

Case matching and syncretism in ATB-dependencies*

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Abstract

Syncretism has been reported to have the peculiar property of repairing violations of syntactic constraints, e.g. with agreement (Schütze 2003; Bhatt & Walkow 2013) and case matching (Citko 2005; van Craenenbroeck 2012). This paper puts forward the view that in one well-reported instance of syncretism repair of case-matching violations with ATB-movement, this repair follows directly from the nature of ATB movement. We pursue a novel movement-based analysis in which ATB movement involves the actual fusion of two syntactic objects, via intersection of feature sets. As well as deriving the one-to-many relation between fillers and gaps in ATB, we show how the ‘repair’ effect of syncretism with case matching violations follows naturally under this approach.

1 Introduction

This paper addresses a widely discussed instance of the ‘repair effect’ of syncretism with violations of the case matching requirement in so-called Across-The-Board (ATB) constructions such as (1) (see e.g. Ross (1967), Williams (1978), and de Vries (2017) for an overview).

- (1) a. What does [John like ___] and [Mary hate ___] ?
b. The man who [John saw ___] and [Bill hit ___]

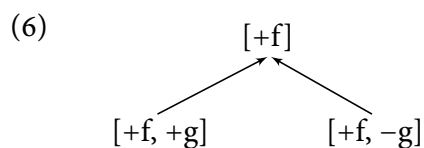
In languages with rich case morphology such as Polish, ATB constructions are subject to a case matching requirement, that is, ATB movement is only possible if the case assigned at each extraction site is the same:

- (2) a. *Czego Jan nienawidzi _{GEN} a Maria lubi _{ACC}?
what.GEN Jan hates and Maria likes
b. *Co Jan nienawidzi _{GEN} a Maria lubi _{ACC}?
what.ACC Jan hates and Maria likes
‘What does Jan hate and Maria like?’

(Citko 2005:487)

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non-empty feature set (6).



This intersection would then also be realized by a syncretic, underspecified exponent. This therefore allows us to draw a direct link between ATB-movement and syncretism repair. They both are contingent on a feature overlap between mismatching contexts. In this way, we arrive at a more natural explanation for why syncretism repairs case-mismatches in ATB, rather than stipulating additional machinery to account for it.

The paper is structured as follows. Section 2 discusses the data surrounding ‘repair by syncretism’ in ATB constructions in more detail. Section 3 provides the analysis of ATB based on intersection. In particular, section 3.1 discusses previous approaches to ATB movement, section 3.2 lays out a novel approach to ATB utilizing intersection of feature sets, section 3.3 shows how this approach can derive the syncretism facts in Polish and section 3.5 presents an analysis of syncretism repair in Right Node Raising constructions in Russian. Finally, section 4 provides a conclusion and discusses some further issues.

2 Syncretism and case matching with ATB movement

ATB constructions are characterized by an asymmetric dependency between one filler and two gaps. There are various restrictions on what kind of gaps are possible in these constructions (see section 3.1), one of the more interesting ones being case matching. In languages with rich case morphology, the case assigned by the verb to each of the ‘gaps’ has to match. For example in Polish, the verbs *widzieć* ‘see’ and *lubić* ‘like’ both assign accusative and ATB movement is licensed (7).

- (7) *Kogo* Janek widział —_{ACC} a *Maria* lubiła —_{ACC} ?
 who.ACC John saw and Mary liked
 ‘Who did John see and Mary like?’ (Borsley 1983:170)

However, if the cases assigned by the verbs differ, for example with *lubić* ‘like’ (accusative) and *nienawidzić* ‘hate’ (genitive), then it is not possible for a single wh-phrase to fulfil the conflicting case matching requirements of each verb simultaneously.

- (8) a. **Czego* Jan nienawidzi —_{GEN} a *Maria* lubi —_{ACC} ?
 what.GEN Jan hates and Maria likes
 b. **Co* Jan nienawidzi —_{GEN} a *Maria* lubi —_{ACC} ?
 what.ACC Jan hates and Maria likes
 ‘What does Jan hate and Maria like?’ (Citko 2005:487)

An interesting exception to this, discussed by Borsley (1983); Dyła (1984); Franks (1995); Bondaruk (2003) and Citko (2005), is if the forms of two cases happen to be syncretic. For example,

two cases is ungrammatical:

- (14) *Dziewczyna, *którą* Janek lubi —_{ACC} a Jerzy nienawidzi —_{GEN}
 girl who.ACC John likes and George hates
 ‘The girl who John likes and George hates’ (Polish; Dylą 1984:703)

In addition, Franks (1995) discusses case mismatches in relative clauses in Russian. In (15), the relative pronoun *kotoroj* is syncretic for instrumental and dative, meaning that case matching is satisfied.

- (15) *deвушка, kotoroj* ja byl uvlęčen —_{INST} i daval den’gi —_{DAT}
 girl who.INST/DAT I was carried-away-with and gave money
 ‘The girl who I was carried away with and gave money to’
 (Russian; Franks 1995:63)

ATB topicalization also shows a case matching requirement that is obviated by syncretism. The third person masculine personal pronoun in Polish is syncretic for genitive and accusative (*jego*), whereas its feminine counterpart is not (*ją* vs. *jej*). Consequently, only the former is possible in ATB topicalization structures with mismatched verbs.

- (16) a. *Jego* Janek lubi —_{ACC} a Jerzy nienawidzi —_{GEN}
 him.ACC/GEN John likes and George hates
 ‘Him, John likes and George hates.’
 b. **Ją* Janek lubi —_{ACC} a Jerzy nienawidzi —_{GEN}
 her.ACC Janek likes and George hates
 ‘Her, John likes and George hates.’ (Polish; Dylą 1984:703)

A similar effect has also been reported for German (see Pullum & Zwicky 1986:764). For example, in (17) extraction of an object from non-distinct case-marked positions is only possible if the filler is syncretic (17b).

- (17) a. *Die/den Bär-en hat er —_{ACC} geliebt und —_{DAT} geholfen.
 the.ACC.PL/the.DAT.PL bear-PL.ACC/DAT has he loved and helped
 ‘He has loved and helped bears.’
 b. Bär-en hat er —_{ACC} geliebt und —_{DAT} geholfen.
 bear-PL.ACC/DAT has he loved and helped
 ‘He has loved and helped bears.’ (Blümel 2017:127)

Similarly, Ott (2012) shows that there is syncretism repair in so-called ‘split topicalization’ as in (18) (cf. Fanselow & Ćavar 2002). Whereas the word for ‘women’ is syncretic in dative and accusative (*Frauen*), ‘men’ is not (*Männern* vs. *Männer*). Accordingly, only the syncretic form is possible in split topicalization (18).

- (18) a. ?Frauen vertraut er nur blonden —_{DAT} und küsst er nur hübsche
 women.ACC/DAT trusts he only blonde.DAT and kisses he only pretty.ACC
—_{ACC}
 ‘As for women, he only trusts blonde ones and kisses pretty ones.’

- b. *Männer(*-n) hilft sie nur blonden —_{DAT} und küsst sie nur
 men.ACC(-DAT) helps she only blonde.DAT and kisses she only
 hübsche —_{ACC}
 handsome.ACC
 ‘As for men, she only helps blonde ones and kisses handsome ones.’

(German; Ott 2012:35)

Finally, we also find a similar ‘repair by syncretism’ effect in another ATB construction, Right-Node Raising (RNR). In many respects, RNR is similar to ATB movement, only to the right (see section 3.5 for further discussion). Asarina (2011:174) shows that, in Russian, RNR imposes case matching requirements on the displaced element. The feminine noun ‘plate’ is not syncretic in the nominative and accusative cases (*tarelka* vs. *tarelku*) and is therefore not licensed in the RNR construction (19).

- (19) *On ne ostavil —_{ACC}, tak kak emu nadoela —_{NOM}, *tarelk-a/-u* s chürnoj
 he not kept as him sick.of plate-NOM/-ACC with black
 kaëmkoj.
 border
 ‘He didn’t keep, as he was sick of, the plate with the black border.’

Interestingly, if the nominative and accusative forms are syncretic, as with the neuter noun *bljudce* (‘saucer’), then a case mismatch is permitted (20).

- (20) On ne ostavil —_{ACC}, tak kak emu nadoela —_{NOM}, *bljudc-e* s chürnoj
 he not kept as him sick.of saucer-ACC/NOM with black
 kaëmkoj.
 border
 ‘He didn’t keep, as he was sick of, the saucer with the black border.’

Whether or not RNR actually involves movement is a controversial issue that we return to in section 3.5.

2.1 Interim summary

We have seen that in Polish and German, there are case matching effects that arise with ATB constructions in which there is a one-to-many relation between fillers and gaps. On an intuitive level, it seems that what look like *bona fide* syntactic constraints are sensitive to the morpho-phonological form of linguistic objects. Taken at face value, the existence of ‘repair by syncretism’ would seem to be incompatible with postsyntactic ‘late insertion’ approaches to morphology, e.g. Distributed Morphology (Halle & Marantz 1993; Harley & Noyer 2003; Embick & Noyer 2007; Nevins 2015). Proponents of this view assume that syntax operates on abstract feature bundles that do not contain any morpho-phonological information. Consequently, if matching violations can be overridden by paradigmatic identity of distinct cases, then this would seem to pose a serious challenge to this view. On the other hand, one could claim that the syncretism facts indicate that case matching should be a processing or PF constraint, rather than a syntactic one (Smits

1991). However, implementing a matching restriction in this module of the grammar would entail PF (or the parser) having access to syntax-specific information about the case-assigning properties of individual verbs. This seems to be undesirable if we want to maintain a strictly modular view of grammar. As a result, we seem to be faced with the problem of ‘domain leakage’, that is, whichever module of grammar case matching is implemented in, it will require access to information ordinarily reserved for a different module.

In what follows, we argue that this is not necessarily the case under the view that both the mechanism for ATB movement and the approach to syncretism share a common property; non-empty intersection of feature sets. In the following section, we propose a new approach to ATB that can explain the syncretism facts while still remaining compatible with a DM view of morphology.

3 An intersection approach to ATB constructions

In this section, we present a new take on ATB constructions in which the one-to-many relation between fillers and gaps is derived by an intersection operation that creates a single item from those originating in the gaps. It will be shown how this can directly derive the link between syncretism and ATB movement under the assumption that syncretism is derived by means of underspecification. First, section 3.1 discusses the main approaches to ATB in the literature and how these struggle to capture ‘repair by syncretism’ in a satisfactory way. Section 3.2 will lay out some of the core assumptions required for the analysis to follow. The following section 3.3 illustrates how an intersection-based approach to ATB can explain why case matching violations can only be repaired by syncretic forms. Section 3.4 explicates the formalism of intersection further and, finally, section 3.5 extends this analysis to Right Node Raising in Russian.

3.1 Previous approaches to ATB

A number of different theories of ATB movement have been proposed in the literature. Broadly speaking, they fall into one of two camps: Those that assume that there is ‘extraction’ from both conjuncts in parallel, what we might call ‘symmetric approaches’, and those that assume that genuine extraction only takes place from one conjunct and the other gap is not related to movement (‘asymmetric approaches’). Asymmetric approaches derive the second gap in an ATB structure either via a parasitic gap, sideward movement or ellipsis. Each of these approaches will be discussed in turn, considering the extent to which they can account for the syncretism facts. Subsequently, we will do the same for symmetric approaches which either assume genuine movement from both conjuncts or a multidominant structure.

3.1.1 Parasitic gaps

The first kind of asymmetric approach to ATB assumes that extraction only takes place from the first gap (e.g. Munn 1992, 1993, 1999; Franks 1995; Reich 2007), and the second gap contains a

parasitic gap derived by empty operator movement (following the analysis of parasitic gaps in Chomsky 1981):

(21) *Parasitic gap approach to ATB*

What₁ does [_{&P} [_{TP} John like t₁] and [_{TP} Op₂ Mary hate t₂]] ?

Some motivation for this comes from the observation that certain reconstruction phenomena seem to behave asymmetrically, that is, they seem to only be able to reconstruct into the first conjunct.² In terms of deriving syncretism, one could appeal to the fact that it has sometimes been argued that parasitic gaps also exhibit case matching effects similar to the ones we find in ATB (Huybregts & van Riemsdijk 1985; Bayer 1988; Kathol 2001; Himmelreich 2017).

Consider the German examples from Bayer (1988:420) in (22) and (23). In (22), the parasitic gap is assigned dative by the verb *anbieten* ‘offer’, whereas the real gap is assigned genitive by *entsinnen* ‘remember’. There seems to be the familiar case matching requirement (22) that is alleviated by syncretism (23).

(22) *Dieses Polizisten hätte er sich [ohne —_{DAT} schon mal Geld angeboten
this policeman.GEN has.SUBJ he REFL without already once money offered
zu haben] niemals —_{GEN} entsinnen können
to have never remember can
‘He would have never been able to remember this policeman without having once offered
money to (him).’

(23) ?Der Polizei hätte er sich [ohne —_{DAT} schon mal Geld angeboten zu
the police.DAT/GEN has.SUBJ he REFL without already once money offered to
haben] niemals —_{GEN} entsinnen können
have never remember can
‘He would have never been able to remember the police without having once offered
money to (them).’

