

Extraction out of conjuncts is disallowed (the Coordinate Structure Constraint-CSC), as in (2), unless the moving element moves out of each conjunct (across-the-board-movement-ATB), as in (3).

- (1) Extraction out of conjuncts is disallowed.
- (2) \*Who<sub>i</sub> did you see [enemies of t<sub>i</sub>] and John?
- (3) Who<sub>i</sub> did you see [friends of t<sub>i</sub>] and [enemies of t<sub>i</sub>]?

Ross's (1967) original formulations of the CSC and the ATB exception.<sup>1</sup>

- (4) In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct (Ross 1967:98-99)
- (5) There is an important class of rules to which (4) does not apply. These are rule schemata which move a constituent out of all the conjuncts of a coordinate structure (Ross 1967:107)

An exception (Postal 1998, Zhang 2010; I will refer to such cases as distributed coordinations)

- (6) Which book<sub>i</sub> and which magazine<sub>j</sub> did [John buy t<sub>i</sub>] and [Bill read t<sub>j</sub>] respectively?

(6) violates the CSC ban and also does not fit the ATB pattern: it is not the case that the moving element is extracted out of each conjunct in (6). (6) seems to involve two separate extractions, of two different elements, out of the conjuncts. One may then expect (6) to be even worse than (2).

Postal (1998) argues that *which book* and *which magazine* indeed undergo separate extractions in (6) Binding into the individual conjuncts in (7): *which man* binds an anaphor in the first conjunct and *which woman* in the second conjunct.

- (7) [Which man]<sub>i</sub> and [which woman]<sub>j</sub> did respectively the doctor talk to t<sub>i</sub> about himself<sub>i</sub>, and the lawyer talk to t<sub>j</sub> about herself<sub>j</sub>; (Postal 1998:161)

In (8), the first wh-phrase licenses a parasitic gap in the first conjunct and the second wh-phrase in the second conjunct.

- (8) [Which secretary]<sub>1</sub> and [which programmer]<sub>2</sub> did Jerome respectively fire t<sub>1</sub> after finding t<sub>1</sub> drunk and hire t<sub>2</sub> after finding t<sub>2</sub> sober? (Postal 1998: 136)

In (9), the anaphor can be bound within the first conjunct or within the second conjunct.

- (9) a. ?[Which painting] and [which book about herself<sub>i</sub>] did John buy and Mary<sub>i</sub> sell respectively?  
b. ?[Which book about herself<sub>i</sub>] and [which painting] did Mary<sub>i</sub> buy and John sell respectively?

The IO in double object constructions cannot wh-move; this also holds in distributive coordinations.

- (10) a. \*Which nurse<sub>1</sub> did Ernest sell t<sub>1</sub> cocaine?

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<sup>1</sup>(4) also involves a ban on extraction of conjuncts, which has been shown to be an independent condition (Grosu 1973, Postal 1998, Stjepanović 2014, and Oda 2017).

- b. \*[Which nurse]<sub>1</sub> and [which hostess]<sub>2</sub> did Ernest sell t<sub>1</sub> cocaine and George sell t<sub>2</sub> heroin, respectively? (Postal 1998:135)

Distributed coordinations: separate extractions+coordination in the moved position

Not noted before: the ATB requirement still holds ((11)-(12) contrast with (13)).

- (11) \*Which book<sub>i</sub> and which magazine<sub>j</sub> did [John buy t<sub>i</sub>], [Bill read t<sub>j</sub>] and [Mary write a novel] respectively?  
 (12) \*Which book<sub>i</sub> and which magazine<sub>j</sub> did [Mary write a novel], [John buy t<sub>1</sub>] and [Bill read t<sub>2</sub>] respectively?  
 (13) Which book<sub>i</sub>, which magazine<sub>j</sub> and which novel<sub>k</sub> did [John buy t<sub>i</sub>], [Bill read t<sub>j</sub>] and [Mary borrow t<sub>k</sub>] respectively?

The ATB requirement needs to be reformulated: it is not the case that the moving element must move out of each conjunct; rather, movement must take place out of each conjunct. It can be the same element moving out of each conjunct, or different elements: as long as there is a gap in each conjunct the ATB requirement is satisfied. I will refer to such cases as non-ATB ATB.

The ATB requirement holds for distributed coordination constructions in the same way as with regular ATB constructions: There is an interpretative parallelism requirement on regular ATB, which is relaxed with cross-clausal ATB (see e.g. Franks 1993).

- (14) \*I wonder who<sub>i</sub> [t<sub>i</sub> left] and [Mary kissed t<sub>i</sub>]  
 (15) \*I wonder who<sub>i</sub> [John saw t<sub>i</sub>] and [t<sub>i</sub> kissed Mary]  
 (16) I wonder who<sub>i</sub> [John saw t<sub>i</sub>] and [Peter thinks t<sub>i</sub> kissed Mary]

The parallelism requirement in question also holds for non-ATB ATB.

- (17) [[Which nurse]<sub>i</sub> and [which hostess]<sub>j</sub>] t<sub>i</sub> dated Fred and t<sub>j</sub> married Bob respectively?  
 (18) [[Which nurse]<sub>i</sub> and [which hostess]<sub>j</sub>] did Fred date t<sub>i</sub> and Bob marry t<sub>j</sub>, respectively?  
 (19) \*[[Which nurse]<sub>i</sub> and [which hostess]<sub>j</sub>] did Fred date t<sub>i</sub> and t<sub>j</sub> marry Bob, respectively?  
 (20) Which writer<sub>i</sub> and which actor<sub>j</sub> does John adore t<sub>i</sub> and Peter claim t<sub>j</sub> will succeed in Hollywood respectively.

