What's in a phase label:
Toward a formal theory of syntax features at the syntax-semantics interface[*]

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1   Features in the label

With the rise of the Minimalist Program (Chomsky, 1995, and following work), the focus of syntactic investigation has shifted toward features and their bundles. Yet, there are still many unanswered questions about feature representations and their bundling throughout the derivation. At the very core of our theorizing, we assume that a larger structure is represented by a label of its maximal projection or a phase (e.g., Chomsky 2013, 2015) but we do not have a good theory of which features form a label and what happens if there is more than one feature of the same type present in the search domain of a label. This paper directly addresses the question of labeling by investigating narrow-syntax features at the syntax-semantics interface.

While substantial attention has been paid to features at the syntax-morphology interface, especially within the Distributed Morphology framework (e.g., Halle and Marantz 1993; Embick and Noyer 2007), we know very little about what happens to syntactic features at the syntax-semantics interface. This paper entertains the idea that narrow-syntax features are computed by the syntax-semantics interface in a manner parallel to the computations of overt syntax features at the syntax-morphology interface. Specifically, I argue that the syntax-semantics interface forms new feature bundles during spell-out. These interface bundles become part of the label of the spelled-out phase; their primary purpose is to make narrow-syntax features legible to the external interpretive module.

Even though the mapping of narrow syntax features onto interface feature bundles is direct, the new bundles are a new type of object, and the mapping operations are parallel to those assumed in the Distributed Morphology framework for morphologized structures. The proposal is

firmly rooted in the Y-model. The guiding idea is that only features present in narrow syntax can contribute to the formation of these interface bundles. Thus only syntax builds structures. The role of interfaces is to interpret these structures and make them legible for the purposes of externalization. Importantly, at no point during the interface bundle formation, the grammar can use compositional-semantics input. Furthermore, there is no guarantee that the mapping of narrow-syntax features onto denotations is isomorphic. Thus more than one narrow-syntax feature can form an interface-bundle with an atomic semantic interpretation.

The empirical core of the paper concerns syntactic properties of associative constructions in Czech. As we will see, these constructions exhibit unusual correlations among four grammatical properties that do not form an obvious class, namely, variable agreement in the domain that otherwise does not allow a variable agreement, an obviation of biding Condition A in an environment that otherwise displays strict Condition A properties, blocked *wh*-movement from a domain that otherwise allow *wh*-extraction, and Person-Case Constraint (PCC) violation in a domain that otherwise does not display sensitivity to PCC. I argue that these unexpected correlations arise via a structural relationship with the hypothesized interface-bundle formation in the label of a phase head.

The proposal not only provides a principled explanation of unexpected correlations discussed in the paper, but it also restricts when and where in the derivation such correlations can arise. Specifically, I argue that before spell-out, the label of the phase contains only features projected from narrow syntax. As part of spell-out of a phase, the phase is labeled by the conceptual-intentional (CI) interface and the complement of the phase-head is sent to the the sensorymotor (SM) interface (Chomsky, 2013, 2015). The formation of new feature bundles arises during the labeling by CI. Crucially, the edge of the phase including the label, remains accessible to narrow syntax operations of the next phase. Thus, any syntactic operation that takes place after the spell-out of the complement of the phase head accesses a phase label that contains both features projected within narrow syntax and newly formed interface bundles. Syntactic operations that take place before the phase is labeled by CI can only refer to narrow-syntax features.

The paper thus has two goals: (a) to provide an empirical argument for a mechanism of syntax-semantics interface bundle formation and (b) to build a corresponding fragment of a grammar as a proof of concept. Section 2 introduces the data pattern that will motivate the proposal. Section 3 zooms on binding and agreement correlations, and identifies the syntax-semantics-interface feature formation that is the locus of these unexpected correlations. Section 4 offers a formal model of rebundling features at the interface, and explores further empirical predictions the theory makes.

2   Syntactic properties of comitative constructions

Czech comitatiave constructions (henceforth, CC)[1] are formed by a noun phrase accompanied by an associative prepositional phrase headed by *s(e)* 'with,' as in (1).[2] Despite the appearance of being

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[1] The most comprehensive overview of Czech comitative constructions can be found in Skrabalova (2003, 2004).