However, the idea that case matching in ATB is related to parasitic gaps is undermined by the fact that not all languages show case matching effects with parasitic gaps, as also discussed by Himmelreich (2017). She shows that Polish, the language with the most widely discussed examples of case matching in ATB, does in fact not seem to impose the same case matching requirement on parasitic gaps (pace Bondaruk 1996, 2003, who claims that both require strict case matching with the exception of syncretic forms and mismatches between accusative and genitive of negation). In (24), the form *którq* is unambiguously accusative and not syncretic for dative. Nevertheless, a mismatch between the real gap and the parasitic gap is tolerated, in contrast to ATB constructions.

²However, this is only true for some diagnostics (Principle A, Principle C and Weak Crossover). Other diagnostics such as Strong Crossover, variable binding, idiom reconstruction and scope reconstruction behave symmetrically (see Citko 2005; Salzmann 2012a,b for discussion). This suggests that the phenomena that seem to behave asymmetrically are probably sensitive to effects of linear proximity.

- (24) To jest dziewczyna, którą Jan lubił —_{ACC} [zanim zaczął pomagać —_{DAT}]
 this is girl which.ACC Jan liked before started help
 ‘This is the girl Jan liked before he started to help her.’ (Himmelreich 2017:16)

If the explanation for case matching in ATB constructions came from the fact that ATB involves parasitic gaps, then this difference in Polish would be entirely unexpected. Furthermore, there are a number of other more fundamental asymmetries across languages between ATB and parasitic gaps, in particular the much more restricted nature of parasitic gaps cross-linguistically (see Salzmann 2012a for relevant discussion).

Another challenge for the ‘parasitic gap’ view of ATB-dependencies comes from the fact that we would, all else being equal, expect languages with ATB-movement to also have parasitic gaps. As Blümel (2017:114) points out, this is not the case, as there are many languages with ATB-movement that do not seem to have parasitic gaps of the English kind. Blümel (2017) points to Welsh as a good example of this. Borsley (2013) provides the data in (25) showing that Welsh respects the CSC (25a), and that extraction from conjunctions must involve ATB-movement (25b).

- (25) *ATB-movement in Welsh* (Borsley 2013:10):
- a. *y dyn₁ [TP welais i —₁] a [TP gwelaist tihau Megan]
 the man see.PST.1SG I and see.PST.2SG you Megan
 ‘The man that I saw and you saw Megan’
- b. y dyn₁ [TP welais i —₁] a [TP gwelaist tihau —₁ hefyd]
 the man see.PST.1SG I and see.PST.2SG you too
 ‘The man that I saw and you saw too’

However, Borsley (2013) also argues that Welsh does not allow for true parasitic gaps (26).

- (26) *Dyna ’r adroiddiad₁ dw i wedi ei daflu —₁ ffwrdd [heb ddarllen
 there.is the report be.PRS.1SG I PERF 3SG.M throw away without 3SG.M
 pg₁]
 read
 ‘There is the report which I threw away without reading.’ (Borsley 2013:23)

Thus, if the derivation of ATB-movement involved a parasitic gap in the second conjunct, then we would expect parasitic gaps to be available independently. The Welsh data thus suggest that ATB and parasitic gaps are different phenomena.

A final unexpected asymmetry between ATB-movement and parasitic gaps pertains to what Postal (1998) calls *antipronominal contexts*. These are environments in which pronouns and traces of certain types of \bar{A} -movement are not permitted, for example *change-of-color* verbs (27a) (also see Poole 2017). If ATB-movement involved a parasitic gap in the second conjunct, then we would expect parallel behaviour with regard to antipronominality. This is not what we find, however, since traces of ATB-movement are possible in this position (27b), whereas parasitic gaps are not (27c).

- (27) *Asymmetry between ATB and PGs in antipronominal contexts* (Postal 1993:744):
- a. Blake painted his house {green /*it}
 - b. What color_i did Blake paint his house t_i and Mary paint her shed t_i ?
 - c. *What color_i did they criticize t_i after painting their house pg_i ?

3.1.2 Sideward movement

A closely related approach involves the application of Nunes' (2001; 2004) *Sideward Movement* operation to ATB (Hornstein & Nunes 2002; Fernández-Salgueiro 2008). In this approach, the filler in the ATB configuration undergoes 'interarboreal' movement (i.e. between workspaces; cf. Bobaljik & Brown 1997). In the derivation of ATB, the moved item originates in the second clause of the conjunction, which is built in its own workspace (28a). It then undergoes sideward movement to the workspace in which the first conjunct is built, where it is merged as the object of *like* (28b). At a later step, the *v*P_s form a conjunction (now in the same workspace) (28c). Finally, the *wh*-phrase in the first conjunct is extracted to SpecCP (28d).³

- (28) *Sideward movement approach to ATB*
- a. Workspace 1: [_{vP} Mary [_{vP} hate ⟨what⟩]] ⇒
 - b. Workspace 2: [_{vP} like what] ⇒
 - c. [&P [_{vP} John [_{vP} like what]] & [_{vP} John [_{vP} like ⟨what⟩]]] ⇒
 - d. [_{CP} what ... [_{vP} [_{vP} like ⟨what⟩]]] & [_{vP} [_{vP} hate ⟨what⟩]]]
-

This approach can neatly derive the fact that there is a gap in both conjuncts, however it does suffer from a number of technical issues regarding cyclicity and activity (see Salzmann 2012a:401f. for critical discussion). More importantly for our present purposes, it is not clear that this approach can derive 'repair by syncretism' in any insightful way. Since there is only a single element to which case is assigned, we require that cases can be assigned multiple times to the same item, or 'stacked' (see e.g. McCreight 1988; Yoon 2004; Merchant 2006; Richards 2013; Pesetsky 2013; Assmann et al. 2014). The case matching requirement could be treated as a ban against multiple assignment of non-identical cases (also see Salzmann 2012a:431, fn.41 for discussion).

One challenge for this view of ATB-movement is the *parallelism requirement* (to be discussed further in section 3.2.2). It has been long noted that ATB movement must take place from structurally 'parallel positions' (Williams 1978; George 1980; Anderson 1983; Woolford 1987; Franks 1993, 1995; Kasai 2004; Citko 2006). This refers to the fact that ATB extraction from a subject and object position is not possible, as in (29).

- (29) *I know a man who_i [Bill saw ____i] and [____i likes Mary] (Williams 1978:34)

In symmetric theories of ATB (such as parallel movement and multidominance), a constraint en-

³This approach is therefore not entirely asymmetric since, in a sense, extraction does take place from both conjuncts, but crucially movement to SpecCP proceeds only from the first conjunct and is therefore asymmetric.

sureing this can be formulated in a rather direct way as a local constraint since information about the filler position and both ATB-gaps is locally available within one single derivational step, i.e. movement or re-merge. Thus, checking of the parallelism constraint requires no derivational back-tracking comparing distinct, non-adjacent derivational steps. In the sideward movement approach, however, this requirement is less straightforwardly expressible since the gap positions in the respective conjuncts are only related indirectly, almost accidentally, as they are created at different stages of the derivation. Therefore, the constraint required to capture the ungrammaticality of (29) could only be stated as a global constraint correlating non-adjacent derivational steps (cf. Lakoff 1970) which has been argued to be problematic (see Müller 2011). Thus, it must be a property associated with the moved item itself. One way to approach this would be to assume that parallelism follows from case-matching. In other words, ATB-extraction of a subject and object would lead to a case-mismatch involving nominative and accusative assigned to the same *wh*-phrase. The problematic aspect of this is that we independently require that case-matching can be alleviated by syncretism to account for the Polish cases. If we allow for syncretism to license case mismatches, then we immediately lose our explanation for parallelism, since the form *what* in (30) is syncretic for nominative and accusative, but does not result in grammaticality.

(30) *What₁ does [John like ___₁] and [___₁ annoys Mary] ?

Thus, it seems that the parallelism requirement has to be stated independently of the individual items involved in the ATB-dependency. This is more readily implementable in symmetric theories in which the filler in SpecCP is linked to the gap in each conjunct directly (i.e. by a single movement step or instance of re-merge, see section 3.2.2). Trying to capture it via some property of the moved item itself, e.g. case-matching, runs into immediate problems.

3.1.3 Ellipsis

A different kind of asymmetric approach derives one of the ATB gaps via ellipsis (Ha 2008; Salzmann 2012a,b). In Ha's (2008) approach, it is the gap in the first conjunct that is derived by ellipsis (31a), whereas Salzmann (2012a,b) assumes that it is the second one (31b).

(31) *Ellipsis approaches to ATB*

a. *RNR & ATB* (Ha 2008):

What₁ does [_{TP} John like_[E_{RNR}] *what*] and [_{TP} Mary hate t₁] ?

b. *Derivational ellipsis* (Salzmann 2012a):

What₁ does [_{TP} John like t₁] and_[E_{ATB}] [_{TP} Mary hate *what*] ?

Ha appeals to ellipsis approaches to Right Node Raising (cf. Hartmann 2000; and see section 3.5), whereas Salzmann follows Aelbrecht's (2011) Agree-based approach to ellipsis licensing. In a sense, both approaches are similar in that they involve some special version of Merchant's (2001) [E]-feature (however, only Salzmann (2012a) predicts asymmetric reconstruction in the first conjunct). The ellipsis analysis, as all asymmetric approaches, faces the challenge that ATB has been argued to require a 'single identity reading', which seems to implicate a movement gap in each

conjunct (see e.g. Citko 2005:489, but cf. Munn 1999, Salzmann 2012a:402, fn.4). However, let us focus on the question of ‘repair by syncretism’. Salzmann (2012a:431, fn.41) claims that ‘once ellipsis is involved and if morphological mismatches are tolerated, one may expect case mismatches in ATB’. Indeed, one central characteristic of ellipsis is that it is known to tolerate form mismatches of various kinds (see e.g. Fiengo & May 1994; Merchant 2013), they have a different profile to mismatches with ATB-movement. In ellipsis constructions, mismatches in the form of the verb, for example, are readily tolerated (32) (e.g. Sag 1976; Fiengo & May 1994; Merchant 2001).

(32) The boys bought the book and the girls did [_{VP} buy the book] too.

The plausible reason for this is that the mismatching finiteness/tense features are actually located outside the ellipsis site in (32), i.e. on T. In fact, Merchant (2013) shows that there is an asymmetry between VP- and TP-ellipsis with regard to voice mismatches. TP ellipsis (or *sluicing*) does not allow for mismatches in voice features between the verb, even if the the forms of the verb match (33). This is because, unlike in (32), the mismatching features are contained in the ellipsis site (assuming that they are encoded on Voice, as Merchant (2013) does).

(33) *This book was put_[PASS] on my table, but I don’t know who [_{TP} put_[ACT] this book on my table]

Thus, the standard identity conditions on ellipsis are that mismatches in form are tolerated, but mismatches in features are not. If we apply the same matching conditions to ATB-movement, we would expect that mismatches in the form of wh-phrases are possible, but mismatches in the feature values are not. However, this is clearly the opposite of what we need to say. The syncretism facts require that the wh-phrases can mismatch in terms of features, only if they have the same phonological form, i.e. are syncretic. In fact, if the ellipsis identity conditions applied to ATB-gaps, then we would not expect to find a case-matching requirement at all. For example, case mismatches such as (2a), repeated as (34), could be analyzed as in (35).

(34) *Czego Jan nienawidzi _{—GEN} a Maria lubi _{—ACC}?
 what.GEN Jan hates and Maria likes
 ‘What does Jan hate and Maria like?’

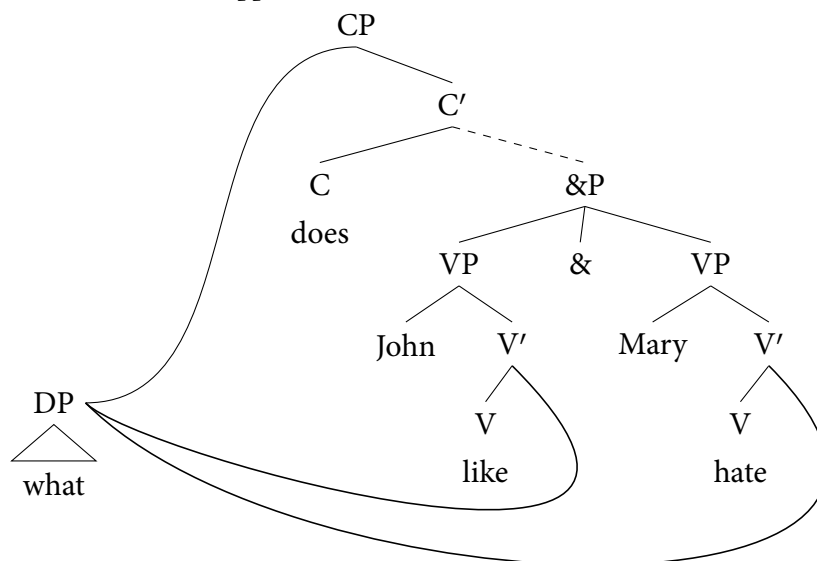
(35) Czego₁ [_{TP} Jan nienawidzi t₁] a_[E_{ATB}] [_{TP} Maria lubi e_θ] ?

