Structural Syncretism and the Binarity Constraint on Merge

Barbara Citko *(University of Washington)* and Martina Gračanin-Yuksek *(Middle East Technical University)*

1. Introduction

This talk explores properties of Merge against a backdrop of multidominant (MD) syntax → the MD setting allows us to discover constraints on Merge that remain inaccessible in the absence of MD.

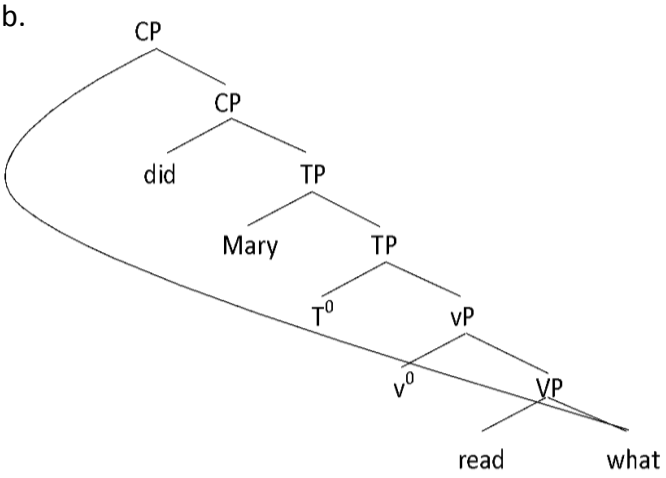
Two types of multidominant structures:

- structures generated by **Internal Merge**
- structures generated by **Parallel Merge** (Citko 2000, 2005)

Internal Merge represents movement (Chomsky 2004, Collins and Stabler 2016, Gärtner 1999, 2002, among others). The shared constituent belongs to *a single derivation.*

(1) a. **What**$_i$ did Mary read t_i?

b.

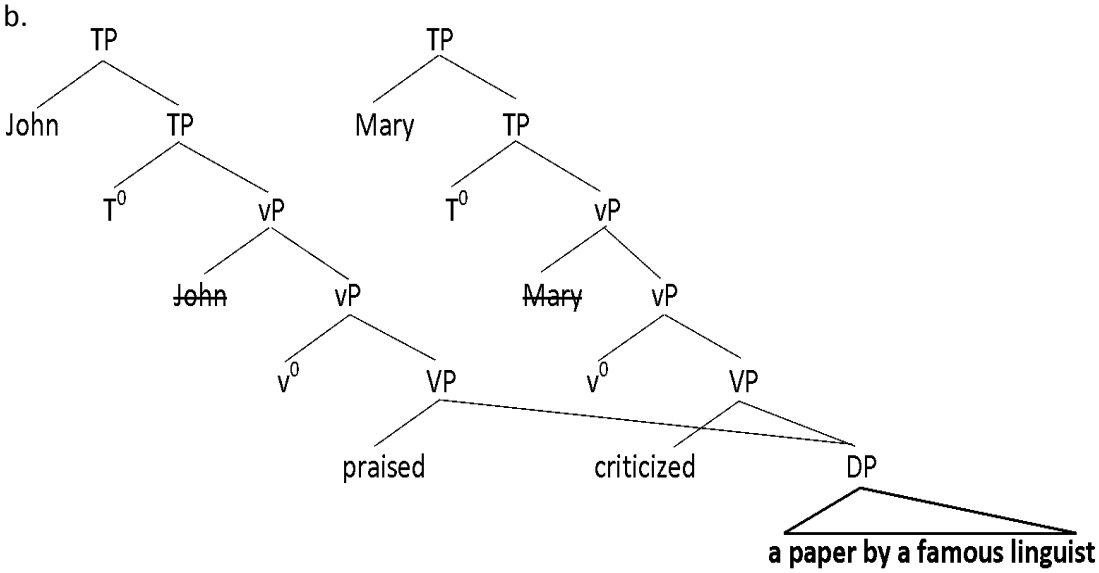


Parallel Merge represents e.g. Right Node Raising (Bachrach and Katzir 2009, Citko 2011, Fox and Pesetsky 2007, Goodall 1987, Johnson 2007, McCawley 1982, De Vries 2009, Wilder 1999, among many, many others; contra Postal 1998, Sabbagh 2007, Valmala 2013, among others).

In RNR, the shared constituent belongs simultaneously *to two distinct derivations*, as in (2b), up to the point the two TPs merge with the conjunction phrase (2c):

(2) a. John praised __, and Mary criticized__, **a paper by a famous linguist.**

b.



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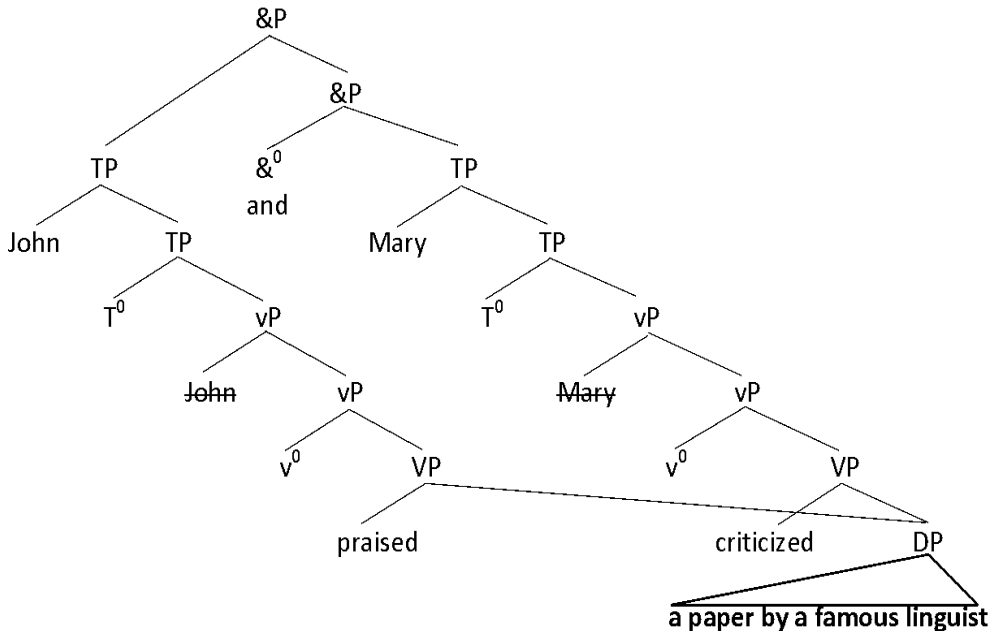
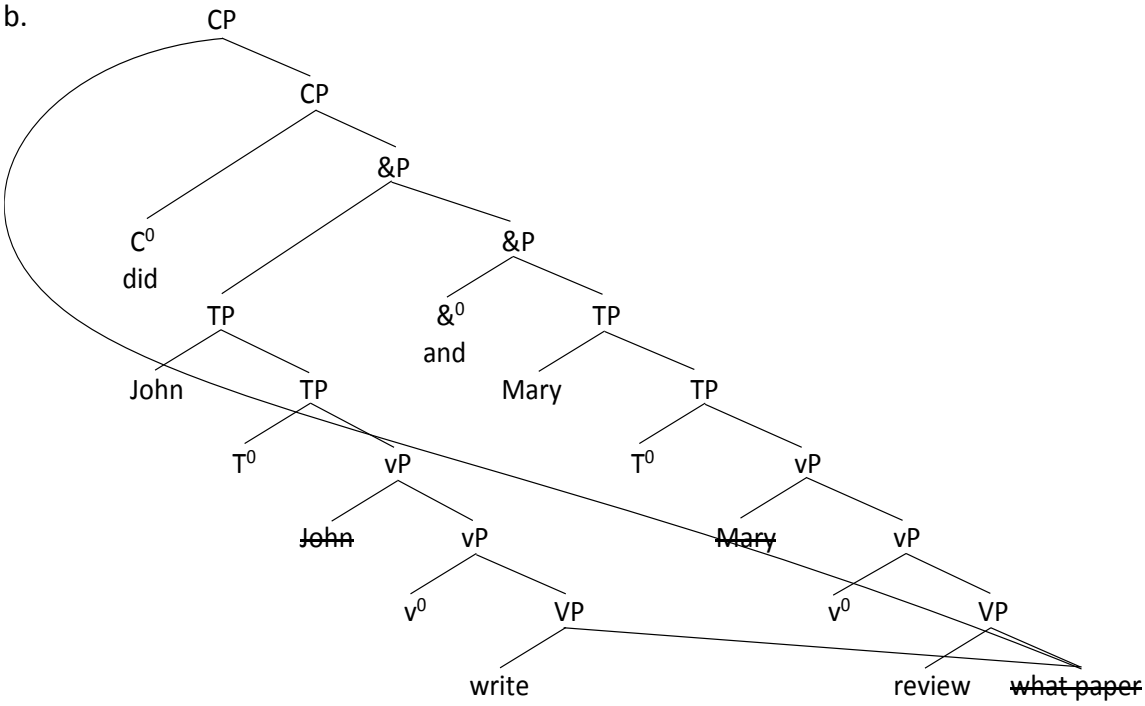