The ATB requirement holds in the same way in distributed coordination constructions as with regular ATB constructions, which further indicates that the former are a type of ATB constructions although they don't involve extraction of the same element.

### AP ATB in Serbo-Croatian

SC allows left-branch extraction of adjectives. It also allows it in distributive coordinations.

- (21) Crvene i bijele ona suknje i kapute prodaje.  
 red and white she skirts and coats is-selling  
 'She is selling red skirts and white coats.'  
 (22) Crvena i bijela meni suknja i haljina smetaju.  
 red and white me<sub>DAT</sub> skirt and dress bother  
 'The red skirt and the white dress bother me.'

It is also possible to have three adjectives, as in (23), with the relevant traces indicated in (24).

- (23) ?Crvena, bijeli i šareni meni suknja, kaput i šešir smetaju.  
 red white and colorful me<sub>DAT</sub> skirt coat and hat bother
- (24) Crvena<sub>i</sub>, bijeli<sub>j</sub> i šareni<sub>k</sub> meni [t<sub>i</sub> suknja], [t<sub>j</sub> kaput] i [t<sub>k</sub> šešir] smetaju.  
 red white and colorful me<sub>DAT</sub> skirt coat and hat bother

As with English non-ATB ATB, the ATB requirement is operative here. (25), where ATB does not take place out of the last conjunct, is unacceptable.

- (25) \*Crvena<sub>i</sub> i bijeli<sub>j</sub> meni [t<sub>i</sub> suknja], [t<sub>j</sub> kaput] i [šareni šešir] smetaju.  
 red and white me<sub>DAT</sub> skirt coat and colorful hat bother

We are dealing with actual extraction in these cases, as shown by their island-sensitivity.

- (26) \*Crvena, bijeli<sub>j</sub> i šareni<sub>k</sub> je otišao [zato što mene [t<sub>i</sub> suknja], [t<sub>j</sub> kaput] i [t<sub>k</sub> šešir] iritiraju].  
 red white and colorful is left because me skirt coat and hat irritate  
 ‘He left because the red skirt, white coat, and colorful hat irritate me.’

The same holds for English

- (27) \*[[How loudly] and [how softly]] didn’t you say [[that John had spoken t] and [that Peter had replied t]]?  
 (de Vos and Vicente 2005)

There are only two fronted APs in (28), with three Ns in the lower coordination. Yet, (28) is acceptable

- (28) Crvena i bijeli meni suknja, kaput i šešir smetaju.  
 red and white me<sub>DAT</sub> skirt coat and hat bother

Mixing non-ATB ATB and traditional ATB: (28) is acceptable only on a particular meaning: ‘red skirt, white coat, and white hat’, where a traditional ATB dependency is formed between ‘white coat’ and ‘white hat’ with respect to ‘white’ (‘coat’ and ‘hat’ are masculine, the adjective that modifies them is also masculine; ‘red’ and ‘skirt’ are feminine).

- (29) Crvena<sub>i</sub> i bijeli<sub>j</sub> meni [t<sub>i</sub> suknja], [t<sub>j</sub> kaput] i [t<sub>j</sub> šešir] smetaju.  
 red and white me<sub>DAT</sub> skirt coat and hat bother

The ATB requirement is then still satisfied in (28): (28) is in fact acceptable only on the reading on which there is an AP-gap in the base position of each of the conjuncts in (28).

Another example: (30) involves regular ATB between ‘red skirt’ and ‘red shirt’ (‘shirt’ is feminine).

- (30) Crvena<sub>i</sub> i bijeli<sub>j</sub> meni [t<sub>i</sub> suknja], [t<sub>i</sub> košulja] i [t<sub>j</sub> kaput] smetaju.  
 red and white me<sub>DAT</sub> skirt, shirt and coat bother

Mixing non-ATB ATB and regular ATB is also possible in English.

- (31) ?How many cakes and how many letters did Mary bake, John write, and Peter mail respectively?  
 (32) ?How many cakes and how many letters respectively did Mary bake, John write, and Peter mail?  
 (33) ?Which magazine and which book did Peter buy, John read, and Mary borrow respectively?  
 (34) ?Which magazine and which book respectively did Peter buy, John read, and Mary borrow?

In contrast to (28) and (30), (35) is unacceptable.

(35) \*Bijeli<sub>i</sub> i crvena<sub>j</sub> meni [t<sub>i</sub> kaput], [t<sub>j</sub> suknja] i [t<sub>i</sub> šešir] smetaju.  
white and red me<sub>DAT</sub> coat skirt and hat bother

Traditional ATB can only be formed between contiguous NPs: There can be no ATB between ‘red skirt’ and ‘red hat’ since the nouns have different gender (‘skirt’ is feminine, ‘hat’ masculine). There can be no ATB between ‘white coat’ and ‘white skirt’ (‘coat’ is masculine, ‘skirt’ feminine). There also can’t be ATB between ‘white coat’ and ‘white hat’ although there is no gender disagreement issue here.

The effect is also found in English: (36), where given the pragmatics of the example regular ATB has to hold between the first and the third conjunct, skipping the second conjunct, is worse than (32)-(34).