If mismatches of the kind regularly found in phrasal ellipsis were tolerated in (35), then we would expect it to be grammatically, contrary to fact. On the other hand, if it were the contradictory features on the wh-phrases that were responsible for the deviancy of (34), then it is unclear why having the same form (i.e. being syncretic) should fix this. The only way around this would be to propose that ellipsis in ATB-constructions permits feature mismatches only in cases of syncretism, but never if there is also a mismatch in form. However, this is radically different to the identity conditions normally imposed by ellipsis and thereby fundamentally undermines ellipsis-based analyses of ATB.

3.1.4 Multidominance

Now, we turn to the symmetric approaches that assume that each of the ATB gaps is directly related to the filler. One particular approach that has gained much traction in recent years is the multidominance approach to ATB (Citko 2005, 2011; Gračanin-Yüksek 2007, 2013; Bachrach & Katzir 2009). This approach assumes that the filler is related to each gap, however this is not derived by movement. Instead, a multidominant view of syntax is adopted in which an element can be in more than one position simultaneously. In an ATB construction, the *wh*-phrase is associated with both gaps and its derived position in SpecCP, however it is only pronounced in one of these positions (36).

(36) *Multidominance approach to ATB*



This approach has the direct advantage that it can derive ‘single identity readings’ of ATB, that is, it is only possible to give a single individual answer, rather than a pair-list answer, to an ATB question:

(37) A: Who does John like and Mary hate?

B: Jane

#B: John, Bill and Mary, Jane

For other arguments in favour of a multidominance approach to ATB, see Citko (2005, 2011). However, a problematic data point that is not often discussed in conjunction with the multidominance approach is the fact that, in some languages, ATB movement can have resumptive pronouns in the gaps. For example in Akan (Niger Congo, Ghana), \bar{A} -movement of animate DPs triggers obligatory resumption, also in ATB *wh*-questions (Saah 1994) (38).

(38) [_{CP} Hwáń₁ na [_{TP} Kofi pé nó₁] nańsó [_{TP} Ámmá tán nó₁] nó] ?
 who FOC Kofi like 3SG but Ama hate 3SG CD
 ‘Who does Kofi like (him) but Ama hate (him)?’

(Akan; Sampson Korsah p.c.)

Furthermore, Salzmann (2012*b*) shows that it is possible to have resumptive pronouns in both gaps in ATB relativization in Zurich German (39).

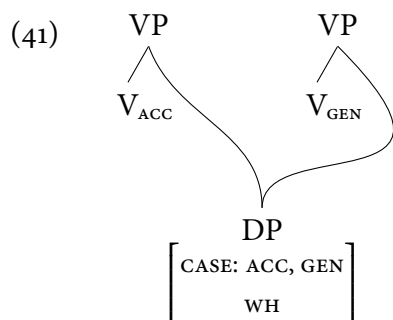
- (39) de Lehrer₁, wo [TP de Hans von *em*₁ schwärmt] und [TP d Susi über *en*₁ fluecht]
 the teacher c the Hans of him is.excited and the Susi about him swears
 ‘The teacher that Hans is excited about (him) and Susi hates swears about (him)’
 (Zurich German; Salzmann 2012*b*:356)

These data are problematic for multidominance accounts of ATB since, as is clear in (36), they assume that the *wh*-phrase is syntactically present in both of the gaps. Whereas the multidominance account straightforwardly derives the fact that ATB movement leaves gaps, it does not seem to be possible to account for resumptive pronouns if the filler is also structurally present in its base positions.⁴

Turning now to ‘repair by syncretism’, Citko (2005:486ff.) explicitly addresses the question of how her multidominance approach can derive the fact that syncretism can repair case matching violations. Citko puts forward an explanation based on underspecification couched in the framework of Distributed Morphology. She assumes that ‘the lexicon contains a single *wh*-form, underspecified in such a way that it is compatible with both genitive and accusative’ (Citko 2005:487). Consider again example (3), repeated below, where syncretic forms license a mismatch in case.

- (40) Kogo Janek lubi ---_{ACC} a Jerzy nienawidzi ---_{GEN} ?
 who.ACC/GEN John likes and George hates
 ‘Who does John like and George hate?’ (Borsley 1983:170)

Citko assumes that the *wh*-phrase is simultaneously present in the object position of both verbs (and also in SpecCP, of course). The element receives both case features assigned by the verbs in question (GEN and ACC) (41).



Citko (2005:488) then states that ‘the lexicon contains a single form that is compatible with both accusative and genitive case features by virtue of underspecification’ (*kogo*) and this can be inserted into the terminal. The ungrammaticality of case mismatches in the inanimate *wh*-series

⁴Martin Salzmann (p.c.) suggests that this might not necessarily be fatal for a ‘big DP’ approach to resumption, in which the DP starts out in the same phrase as the resumptive pronoun and is extracted (e.g. [_{DP} DP [_D D resumptive]]) (e.g. Boeckx 2003). If the ATB-moved item multiply dominated the specifier of both ‘big DPs’, then this might work. However, if one no longer has a movement approach, in which the resumptive pronoun is stranded, then it is unclear what the status of the ‘big DP’ is in such an analysis. A perennial problem is that these complex elements never occur overtly, so it is unclear what their motivation would be in a multidominance approach.

where there is no syncretism (2) (repeated below) is explained by the assumption that ‘there is no single lexical item that can be inserted into this slot without a feature clash, [...] the result is ungrammatical’.

- (42) a. *Czego Jan nienawidzi —_{GEN} a Maria lubi —_{ACC}?
 what.GEN Jan hates and Maria likes
- b. *Co Jan nienawidzi —_{GEN} a Maria lubi —_{ACC}?
 what.ACC Jan hates and Maria likes
 ‘What does Jan hate and Maria like?’ (Citko 2005:487)

There are, however, a number of fundamental problems with Citko’s analysis. First, Citko seems to assume privative case features (GEN, ACC). As is clear from (41), the wh-phrase receives both ACC and GEN and bears [CASE:ACC,GEN] at the point at which Vocabulary Insertion takes place. In order for *kogo* to be inserted, the Vocabulary Item would have to bear either the features [CASE:ACC,GEN], [CASE:ACC] or [CASE:GEN]. The first option, which is actually not underspecification, would render it unfit for insertion into terminals with [CASE:ACC] and [CASE:GEN] specifications, that is, non-ATB environments where the wh-phrase is assigned only one case, following the Subset Principle (see (43) below). The second and third options would incorrectly restrict the distribution of *kogo* to either genitive or accusative contexts respectively, but do not capture the fact that the forms are syncretic.⁵

Furthermore, regarding the illicit case mismatches without syncretism in (42), Citko attributes the ungrammaticality to the fact that ‘there is no single lexical item that can be inserted into this slot without a feature clash’ (2005:488). However, this is not a standard approach in DM, where Vocabulary Insertion relies on underspecification and the Subset Principle to regulate competition between exponents (43).

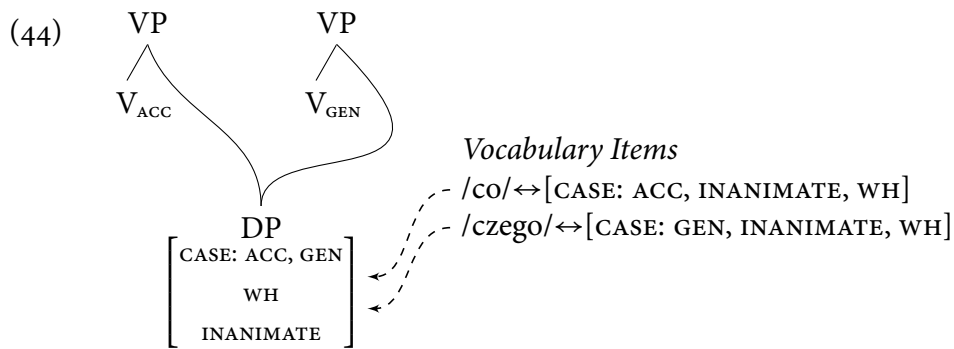
- (43) *Subset Principle* (Halle 1997; our emphasis):

The phonological exponent of a Vocabulary Item is inserted into a morpheme in the terminal string if the item matches *all or a subset of the grammatical features specified in the terminal morpheme*. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

Thus, if we have a terminal corresponding to an inanimate wh-phrase assigned both genitive and accusative, it is not true that we have a feature clash. Instead, the Subset Principle predicts that we should be able to insert either exponent since both fulfil the Subset Principle and are equally specific (44).⁶

⁵One would be forced to have multiple entries for *kogo*, which would reduce the syncretism here to accidental homophony, see Asarina (2011).

⁶Furthermore, the way the analysis in Citko (2005) is presented seems to suggest that inanimate wh-phrases involve the absence of an [ANIMATE] feature. If this is the case, then the single Vocabulary Item for *kogo* ‘who’ would realize the features [CASE:ACC,GEN,WH] and constitute a subset of the terminal in (i). Furthermore, it would count as equally specific for insertion (since it also realizes three features of the terminal; [CASE:ACC, CASE:GEN, WH] and should therefore also be an option for insertion here; clearly an undesirable result.)



Consequently, we would expect that there should not be a case matching requirement to begin with. We could get around the first problem by decomposing the privative case features ACC and GEN into smaller features such as $[\pm\alpha]$ and $[\pm\beta]$ such that $ACC:[+\alpha, +\beta]$ and $GEN:[+\alpha, -\beta]$. By specifying *kogo* for $[\pm\alpha]$ only, it would be compatible with $ACC:[+\alpha, +\beta]$ and $GEN:[+\alpha, -\beta]$, as well as a situation where a terminal bears both ACC and GEN, i.e. $[+\alpha, +\beta, +\alpha, -\beta]$. The second problem, however, remains. Even if we leave aside the conceptual question of how a terminal can bear $+\beta$ and $-\beta$ simultaneously, we would still expect that either $/co/ \leftrightarrow [+\alpha, +\beta]$ or $/czego/ \leftrightarrow [+\alpha, -\beta]$ could be inserted into a terminal with both genitive and accusative features $[+\alpha, +\beta, +\alpha, -\beta]$ in accordance with the Subset Principle (43). In order for the derivation with the inanimate wh-phrase to actually crash, one would have to introduce an *ad hoc* condition on Vocabulary Insertion, which demands that features on the VI are not in conflict with features on the terminal (which only ever seems to be the case in ATB constructions). Insertion of either $co \leftrightarrow [+\alpha, +\beta]$ or $czego \leftrightarrow [+\alpha, -\beta]$ would be precluded by their respective value of $[\pm\beta]$ conflicting with the value of $[\pm\beta]$ on the terminal ($[\pm\beta]$ on *co* conflicting with $[-\beta]$ on the terminal and $[-\beta]$ on *czego* conflicting with $[\pm\beta]$ on the terminal). However, going down this route entails giving up the Subset Principle, one of the core assumptions of DM.⁷

Alternatively, one could impose a ban against conflicting features on a terminal itself which would trigger a repair that deletes both conflicting features. Thomas (2015) actually pursues this alternative strategy. She proposes a rule of *Case Unification* defined in (45).

⁷Asarina (2011) proposes a different way of dealing with conflicting case values on a single terminal in a multidominance analysis. When an element with a given feature matrix is assigned a second, different value for the already valued case feature, the whole feature matrix is duplicated to accommodate that value. The element then has two feature matrices that differ only in the value for the case feature. As long as both matrices could potentially be spelled out by the same morphological rule (i.e. one that does not make reference to the distinct feature and is thus underspecified), the result is grammatical. However, even though the rule should actually be able to spell out both feature matrices only one exponent exists on the surface. In effect, this ties insertion of a VI into a terminal's feature matrix to a potential insertion of the same VI in the other feature matrix on the terminal even though that second insertion never actually happens. Roughly paraphrased: A VI may be inserted into a terminal with two feature matrices as long as it remains unclear which of the two it actually realizes. Thus, this leads back to the additional ban against a feature clash for vocabulary insertion: A VI may only be inserted into a terminal if it is not in conflict with any features on that terminal (even if they are in a different feature matrix). Another potential problem is that if syntactic objects are understood as being just bundles of features duplicating an element's feature matrix is the same as duplicating the actual element itself.

(45) *Case Unification*:

Every DP can only have one case, i.e. bear maximally one specification of each case subfeature ($[\pm\alpha]$ and $[\pm\beta]$ in our discussion). If this number is exceeded, the subfeatures must be reduced by:

- a. deleting all but one subfeature of a kind if they coincide in value (i.e. $[\pm\alpha]$ here) or
- b. deleting all subfeatures of a kind if instances with differing values are present (i.e. $[\pm\beta, -\beta]$ here).


