, Arnold M., and Geoffrey K. Pullum. 1983. Cliticization vs. Inflection: English N'T. *Language* 59: 502–513.