Parallel Merge and Internal Merge can both apply to a single object. This is what happens in ATB wh-questions. Crucially, it happens after the two TPs have already been united into *a single derivation,* as shown in (3b):

(3) a. **What paper**$_i$ did John write t_i and Mary review t_i?

b.



→ What constraints emerge when Parallel Merge and Internal Merge apply to a single object?

CLAIM: Merge is subject to a binarity constraint, but the binarity does not refer to syntactic objects, but to **syntactic positions**:

- **Binarity Constraint on Merge (BiCoM):** Merge **cannot** relate more than two positions in a single derivation (even if doing so combines only two objects).

2. Observation 1 (familiar): ATB constructions are subject to parallelism

ATB extraction from non-parallel positions is ungrammatical (Williams 1978):

(4) a. I know a man **who**$_i$ Bill saw t_i and Mary liked t_i.

b. *I know a man **who**$_i$ Bill saw t_i and t_i likes Mary. (Williams 1978: 34)

This is often attributed to the Parallelism Constraint on ATB Movement (Anderson 1983, Gazdar 1981, Goodall 1987, Kasai 2004, Pesetsky 1982, Williams 1978, Woolford 1987, among others).

(5) *Parallelism Condition on ATB movement*
ATB movement must take place from syntactically parallel positions. (Kasai 2004: 181)

Polish and Croatian exhibit similar effects (Dyła 1984, Franks 1995, among others):

(6) a. *__Który klub piłkarski__$_i$ Jan zawsze krytykuje t_i, a i tak t_i wygrywa mecze? *Pol*
which club soccer Jan always criticizes and still wins matches
Lit. 'Which soccer club does Jan always criticize and still wins matches?'

b. *__Koji nogometni klub__$_i$ Jan uvijek kritizira t_i a ipak t_i osvaja turnire? *Cro*
which soccer club Jan always criticizes and still wins tournaments
Lit. 'Which soccer club does Jan always criticize and still wins tournaments?'

(7) a. *__Co__$_i$ Janek zrobił t_i a t_i zmartwiło Marię? *Pol*
what John did and upset Mary
Lit.'What did John do and upset Mary? ' (Borsley 1983: 170)

b. *dziewczyna, __której__$_i$ Janek dał t_i swoją marynarkę
girl who.DAT Jan gave his jacket
a mimo tego t_i było zimno.
and in.spite.of that was cold
'the girl who Jan gave his jacket and was nevertheless cold' (Dyła 1984: 704)

c. *człowiek, __którego__$_i$ t_i nie było na zajęciach i Janowi jest żal t_i
man who.GEN not was in class and Jan is sorry.for
'the man who wasn't in class and Jan feels sorry for' (Franks 1995: 71)

Extraction from non-parallel positions improves if the subject is further embedded (Williams 1978):

(8) a. *Tell me __who__$_i$ Bill saw t_i and t_i likes Mary.

b. Tell me __who__$_i$ Bill saw t_i and John believes t_i likes Mary. (Williams 1978: 34)

Polish and Croatian show similar effects:

(9) a. *dziecko, __które__$_i$ lubisz t_i i t_i było dobre *Pol*
child who.ACC/NOM like.2SG and was good
'the child that you like and was good.'

b. dziecko, __które__$_i$ lubisz t_i i chcesz, żeby t_i było dobre
child who.ACC/NOM like.2SG and want.2SG COMP was good
'the child that you like and want it to be good.' (Franks 1995: 76-77)

(10) a. *dijete __koje__$_i$ voliš t_i i t_i bilo je dobro *Cro*
child who like.2SG and been AUX good
'the child that you like and was good.'

b. dijete **koje**$_i$ voliš t_i i želiš da t_i bude dobro
child who like.2SG and want.2SG that be good
'the child that you like and want it to be good.'

Existing accounts

Williams (1978) attributes the parallelism requirement (and the improvement with the embedding of the subject gap) to a constraint on factorization:

(11) If one conjunct is split by a factor line, all must be split, and further, if the conjuncts are split, then the left conjunct brackets must all belong to the same factor.

(12) a. *Tell me **who**$_i$ Bill saw t_i and t_i likes Mary.

b.

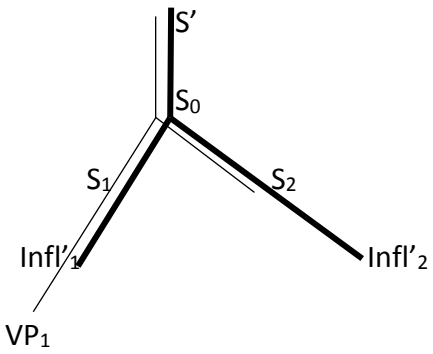
C	**[**Bill saw	**who**]
and		
		[**who** likes Mary]

Pesetsky (1982) attributes it to the violation of the Path Containment Condition; the condition that requires of any two paths between A'-bound empty categories and their A' binders that one path contain the other.