In the case at hand, *Case Unification* would have to apply to the case specifications $\{+\alpha, -\beta\}$ and $\{+\alpha, +\beta\}$. According to (45a), one instance of $+\alpha$ is deleted resulting in $\{+\alpha, -\beta, +\beta\}$. According to (45b), both instances of β will be deleted. Thus, the output specification after application of (45) is $\{+\alpha\}$. Crucially, this specification is the same as the result of set intersection applied to both case specifications $\{+\alpha, -\beta\} \cap \{+\alpha, +\beta\} = \{+\alpha\}$, which is exactly the mechanism we argue to be responsible for why case mismatches can be repaired by syncretism. Importantly though, *Case Unification* is merely a post-hoc patch to account for the observed syncretism repair in ATB-movement and can be tacked onto any approach to ATB-movement that provides both case specifications on the moved DP. In contrast, in our approach, the very nature of ATB-movement involves intersection (of two moving DPs). The fact that syncretism can repair case mismatches (as long as at least some case subfeature is identical on both DPs) is thus just a welcome byproduct of the mechanism of ATB-movement and therefore, all else being equal, to be preferred over the patch solution.

3.1.5 **Parallel extraction**

The last approach is the most traditional one and assumes that we can simply extract from both conjuncts simultaneously (46) (e.g. Ross 1967; Williams 1978; Dyła 1984; Blümel 2014, 2017).

(46) *Parallel extraction approach to ATB*

What_{t₁} does [_{&P} [_{TP} John like t₁] and [_{TP} Mary hate t₁]] ?



For reasons that are still poorly understood (but see section 3.2.2), this particular kind of extraction can circumvent the *Coordinate Structure Constraint*, stating that extraction from a single conjunct is not possible (Ross 1967; Grosu 1973). Furthermore, it is unclear how moving two items can result in a single filler (cf. Weisser 2015:147; Blümel 2017). This has typically been handled by construction-specific rules (Ross 1967; Williams 1978), however this is something that the analysis to follow will explain. Since this approach is also symmetric, it shares with multidominance analyses the virtue of being able to explain single identity readings in ATB constructions.

Regarding the question of ‘repair by syncretism’, current parallel extraction approaches have to make some additional assumption or stipulation to derive it (e.g. Dyła 1984:702). For example, Blümel (2014, 2017) simply states the matching requirement as in (47b):

- (47) A movement chain must
- a. comprise non-distinct members (i.e. they must be featurally identical)
 - b. be headed by a syntactic object which receives an exponent compatible with all lower chain members.

(Blümel 2017:144)

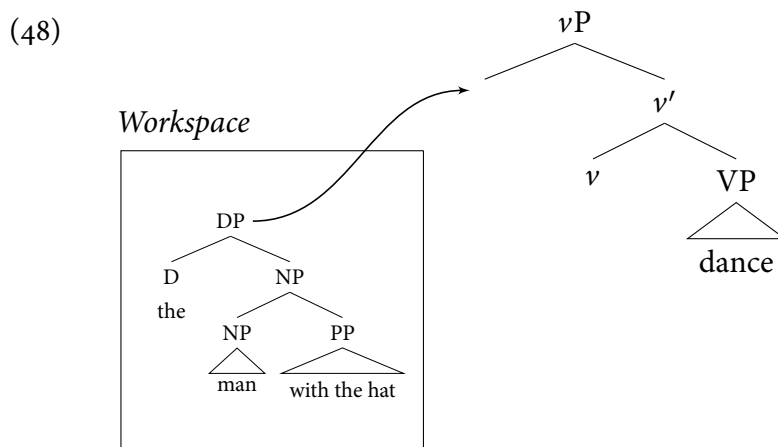
It is suggested by Blümel (2017:145) that (47b) follows from the assumption that Vocabulary Insertion must be able to apply, at least for the purposes of checking (47), to all members of a movement chain. This is superfluous, however, since these lower copies will later be deleted via Chain Reduction or some other process. Thus, it seems that the clause in (47b) is designed specifically to account for syncretism, and therefore constitutes the kind of tailor-made solution to the syncretism problem that we are trying to avoid.⁸ As the following sections will show, if we modify our conception of the nature of ATB-movement, we can find a way for the effect of syncretism on case matching to fall out naturally.

3.2 Theoretical assumptions

In the following, we propose an account of ATB dependencies that utilizes an intersection of the ATB-moved elements to create a single filler. In order to derive this, we will introduce new assumptions, or make some already existing ideas more explicit. The motivation for each of these assumptions will be discussed in turn.

3.2.1 Movement via an external workspace

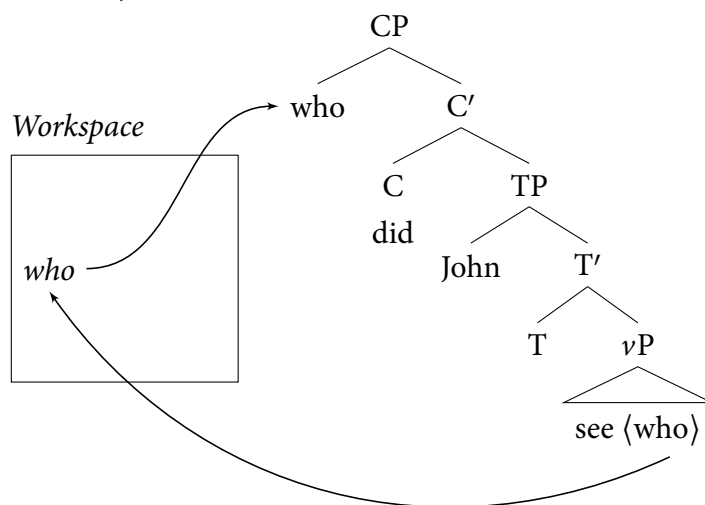
The existence of complex specifiers necessitates more than one workspace in a syntactic derivation. In (48), the complex subject *the man with the hat* undergoes External Merge with v' as its specifier, however, this complex DP must have been built somewhere other than the current workspace, i.e. from another numeration, see e.g. Nunes & Uriagereka (2000:22), Nunes (2004:174), Putnam (2007:99), Di Sciullo & Isac (2008:287), and Collins & Stabler (2016:47).



⁸What is more, if (47) were really a general condition on movement chains, it would seem to run into problems with instances of 'raising-to-accusative' in English (Postal 1974) or Sakha (Baker & Vinokurova 2010). The reason for this is that the featurally-impooverished lower copy would not be compatible with the exponent realizing accusative in the higher copy.

This existence of an additional workspace has been exploited by Nunes (2001, 2004) who assumes that it is possible for elements to undergo ‘sideward’ movement to another workspace of the local tree. Furthermore, there has been an effort to dispense with a separate operation for movement, and instead view movement as a kind of Merge (e.g. Chomsky 1995; Starke 2001). In particular, movement is assumed to be a variant of External Merge, with the difference being whether the target of the operation is included in the same workspace (Collins & Stabler 2016:48). Both operations have in common that they obey Chomsky’s (1995) *Extension Condition*, stating that Merge must apply at the root node (i.e. extend the tree). We claim that one natural way to capture this is to actually decompose Internal Merge into two steps: Sideward Movement & External Merge. In the Copy Theory of Movement, it seems that Internal Merge is already often (tacitly) assumed to consist of two steps: the first step creates a copy, and the second step involves External Merge of this copy at the root (this is made explicit in Putnam 2007, Stroik 2009 and Stroik & Putnam 2013:22; though see Chomsky 2013 for a different view). One question that is not often addressed is where exactly this moving copy is generated and stored. If there is to be no distinction between External and Internal Merge, then Internal Merge should always involve root merger of an item in a separate workspace. Thus, we assume that all instances of Internal Merge proceed in a two-step fashion as in (49): ‘sideward’ movement to an external workspace (creating a copy) followed by External Merge at the root node.

(49) Who did John see?



3.2.2 Parallel movement

Another assumption we make is that ATB involves parallel movement, that is, simultaneous movement from two distinct positions to a single landing site. However, it has been long noted that these distinct positions must, in some sense, be ‘parallel positions’ (Williams 1978; Franks 1993, 1995; Kasai 2004; Citko 2006). For example, ATB extraction from a subject and object position is not possible in (50) (despite *a man* being syncretic for nominative and accusative).

(50) *I know a man who [Bill saw t_1] and [t_2 likes Mary] (Williams 1978:34)

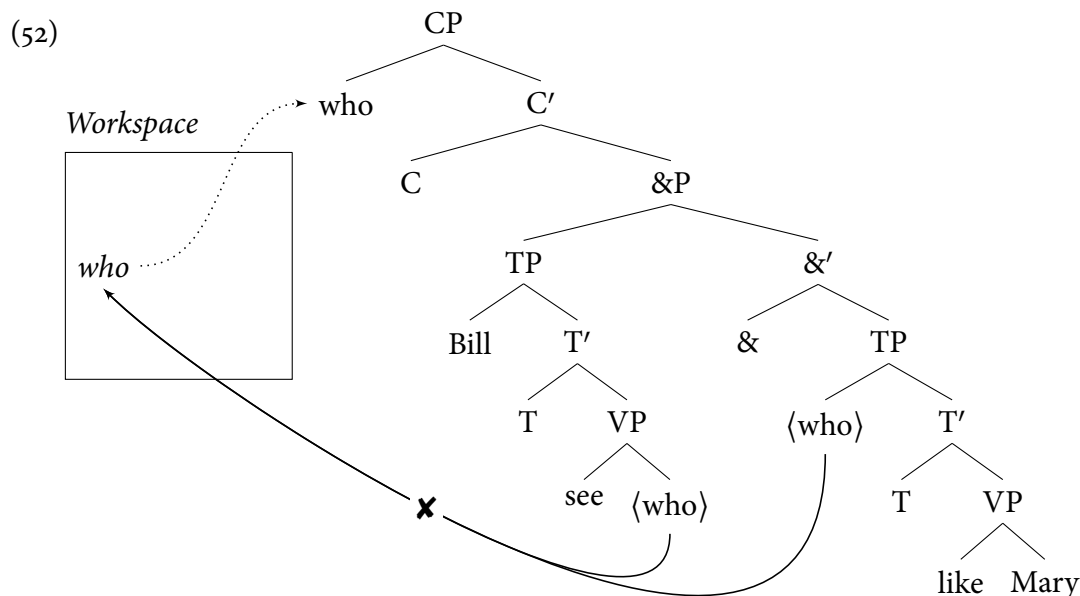
Furthermore, Franks (1993, 1995) discusses ungrammatical examples of ATB movement from

Russian, in which the case matching requirement is met, but the extraction is from different structural positions, and therefore illicit.

As discussed in section 3.1.2, in symmetric approaches like the present one, a derivational constraint such as (51) can easily be formulated to capture the parallelism requirement.⁹

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

With extraction out of both conjuncts proceeding simultaneously, at the point of extraction (i.e. merger of C and &P) the grammar can easily check whether both to-be-extracted elements are in parallel positions, where we interpret parallel to mean being a sister of the same category (i.e. T', v', or V). If they are in non-parallel positions, as is the case in (50), (51) prevents ATB movement (52).



It follows from parallel movement and the Parallelism Condition that ATB-movement from non-parallel positions is impossible even if the two moving items bear matching case, syncretic case, or no morphological case marking at all.

Parallel movement of two elements resulting in a single item seems to be restricted to coor-

⁹There are some examples, in which the parallelism condition appears to be flouted. One such example is from Williams (1978:34) in (i).

- (i) I know the man who [John likes ___] and [we hope ___ will win]

Here, it looks like we extracted from the embedded subject position, however since *hope* is a raising-to-object verb, we can assume that the position from which ATB-extraction takes place is Spec ν P in both conjuncts (Kasai 2004). This would also extend to cases of ATB-extraction of dative DPs from direct and indirect object position as in the German example (ii). Under the assumption that ν P constitutes a phase both dative DPs would individually have moved to Spec ν P prior to ATB-extraction due to the Phase Impenetrability Condition (Chomsky 2000, 2001).