[2] In Czech a mono-consonantal preposition forms a phonological word with the following lexical item. Such a preposition gets vocalized (i.e., *s* → *se*) in environments that would otherwise violate phonotactic constraints on consonantal cluster formation.

a modification structure, the construction is interpreted as if it were a coordination.[3] Furthermore, even though the head noun is in the singular, the modified nominal structure can trigger plural agreement.[4]

(1) Petr s   Marií čekali   v čekárně.
    Petr with Marie waited.PL in waiting_room
    'Petr and Marie waited in the waiting room.'

One might hypothesize that the construction is a form of coordination, i.e., the preposition 'with' is a conjunction head in a morphological disguise. We will see that reducing comitative constructions to coordination structures is not tenable because comitative constructions do not syntactically behave like coordination structures. In fact, the construction displays a range of syntactic properties otherwise unattested in nominal constructions in Czech, namely, a variable agreement, restrictions on *wh*-movement, a person-case constraint sensitivity, and a lack of complementary distribution of anaphors and pronouns. These properties will be critical for our investigation of syntactic features at the syntax-semantics interface.

Before we can demonstrate that comitative constructions are meaningfully different from other DPs in Czech, we first have to firmly establish that they form a constituent and that this constituent is a DP.

Suggestive evidence that the nominal, which I will call a focal noun,[5] and the PP form a constituent comes from that the comitative reading and plural agreement arise only if the associative PP is linearly adjacent to the focal noun, (2). If the associative PP is not adjacent to the focal noun, the sentence is grammatical but the reading is that of VP-modification, and the agreement is singular, as in (3).[6]

(2) Petr (s   Marií) čekali   *(s Marií) v čekárně   *(s Marií).
    Petr with Marie waited.PL with Marie in waiting_room with Marie

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[3]Czech also has so called pronominal associative constructions. They have the form of 'DP with PP' as well but the DP is a morphologically plural pronoun, interpreted as singular. I.e., the form 'we with Peter' means 'Peter and I'. I discuss this related construction in the appendix A.

[4]To set up the scene, I use comitative constructions with proper names in order to avoid an NP-adjunction reading (as in 'a man with a hat'). Although an NP-adjunction reading is in principle possible with proper names as well, in most contexts it is dispreferred.

[5]I call the noun focal in order to recognize that the PP is in some sense subordinate to the noun. The subordination is based on a pre-existing or accommodatable relationship between the individual denoted by the focal nominal and the nominal embedded in the associative PP (see, e.g., Skrabalova 2003, 2004 for a discussion of pragmatic considerations). The relationship must hold within the situation the proposition describes. Thus any lexical combination is in principle possible, as long as (a) the relationship between the individuals denoted by the focal noun and the PP is accommodatable or already supported by the context, and (b) both nominals denote sentient individuals.

[6]The difference in interpretation is subtle but clearly detectable with a class of predicates resistant to the accompaniment reading, e.g., 'hate' (cf. Vassilieva and Larson 2005), as in (i).

(i)   a.   Petr s   Marií nesnášejí brokolici.
             Petr with Marie hate.PL   broccoli
             'Peter and Mary hate broccoli.'
       b.   #Petr nesnáší brokolici s   Marií.
             Petr hate.SG broccoli with Marie
             '#Peter hates broccoli with Mary.'

'Peter and Mary waited in the waiting room.'

(3) Petr *(s Marií) čekal/ *čekali (s Marií) v čekárně (s Marií).
Petr with Marie waited.M.SG/ waited.PL with Marie in waiting_room with Marie
'Peter waited in the waiting room with Mary.'

Since Czech is a scrambling language, we have to ensure that adjacency is not a consequence of information-structure-related reordering. The example in (4) demonstrates that in Czech a VP adverbial cannot surface between the subject and the inflected verb in an informationally unmarked word order but only in contrastive-focus utterances, (5).[7] The comitative example in (2) is in a neutral word order. The adjacency requirement thus cannot arise from reordering of a VP modifier.[8]

(4) Chlapec ??/*(k domovu) tancoval (k domovu) v pondělí.
boy toward home danced toward home in Monday
'A/the boy danced (on the way) to his home on Monday.'