(13) Path Containment Condition
If two paths overlap, one must contain the other.

(14) a. *Tell me **who**$_i$ Bill saw t_i and t_i likes Mary.

b.



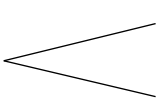
(i) Path between the conjunction and the conjuncts: {S_1, S_2, S_0}

(ii) Path between $INFL_1$, $INFL_2$ and COMP: {$INFL'_1$, S_1, **$INFL'_2$**, S_2, S_0, S'}

(iii) Path between e_1, e_2 and COMP: {**VP_1**, $INFL'_1$, S_1, S_2, S_0, S'}

(Pesetsky 1982: 453/454)

Goodall (1987) attributes it to a Principle C violation: the trace in the matrix subject position of one conjuncts c-commands the trace in the other conjunct.

(15) *the man [$_S$ **who$_i$**  [$_S$ John [$_{VP}$ saw ***t$_i$***]]]
[**$_S$** ***t$_i$*** [$_{VP}$ kissed Mary]]] (Goodall 1987: 69)

Woolford (1987) attributes it to an ECP violation: the subject trace in the second conjunct is not properly governed ('the S that immediately dominates coordinate S nodes is a barrier')

(16) a. *Tell me who Bill saw and likes Mary.

b. [$_{CP}$ ***who$_i$*** **[$_S$** [$_S$ Bill saw ***t$_i$***] and [$_S$ ***t$_i$*** likes Mary]]]

Franks (1995) attributes it to a parallelism constraint on thematic roles:

(17) In any ATB construction, the gaps must pertain either to most prominent or to not most prominent arguments, consistently across all the conjuncts.
(Franks 1995: 67)

(18) a. *Tell me **who$_i$** Bill saw ***t$_i$*** and ***t$_i$*** likes Mary.

b. who Bill saw ***t$_i$*** (Agent, **Theme**)

c. who ***t$_i$*** likes Mary (**Experiencer,** Theme)

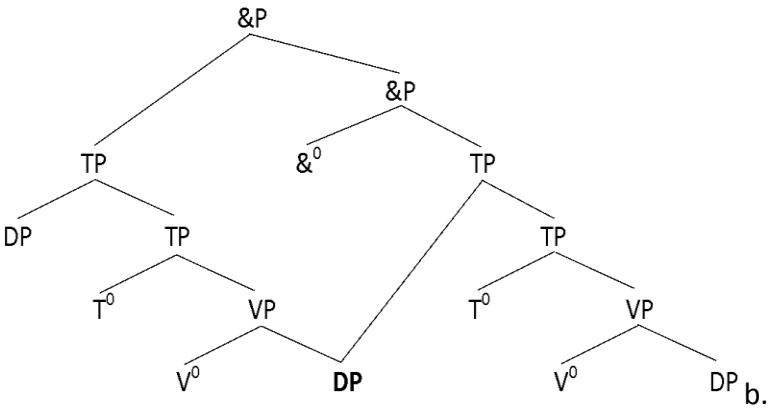
In Section 4, we propose an alternative explanation of the Parallelism Requirement in ATB constructions in terms of the Binarity Constraint on Merge. First, however, we show that RNR differs from ATB movement with respect to the Parallelism Requirement.

3. Observation 2: Absence of the Parallelism Requirement in RNR

Right Node Raising examples in which the shared constituent occupies non-parallel positions in the two conjuncts (i.e. object and subject) are also ungrammatical:

(19) a. *John saw __ and **Bill** told __ a joke.

b.



b.

Such examples are independently ruled out by the so-called Right Edge Restriction on RNR, which requires the shared element in RNR to be right-peripheral (Sabbagh 2007, Wilder 1999, among others).

(20) *Joss will donate __ to the library, and Maria will donate **several old novels** to the museum. (Sabbagh 2007: 354)

However, in **Locative Inversion** the subject can be final (Bresnan 1994, Bruening 2010, Collins 1997, Culicover and Levine 2001, Emonds 1970, Postal 2004, among many others):

(21) a. Down the hill rolled **John.**

b. Into the room walked **the defendant's former wife**.

c. From this data set emerged **a new generalization about climate change**.

Interestingly, as long as the Right Edge Restriction is not violated, the shared constituent in RNR can be the object in one conjunct and the subject in the other, showing that ***RNR is not subject to the Parallelism Constraint observed in ATB movement.***

(22) **RNR: Object/Subject**

a. Everyone expected __, and into the room walked __, **a guy in a blue suit**.

b. Bill pushed __, and down the hill rolled __, **the guy in a blue jacket**.

(23) **ATB: Object/Subject**

a. *This is the guy **OP**$_i$ that everyone expected t_i, and into the room walked t_i.

b. *This is the guy **OP**$_i$ that Bill pushed t_i, and down the hill rolled t_i.

(24) **RNR: Subject/Object**

a. Into the room walked __, and everyone's eyes turned to __, **the defendant's former wife.**

b. From this data set emerged __, and everyone was surprised by __, **a new generalization about climate change.**

(25) **ATB: Subject/Object**

a. *She is the person **OP**$_i$ that into the room walked $\boldsymbol{t}_i$ and everyone's eyes turned to $\boldsymbol{t}_i$.

b. *This is the generalization about climate change **OP**$_i$ that from this data set emerged $\boldsymbol{t}_i$ and everyone was surprised by $\boldsymbol{t}_i$.

The ungrammaticality of the ATB examples in (23) and (25) is not surprising given the general ban on extraction of postverbal subjects in Locative Inversion (Bresnan 1994, Coopmans 1989, Diercks 2014, among others):

(26) ***Which horse**$_i$ out of the barn ran $\boldsymbol{t}_i$? (Coopmans 1989: 732)

However, there are languages that allow postverbal subjects more freely, e.g., Polish and Croatian:

(27) *Pol*

a. Kawał opowiedział **Piotr**.
joke told Peter.NOM
'Peter told a joke.'

b. Na zajęciach nie było **Piotra.**
in class not was Piotr.GEN (=ACC)
'Peter wasn't in class.'

c. Było zimno **Piotrowi**.
was cold Piotr.DAT
'Peter was cold.'

(28) *Cro*

a. Šalu je ispričao **Petar**.
joke AUX told Peter.NOM
'Peter told a joke.'

b. U razredu nije bilo **Petra.**
in class not-AUX been Peter.GEN (=ACC)
'Peter wasn't in class.'

c. Hladno je bilo **Petru**.
cold AUX been Peter.DAT
'Peter was cold.'

Similarly to English, Polish and Croatian allow the shared constituent in RNR to occupy non-parallel positions (as long as its case forms are the same/syncretic across conjuncts):

(29) **RNR: Object$_{ACC}$/Subject$_{NOM}$**

a. Jan zawsze krytykuje __, a mecze i tak wygrywa __ , **klub** *Pol*
Jan always criticizes but matches still wins club.ACC/NOM
piłkarski z Warszawy.
soccer from Warsaw
Lit. 'Jan always criticizes and still wins the matches the football club from Warsaw.'

b. Jan uvijek kritizira __, a turnire ipak osvaja __ , **nogometni klub** *Cro*
Jan always criticizes but tournaments still wins football team.ACC/NOM
iz Rijeke.
from Rijeka
Lit. 'Jan always criticizes but tournaments still wins the football team from Rijeka.