(36) \*How many letters<sub>i</sub> and how many cakes<sub>j</sub> did Peter write t<sub>i</sub>, John bake t<sub>j</sub>, and Mary address t<sub>i</sub> respectively?

We may have here a locality effect on ATB, where it is not possible to skip a potential ATB site (sort of Maximize ATB, on a par with Max Elide, see Citko 2003 for a Max ATB-style proposal).

Alternatively, this may be related to a general interpretive effect with distributed coordinations.

(6) is not ambiguous: the first trace must correspond to the first wh-phrase and the second trace to the second wh-phrase. Only a crossing wh-trace dependency is possible here, a nesting dependency, which would give an interpretation where the first trace corresponds to the second wh-phrase, is disallowed.

(37): the indices indicate the only possibility for the interpretation of the conjuncts.

(37) Which book<sub>i</sub>, which magazine<sub>j</sub>, and which painting<sub>k</sub> respectively did [John buy t<sub>i</sub>], [Bill read t<sub>j</sub>], and [Mary sell t<sub>k</sub>]?

The same holds for SC: (38) gives the only possibility for the interpretation of the extracted adjectives.

(38) Crveni<sub>i</sub>, bijeli<sub>j</sub> i šareni<sub>k</sub> meni [t<sub>i</sub> sako], [t<sub>j</sub> kaput] i [t<sub>k</sub> šešir] smetaju.  
red white and colorful me<sub>DAT</sub> jacket coat and hat bother  
‘The red jacket, white coat, and colorful hat bother me.’

Distributed coordinations require crossing dependencies. In unacceptable (35), which mixes non-ATB ATB and regular ATB, gender specification of the adjectives forces the dependencies shown in (39).

(39) \*Bijeli<sub>i</sub> i crvena<sub>j</sub> meni [t<sub>i</sub> kaput], [t<sub>j</sub> suknja] i [t<sub>i</sub> šešir] smetaju.  
white and red me<sub>DAT</sub> coat skirt and hat bother

(39) is ruled out by the general crossing dependencies requirement on distributed coordinations.

**Some potentially interfering issues:** Citko and Gračanin-Yukseš (2013) show (40) can involve either coordinated wh-phrases or coordinated clauses, with ellipsis taking place in the first conjunct.

(40) Ko i šta kupuje?  
who and what is-buying  
‘Who is buying what?’

Evidence for the possibility of a clausal structure: clitic *je* follows the first as well as the second wh-phrase, which indicates the conjuncts are actually clauses in (41).

- (41) Ko je i šta je kupio?  
who is and what is bought  
'Who bought what?'

The impossibility of the clitic following the first conjunct in (41) indicates we are not dealing here with a larger clausal coordination (+ellipsis). It is really APs that are coordinated (in the moved position).<sup>2</sup>

- (42) \*Crvene su i bijele su meni suknje i haljine smetale.  
red are and white are me<sub>DAT</sub> skirts and dresses bothered  
'The red skirts and the white dresses bothered me.'

SC clitics are second position clitics; as such they are used as a constituenthood test. Clitic placement in (42) confirms that *crvene i bijele* is a single constituent, which is the case under the coordination-in-the-moved position analysis.

- (43) Crvene i bijele su meni suknje i haljine smetale.  
red and white are me<sub>DAT</sub> skirts and dresses bothered  
'The red skirts and the white dresses bothered me.'

Multiple left-branch extraction (LBE) in SC (Bošković 2016).<sup>3</sup>

- (44) Onu<sub>i</sub> staru<sub>j</sub> prodaje t<sub>i</sub> t<sub>j</sub> kuću.  
that old sells house  
'He is selling that old house.'  
(45) \*Prodaje onu i staru kuću.  
sells that and old house  
(46) \*[Onu i staru]<sub>i</sub> prodaje [t<sub>i</sub> kuću].  
that and old sells house

(44): multiple LBE of the demonstrative and the adjective is possible. These elements cannot be coordinated within a single NP in situ (45); they also cannot undergo LBE as a coordination (46).

Non-ATB ATB left-branch extraction also involves multiple LBE, but it is not possible in (47).

- (47) \*Oni<sub>i</sub> i bijele<sub>j</sub> meni [t<sub>i</sub> kaputi] i [t<sub>j</sub> haljine] smetaju.  
those and white me<sub>DAT</sub> coats and dresses bother  
'Those coats and white dresses bother me.'

The demonstrative and the adjective can undergo LBE; in fact they can be involved in multiple LBE (44). However, they cannot be coordinated, hence cannot undergo LBE as a coordination (45)-(46).

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<sup>2</sup>It is also unclear how the interpretation would work on the clausal ellipsis analysis, given that 'white' modifies only the second conjunct (i.e. "dress") in (22).

<sup>3</sup>On the relevant reading, *onu* is not a separate nominal in (45)-(46) (demonstratives can be separate nominals, as in *I like this*) but modifies *kuću*, just like *staru* (there is only one nominal on this reading, 'that old house').

(47) shows that the elements that undergo non-ATB ATB are indeed involved in a coordination with each other: (47) is ruled out on a par with (45) because *oni* and *bijele* cannot be coordinated.

The demonstrative and the adjective cannot be involved in a coordination in their base position in (47), in contrast to (45), where the demonstrative and the adjective are coordinated in their base position (the relevant interpretation of (47) is those coats and white dresses), the demonstrative and the adjective do not modify the same noun in (47), in contrast to (45)).