(5) a. Did you say that the boy danced toward his home on TUESDAY?
b. No! Chlapec k DOMovu tancoval V PONdělí.
no boy toward home danced in Monday
'No. As for his home, he danced toward it on MONDAY.'

Additional evidence that the focal noun and the PP in a comitative construction form a constituent comes from topicalizations. As we see in (6), topicalization targets both the focal noun and the PP. The corresponding resumptive pronoun is plural and refers to the fronted constituent as a unit.

(6) a. Petra s Marií, ty jsem teda nikomu nepředstavil.
Petr.ACC with Marie, those.ACC am for_sure nobody.DAT not-introduced
'As for Peter and Mary, I certainly didn't introduce them to anyone.'
b. Petra, *ty/toho jsem s Marií teda nikomu nepředstavil.
Petr.ACC, those.ACC/him.ACC am with Marie for_sure nobody.DAT not-introduced
'As for Peter, I certainly didn't introduce him to anyone with Mary.'

The topicalization example in (6) also indicates that the constituent is a DP because the fronted constituent is a direct object and the resumptive pronoun can only refer to individuals. The conclusion that comitative constructions are DPs is further confirmed by the fact that a comitative construction can be a fragment answer to a *who*-question, (7-b), and coordinated with another DP, as in (7-c).

(7) a. Kdo přišel na večírek?
who came to the party
'Who came to the party?'
b. Petr s Marií.
Petr with Marie
'Petr and Marie.'

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[7]The example is constructed to mimic the metric structure of the comitative example in (2) in order to avoid other prosodic confounds.

[8]See Kučerová (2007) and the literature cited there for tests how to determine basic word order in Czech.

c. Petr s Marií, a Lucie.
Petr with Marie and Lucie
'Petr and Marie, and Lucie.'

The rest of this section demonstrates that even though comitative constructions are DPs they do not syntactically behave like other DPs in Czech.

The first fact to note is that predicate agreement with a comitative construction is variable. While some speakers have a preference for plural agreement, all speakers find both singular and plural agreement acceptable with the intended interpretation, (8).

(8) Petr s Marií čekal/ čekali v čekárně.
Petr with Marie waited.M.SG/ waited.PL in waiting_room
'Petr and Marie waited in the waiting room.'

The agreement variability is puzzling because in Czech, predicate agreement is exclusively based on ϕ-features of nominative nominals.[9] The only exception is agreement with DP conjunctions as Czech allows first-conjunct agreement. However, even with conjunctions, agreement optionality is restricted to the base-generated subject position. In a derived subject position, agreement must be plural, (9). In the examples of comitative constructions we have considered so far, the comitative is not in its base-generated position, and yet agreement remains variable. We can conclude that agreement variability is an intrinsic property of the construction, independent of subject-hood.

(9) a. Petr a Marie *čekal/ čekali v čekárně.
Petr and Marie waited.M.SG/ waited.PL in waiting_room
b. V čekárně čekal/ čekali Petr a Marie.
in waiting_room waited.M.SG/ waited.PL Petr and Marie
'Peter and Mary waited in the waiting room.'

Yet, in one crucial respect comitative constructions behave like conjunctions but still differ from other DPs. As demonstrated in (10) and (11), nominal adjuncts and complements can be freely *wh*-extracted in Czech.

(10) Čeho je Petr studentem? Matiky.
of-what is Peter student math
'What is Peter a student of? Of math.'

(11) S čím chcete ty koblihy? S marmeládou.
with what you-want those doughnuts with jam
'What doughnuts do you want? With jam.'