(30) **ATB: Object$_{ACC}$/Subject$_{NOM}$**

a. ***Który klub piłkarski$_i$** Jan zawsze krytykuje ***t$_i$***, *Pol*
which.ACC/NOM club.ACC/NOM soccer.ACC/NOM Jan always criticizes
a i tak ***t$_i$*** wygrywa mecze?
and still wins matches
Lit. 'Which soccer club does Jan always criticize and still wins matches?'

b. ***Koji nogometni klub$_i$** Jan uvijek kritizira ***t$_i$*** *Cro*
which.ACC/NOM soccer.ACC/NOM club ACC/NOM Jan always criticizes
a ipak ***t$_i$*** osvaja turnire?
but still wins tournaments
Lit. 'Which soccer club does Jan criticize but nevertheless wins tournaments?'

(31) **RNR: Indirect Object$_{DAT}$/Subject$_{DAT}$**

a. Jan dał swoją marynarkę __, a mimo tego było zimno __, *Pol*
Jan gave his jacket and in.spite.of that was cold
nowej dziewczynie w naszej klasie.
new.DAT girl.DAT in our class
Lit. 'Jan gave his jacket to and was cold in spite of that a new girl in our class.'

b. Jan je dao jaknu __ ,a svejedno je bilo hladno __, *Cro*
Jan aux given jacket and in.spite.of.that aux been cold
novoj djevojčici u našem razredu.
new.DAT girl.DAT in our class
Lit. 'Jan gave his jacket to and was cold in spite of that a new girl in our class.'

(32) **ATB: Indirect Object$_{DAT}$/Subject$_{DAT}$**

a. *dziewczyna, **której**$_i$ Janek dał t_i swoją marynarkę *Pol*
girl who.DAT Jan gave his jacket
a mimo tego t_i było zimno
and in.spite.of that was cold
Lit. 'the girl who Jan gave his jacket and was nevertheless cold' (Franks 1995: 64)

b. ***djevojčica kojoj**$_i$ je Jan dao jaknu t_i a svejedno je bilo hladno t_i *Cro*
girl.NOM which.DAT aux Jan given jacket and nevertheless aux been cold
Lit. 'the girl who Jan gave his jacket and was nevertheless cold'

(33) **RNR: Subject$_{GEN}$ /Object$_{GEN}$**

a. Z powodu choroby na zajęciach nie było __, i Janowi było żal __ , *Pol*
because.of sickness in class was not and Jan was sorry.for
nowego studenta lingwistyki.
new.GEN student.GEN linguistics
Lit. 'Due to sickness wasn't in class and Jan felt sorry for the new student of linguistics.'

b. Zbog bolesti u razredu nije bilo __ , a Janu je bilo žao __, *Cro*
because.of sickness in class not been and Jan aux been sorry.for
novog studenta lingvistike.
new. GEN student.GEN linguistics
Lit. 'Due to sickness wasn't in class and Jan felt sorry for the new student of linguistics.'

(34) **ATB: Subject$_{GEN}$ /Object$_{GEN}$**

a. *człowiek, **którego**$_i$ t_i nie było na zajęciach i Janowi jest żal t_i *Pol*
man who.GEN not was in class and Jan is sorry.for
Lit. 'the man who wasn't in class and Jan feels sorry for' (Franks 1995: 71)

b. ***Kojeg studenta**$_i$ zbog bolesti t_i nije bilo u razredu *Cro*
which.GEN student.GEN because.of sickness not been in class
a Janu je bilo žao t_i?
and Jan aux been sorry.for
Lit. 'Which student was absent from the class because of the sickness, and Jan felt sorry for?

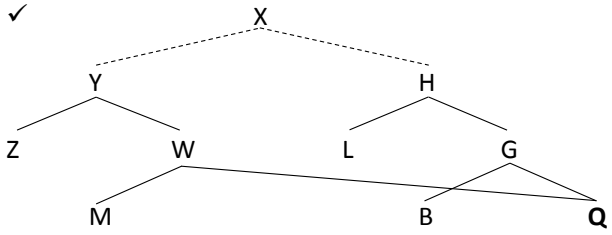
4. Analysis

We derive the contrast between ATB movement and RNR from a more general structure building principle, which we dub the Binarity Constraint on Merge (BiCoM):

(35) **Binarity Constraint on Merge (BiCoM)**
Merge cannot relate more than two <u>positions</u> at a time <u>within a single derivation</u>.

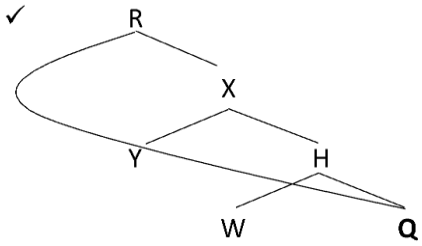
(36) a. Parallel Merge

✓



b. Internal Merge

✓



c. Parallel Merge + Internal Merge

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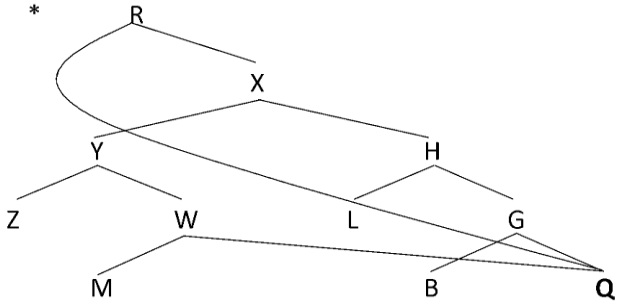
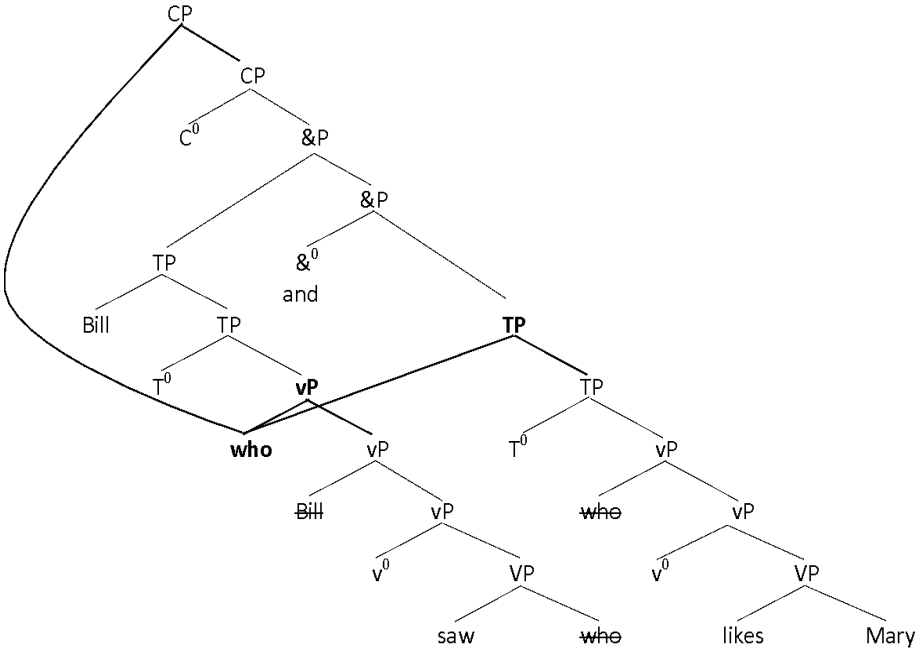