The coordination in (47) can only take place after movement, since the relevant elements are not coordinated in their base-position. The individual movements themselves also must be possible in (47), given that such multiple left-branch extraction is in principle possible (44).

(47) is ruled out due to illicit coordination, where the coordination takes place after movement.

Additional evidence that non-ATB ATB examples involving left-branch extraction do not involve a larger coordination with ellipsis in the first conjunct: under this analysis we would not be able to appeal to the impossibility of coordination of a demonstrative and an adjective, i.e. (45), since this is not what would be coordinated in (47) under that analysis.

NP ellipsis that strands demonstratives and adjectives is possible in SC (Bošković 2013b). (47) provides evidence not only against clausal ellipsis, but also against the NP ellipsis analysis.

Also, a clitic (*mu*) can intervene between the demonstrative and the AP in (44), as shown by (48). Recall that this is not possible with non-ATB ATB constructions, as shown by (42).

(48) ?Onu<sub>i</sub> mu        staru<sub>i</sub> prodaje t<sub>i</sub> t<sub>j</sub> kuću.  
      that him<sub>DAT</sub> old    sells        house  
      ‘He is selling that old house to him.’

All this confirms the coordination in the moved position analysis of (22)/(42). Elements undergoing multiple LBE need not move to the same position, hence a clitic can intervene between them (48).

Elements involved in non-ATB ATB (as in (42)) are located in the same position, in fact non-ATB ATB involves a coordinated phrase, hence a clitic cannot intervene between the relevant elements.

**Conclusion:** Coordination formation should not be restricted to base-generation (i.e. lexical insertion/external merge), i.e. it should not be restricted in such a way that it can only occur pre-movement.

### Japanese numeral constructions

Japanese floating quantifier constructions provide another case of non-ATB ATB extraction.

(49) John-ga    [VP [PP yaoya-kara]                    [mikan-o    3-ko]-to [banana-o    5-hon] katta.  
      John-NOM            vegetable.store-from orange-ACC 3-CL and banana-ACC 5-CL    bought  
      ‘John bought [3 oranges and 5 bananas] from a vegetable store.’

It’s possible to extract the NPs from the conjuncts, with coordination recreated in a higher position.

(50) John-ga [mikan-to banana]-o yaoya-kara                    (sorezore) [3-ko]-to [5-hon] katta.  
      John-NOM orange and banana-ACC vegetable.store-from respectively 3-CL and 5-CL bought

The ATB requirement is also imposed here: compare (53), where extraction takes place from each conjunct, and (52), where this is not the case (extraction does not take place from the last conjunct).

- (51) John-ga yaoya-kara [mikan-o 3-ko]-to [banana-o 5-hon]-to [budou-o 2-fusa] katta.  
 John-NOM vegetablestore-from orange-ACC 3-CL and banana-ACC 5-CL and grape-ACC 2-CL bought  
 ‘John bought 3 oranges, 5 bananas and 2 bunches of grapes from a vegetable store.’
- (52) ?\*John-ga [mikan-to banana]-o yaoya-kara (sorezore) [3-ko] to [5-hon] to  
 John-NOM orange and banana-ACC vegetable.store-from respectively 3-CL and 5-CL and  
 [budou-o 2-fusa] katta.  
 grape-ACC 2-CL bought
- (53) John-ga [mikan-to banana-to budou]-o yaoya-kara (sorezore) [3-ko] to [5-hon] to  
 John-NOM orange and banana and grape-ACC vegetable.store-from respectively 3-CL and 5-CL and  
 [2-fusa] katta.  
 2-CL bought

This kind of non-ATB ATB is possible without the coordinator *to* in the higher position. In such cases another coordinator, *sosite*, appears in the higher position.

- (54) John-ga [mikan-o<sub>i</sub> sosite banana-o<sub>j</sub>] yaoya-kara (sorezore) [t<sub>i</sub> 3-ko]-to [t<sub>j</sub> 5-hon] katta.  
 John-NOM orange-ACC and banana-ACC vegetablestore-from respectively 3-CL and 5-CL bought

The ATB requirement is again imposed here. (56), where extraction takes place from each conjunct, is better than (55), where extraction takes place from the first and the second, but not the third conjunct.

- (55) ?\*John-ga [mikan-o<sub>i</sub> sosite banana-o<sub>j</sub>] yaoya-kara (sorezore)  
 John-NOM orange-ACC and banana-ACC vegetable.store-from respectively  
 [t<sub>i</sub> 3-ko] to [t<sub>j</sub> 5-hon] to [budou-o 2-fusa] katta.  
 3-CL and 5-CL and grape-ACC 2-CL bought
- (56) John-ga [mikan-o<sub>i</sub> sosite banana-o<sub>j</sub> sosite budou-o<sub>k</sub>] yaoya-kara  
 John-NOM orange-ACC and banana-ACC and grape-ACC vegetable.store-from  
 (sorezore) [t<sub>i</sub> 3-ko] to [t<sub>j</sub> 5-hon] to [t<sub>k</sub> 2-fusa] katta.  
 respectively 3-CL and 5-CL and 2-CL bought

Island sensitivity

- (57) ?\*mikan-o sosite banana-o Mary-wa [John-ga yaoya-kara (sorezore) 3-ko-to 2-hon  
 orange-ACC and banana-ACC Mary-TOP John-NOM vegetable.store-from respectively 3-CL and 2-CL  
 katta-kara] okotta.  
 bought-because got.angry  
 ‘Mary got angry because John bought 3 oranges and 2 bananas from a vegetable store.’
- (58) ?\*mikan-to banana-o Mary-wa [John-ga yaoya-kara (sorezore) 3-ko-to 2-hon  
 orange and banana-ACC Mary-TOP John-NOM vegetable.store-from respectively 3-CL and 2-CL  
 katta-kara] okotta  
 bought-because got.angry

### A restriction on non-ATB ATB

The above cases of non-ATB ATB all involve coordination formation in the moved position. Non-ATB ATB is in fact not possible without coordination formation in the moved position.