In contrast, a comitative PP cannot be *wh*-extracted without the associative reading being lost, (12). In order to ensure we test the comitative construction, despite the changes in the linear order

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[9]Czech thus differs from Russian, a language most frequently studied with respect to its comitative constructions (e.g., McNally 1993; Feldman 2001; Ionin and Matushansky 2002; Vassilieva and Larson 2005). Russian allows a switch to 'semantic' agreement in local Agree environment, i.e., between a subject and its predicate, for example with numeral constructions (e.g., Babyonyshev 1997; Pereltsvaig 2006). In Czech, local Agree is strictly based on the ϕ-features of the probe. Neither Czech, nor Russian has *committee*-type nouns attested in some English dialects.

and information structure, the example uses predicate 'hate' which semantically excludes a VP-modification reading of the PP, . As we can see in (13), the focal noun cannot be *wh*-extracted either.

(12) a. *S   kým   Petr nesnášejí brokolici?
          with whom Petr hate.PL   broccoli
          '*Who does Peter and *t* hate broccoli?'
      b. #S   kým   Petr nesnáší brokolici?
          with whom Petr hate.SG broccoli
          '#With whom does Peter hate broccoli *t*?'

(13) *Kdo s   Marií nesnášejí brokolici?
      who with Marie hate.PL   broccoli
      '*Who and Marie hate broccoli?'

Thus with respect to *wh*-extractions comitative constructions behave like coordinations. However, there are two other syntactic properties that clearly separate comitative constructions from coordinations. The first fact concerns person and category restrictions on comitative constructions. As seen in (14), the associative PP cannot be pronominal.

(14) a. *Petr se   mnou/ s   tebou/ s   ním šli   do kina.
          Petr with me/   with you/   with him went.PL to cinema
      b. *Petr se   mnou jsme   šli   do kina.
          Petr with me   aux.1PL went.PL to cinema
      intended: 'Peter and I/you/he went to the movies.'

There is only one other structural position in which strong pronouns are banned in Czech, namely, a direct object. Instead, a repair strategy, be it focus or a raised smaller structure (a weak pronoun or a clitic, instead of a strong DP pronoun), must be used, as in (15-b) and (15-c).[10]

(15) a. *Petr viděl mne/ tebe/ jeho...
          Petr saw me/   you/ him
      b. Petr viděl MNE/ TEBE/ JEHO...
          Petr saw me/   you/ him
          'Petr saw ME/ YOU/ HIM....'
      c. Petr mně/ tě/   ho... viděl.
          Petr me.CL/ you.CL/ him.CL   saw
          'Petr saw me/ you/ him....'

This restriction on objects has been characterized in terms of the person case constraint (PCC; e.g., Anagnostopoulou 2003, 2005; Béjar and Rezac 2003; Rezac 2008; Pancheva and Zubizarreta 2017), and Czech has been classified as a strong PCC language, i.e., in a local domain the structurally less accessible DP cannot be lower on the person hierarchy than the structurally more accessible DP (Sturgeon et al., 2011, and references cited there).[11] I argue that the ban on pronominals

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[10]See Béjar and Rezac (2003) for other cases in which focus and movement systematically repair PCC violations.

[11]This classification has been disputed in Bhatt and Šimík (2009) but the counter-examples brought forward suggest that some form of logophoricity is likely at play. See Pancheva and Zubizarreta (2017) for a relevant proposal.

in comitatives results from the PCC. Note that no such ban is attested in other DPs and related constructions. No such restriction on person and category holds for when the PP is a VP-modifier, (16), neither is the ban attested in coordinations, (17).

(16)   Petr šel   se mnou do kina.
           Petr went.SG with me   to cinema
           'Peter went to the movies with me.'

(17)   a.   Petr a   já jsme   šli   do kina.
                Petr and I aux.1PL went to cinema
        b.   Já a   Petr jsme   šli   do kina.
                I   and Petr aux.1PL went to cinema
           'Peter and I went to the movies.'

Finally, unlike coordinations, comitative constructions are not recursive, (18). Yet, as previously observed by Feldman (2001), they may be embedded within a recursive coordination structure, (19), which is unsurprising if comitative constructions are DPs.

(18)   *Petr s   Marí s   Lucií šli   do kina.
           Petr with Marie with Lucie went to theater
           intended: 'Petr, Marie and Lucie went to the movies.'