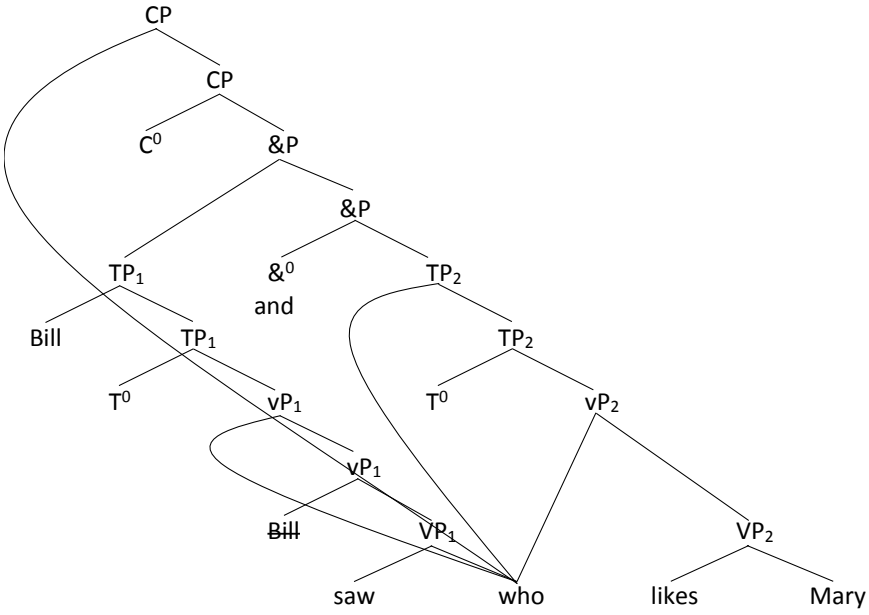
In the ungrammatical cases of ATB movement, the shared constituent occupies ***two different positions*** in the two conjuncts: complement of the verb in the first conjunct and [Spec, TP] in the second conjunct. Subsequent ATB movement would relate these two positions to a ***third position*** (i.e. [Spec, CP]), in violation of BiCoM.

(37) a. *I know a man ***who**$_i$* Bill saw t_i and t_i likes Mary.

b. *I know a man



c. *I know a man

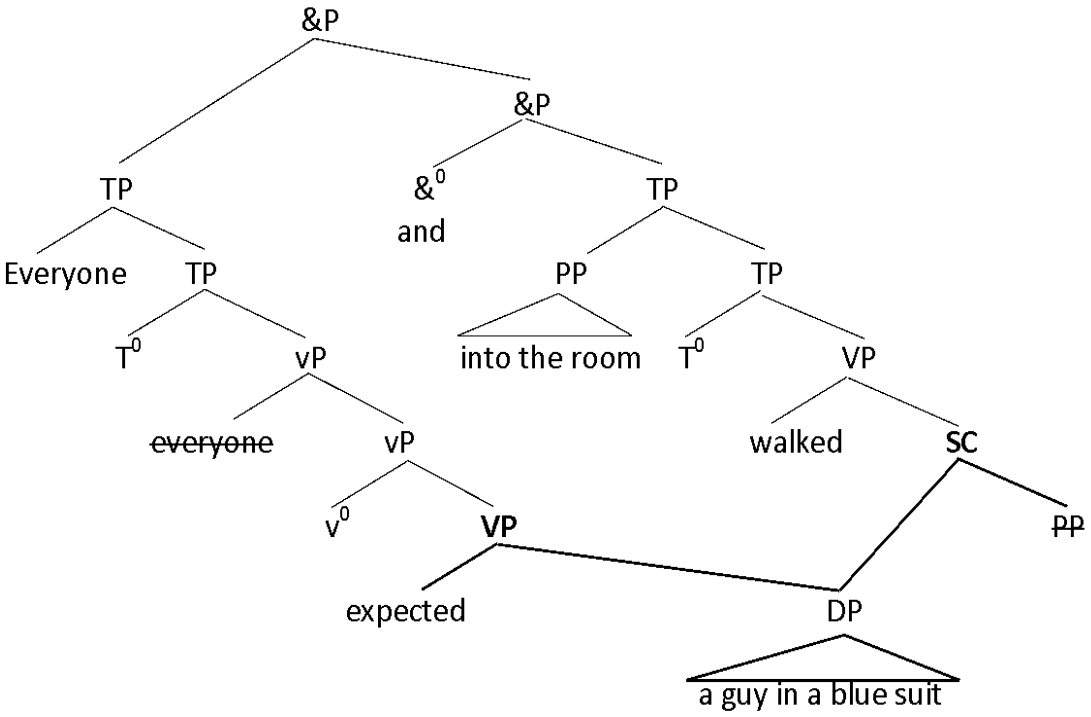


Note, however, that although in (37b-c), Merge targets only ***two objects*** (the wh-phrase and CP), it is disallowed by BiCoM because it relates ***three positions*** ([Spec, CP], [Spec, TP] and complement of V).

By contrast, RNR examples are well-formed because the shared element is part of *two independent derivations* and does not undergo further instances of Merge after the two are joined into one. Thus, Merge in this case never relates more than two positions *in a single derivation.*

(38) a. Everyone expected __, and into the room walked __, **a guy in a blue suit**.