- (ii) Wem hat sie [_{—DAT} geholfen] und [_{—DAT} etwas Geld gegeben]?
who.DAT has she helped and some money.ACC given
'Who did she help and give some money to?'

dinate structures (but cf. Vicente 2016 on some possible exceptions). A possible reason for this could be that it is a Last Resort option to circumvent the Coordinate Structure Constraint (CSC, Ross 1967) that militates against extraction from a single conjunct. If we take a representational view of the CSC as in (53) (see Mayr & Schmitt 2013:41, Weisser 2015:197f., but cf. Kato 2005), then no extraction can take place from a single conjunct at any point of the derivation. Crucially, by moving in parallel we avoid both of the configurations banned by (53):

(53) *Coordinate Structure Constraint* (Weisser 2015:197):

In a structure [_{&P} A [_{&'} B]], movement (out) of either A or B is prohibited:

*[α ... [_{&P} [_A t_α] & [_B β]]]

*[β ... [_{&P} [_A α] & [_B t_β]]]

Furthermore, this general approach can help to make sense of an interesting restriction on ATB movement reported by Kasai (2004) and Citko (2005, 2011). In multiple wh-fronting languages such as Polish, it is not possible to combine ATB extraction and multiple wh-fronting:

- (54) a. *Kogo₁ kogo₂ [_{TP} Jan lubi t_1] a [_{TP} Maria kocha t_2] ?
 who.ACC who.ACC Jan likes and Maria loves
 ‘Who does Jan like and Maria love?’
- b. *Kogo₁ komu₂ [_{TP} Jan lubi t_1] a [_{TP} Maria się przygląda t_2] ?
 who.ACC who.DAT Jan likes and Maria REFL looks.at
 ‘Who does Jan like and Maria look at?’ (Citko 2005:492)

As Citko argues, this follows under a multidominance approach. Under a movement-based approach, these examples serve to show us that parallel extraction (somehow resulting in a single filler) is the only way to leave a coordination structure since multiple ATB wh-fronting entails two separate extraction operations that each violation the CSC as defined in (53). Revealingly, multiple wh-fronting is possible only if each filler corresponds to two gaps:

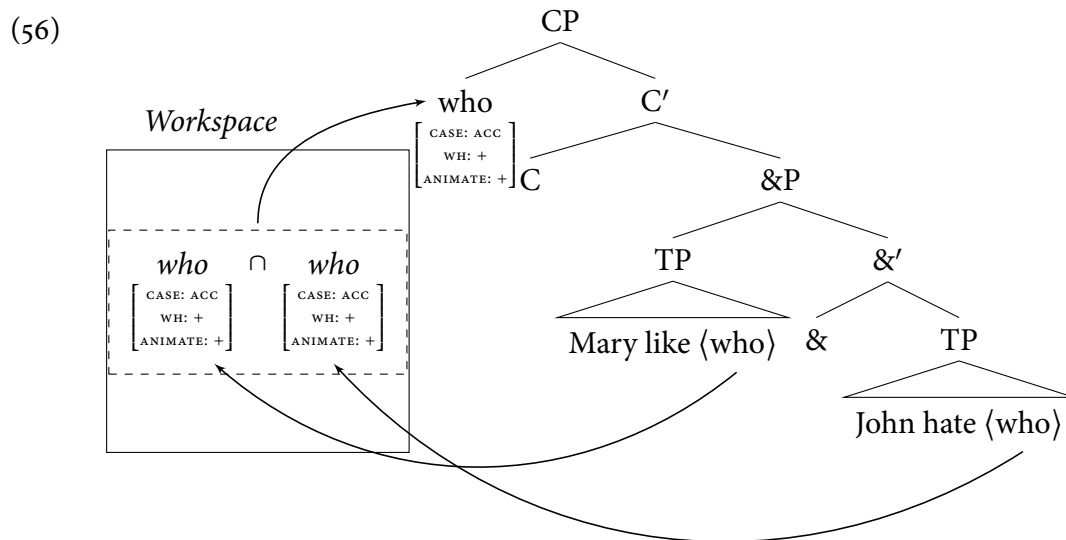
- (55) Co₁ komu₂ [_{TP} Jan kupił t_1 t_2] a [_{TP} Piotr wysłał t_1 t_2] ?
 who.ACC who.DAT Jan bought and Peter sent
 ‘What did Jan buy for whom and Peter send to whom?’ (Citko 2011:57)

As a result, even in languages with the option of multiple wh-fronting, extraction from a coordinate structure must involve parallel movement. How exactly this parallel movement results in a single filler is discussed in the following section.

3.2.3 Feature set intersection

In the previous section, we established our assumption that ATB movement proceeds in parallel to an external workspace, however, how does ATB extraction result in a single filler if two elements are moved simultaneously? We suggest that parallel movement to an external workspace results in set intersection of the feature sets of the moving elements. Recall that parallel sideward movement is viewed as a Last Resort solution to circumvent the CSC and is therefore not the norm. We assume that the external workspace has a restriction that it can hold a single moving

item.¹⁰ As a result of this restriction, something must happen if two items move in parallel. It seems we have two options: (i) intersection of feature sets, (ii) unification of feature sets. The latter option would run into the same problems shown for Citko's DM approach in section 3.1.4, since the *wh*-phrase would bear both case values in a unification approach. Thus, we assume that if more than a single item is moved (via the external workspace), intersection of the feature sets of these items must take place. In a simple example of ATB movement in (56), both *wh*-phrases (with matching feature sets) are intersected in the external workspace, resulting in a single *wh*-phrase bearing the same features as the two moved items. This single element then re-enters the structure at the landing site for ATB movement.



In this way, we can derive the asymmetric relation between fillers and gaps that is a hallmark of ATB dependencies. Furthermore, if the feature sets of the items do not intersect for a particular feature, for example animacy features with *who* ([animacy: +]) and *what* ([animacy: -]), then the value of that binary feature will be empty and thus result in a crash (given *Full Interpretation*; Chomsky 1995).¹¹ Example (56) is a somewhat trivial case, in which both of the intersected items have exactly the same features. However, as we show in the next section, this intersection operation has interesting, welcome consequences when cases do not match, but are syncretic.

3.3 Deriving case mismatches under ATB with syncretic forms

This section will illustrate how ‘repair by syncretism’ follows naturally in an intersection approach to ATB movement on the basis of the examples from Polish. To begin with, we decompose standard case features in Polish into the smaller binary subfeatures [subj(ect):±], [gov(erned):±], and [obl(ique):±] (Jakobson 1962; Bierwisch 1967; Wiese 1999; Alexiadou & Müller 2008) in (57).¹²

¹⁰Note that this does not imply that there is only one external workspace, we assume there are as many as needed. The important point is that parallel movement of two items to any of these workspaces will result in intersection. Also, regular movement of two items into two distinct workspaces is excluded by the CSC.

¹¹Note that we assume that features are represented as feature-value pairs, and that feature values are intersected. Thus, intersection of [animacy: +] and [animacy: -] will not lead to an empty set but to a set containing the feature [animacy:] with an empty value. An empty feature value for a feature will result in a crash.

¹²The exact labels we give the features are, to a certain degree, arbitrary as long as the decomposition derives the correct paradigmatic distinctions. However, for convenience, we adopt the conventional labels *subject:±*, *governed:±*

These three subfeatures together are understood to constitute the value of a complex CASE feature such that the exact featural representation of case is CASE: [SUBJECT:±, GOVERNED:±, OBLIQUE:±] (though see the *No Complex Values* hypothesis in Adger 2010). We assume that the value of CASE is not empty (i.e. does not violate the *Case Filter*) as long as at least one of its subfeatures has a value and that empty values of subfeatures per se do not lead to a crash. For ease of exposition, in the following we will refrain from writing out the CASE: part of the feature.

(57) *Polish case decomposition and wh-phrases*

Case	Decomposition	wh _{anim}	wh _{inan}
NOM	[subj:+ gov:- obl:-]	<i>kto</i>	<i>co</i>
ACC	[subj:- gov:+ obl:-]	<i>kogo</i>	<i>co</i>
GEN	[subj:+ gov:+ obl:+]	<i>kogo</i>	<i>czego</i>
DAT	[subj:- gov:- obl:-]	<i>komu</i>	<i>czemu</i>
INS	[subj:+ gov:- obl:+]	<i>kim</i>	<i>czym</i>
LOC	[subj:- gov:- obl:+]	<i>kim</i>	<i>czym</i>

Syncretism can then be captured by assuming that syncretic forms are underspecified and realize a feature that is present in both contexts. In other words, syncretic forms must have at least one feature in common (the one that the syncretic form realizes), i.e. their contexts' feature sets must overlap. For example, one can see in (57) that animate wh-phrases in the genitive and the accusative share the feature [gov:+]. Thus, the exponent *kogo* can be underspecified for only [gov:+, anim:+] and will therefore be inserted in both accusative and genitive animate contexts. We assume the following Vocabulary Items for Polish wh-phrases:

(58) *VIs for Polish wh-phrases*

Animate series

DAT	/komu/ ↔ [subj:- gov:- obl:- anim:+]
NOM	/kto/ ↔ [subj:+ gov:- obl:- anim:+]
INS,LOC	/kim/ ↔ [gov:- obl:+ anim:+]
ACC,GEN	/kogo/ ↔ [gov:+ anim:+]

Inanimate series

DAT	/czemu/ ↔ [subj:- gov:- obl:- anim:-]
GEN	/czego/ ↔ [subj:+ gov:+ obl:+ anim:-]
INS,LOC	/czym/ ↔ [gov:- obl:+ anim:-]
NOM,ACC	/co/ ↔ [obl:- anim:-]

Although ATB is independently assumed to involve intersection in order to derive the one-to-many relation we observe between fillers and gaps, we also see that this will derive the case matching data, in particular, repair by syncretism in the following way: If we try to ATB-move two wh-phrases with mismatching cases, those with an overlapping feature will result in a successful and *oblique:±* without attributing these any semantic relevance. They could easily be replaced by $\alpha : \pm, \beta : \pm, \gamma : \pm$.

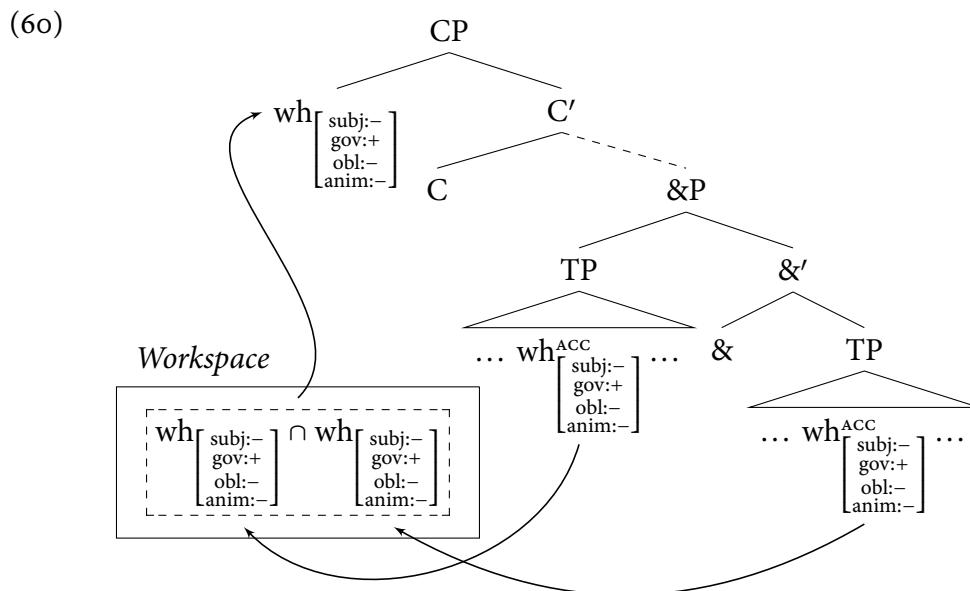
intersection and – provided that there is a suitably underspecified VI – will be realized by that VI. We will show this in detail in the following sections.

3.3.1 ATB with matching cases (no syncretism)

An example of an ATB dependency with matching cases is given in (59) where both verbs assign accusative case to an animate wh-phrase.

- (59) Co Janek widział ---_{ACC} a Maria lubiła ---_{ACC} ?
 what.ACC John saw and Mary liked
 ‘What did John see and Mary like?’

As we saw in previous sections, both wh-phrases move in parallel via the external workspace. Given the assumption this workspace can only hold one item, both items undergo feature intersection. Since in this case both items have exactly the same case features the newly formed item is identical to each of the two moving items, that is, it bears a fully specified accusative case. This new item is then merged from the external workspace into SpecCP.



At Spell-Out, only one of the four wh-vocabulary items from the inanimate series (61), namely *co*, is specified for a subset of the wh-phrase’s morphosyntactic features and therefore available for insertion. All other VIs are specified for at least one feature-value that is not part of the terminal. Hence, the accusative marker *co* is inserted as expected in accordance with the Subset Principle.

- (61) *Vocabulary insertion:*

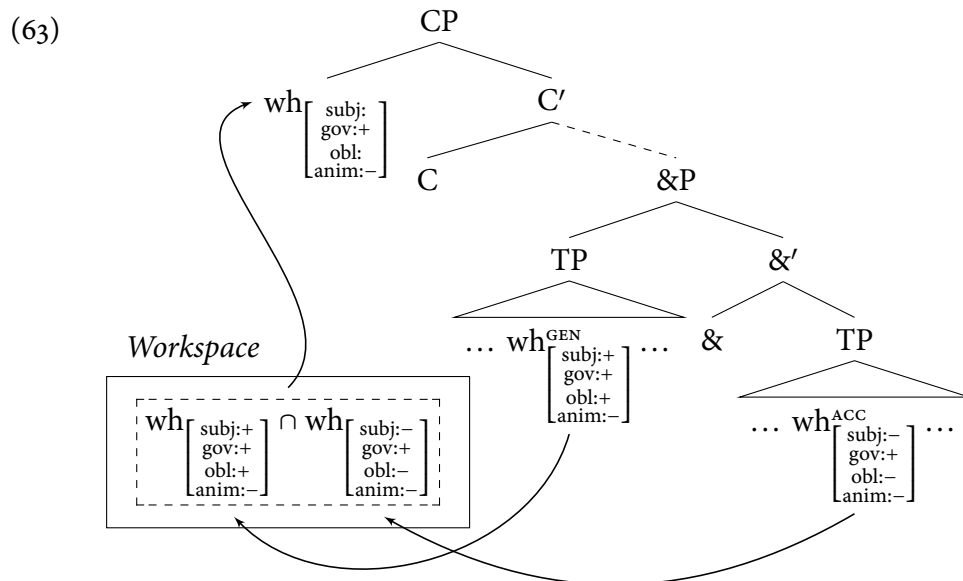
/czemu/ ↔ [subj:- gov:- obl:- anim:-] $\not\subseteq$ {subj:- gov:+ obl:- anim:-}
/czego/ ↔ [subj:+ gov:+ obl:+ anim:-] $\not\subseteq$ {subj:- gov:+ obl:- anim:-}
/czym/ ↔ [gov:- obl:+ anim:-] $\not\subseteq$ {subj:- gov:+ obl:- anim:-}
/co/ ↔ [obl:- anim:-] \subseteq {subj:- gov:+ obl:- anim:-}

3.3.2 ATB with mismatching cases (no syncretism)

Now consider an example like (62) where one verb assigns genitive and the other accusative. Because the wh-phrases for both cases are not syncretic, the resulting sentences are ungrammatical.