(19)   Petr a   Marie s   Lucií šli   do kina.
           Petr and Marie with Lucie went to theater
           'Petr, Marie and Lucie went to the movies.'

To conclude, comitative constructions have a syntactic distribution of regular DPs but unlike other DPs they systematically show agreement optionality. They are similar to coordinations in their interpretation and the restriction on *wh*-extractability, but, unlike coordinations, they show strong PCC effects and their formation is not recursive. The table in (20) summarizes the range of unexpected properties comitative constructions display and compares them with coordinations and other DPs in Czech.

(20)

	comitatives	coordinations	other DPs
variable agreement?	yes	no	no
wh-extractions?	no	no	yes
PCC?	yes	no	no
recursion?	no	yes	no

While associative constructions have been extensively studied across Slavic, to my knowledge none of the existing proposals takes into account the full set of data reported here. Instead, they concentrate on associative semantics, conjunction-like interpretation and agreement. In turn, the proposals fall short when the complete empirical picture is considered. For this reason, I discuss the approaches briefly, highlighting their main contribution.

    Older approaches, both syntactic and semantic, treat associative constructions as conjunctions (e.g., Dyła 1988; McNally 1993), paying close attention to associative plurality and binding facts to be discussed in section 3. The conjunction approach is partially preserved in Feldman (2001)

and Skrabalova (2003, 2004), who argue that associative constructions are not structurally uniform. Instead, they either show conjunction-like properties (with the associative PP behaving like a 'subject') or the PP is a nominal adjunct. Other approaches, most notably Ionin and Matushansky (2002) and Vassilieva and Larson (2005), reject the conjunction analysis and explore different attachment sites of the PP, either within a DP, or as a VP adjunct.

The empirically richest and theoretically most substantial account of Czech associative construction is presented in Skrabalova (2003, 2004). According to her, associative structures are ambiguous between conjunctions and NP-modification structures. The distinction allows her to systematically account for the agreement variability and conjunction-like behavior of associatives. Unfortunately, the account cannot explain the PCC facts, the restriction on 3rd person pronoun in associatives, and the locality properties of their associative PPs. In addition, the analysis makes the incorrect prediction that *wh*-extraction should be possible for the NP-modification structure.[12]

Vassilieva and Larson (2005) provide the most complete account of Russian facts where they reject the conjunction analysis and argue instead that the associative PP is a nominal complement in pronominal associative constructions and a complement of D in comitative constructions. However, their analysis does not extend to Czech as it fails to account for agreement optionality in comitative constructions, and the PCC restriction.[13] Furthermore, their analysis of comitatives incorrectly predicts that *wh*-extraction of the PP should be allowed.

Ionin and Matushansky (2002) argue that comitative constructions are derived from accompaniment structures by movement of the PP, and thus require a unique base-generated position of the associative PP. The only difference between these two constructions is that the comitative ones give rise to associative semantics whereas the other ones do not. Although their basic intuition is appealing, the proposal does not account for agreement, PCC, *wh*-extraction, locality properties and the fact that predicates like 'hate' are restricted to comitative structures.

An empirically complex description of the Slavic facts can be found in semantic papers within the GPSG and HPSG tradition (Dyła, 1988; McNally, 1993; Feldman, 2001). As they largely concentrate on semantics of the construction, they do not fully account for the syntactic facts either,[14] but some sophisticated aspects of their analyses will become relevant in section 3 where binding facts are discussed.

Next section adds one more empirical property to the set of properties discussed in this section and summarized in (20), namely, the fact that in comitative constructions anaphors and pronouns are not in a complementary distribution. Even more surprisingly, the choice between an anaphor and a pronoun correlates with singular and plural agreement of the predicate.

3   A binding puzzle

As we saw in (8), repeated below, predicate agreement with comitative constructions is variable.

(21)   Petr s   Marií čekal/   čekali v čekárně.
       Petr with Marie waited.M.SG/ waited.PL in waiting_room

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[12]Moreover, the proposal cannot account for the distinct distribution of comitative and pronominal associative constructions discussed in the appendix A.

[13]In addition, their proposal cannot account for the syntactic distribution of pronominal associative constructions and the PP adjacency facts, discussed in the appendix A.