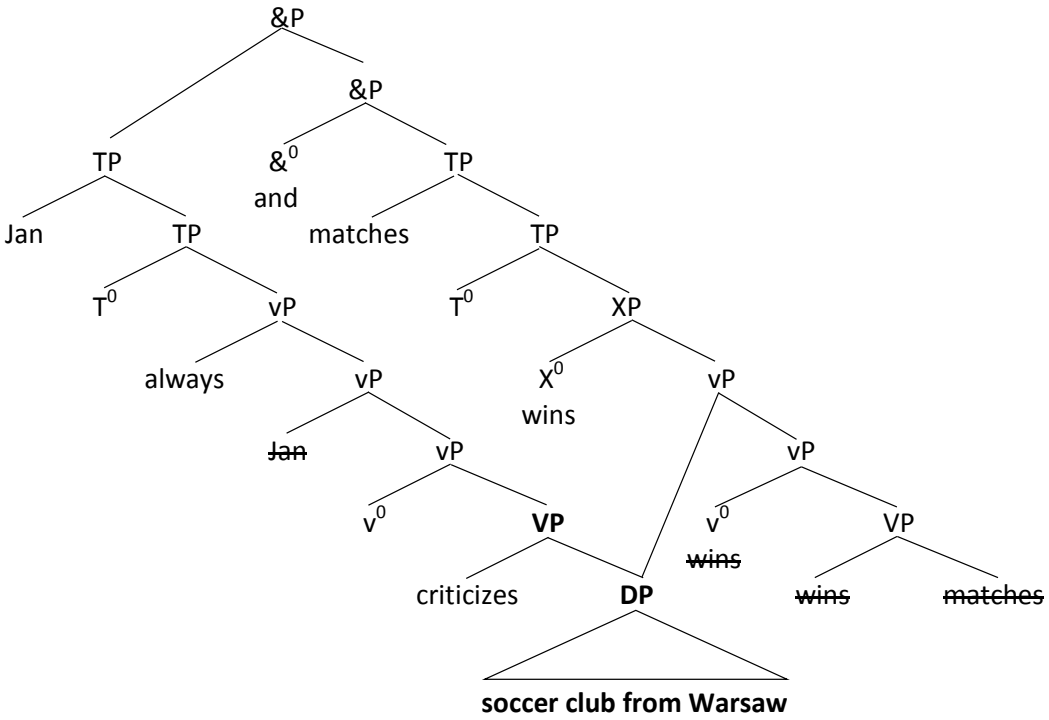
b.



(39) a. Jan zawsze krytykuje, a mecze i tak wygrywa, **klub piłkarski** *Pol*
Jan always criticizes and games still wins club.ACC/NOM soccer
z Warszawy.
from Warsaw
Lit. 'Jan always criticizes matches still wins the soccer club from Warsaw.'

b. Jan uvijek kritizira __, a turnire ipak osvaja __ , **nogometni klub** *Cro*
Jan always criticizes but tournaments still wins football team.ACC/NOM
iz Rijeke.
from Rijeka
Lit. 'Jan always criticizes but tournaments still wins the football team from Rijeka.'

c.

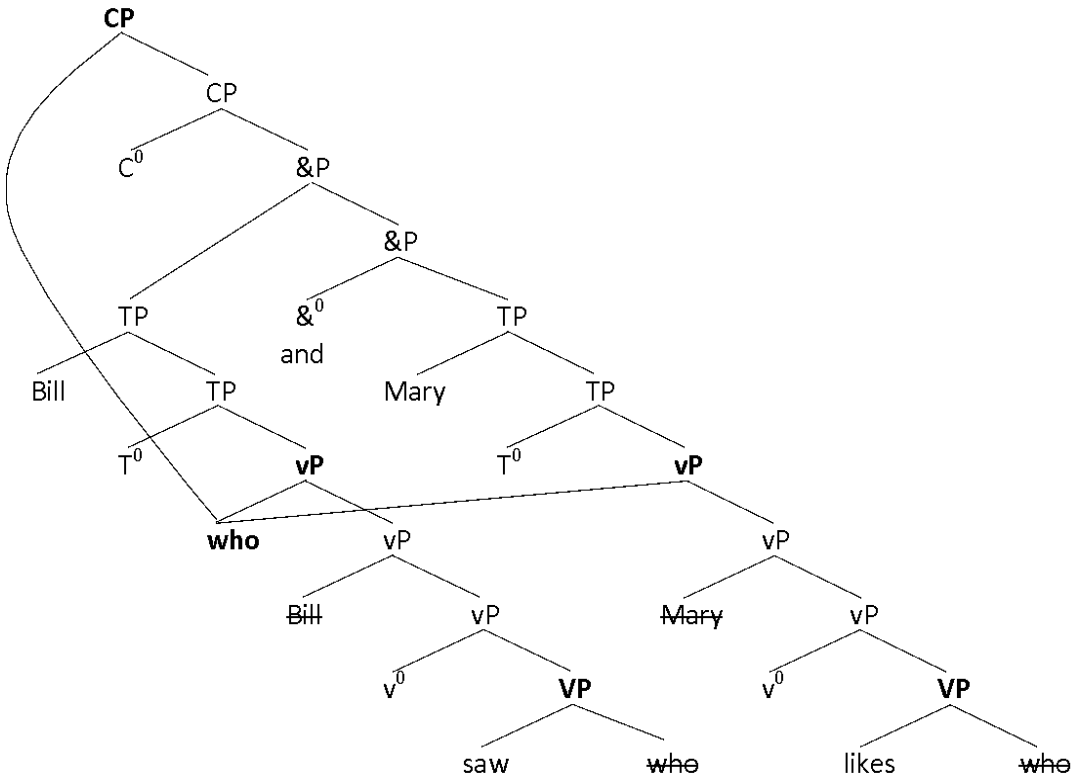


5. Grammatical ATB Movement and *Structural Syncretism*

BiCom excludes *all* cases of ATB extraction, but some such constructions are, of course, grammatical, as shown in (40). We propose that here, even though Merge also relates *three* positions in a single derivation ([Spec, *v*P] in the first conjunct, [Spec, *v*P] in the second conjunct, and [Spec CP]), two of these positions are both [Spec, *v*P]s and thus 'count' as one for purpose of further Merge operations. We refer to this situation as ***structural syncretism***.

(40) a. I know a man **who**$_i$ Bill saw t_i and Mary liked t_i.

b.



Syncretic forms ameliorate case conflict configurations in ATB questions and RNR (Asarina 2011, Borsley 1983, Citko 2005, 2011, Dyła 1984, Franks 1995, among many others):

(41) a. ***Co**$_i$ **/czego**$_i$ Jan lubi t_i a Maria się boi t_i? *Pol*
what.ACC/what.GEN Jan likes$_{ACC}$ and Maria REFL fears$_{GEN}$
'What does Jan like and Maria is afraid of?'

b. **Kogo**$_i$ Jan lubi t_i a Maria się boi t_i?
who.ACC/GEN Jan likes$_{ACC}$ and Maria REFL fears$_{GEN}$
'Who does Jan like and Maria is afraid of?'

(42) a. ***Što**$_i$ **/čega**$_i$ Jan voli t_i a Maria se boji t_i? *Cro*
what.ACC/what.GEN Jan likes$_{ACC}$ and Maria REFL fears$_{GEN}$
'What does Jan like and Maria is afraid of?'

b. **Koga**$_i$ Jan voli t_i a Maria se boji t_i?
who.ACC/GEN Jan likes$_{ACC}$ and Maria REFL fears$_{GEN}$
'Who does Jan like and Maria is afraid of?'

(43) a. Jan lubi __, a Maria się boi__, **dużego klauna**. *Pol*
Jan likes$_{\mathbf{ACC}}$ and Maria REFL fears$_{\mathbf{GEN}}$ big.ACC/GEN clown.ACC/GEN
'Jan likes and Maria fears this big clown.'

b. Jan voli__, a Petra se boji__, **velikog klauna.** *Cro*
Jan loves$_{\text{ACC}}$ and Petra REFL fears$_{\text{GEN}}$ big. ACC/GEN clown. ACC/GEN
'Jan loves and Petra is afraid of a/the big clown.'