(59)\*Which president do you wonder which famous writer John reads [articles about t] and [essays by t] respectively?

(59) involves extraction of different elements from a single coordination without coordination in the higher position. In English this requires moving wh-phrases to different CPs, but (59) is much worse than wh-island violations.

In (59), the wh-phrases moving from the coordination are interpreted in different CPs. The potentially interfering factor can be controlled for in SC due to multiple wh-fronting. (60), involving non-ATB ATB without coordination, is unacceptable (regardless of clitic placement). (61), its counterpart involving coordination in the higher position, is clearly better than (60).

(60) \*Prema kome<sub>i</sub> za kim su podržali [otpor t<sub>i</sub>] i [potragu t<sub>j</sub>]?  
to whom for whom are supported resistance and pursuit

(61) Prema kome<sub>i</sub> i za kim su podržali [otpor t<sub>i</sub>] i [potragu t<sub>j</sub>]?  
to whom and for whom are supported resistance and pursuit  
'Resistance to whom and pursuit of who did they support?'

The AP non-ATB ATB constructions also require coordination formation in the moved position, as shown by the contrast in (62), where (62a) involves coordination formation in the moved position and (62b) does not, as well as the contrast in (63), involving wh-counterparts of constructions like (62a-b).

(62) a. Crvenu<sub>i</sub> i bijelu<sub>j</sub> je kupio [[t<sub>i</sub> suknju] i [t<sub>j</sub> haljinu]].  
red and white is bought skirt and dress  
'He bought a red skirt and a white dress.'

b. \*Crvenu bijelu je kupio suknju i haljinu.

(63) a. Kakvu<sub>i</sub> i čiju je ukrao [[t<sub>i</sub> suknju] i [t<sub>j</sub> haljinu]]?  
what-kind-of and whose is stolen skirt and dress  
'He stole what kind of a dress and whose skirt.'

b. \*Kakvu čiju je ukrao suknju i haljinu?

**Conclusion:** non-ATB ATB requires coordination formation in the moved position, i.e. the elements undergoing non-ATB ATB must participate in a coordination in their final position.

(64) is unacceptable although it involves extraction from each conjunct.

In contrast to (13), which involves wh-movement out of each conjunct, (64) involves wh-movement out of the second and third, and head-movement out of the first conjunct.

(64) \*[Which book<sub>i</sub> and which magazine<sub>j</sub>] did<sub>k</sub> [Mary t<sub>k</sub> write a book], [John buy t<sub>i</sub>], and [Bill read t<sub>j</sub>] respectively.

Since the ATB requirement simply requires that there is movement out of each conjunct, there is no violation of the ATB requirement here.

(64) is accounted for independently: elements that are extracted out of conjuncts of a single ConjP must participate in a coordination in the higher position, which is not the case with *did* in (64).

Distributed coordination is allowed with A-movement.

(65) The dogs and the roosters barked and crowed all night.

(Zhang 2010:170)

Distributed coordinations involving head-movement are quite generally disallowed (66).

(66) \*Will<sub>i</sub>, can<sub>j</sub>, and must<sub>k</sub> [John t<sub>i</sub> buy a book], [Peter t<sub>j</sub> sell a magazine], and [Mary t<sub>k</sub> borrow a novel] respectively.

Kayne (1994): head coordination is quite generally disallowed.

If distributed extractions require that extracted elements be coordinated and if head coordination is disallowed it follows that distributed coordinations with head-movement will be disallowed.

The impossibility of distributed extraction involving head-movement is another argument for the coordination-in-the-moved position restriction on non-ATB ATB.

### When is late coordination formed?

Zhang (2010): higher ConjP is formed through sideward movement/merger (see Nunes 2004).

Derivation of (6) is given in (67): the *wh*-phrases undergo sideward merger into ConjP (see (67b); *which book* is merged with *which magazine*, forming a ConjP, in a separate derivational space); this ConjP is introduced into the structure directly in its final position, the interrogative SpecCP (see (67c)).

- (67) a. [bought which book]                      b. [read which magazine]  
      b. [ConjP [which book] and [which magazine]]  
      c. [CP [ConjP [which book] and [which magazine]] did John buy [~~which book~~] and Peter read [~~which magazine~~]]

Problem: islandhood (under Zhang's analysis, the *wh*-phrases do not move out of the island)

(68) \*[[How loudly] and [how softly]] didn't you say [[that John had spoken t] and [that Peter had replied t]]?

Another problem: intermediate reconstruction effects, as in (69), where Condition A cannot be satisfied in either the final or the original (i.e.  $\theta$ ) position of *which picture of himself*. (Under Zhang's analysis, only at these points are both *John* and *which picture of himself* present in the structure.)

(69) Which book and which picture of himself<sub>i</sub> did John<sub>i</sub> say that Mary bought and Sue sold respectively?

Parasitic gap constructions also raise an issue for Zhang's analysis.