[14]Feldman (2001) explicitly acknowledges this limitation.

'Petr and Marie waited in the waiting room.'

Surprisingly, agreement optionality disappears if there is a possessive pronoun embedded in the associative PP. Czech possessive pronouns, unlike their English counterparts, morphologically distinguish between anaphors (reflexives) and coreferential (pronominal) forms. The anaphoric forms, unlike other pronominal forms in Czech, do not morphologically realize person, gender and number; instead, they are based on a ϕ-feature-invariant (so-called reflexive) root (*sv-*). In contrast, the coreferential forms overtly mark person, number and gender.[15]

As shown in (22), when the possessive within the associative PP is in the coreferential form, i.e., inflected for ϕ-features, predicate agreement is plural. In contrast, if the possessive is anaphoric, i.e., with no ϕ-feature morphology, predicate agreement is singular, (23). In other words, when the agreement takes the expected form, i.e., it is based on the ϕ-features of the goal, here singular, the possessive appears in the expected form, i.e., an anaphor. In contrast, the unexpected agreement (plural) correlates with the unexpected form of the pronoun (non-anaphoric).

(22) %Marie s   jejím mužem navštívili/ ??navštívila kamarádku.
      Marie with her   husband visited.PL/ visited.SG   friend
      'Marie$_i$ and her$_i$ husband visited a friend.'

(23) %Marie se   svým mužem ??navštívili/ navštívila kamarádku.
      Marie with self's husband visited.PL/   visited.SG friend
      'Marie$_i$ and her$_i$ husband visited a friend.'

The reported correlation between predicate agreement and the type of possessive pronoun holds for ten out of 20 speakers the data were collected from (indicated by the symbol %).[16] The other speakers accept all combinations of pronouns and agreement. If speakers have any contrast, it is in the reported direction.[17]

That all speakers accept the coreferential forms in comitative constructions is in and of itself surprising. As we see in (24), only anaphoric forms are allowed in canonical Condition A environments in Czech. The examples in (25) and (26) demonstrate that nominal complements and adjuncts, respectively, count as canonical Condition A environments, i.e., bound possessive pronouns in their specifiers must be anaphoric.[18]

(24) Petr$_i$ viděl svého$_i$/ jeho$_{*i/j}$ bratra.
      Petr saw REFL/ his   brother

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[15]The anaphoric and coreferential forms were previously analyzed as subject-oriented anaphors and pronouns (e.g., Toman 1991 and following work).

[16]Two speakers volunteered the judgements without being given minimal pairs; the other judgements are based on grammaticality judgement task. The data were collected over Skype, in person and during a doctoral seminar at [left out for anonymity].

[17]The correlation between binding and agreement has not been previously reported for Czech but a similar split in speaker's judgements might be attested in Russian. According to Feldman (2001), plural agreement with a comitative structure requires coreferential forms. In contrast, McNally (1993) reports both anaphoric and coreferential forms as acceptable. Neither of the papers comments on the size of their speaker sample and their data collection. In Polish, at least according to the data reported in Dyła (1988), there is no morphological difference tied to agreement but it is possible that a larger data collection would reveal a similar split.

[18]In some Czech dialects, the morphological distinction is partially lost. I controlled for this potential confound by asking for canonical Condition A judgements as well, and excluded from the sample of speakers who didn't have the canonical distribution pattern in other environments.

'Petr$_i$ saw his$_i$ brother.'

(25) Horlivý student svého/ *jeho oboru se   hned   pozná.
      keen   student of-self of-his subject REFL immediately recognized
      'One immediately recognizes a keen student$_i$ of his$_i$ subject.'

(26) Žena   ve svém/ *v jejím kabátě se   cítí lépe než žena   v cizím   kabátě.
      woman in self   in her   coat   REFL feels better than woman in stranger coat
      'A woman$_i$ in her$_i$ coat feels better than a woman in someone else's coat.'