- (62) a. *Czego Jan nienawidzi _{—GEN} a Maria lubi _{—ACC}?
 what.GEN Jan hates and Maria likes
- b. *Co Jan nienawidzi _{—GEN} a Maria lubi _{—ACC}?
 what.ACC Jan hates and Maria likes
 ‘What does Jan hate and Maria like?’ (Citko 2005:487)

Again, as this is ATB movement, both wh-phrases move in parallel into the external workspace where they are intersected. In contrast to the above example with matching cases, there is a case mismatch between the moving items. The resulting single wh-phrase thus only bears values for those features which have the same value on both movees. These are features that accusative and genitive have in common plus the animacy (and wh) feature which are the same on both items. Since both cases differ in their value for [subj:±] and [obl:±] but have the same [gov:+] value the newly formed wh-phrase only bears a value for the latter together with the [anim:-] feature (63).



When vocabulary insertion takes place, none of the vocabulary items of the inanimate series fulfils the Subset Principle. All of them are specified for features like [subj:±] or [obl:±] which are not valued on the terminal. Hence, none of them can be inserted. For reasons of recoverability, however, a wh-phrase cannot remain unrealized at PF and the failure of vocabulary insertion results in a crash of the derivation which explains why (62) is ungrammatical.

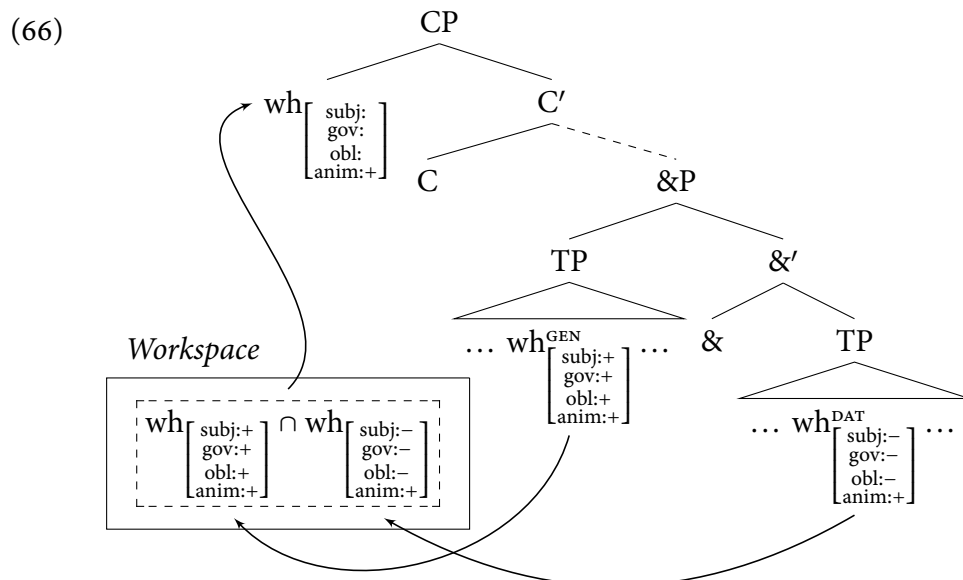
- (64) *Vocabulary insertion:*
- /czemu/ ↔ [subj:- gov:- obl:- anim:-] ∉ {gov:+ anim:-}
- /czego/ ↔ [subj:+ gov:+ obl:+ anim:-] ∉ {gov:+ anim:-}
- /czym/ ↔ [gov:- obl:+ anim:-] ∉ {gov:+ anim:-}
- /co/ ↔ [obl:- anim:-] ∉ {gov:+ anim:-}

3.3.3 ATB with mismatching cases (empty intersection)

In addition, there is another way in which a case mismatch can lead to a crash and, thus, ungrammaticality. Consider a case mismatch like (65) where one verb *nienawidzić* ‘hate’ assigns genitive and the other verb *ufać* ‘trust’ assigns dative.

- (65) a. *Kogo Jan nienawidzi _{—GEN} a Maria ufa _{—DAT?}
 who.ACC/GEN Jan hates and Maria trusts
 ‘Who does Jan hate and Maria trust?’
- b. *Komu Jan nienawidzi _{—GEN} a Maria ufa _{—DAT?}
 who.DAT Jan hates and Maria trusts
 ‘Who does Jan hate and Maria trust?’ (Joanna Zaleska, p.c.)

As in the examples discussed above, both wh-phrases move to the external workspace in parallel and a new single wh-phrase is created by intersecting both of them. However, since genitive and dative have different values for all three case features, the new item that is merged in SpecCP only bears a value for the animacy feature but remains unspecified for case (66).



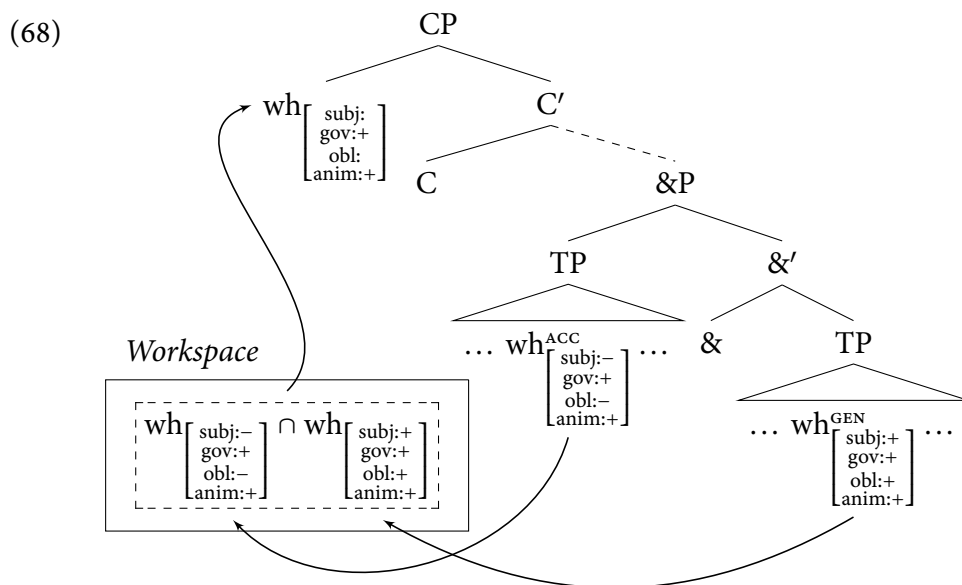
In other words, the newly formed wh-phrase has an entirely empty value for the CASE feature. Since there is no other case-assigner in the structure who at this point has not already assigned its case the item remains case-less until spell-out. A DP that does not have case, however, is in conflict with the Case Filter (or whatever constraint ensures that DPs have Case). The derivation leads to a crash after Spell-Out, due to unspecified case feature values e.g. *Full Interpretation* (Chomsky 1995).

3.3.4 ATB with mismatching cases (with syncretism)

The interesting case now concerns ATB movement with mismatching cases that happen to be realized by the same (syncretic) form. Consider the, by now familiar, case in (67).

- (67) Kogo Janek lubi _{—ACC} a Jerzy nienawidzi _{—GEN} ?
 who.ACC/GEN John likes and George hates
 ‘Who does John like and George hate?’ (Borsley 1983:170)

As usual, ATB movement proceeds via parallel movement to an external workspace where both wh-phrases are intersected to create a new single wh-phrase. Again, like in (63), accusative and genitive only have one feature-value in common which is [gov:+], while they differ in the values for the other two case features [subj:±] and [obl:±]. The new wh-phrase is thus specified for [gov:+] and, in contrast to (63), importantly also for [anim:+] instead of [anim:-]. The other features are unvalued.



In contrast to the inanimate series, the animate series of Polish wh-vocabulary items contains a VI that is syncretic for accusative and genitive. *Kogo* is underspecified for [subj:±] and [obl:±] in exactly the same way that the wh-terminal in SpecCP is. It therefore fulfils the Subset Principle and can be inserted. Since ATB and syncretism employ the same underlying mechanism, i.e. intersection of feature sets, a syncretic vocabulary item can repair a case mismatch in an ATB dependency.

- (69) *Vocabulary insertion:*
 /komu/ ↔ [subj:- gov:- obl:- anim:+] ∉ {gov:+ anim:+}
 /kto/ ↔ [subj:+ gov:- obl:- anim:+] ∉ {gov:+ anim:+}
 /kim/ ↔ [gov:- obl:+ anim:+] ∉ {gov:+ anim:+}
 /kogo/ ↔ [gov:+ anim:+] ⊆ {gov:+ anim:+}

One may wonder if it is possible for feature set intersection via ATB-movement to create an underspecified item that could be realized by a completely different exponent. An example of this would be ATB-movement of a dative and accusative DP resulting in an entirely different case such as instrumental, for example. However, this scenario seems unlikely. To appreciate this, consider the following abstract example that captures the spirit of the present approach. If

we have the paradigm in (70), then the distribution of A can be captured by underspecification for the feature [f:+] only. The forms B and C, on the other hand, will require full specifications (70b,c).

(70)		g:+	g:-	(71)	a. [f:+]	↔	A
	f:+	A	A		b. [f:-, g:+]	↔	B
	f:-	B	C		c. [f:-, g:-]	↔	C

As we saw, intersection of items bearing the mismatching features [f:+, g:+] and [f:+, g:-] will result in morphological realization by (71a). However, what if there was another, completely non-syncretic exponent that just happened to be underspecified for the features realized by the features shared by the intersected items. For example, if the feature sets corresponding to the forms B and C in (70) were intersected, then the result would be the feature value they have in common, namely [f:-], with [g:] going unvalued. If there were an exponent such as D in (72), then this could be inserted.

(72) [f:-] ↔ D

However, would this situation plausibly ever arise? This would be an instance in which there is a distinct, underspecified VI for a form that only occurs in ATB contexts. While it is possible to formulate such a lexical entry, the morphology of the language provides no cue to the learner to posit such a form.

A more plausible scenario, following common practice in Distributed Morphology, is that the form C is underspecified (73).

(73) [f:-] ↔ C

In case of an intersection yielding [f:-, g:], C would then be inserted. If this were possible, we would expect there to be instances of ATB-movement with mismatching cases, e.g. accusative and dative, where the moved item is always realized with one of the two, e.g. accusative. The entry in (73) instantiates a case of maximal underspecification, where Vocabulary Items are specified for as few features as necessary. As Pertsova (2007) shows, however, the most plausible learning algorithm yields minimally underspecified entries. The default entry is therefore maximally specified and each underspecification must be motivated by a syncretism in the paradigm in question. In order to arrive at (73), C would thus have to be syncretic, occurring in at least one other [f:-] context. Its occurrence in ATB-movement where intersection yields [f:-, g:] would then reduce to a standard case of repair by syncretism. If syncretism is not independently available in the grammar, underspecification as in (73) will be impossible and mismatches under ATB-movement will result in a failure of Vocabulary Insertion, as shown in section 3.3.2.

3.4 Intersecting complex elements

In the intersection analysis developed here, there still remains the question of how we can account for items with complex internal structure that undergo ATB-movement. For example, it is

possible to have ATB-extraction of complex elements such as *which book* in (74).

(74) Which book_i did [Mary read t₁] and [John throw away t₂] ?

This would seem to pose a challenge for a naïve theory of set-intersection since we would intersect of ‘nested sets’. To see this, let us assume that the wh-object *which book* corresponds to a set in (75) containing the sets corresponding to *which* and *book* (i.e. Merge is set formation; see e.g. Collins 2000, 2017; Chomsky 2013).

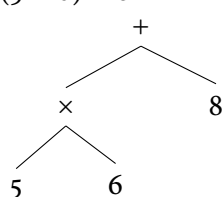
(75) *which book* = $\{\{D, ACC, \phi\}_{which}, \{D, ACC, \phi\}_{book}\}$

Furthermore, if each of these elements bears case feature values such as α , β and γ , then we want to intersect the elements of the sets corresponding to *which* and *book*, respectively (76).