(70) [CP[ConjP [Which secretary]<sub>1</sub> and [which programmer]<sub>2</sub>] did Jerome respectively fire t<sub>1</sub> after finding t<sub>1</sub> drunk and hire t<sub>2</sub> after finding t<sub>2</sub> sober]? (Postal 1998: 136)

The *wh*-phrases license parasitic gaps within their initial conjuncts.

A *wh*-phrase phrase in situ cannot license a parasitic gap: a parasitic gap is licensed by a moved *wh*-phrase that c-commands the parasitic gap.

Under Zhang's analysis, there is never a c-command relationship between the moved *wh*-phrases and the parasitic gaps which they license in (70).

Some regular movement must be involved in the derivation of distributed extraction coordinations.

The late-formed ConjP can still be formed through sideward merger as long as it is introduced into the structure earlier, in which case the late-formed ConjP would be moving out of the island in (68), and the movement would bring the anaphor close enough to *John* in (69) to satisfy Condition.

How close to the original ConjP is the late-formed (i.e. derivationally-formed) ConjP introduced?

(71): what is present in the  $\theta$ -position of the relevant conjuncts (given the predicate-internal subject hypothesis) is not the *you and me* ConjP: only *you* is present in the  $\theta$ -position of the first conjunct and only *me* is present in the  $\theta$ -position of the second conjunct, given that each conjunct agrees separately in (71), in contrast to (72) (this confirms elements involved in distributed extraction coordination start the derivation separately).

(71) He wants you and me to respectively go out of your mind and (go) out of my mind.

(72) cf. You and I are going out of our/\*my/\*your mind(s). (Postal 1998:161)

In (71) the conjuncts trigger agreement separately. In (73), they trigger it jointly.

(73) A dog and a rooster were barking and crowing all night.

(74) cf. \*A dog and a rooster was barking and crowing all night.

Late coordination must be formed, and inserted into the structure, before subject-verb agreement is determined here (so below T, given that T probes the subject for agreement).

(75): lower coordination must be on a higher level than in (73)—it cannot be a vP&vP coordination given that the auxiliary is present inside each conjunct (so there are two Ts in (75) and one T in (73)).

(75) John and Mary were hunting lions and were frightened by snakes respectively (Dougherty 1970)

Discrepancy between agreement and interpretation within the conjuncts: what is interpreted in the  $\theta$ -position of the first conjunct is *John*, and what is interpreted in the  $\theta$ -position of the second conjunct is *Mary* (the interpretation is ‘John was hunting lions’ and ‘Mary was frightened by snakes’). But the agreement within the conjuncts is with *John and Mary*.

There are two auxiliaries, hence two Ts, in (75); the late-formed ConjP must be inserted inside each conjunct so that the auxiliary, i.e. T, agrees with the late-formed ConjP within each conjunct.

The late-formed ConjP (*John and Mary*) then undergoes regular ATB out of the conjuncts.

The final and crucial ingredient before the actual derivation can be determined

The relevant elements must be undergoing movement themselves, prior to late coordination formation: There is a not-directly-from-the-interpreted-position restriction on derivational ConjP formation.

Only mobile elements can participate in ATB non-ATB constructions. While non-ATB ATB involving LBE is possible in SC, it is not possible in English (76a), which disallows LBE (76b).<sup>4</sup>

(76) a. \*Red, Mary bought dresses

b. \*Red and blue, Mary bought houses and dresses.

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<sup>4</sup> Slovenian speakers generally disallow regular adjectival LBE and they also disallow it with distributed extraction coordinations of the kind discussed for SC here.

In contrast to prepositional double objects (77c), the IO in DP DP double object constructions cannot undergo wh-movement (77d). It also cannot participate in distributive extraction coordinations (77b).

- (77) a. [Which nurse]<sub>1</sub> and [which hostess]<sub>2</sub> did Ernest sell cocaine to t<sub>1</sub>, and George sell heroin to t<sub>2</sub>, respectively?  
b. \*[Which nurse]<sub>1</sub> and [which hostess]<sub>2</sub> did Ernest sell t<sub>1</sub> cocaine and George sell t<sub>2</sub> heroin, respectively? (Postal 1998:135)  
c. cf. Which nurse<sub>1</sub> did Ernest sell cocaine to t<sub>1</sub>  
d. \*Which nurse<sub>1</sub> did Ernest sell t<sub>1</sub> cocaine?

There are prepositions in English which disallow stranding:

- (78) a. Jerome tickled Marsha in that way.  
b. \*What way did Jerome tickle Marsha in?  
c. cf. In what way did Jerome tickle Marsha?  
d. Ernie did it for someone else's sake.  
e. \*Whose sake did Ernie do that for?  
d. For whose sake did Ernie do that? (Postal 1998:127)

The same effect obtains with the distributive extraction coordination in (79).

(79) \*What way<sub>i</sub> and whose sake<sub>j</sub> did Jerome tickle Marsha in t<sub>i</sub> and Peter hugged Mary for t<sub>j</sub> respectively?

(80) cf. In what way<sub>i</sub> and for whose sake<sub>j</sub> did Jerome tickle Marsha t<sub>i</sub> and Peter hugged Mary t<sub>j</sub> respectively

Sideward movement/merger was originally employed by Nunes to get around islandhood/locality effects: sideward movement/merger out of a context that would induce a locality/islandhood effect voids that effect. Whatever locality/islandhood effect is involved in (76), (77b), and (78) (see, respectively, Bošković 2013a and Corver 1992, Douglas 2016 and Hornstein and Weinberg 1981, and Hornstein and Weinberg 1981 and Postal 1998), sideward merger should be voiding it.