It is therefore unexpected that anaphoric and coreferential pronouns in comitatives are not in complementary distribution. Note that the lack of complementarity cannot be explained away by postulating that the anaphoric forms are in some sense logophoric since the unexpected form is the pronominal one.[19]

The pattern raises two interrelated questions: (i) why aren't anaphors and pronouns in a complementary distribution, i.e., what is the structural relationship that underlies the coexistence of the anaphor and the co-referential pronoun in the same syntactic environment, and (ii) why does the pronominal form correlate with agreement? A cue to answering these questions comes from other constructions in which pronouns and anaphors are not in a complementary distribution, i.e., pronouns bound by 1st and 2nd plural pronouns, and imposters.

As seen in (27), anaphors and coreferential pronouns are not in a complementary distribution when bound by 1st or 2nd plural pronouns.

(27) a. Viděli jsme   našeho bratra.
          saw.PL AUX.1PL our   brother
          'We$_i$ saw our$_i$ brother.'
      b. Viděli jsme   svého bratra.
          saw.PL AUX.1PL REFL brother
          'Each of us saw his/her brother.'
          'We$_i$ saw our$_i$ brother.'

Crucially, there is a subtle meaning difference in the variation in binding by these pronouns, as indicated by the English translations. Intuitively, the coreferential form, (27-a), refers to the group of the speaker/hearer and the associate(s) as *a unit*. The natural interpretation of (27-a) is that the brother of the speaker and the brother of the associate(s) denoted by the pronoun are the same person (i.e., the individuals in the associative group are siblings). In contrast, the anaphoric form, (27-b), refers to the *individual members* of the plurality. Under this interpretation, the brother of the speaker and the brother of the associate(s) may but do not have to be the same person. Thus, the coreferential pronoun treats its antecedent as a unit (a group) but the anaphoric pronoun reflects the individuals the group is formed by.

The group interpretation arises from 1st and 2nd plural pronouns denoting associative plurality, i.e., instead of the regular plural interpretation as a sum of *individuals* (Link, 1983), the semantics of associative number has been characterized in terms of a *group* formation with one individual being the pivot of the group (e.g., Benveniste 1966; Zwicky 1977; Noyer 1992; Corbett and Mithun 1996; Corbett 2000; Cysouw 2003; Moravcsik 2003; Nakanishi and Tomioka 2004; Siewierska

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[19]Thus the nature of the pattern is close to Chomsky (1986)'s examples with VP-adjuncts, instead of canonical coreferential cases discussed, for example, in Reinhart and Reuland (1993).

2004; Kratzer 2009). That is, a 1st person plural pronoun does not denote a plurality of speakers but the speaker and their associate(s); similarly, a 2nd person plural pronoun does not denote a plurality of hearers but the hearer and their associate(s).

It thus appears that the antecedent relation of the possessive pronouns in (27) is based on two distinct representations of number in the structure: the anaphoric form is based on the *morpho-syntactically* expressed number, i.e., morpho-syntactic plural that is no different from any other regular plural in the language and that gives rise to a vanilla-plain sum denotation, and the *semantic* number of the group formation specific to semantically associative plurals (group denotation).[20]

The plural interpretation of comitative constructions has been characterized in terms of associative plurality as well (e.g., Feldman 2001; Vassilieva and Larson 2005). Thus there are two similarities between comitative constructions and associative pronouns: first, in both cases the expected binding (anaphoric) correlates with a structure based on the morpho-syntactic realization of the antecedent, while the unexpected pronominal binding correlates with a structure based on the intended semantic interpretation; second, both structures denote associative plurality.

Conspicuously, we systematically find the lack of complementary distribution of coreferential and anaphoric pronouns outside of associative structures, namely, in the domain of indexical shifters (monsters) and imposters, i.e., in other constructions with a dissociation of a morpho-syntactic form and its intended semantic interpretation. Thus, in so-called Lakoff's sentences, demonstrated by (28),[21] the non-reflexive (coreferential) form obtains a split-reference reading, i.e., it is based on the intended semantic denotation, but the anaphoric form requires the non-split reference, i.e., it is based on the morpho-syntactic realization of the relevant person feature.

(28)   If I were you, I wouldn't trust myself/ me as an informant.