(76) $\{\{D, \beta, \alpha, \phi\}_{which}, \{D, \beta, \alpha, \phi\}_{book}\} \cap \{\{D, \alpha, \gamma, \phi\}_{which}, \{D, \alpha, \gamma, \phi\}_{book}\}$
 $= \{\{D, \alpha, \phi\}_{which}, \{D, \alpha, \phi\}_{book}\}$

The issue here is that intersection must apply recursively to elements contained within a sets. While this may seem like an obstacle at first, it can be overcome by exploiting that the fact that set notation is equivalent to a hierarchical tree structure. In fact, applying arithmetic operations to elements with complex internal structure is often implemented by breaking the task down into sub-tasks that apply to an ordered, hierarchical structure. This is pointed out by Seuren (2015:146f.), who draws an explicit parallel to syntax. He argues that the complex equation in (77), in which the inner bracket must be computed first, can be understood in terms of the tree structure in (77).

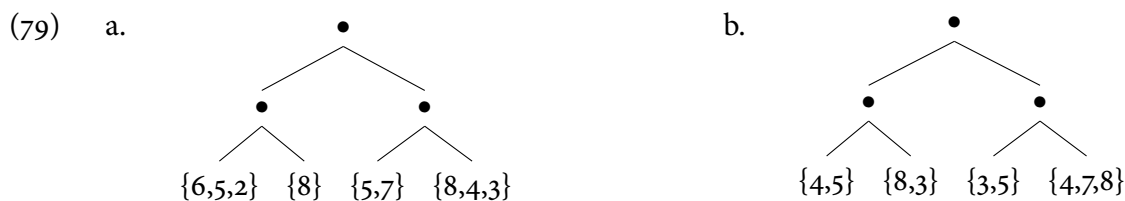
(77) $(5 \times 6) + 8$



We can take a similar approach to intersection of nested sets. Recall that the intuitive view of intersection we took involves taking two trees and building a new tree whose nodes correspond to the shared features of the relative nodes in the input trees. We can therefore treat nested set structures corresponding to complex syntactic structures as application of recursive intersection to a tree structure. Consider first an abstract example with natural numbers. Imagine that we want to intersect the two internally-complex sets in (78).

(78) $\{\{\{6,5,2\}, \{8\}\}, \{\{5,7\}, \{8,4,3\}\}\} \cap \{\{\{4,5\} \{8,3\}\}, \{\{3,5\} \{4,7,8\}\}\}$

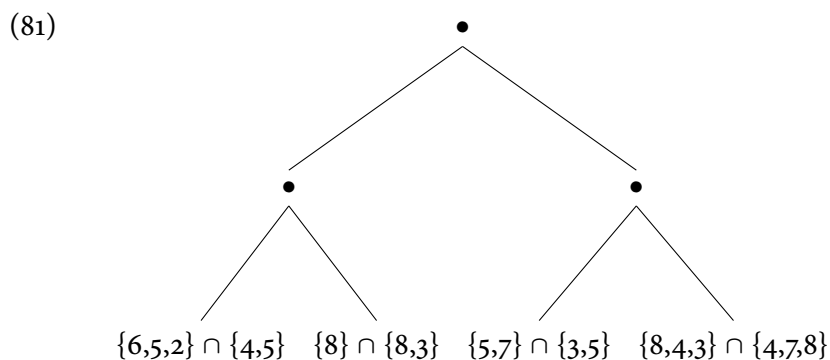
If we break down these sets into the corresponding tree structure in (79), then we treat intersection a top-down tree traversing algorithm similar to the *zipper* function in computer science (Huet 1997).



When ATB-movement creates a new tree from two existing trees \mathcal{T}_1 and \mathcal{T}_2 , one starts at the root node of \mathcal{T}_1 and then follows the path until a terminal node is found. The same number of steps applies to find the corresponding node in \mathcal{T}_2 . In the new tree (\mathcal{T}_3), the specification of this node is the intersection of the relevant nodes in \mathcal{T}_1 and \mathcal{T}_2 .¹³ For instance, in (79a), the algorithm starts at the root and, first, travels to the left daughter. It then proceeds to the right daughter of the current node arriving at $\{8\}$. Thus, the path \mathcal{P}_1 is $\mathcal{P}_1 = \langle \text{left}, \text{right} \rangle = \{8\}$. It then applies the same procedure to the tree in (79b), going down first left, then right, arriving at the terminal node $\mathcal{P}_2 = \langle \text{left}, \text{right} \rangle = \{8, 3\}$. Failure to find a matching node will result in abortion of the algorithm and therefore a crash. This is the case, if either there is no path $\mathcal{P}_2 = \mathcal{P}_1$, as in (80a), or $\mathcal{P}_2 = \mathcal{P}_1$ does not end in a terminal node, as in (80b).

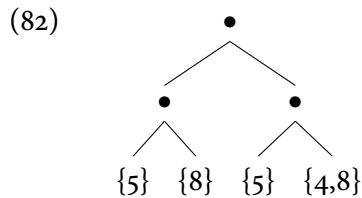


This means that if the trees do not match trivially (i.e. have parallel structures), intersection will be impossible. Recursive application of this algorithm to (79a) and (79b) will generate the tree in (81).



After intersection, we have the tree in (82) corresponding to the set $\{\{5\}, \{8\}\}, \{\{5\}, \{4,8\}\}$.

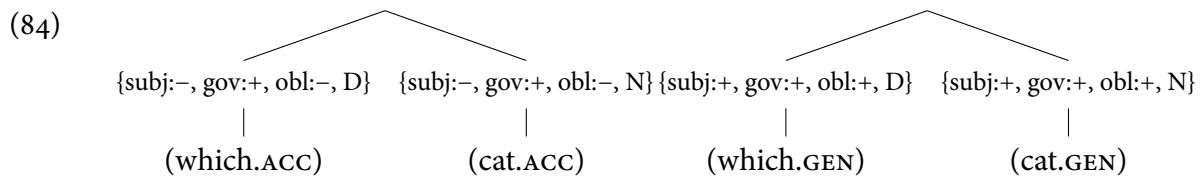
¹³Note that intersection could, in principle, apply at non-terminal nodes. We do not assume this for the syntactic trees in question, given the assumptions of Bare Phrase Structure (e.g. Chomsky 1995; Guimarães 2000). Furthermore, standard approaches to Distributed Morphology assume that Vocabulary Insertion only applies to terminal nodes, i.e. the ones undergoing intersection in the present analysis.



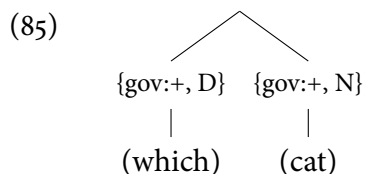
This approach will then also work for intersection of DPs with complex internal structure. In the Polish example in (83), a complex DP can undergo ATB-movement if both the determiners and NPs are syncretic in accusative and genitive (83).

- (83) Któr-ego kot-a Janek lubi _{ACC} a Jerzy nienawidzi _{GEN} ?
 which-ACC/GEN cat-ACC/GEN Janek likes and Jerzy hates
 ‘Which does Janek like and Jerzy hate?’

Let us assume that the two trees that are intersected involve a DP bearing accusative and genitive case respectively:



When these trees undergo parallel movement to the external workspace, a new tree is created by intersecting the relevant terminal nodes. This results in the derived tree in (85).



Given suitably underspecified Vocabulary Items such as those in (86) for the determiner, the terminal corresponding to a non-empty feature set can only be realized by an underspecified, i.e. syncretic, exponent such as the one in (86b).

- (86) a. /która/ ↔ [subj:-, gov:+, obl:-, fem:+]
 b. /którego/ ↔ [gov:+, fem:-]

The discussion in this section therefore demonstrates that the possibility of trees being internally complex is not a challenge to the intersection approach if we assume that intersection applies recursively to the relevant nodes of the trees themselves.

3.5 Right Node Raising

Finally, we will show how this analysis can be extended to case matching in the Russian Right Node Raising constructions discussed in section 2. Recall that Russian imposes the same case

matching condition on RNR as we find for leftward ATB extraction (87), and crucially this restriction can also be circumvented by syncretism (88) (Asarina 2011:174).¹⁴

- (87) *On ne ostavil —_{ACC}, tak kak emu nadoela —_{NOM}, *tarelk-a/-u* s chürnoj
 he not kept as him sick.of plate-NOM/-ACC with black
 kaëmkoj.
 border
 ‘He didn’t keep, as he was sick of, the plate with the black border.’

- (88) On ne ostavil —_{ACC}, tak kak emu nadoela —_{NOM}, *bljudc-e* s chürnoj
 he not kept as him sick.of saucer-ACC/NOM with black
 kaëmkoj.
 border
 ‘He didn’t keep, as he was sick of, the saucer with the black border.’

Before we proceed to the analysis of these constructions, a few remarks on the analysis of RNR are required. Right Node Raising is a notoriously heterogeneous phenomenon and it is unclear what its correct treatment is (cf. Bošković 2004; Abels 2004; Bachrach & Katzir 2009; Barros & Vicente 2011a; Larson 2012; Chaves 2014). Due its similarity to ATB extraction in terms of the asymmetry between fillers and gaps, similar proposals have been made for RNR: (i) ATB movement (e.g. Postal 1974; Sabbagh 2007), (ii) phonological ellipsis (e.g. Wilder 1997; Hartmann 2000) and (iii) multidominance (e.g. McCawley 1982; Gračanin-Yüksek 2013; Bachrach & Katzir 2009, 2017). The emerging consensus is that RNR is better viewed as a cover term for a group of superficially similar phenomena that correspond to a (proper) subset of the aforementioned analytical options (Barros & Vicente 2011a; Chaves 2014). Chaves (2014) assumes that RNR can involve ATB extraction and, while Barros & Vicente (2011a,b) do not argue in favour of an ATB analysis of RNR, they do not rule it out in principle (Barros & Vicente 2011a:46,fn.11). Furthermore, Sabbagh (2007) presents compelling arguments for a movement approach, for example the fact that a universal quantifier right-node-raised from a relative clause can out-scope an existential quantifier outside of that clause (89) (Sabbagh 2007:367).

- (89) John knows [someone [who speaks ___]] and Mary knows [someone
 [who wants to learn ___]] *every Germanic language*
 a. ‘There exist two people John knows such that one speaks every Germanic language
 and Mary knows one that wants to learn every Germanic language’ ($\exists > \forall$)

¹⁴Similar examples have also been discussed in the literature. For example, Zaenen & Karttunen (1984) discuss the Finnish example in (i) where the possessive suffix *-nsa* is syncretic for both genitive/nominative and singular/plural and thereby permits a mismatch (see Toivonen 2000 on some of the intricacies of the possessive suffix).

- (i) He lukivat hänen uusi-mm-an —_{GEN.SG} ja me hänen parha-at —_{NOM.PL}
 they read his new-SPRL-GEN.SG and we his best-NOM.PL
 kirja-nsa
 book-GEN.SG/NOM.PL
 ‘They read his newest book and we read his newest books.’

- b. ‘For every Germanic language, John knows a (potentially different) person who speaks it and Mary knows a person who wants to learn it’ (∀ > ∃)

One common objection to the movement approach to RNR is that it is not subject to the same constraints as other rightward processes such *Heavy NP Shift* (HNPS) (e.g. Bachrach & Katzir 2009:286). For example, HNPS is subject to the *Right Roof Constraint* (i.e. clause-boundedness; cf. Ross 1967) (90a), whereas RNR is not (90b).

- (90) a. *John claimed [_{CP} that Sam loves ___] yesterday *the new headmaster*.
 b. John claims [_{CP} that Sam loves ___] and Mary claims [_{CP} that Sam hates ___] *the new headmaster*

However, the fact that RNR differs from other rightward process is not problematic, in fact there is evidence that RNR is distinct from HNPS since the two processes interact as in (91) (Wilder 1997, also see Kluck & de Vries 2013 for similar Dutch examples).

- (91) [John bought ___] and [Mary put ___ in the fridge (___)] *two bottles of champagne*.
 (Wilder 1997:84)

In order not to violate the *Right Edge Restriction* requiring RNR gaps to be rightmost in the conjunct (Wilder 1997, 1999), the gap in the second conjunct must be to the right of the PP *in the fridge*, i.e. created by HNPS. Furthermore, Bachrach & Katzir (2009:289) present interesting evidence that RNR also interacts with wh-extraction. In (92), normally ungrammatical extraction out of a Complex NP Island is facilitated by first right-node-raising the DP *an article about which animal* and then sub-extracting *which animal*.

- (92) Which animal_i did John say that Mary knew [a man [who wrote ___]] and [a woman [who published ___]] *an article about t_i*?