Just like morphological syncretism can rescue an otherwise impossible ATB movement (i.e. movement of an element marked with two cases), structural syncretism can rescue an otherwise impossible movement from two positions.

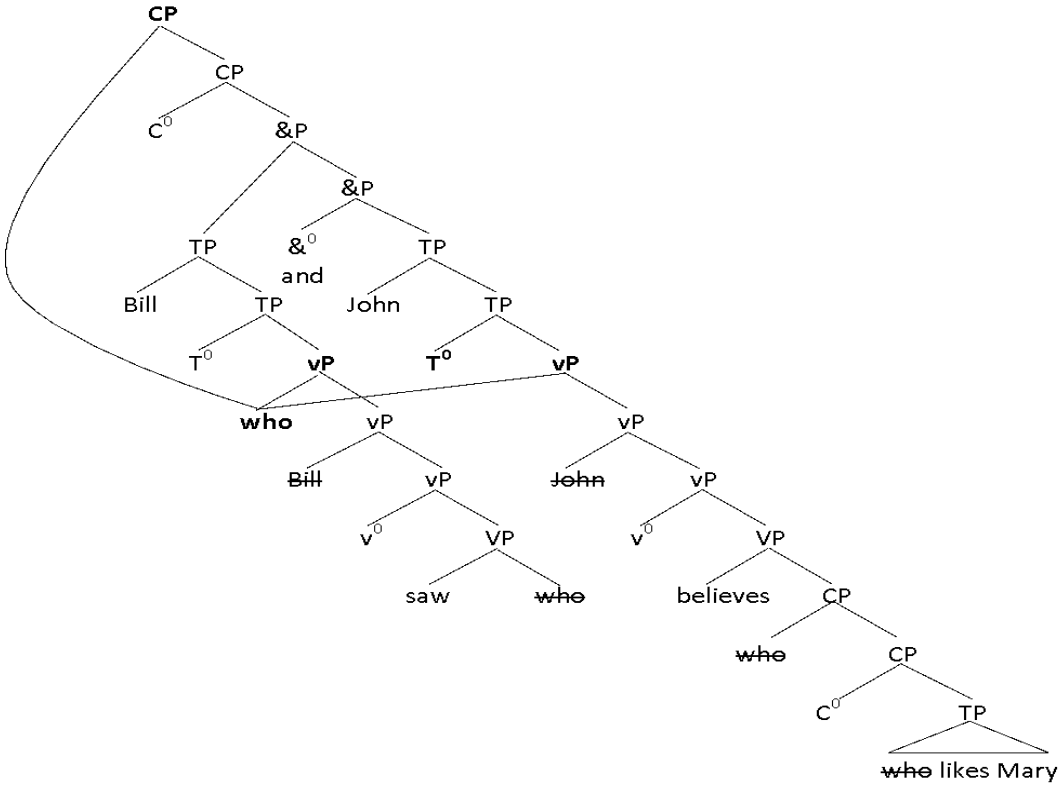
6. Consequences

As first noted by Williams (1978), non-parallel, ungrammatical ATB questions improve if the subject extraction site is further embedded.

(44) Tell me **who**$_{\mathbf{i}}$ Bill saw $\boldsymbol{t_i}$ and John believes $\boldsymbol{t_i}$ likes Mary.

On our analysis, in such cases, at the point in the derivation when C searches for the shared wh-phrase, this phrase occupies syncretic positions in both conjuncts [Spec, *v*P], obviating a BiCoM violation (as in Goodall 1987, Kasai 2004, Pesetsky 1982, among others):

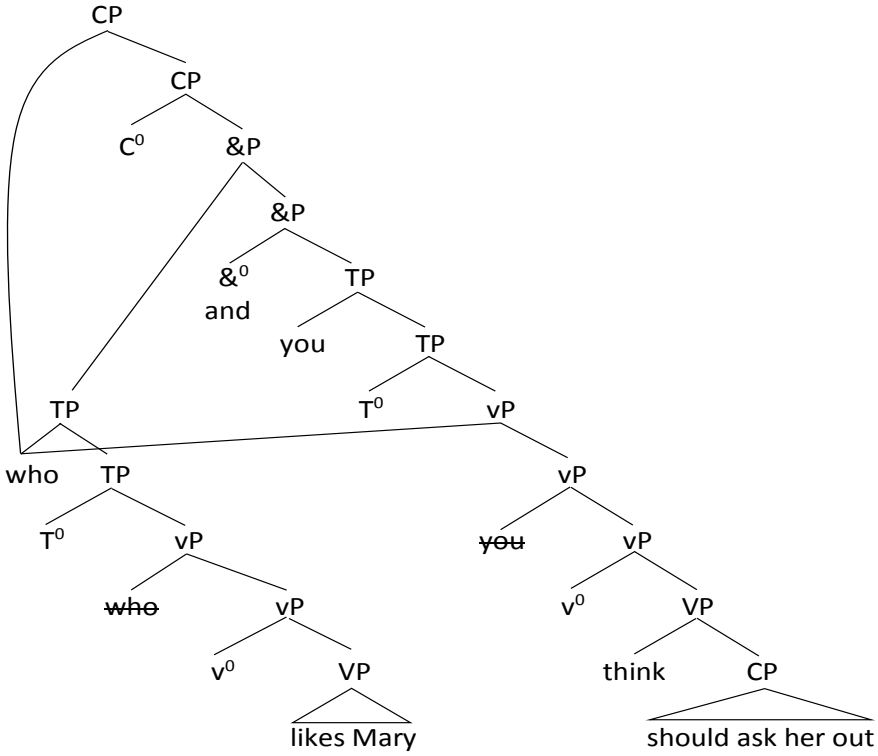
(45) Tell me



Our analysis also predicts that examples of ATB extraction in which the shared wh-phrase is a subject in both conjuncts, but is further embedded in one than in the other, should be ungrammatical due to a BiCoM violation.

(46) a. %Tell me **who**$_i$ t_i likes Mary and you think t_i should ask her out.[1]