The relevant elements must be undergoing regular movement before sideward merger into another ConjP.

Similar to traditional ATB constructions: with traditional ATB there cannot be an island boundary between the edge of the second conjunct and the original extraction site within that conjunct, which means that even with traditional ATB there must be regular movement prior to sideward movement.

The parasitic gap construction also requires this movement.

(81) [Which secretary]<sub>1</sub> and [which programmer]<sub>2</sub> did Jerome respectively fire t<sub>1</sub> after finding t<sub>1</sub> drunk and hire t<sub>2</sub> after finding t<sub>2</sub> sober? (Postal 1998: 136)

A parasitic gap is licensed by a moved wh-phrase that c-commands the parasitic gap. In accounts like Nissenbaum (2000) and Nunes (2004) it is not necessary for the wh-phrase to move to SpecCP to license a parasitic gap; movement to a lower position can do it.

Nissenbaum (2000): the wh-adjuncts in (81) are adjoined to their vPs and the wh-phrases crucially need to move to adjoin to these vPs to license the parasitic gaps.

The wh-phrases need to undergo regular movement to license parasitic gaps within their conjuncts before undergoing sideward merger into ConjP in (81)—immediate sideward movement, as in Zhang’s analysis, would not be sufficient for parasitic gap licensing.

The SC construction under consideration can help us determine the timing of the relevant operations (regular and sideward movement) involved in the derivation of non-ATB ATB constructions since with left-branch extraction (LBE), it is possible to introduce a locality/islandhood effect very close to the base-generation position of the relevant elements.

In contrast to regular LBE (82), deep LBE (83) is disallowed (e.g. Corver 1992, Bošković 2013a). With deep LBE, the nominal from which LBE takes places is a complement of another nominal. The problem here arises with movement from NP1 to NP2 (see Bošković 2013a, Corver 1992): there is no issue with movement out of NP1 per se (i.e. when the relevant NP is not dominated by another NP), otherwise even (82) would be unacceptable.

(82) Crvene<sub>i</sub> sam vidio [t<sub>i</sub> kuće]  
 red am seen houses  
 ‘I saw red houses.’

(83) \*Crvenih<sub>i</sub> sam vidio [NP2 vlasnike [NP1 t<sub>i</sub> kuća]]  
 red am seen owners houses  
 ‘I saw owners of red houses.’

Determining the timing of regular and sideward movement involved in ATB non-ATB.

(84) ?Crvenih<sub>i</sub> i plavih<sub>j</sub> sam vidio [NP1 vlasnike [ConjP [NP t<sub>i</sub> kuća] i [NP t<sub>j</sub> automobila]]]  
 red and blue am seen owners houses and cars  
 ‘I saw owners of [red houses and blue cars].’

(85) \*Crvenih<sub>i</sub> i plavih<sub>j</sub> sam vidio [ConjP[NP1 vlasnike [NP t<sub>i</sub> kuća] i [NP1 ljubitelje [NP t<sub>j</sub> automobila]]]  
 red and blue am seen owners houses and fans cars  
 ‘I saw [owners of red houses] and [fans of blue cars].’

The deep LBE effect is present in (85), but is voided in (84).

This means there is regular movement into NP1 in (85) but not in (84) (there are two NP1s, i.e. higher NPs, in (85) due to the level of coordination-cf. the translation of the examples).

Adjectives are base-generated at the very edge of the nominal domain in SC (this is what makes LBE possible in SC, see Bošković 2013a and Corver 1992).

Any movement from this position will take the AP into NP1 in (85); this movement is precisely what causes a problem in (83), the same problem arises in (85).

In (84), there is a phrase, ConjP, in between the lower nominal domain and the higher NP (i.e. NP1). The AP can then undergo movement from its base-position without moving into the higher nominal domain in (84), in contrast to (85) (Stjepanović (2014, in press), Bošković (2017), and Oda (2017) provide independent evidence that movement to the edge of ConjP is independently possible in SC).

After undergoing movement from their interpreted positions, the APs can undergo sideward merger into the late-formed ConjP in (84), but this ConjP should be inserted into the structure higher than the original ConjP (i.e. the indicated ConjP in (84)) given that, as Bošković (2013a) discusses, regular movement from the edge of the complement of N into the NP causes a locality violation in SC.

Late-formed ConjP can be inserted into a phrase right above the original ConjP, which is NP1 here. Since there is no regular movement from one NP domain into another there is no locality violation.

The derivations are mapped out in (86)-(87) (for ease of exposition we can simply assume that the complement of a noun, in shadow red, is a barrier (see Bošković 2013a for the full account).

In (87), which corresponds to (85), regular movement (movement of  $\alpha$ ) crosses a barrier, which induces a locality effect (the same effect as in (83)).

In (86) (it corresponds to (84)), regular movement doesn't cross a barrier—only sideward movement does, but sideward movement voids locality effects (sideward movement voids islandhood because it does not involve crossing the island boundary:  $\alpha$  is merged with  $\beta$  (forming a ConjP) in a separate derivational space, and then inserted in the position shown in (86)).