Whereas this island-violating extraction would not normally be possible, Bachrach & Katzir (2009) show that wh-movement can be fed by RNR. Although it is possible to enrich multidominance analyses with extra machinery to capture this observation (as Bachrach & Katzir 2009 do, also cf. de Vries 2013), by far the simplest explanation is that RNR is (at least in some cases) a syntactic operation and can therefore interact with other syntactic processes (see Clapp 2008). In general, we agree that an ‘eclectic’ approach to RNR is necessary and that one of these options should be rightward ATB movement (Chaves 2014). Furthermore, we saw that multidominance and ellipsis accounts struggle to adequately capture the fact that syncretism alleviates case matching violations. This leads us to the conclusion that a movement-based analysis of RNR must be invoked for examples in which syncretism repairs case matching violations.

In the theory developed here, the repair effect of syncretism in (88) can easily be accounted for under the premise that Right Node Raising, at least in Russian, involves actual movement to the right.¹⁵ For concreteness sake, we assume that RNR is rightward adjunction to the closest

¹⁵As an anonymous reviewer points out, Polish RNR is different from Russian RNR as it readily tolerates case mismatches, with the raised constituent bearing the case assigned in the second conjunct. This only adds to the

node dominating both extraction sites (Sabbagh 2007:387).¹⁶ As for Polish above, we assume that case features in Russian are decomposed into smaller binary features. For concreteness, we adopt the decomposition in (93) proposed by Müller (2004).

(93) Russian case decomposition (Müller 2004:364):

Case	Decomposition
NOM	[subj:+ gov:- obl:-]
ACC	[subj:- gov:+ obl:-]
GEN	[subj:- gov:+ obl:+]
DAT	[subj:+ gov:+ obl:+]
INS	[subj:+ gov:- obl:+]
LOC	[subj:- gov:- obl:+]

In keeping with standard approaches to syncretism, and the one adopted above for Polish, Vocabulary Items can be underspecified for some of these case features in order to capture the relevant patterns of syncretism we find in the language. In Russian, while feminine nouns such as *tarelk-* ‘plate’ take different case markers in accusative (94a) and nominative (94b), the neuter noun *bljudc-* ‘saucer’ is marked by the same suffix in both cases.¹⁷

- (94) a. On ne ostavil tarelk-*u* / bljudc-*e*.
 he not kept plate-ACC saucer-ACC
 ‘He didn’t keep the plate/saucer.’
- b. Emu nadoel-a/-o tarelk-*a* / bljudc-*e*.
 him sick.of-FEM/-NEUT plate-NOM saucer-NOM
 ‘He’s sick of the plate/saucer.’ (Asarina 2011:174)

In order to capture the fact that /-e/ is inserted on neuters (specified as [fem:-,masc:-]) in both nominative and accusative environments, it is underspecified for case, realizing only the feature shared by the decompositions for nominative and accusative in (93), namely [obl:-] (95a). The exponents, which are specified as [fem:+,masc:-], have a full case specification for nominative (95b) and accusative (95c), and can therefore also be used with the relevant case.

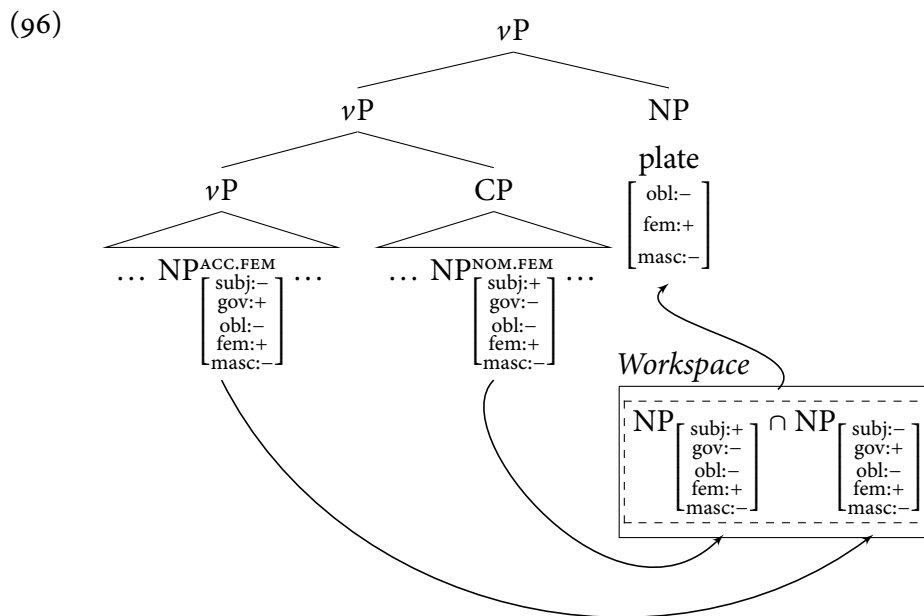
point that RNR is best seen as a cover term for different phenomena in different languages. It also serves to show that ATB and RNR do not necessarily involve the same syntactic process in a single language like Polish.

¹⁶Note that the RNR example here involves movement out of an adverbial clause. We assume that the adverbial clause is adjoined to ν P and the RNR-ed constituent adjoins above this node, as shown in the trees below.

¹⁷In reality, the situation for Russian is a little more complicated. Although there are three genders, these are distributed across four inflection classes that determine which case markers they combine with (see Müller 2004, Asarina 2011 and also Baerman et al. 2005:204). For now, we do not commit to a particular view on the encoding inflection class. It could be represented as a morphosyntactic features (cf. Alexiadou & Müller 2008), however this controversial since such ‘morphomic’ properties do not affect the syntax. If they were features, then the prediction would be that only items belonging to the same inflection class can undergo ATB-movement. For now, we leave this issue to future research.

- (95) VIs for relevant Russian case markers
- $/-e/ \leftrightarrow [\text{obl}:- \text{fem}:- \text{masc}:-]$
 - $/-a/ \leftrightarrow [\text{subj}:+ \text{gov}:- \text{obl}:- \text{fem}:+ \text{masc}:-]$
 - $/-u/ \leftrightarrow [\text{subj}:- \text{gov}:+ \text{obl}:- \text{fem}:+ \text{masc}:-]$

The derivation then proceeds analogously to the analysis of Polish ATB movement in the preceding section. First, the two nouns move from their respective base positions to an external workspace. Next, their feature sets are intersected to form a single set that is subsequently merged in clause-final position. For example (87) with *tarelk-a/-u* ‘plate’, the result of intersection is an NP bearing the features $[\text{obl}:- \text{fem}:+ \text{masc}:-]$ (96).¹⁸

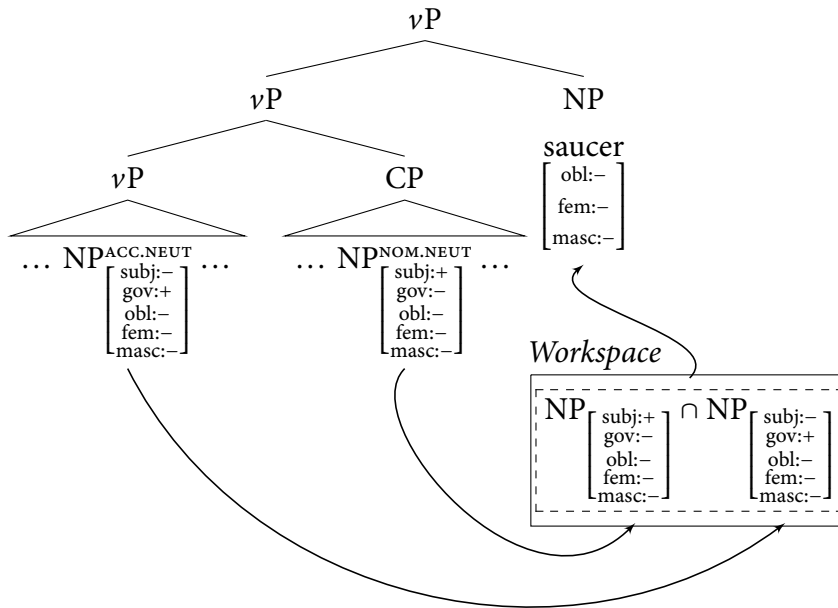


However, there is no VI in (95) that can be inserted into it in accordance with the Subset Principle. Both $/-a/$ and $/-u/$ have the right gender specification but their case features do not form a subset of the case features of the target node. Only the case features of $/-e/$ do so, however, $/-e/$ bears conflicting gender features, i.e. it is specified for $[\text{fem}:-]$ while the target is specified for $[\text{fem}:+]$. According to our assumptions, this leads to a crash in the derivation.

In contrast, the case matching requirement can be circumvented if the moved noun has neuter gender like *bljudc-e* ‘saucer’, where nominative and accusative are realized by the same syncretic marker. Here, the newly formed item bears the features $[\text{obl}:-, \text{fem}:-, \text{masc}:-]$ (97).

¹⁸Following Bošković (2008) and Despić (2013), we assume that Russian, as an articleless language, does not project a DP layer.

(97)



The Vocabulary items /-a/ and /-u/ are both not suitable for insertion because they do not fulfill the Subset Principle (due to having additional case features) and have conflicting gender features ([fem:+] vs. [fem:-]). However, the underspecified VI /-e/ can be inserted as it realizes the neuter gender features and, due to its syncretism in nominative and accusative, is specified only for the case feature that both nominative and accusative have in common ([obl:-]). As a result, intersecting two neuter NPs with mismatching cases results in an item that is compatible with the case marker /-e/.

4 Conclusion

In this paper, we have discussed how one can derive the fact that case matching requirements in ATB constructions can be circumvented by syncretism. On the face of it, these data seem to be incompatible with a postsyntactic view of morphology since morphological form seems to play a role in the licensing of ATB movement. Whereas existing approaches either simply restate ‘repair by syncretism’, or invoke some additional construction-specific resolution mechanism, we have shown that repair by syncretism follows an intersection-based approach to ATB-movement. On this view, intersection is the mechanism independently required to derive the one-to-many signature of ATB dependencies. Once intersection is established as the core mechanism for deriving ATB, the effect of syncretism on alleviating case mismatches falls out naturally (given an underspecification approach to syncretism), rather than having to be stated additionally as in alternative analyses. This is because, in order to intersection to be successful, the intersected items must share some case features. Furthermore, it is these same shared features which are also referred to in underspecification approaches to syncretism. Thus, intersecting non-matching cases will only be successful if there happens to an underspecified exponent that can realize the resulting item. In particular, we have focussed on the classic facts of syncretism repair with ATB movement in Polish. While an extension to other languages showing this effect may entail a different case decomposition (as the patterns of syncretism will most likely differ), the basic mechanism

will remain the same.

There are also other constructions in which case matching effects have been reported. For example, in free relative clauses (Gross & van Riemsdijk 1981; Vogel 2001; Trommer 2002; van Riemsdijk 2006; Himmelreich 2017). As the following examples from Schütze (2003:300) shows that only the form *was*, which is syncretic for nominative and accusative, is possible if the free relative requires a different case to the matrix verb:

- (98) a. *Ich zerstöre_{ACC} [_{CP} *wer* / *wen* mich ärgert_{NOM}]
 I destroy who.NOM who.ACC me.ACC annoys
 ‘I destroy who(ever) annoys me.’
- b. Ich zerstöre_{ACC} [_{CP} *was* mich ärgert_{NOM}]
 I destroy what.NOM/ACC me.ACC annoys
 ‘I destroy what(ever) annoys me.’

The question is can this effect of syncretism be unified with the repair effect in ATB-movement? It seems difficult to conceive of how free relatives could be viewed as the result of an ATB-movement chain. Instead, it is likely that these constructions are due to multiple case assignment to the same DP (i.e. the head of the relative clause) (cf. McCreight 1988). This kind of multiple case assignment to the same position is also what is assumed in a multidominance approach to ATB-dependencies. It would thus be tempting to entertain a multidominance analysis of ATB as it is potentially able to account for why case matching and the repair effect of syncretism are the same in ATB and free relatives: Because both involve multiple case assignment. However, as we have argued in section 3.1.4, in such an approach, we require some additional mechanism to remove conflicting features. Furthermore, there is the empirical issue that in instances of multiple case assignment (that are neither ATB nor free relatives), it often results in multiple exponence or ‘case stacking’ rather than resolution (e.g. Richards 2013; Levin 2017). In fact, Assmann et al. (2014) show that this can even result in a different case exponent entirely, e.g. genitive and accusative resulting in ablative, something that has never been reported to occur in ATB or free relatives.

We also find what looks like a case-matching effect with parasitic gaps, however as section 3.1.1 showed, there are so many asymmetries between PG and ATB-constructions that a theoretical unification seems unwarranted. It therefore may not be that there is a single account of all case matching effects, but in fact that they turn out to be more heterogeneous. For now, we will have to leave this point to future research, however.

In sum, this paper shows that a parallel movement approach to ATB movement, which has fallen out of favour in recent times, is superior to other approaches when it comes to deriving ‘repair by syncretism’ when framed in terms of intersection. In such an approach, both the asymmetric relation between fillers and gaps and the fact that only an underspecified, syncretic exponent can realize the result of extraction of non-distinct elements follows from the nature of the mechanism for ATB-movement itself. Of course, it is always possible to enrich other theories with further operations (e.g. intersection of feature sets) to derive the syncretism fact, but we have seen that this comes for free in the present approach, where intersection is independently

assumed to be the central mechanism for deriving ATB constructions.

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