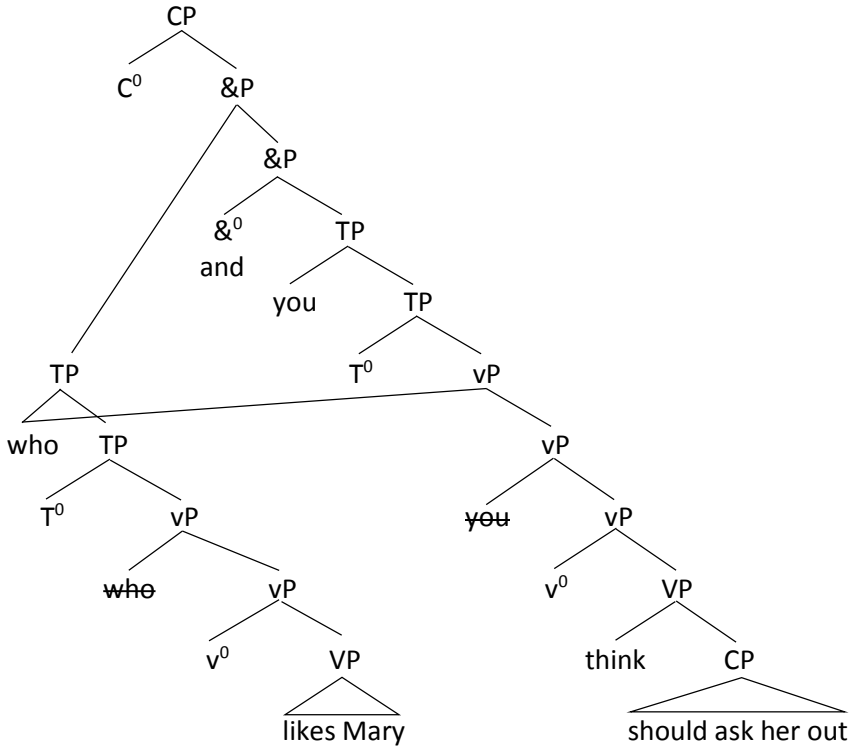
b. Tell me



To account for the fact that for some speakers (46a) is fine, we adopt the *Vacuous Movement Hypothesis* (following Agbayani 2006, Chomsky 1986, George 1980, Kasai 2004, among others), on which the matrix wh-subject remains in [Spec,TP], as shown in (47). This does not violate BiCoM since the shared wh-phrase never merges with CP; thus, Merge in this case never targets more than two positions in the same derivation.

[1] Sentences like this are marked as ungrammatical in George (1980), Pesetsky (1982) and Goodall (1987).

(47) Tell me



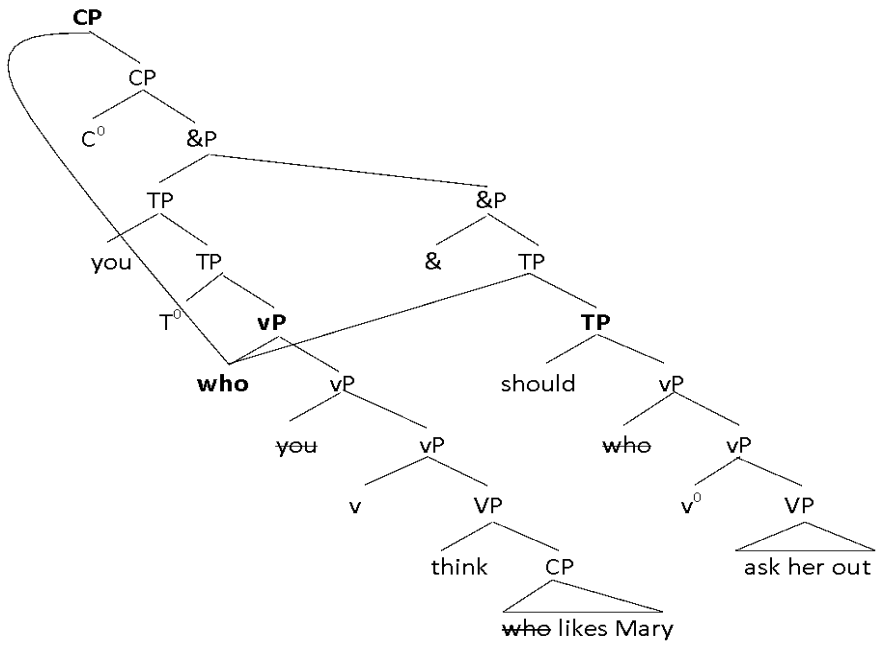
This predicts that if the two conjuncts are reversed, as in (48), the sentence should become ungrammatical, since the *Vacuous Movement Hypothesis* cannot rescue the derivation. However, this is not the case:

(48) Tell me **who**$_i$ you think t_i likes Mary and t_i should ask her out.

We propose that this is because BiCoM only excludes the representation of (48) shown in (49).

(49) a. *Tell me **who**$_i$ [$_{TP}$ you t_i think likes Mary] and [$_{TP}$ t_i should ask her out]

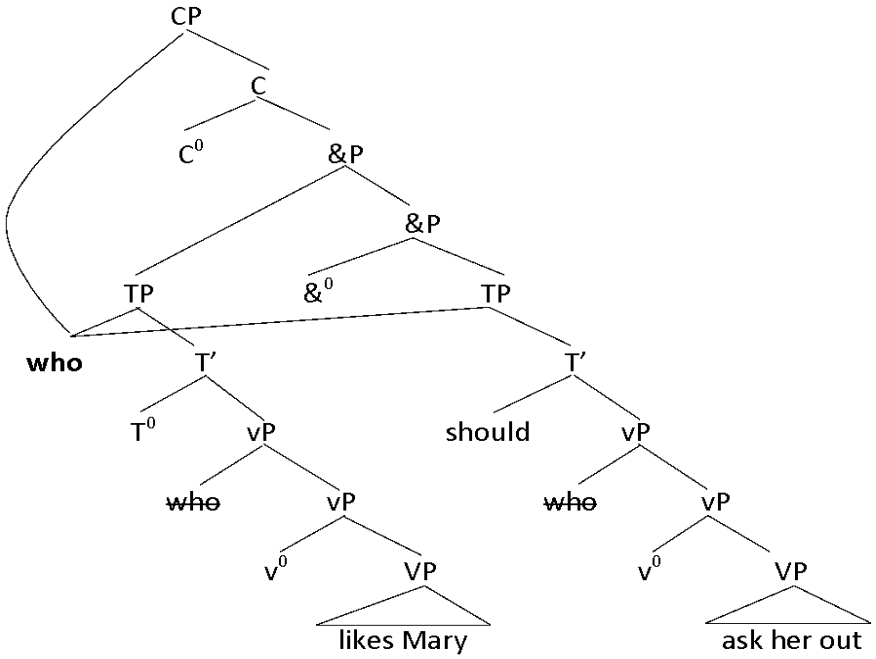
b.



However, (48) has an alternative structure, given in (50), where the shared wh-phrase occupies syncretic positions, [Spec TP], in the two conjuncts.

(50) a. Tell me **who**$_i$ you think [$_{TP}$ t_i likes Mary] and [$_{TP}$ t_i should ask her out]

b. Tell me who you think



Support for the structure in (50b) comes from the ungrammaticality of (51), which violates Principle C if *she* and *Mary* co-refer.

(51) *Tell me who$_j$ **she$_i$** thinks [t_j came to the party] and [t_j brought **Mary$_i$** a present].

The alternative structure, given in (52) does not violate Principle C (even on the coreferent reading) but violates BiCoM:

(52) *Tell me who$_j$ [**she$_i$** thinks t_j came to the party] and [t_j brought **Mary$_i$** a present].

7. Conclusions

Right Node Raising allows violations of the Parallelism Constraint and differs in this respect from ATB constructions.

We attribute the Parallelism Constraint in ATB constructions to the ***Binarity Constraint on Merge***, which prevents Merge from relating more than two positions in a single derivation.

Structurally syncretic positions are treated as one.

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bcitko@uw.edu
mgy@alum.mit.edu