(86)  $[_{NP1} [\alpha+\beta] N1$  **[ConjP**  $\alpha_i$   $[_{NP} t_i$  ( $t_i$  in base-interpreted position of  $\alpha$ )

(87)  $*[_{NP1} [\alpha+\beta] [_{NP1} \alpha_i N1$  **[NP**  $t_i$

Putting everything together for non-ATB ATB constructions more generally.

It is not possible for the relevant elements to undergo sideward movement into the late formed ConjP directly from the positions where they are interpreted.

They have to undergo regular movement from that position, after which they can undergo sideward movement into the newly-formed ConjP (so there is a not-directly-from-the-interpreted-position restriction on derivational ConjP formation)

If a locality effect can be created right at the base-generated position, sideward movement will not be able to obviate it (it would be taking place too late); but if the locality effect is created slightly higher than the base-generated position so that there is room for regular movement to take place before the locality effect can kick in, the locality effect gets obviated through sideward movement.

Any locality effect higher up, i.e. higher than the point of insertion of the late-formed ConjP, will still be in effect, due to the movement of the late-formed ConjP itself (this ConjP is inserted in the first phrase above the phrase where the relevant elements are interpreted (not counting lower ConjP)).

All of this is mapped out in (88). (The brackets where a locality effect could in principle pop up due to regular, not sideward, movement crossing it are given in shadow red. Trace is used for the movement that precedes formation of the derivationally-formed ConjP, and a struck-out copy for the movement of the derivationally-formed ConjP itself. Two phrases are given between the final landing site and the original position of the movement of the derivationally-formed ConjP to indicate that this movement is generally longer than the movement that  $\alpha$  alone undergoes).

(88)  $[\alpha+\beta]_j$  **[WP**  $\dots$  **[ZP**  $[\alpha+\beta]_j$   $[_{YP} \alpha_i$  **[XP**  $t_i$

The locality effect in (85) arises due to the crossing of the redded XP between  $\alpha_i$  and  $t_i$  in (88), which means with movement of the element that will later participate in late coordination ((84) crucially differs from (85) in that that step of movement in (84) does not cross a barrier; it essentially takes place below XP in (88) due to the presence of additional structure in (84)).

The locality effect in (68) arises due to the crossing of a redded phrase between  $[\alpha+\beta]_j$  and  $[\alpha+\beta]_j$  in (88), which means with movement of the late-formed coordination itself.

The reconstruction effect in (69) also occurs on the path between  $[\alpha+\beta]_j$  and  $[\alpha+\beta]_j$ .

Agreement: if agreement takes place below ZP in (88), which means below  $[\alpha+\beta]_j$ , it will involve agreement with an individual conjunct, i.e.  $\alpha$ . This is the case with (71) (and SC A-N agreement). If it takes place above ZP, it will involve agreement with the whole ConjP, i.e.  $[\alpha+\beta]$ , which is the case with (73) and (75).

Islandhood/locality effects are selectively present with non-ATB ATB constructions (in most cases they are present, but sometimes they are voided). This could not be captured if we were to adopt Zhang's analysis, where the relevant elements undergo sideward movement into the late-formed ConjP straight from their interpreted position, with the late-formed ConjP inserted in the final landing site—no locality effects should then be present ((26), (57), (58), (68), (76b), (79) and (85) are problematic).

We also could not capture the relevant state of affairs if the relevant elements were to undergo regular movement from their interpreted position all the way to their final landing site, with the late-formed ConjP formed there.

Potential alternative along these lines (having in mind examples like *And then Ann left*, where the complement of *and* is a non-coordinated CP): the Conj head takes the whole CP as its complement. Assuming that the coordinated phrases have to move into ConjP, (6) can then be analyzed in terms of ConjP shells, as in (89).

(89) [<sub>ConjP</sub> which book and<sub>i</sub> [<sub>ConjP</sub> which magazine t<sub>i</sub> [<sub>CP</sub> ..]]].

On this analysis locality effects would never be obviated ((84) is thus problematic).

The selective presence of locality effects can be captured on an analysis which essentially combines these two accounts, on which there is both regular movement and sideward movement involved in the derivation of non-ATB ATB constructions.

Such an analysis can also capture agreement effects found with non-ATB ATB constructions as well as the mobility requirement on the elements involved in non-ATB ATB and the ability of these elements to license parasitic gaps on their own.

## Conclusion

- It is possible to move different elements out of conjuncts involved in the same coordination
  - Such constructions involve coordination formation after movement.
  - Such constructions are also subject to the ATB requirement: although different elements are moving out of conjuncts movement still must take place out of each conjunct.
- The ATB requirement needs to be reformulated: it is not the case that the moving element must move out of each conjunct but simply that movement must take place out of each conjunct. It can be the same element that is moving out of each conjunct or different elements; the ATB requirement is satisfied as long as there is movement out of each conjunct
- Traditional ATB and non-ATB ATB, where different elements are moving out of the conjuncts, can be mixed under extraction out of the same coordination.
  - Mixed non-ATB ATB cases have the same ordering restrictions (regarding the order of the conjuncts) as pure non-ATB ATB cases.
  - Non-ATB ATB requires coordination formation in the moved position, which rules out non-ATB ATB involving head movement
  - Timing of derivational coordination formation: late-formed coordination is inserted into the structure very close to the the phrase where the relevant elements are interpreted, not in the final position.

The relevant elements first need to undergo regular movement from the positions where they are interpreted: they cannot undergo sideward merger into the derivationally-formed ConjP straight from their base positions.

The derivation of non-ATB ATB constructions then involves both regular and sideward movement.

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