(David Pesetsky, p.c.)

Similarly, split-antecedent pronouns referring to imposters (Collins and Postal 2012 and literature cited there) show a similar duality. As shown by Podobryaev (2017), if a split-antecedent pronoun refers to a grammatically 3rd person imposter, the form of the pronoun can either respect the 3rd person grammatical form of the overt antecedent or it can go with the intended speaker index, as in (29) (Podobryaev, 2017, 340, (24)).

(29)   a.   Yours truly$_i$ told Mary$_j$ that his$_i$ mother doesn't approve of their$_{i+j}$ marriage.
          b.   Yours truly$_i$ told Mary$_j$ that his$_i$ mother doesn't approve of our$_{i+j}$ marriage.

These structures have been characterized as having a distinct grammatical and semantic representation of the person feature. Thus, monsters/imposters and associative structures seem to share a dissociation of the value of the morpho-syntactic representation and its corresponding semantic counterpart.

These similarities strongly suggest that some form of a structural dissociation between the morpho-syntactic representation and its semantic counterpart lies in the very core of the comitative binding puzzle. It is thus tempting to extend the analyses proposed for monsters and imposters,

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[20]Data from Yup'ik, reported in Corbett and Mithun (1996), suggests that at least in some languages morpho-syntax treats associative plural as a separate value.

[21]I replaced the original McClawskey's example, first cited in Lakoff (1968, (13)) "I dreamed that I was Brigitte Bardot and that I kissed me." because younger speakers do not know who Bardot is and have difficulties with identifying the two distinct readings.

most prominently the analysis in Collins and Postal (2012) and its formal semantic modification in Podobryaev (2017),[22] to comitative constructions in Czech.[23] However, even though there are similarities in binding, syntactically the structures are not alike because imposters in English do not interact with narrow-syntax operations outside of binding. For example, predicate agreement with imposters is strictly based on the grammatical form of such an imposter. A switch to an agreement based on the intended semantic interpretation of the imposter is impossible both in Czech, (30), and English, (31).

(30)   Váš   služebník je/*jsem tu.
        yours truly   is/am   here
        'Your truly has arrived.'

(31)   Yours truly is/*am unhappy.

(Collins and Postal, 2012, 3, (5c))

In contrast, not only does the formation of comitative structures interact with binding but it interacts with predicate agreement, *wh*-extraction and person case constraint as well. The complete list of unexpected properties of comitative constructions is given in (32). An empirically adequate account of comitative constructions thus must account for all their properties but it should also shed light on the question why the 'imposter-like' representations limit themselves to variation in binding for imposters and indexical shifters but interact with other syntactic processes for associative constructions.

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[22]In the theoretically-neutral representation of Collins and Postal (2012) for imposters, there is a pronoun-like element within the imposter DP which is bound by a contextually-determined operator. In the more formal account of Podobryaev (2017), the duality is implemented as a complex-indexical structure in the sense of Minor (2011) and Sudo (2012).

[23]In fact, there are proposals that analyze associative pronouns analogically to the structure proposed in Collins and Postal (2012), i.e., as DPs containing a null pronoun. den Dikken et al. (2001) argue that in Hungarian the 1st person pronoun behaves as if it had a comitative structure (based on evidence from agreement and inclusive reference anaphora). According to their proposal, the structure of such a pronoun contains a hidden *pro*.

(i)   [$_{NP}$ 'we'/'us' [$_{SC}$ *pro* 1SG [$_{PP}$ COMIT [x (& y (& z …))]]]]

(den Dikken et al., 2001, 145, (18)).

The idea that there is a hidden anaphoric *pro* in the structure of associative pronouns is generalized and further developed in Rooryck's (2006) account of binding by associative pronouns. Similarly, Feldman (2001) proposes a semantic implementation for comitative structures which includes a *pro*, and so does Skrabalova (2004) in her syntactic analysis of Czech comitative constructions (in contrast to other coordinate structures discussed in her thesis). Feldman's implementation is very close to the semantic analysis of associative DPs in Afrikaans proposed by den Besten (1996). In both proposals the antecedent-like relationship which underlies the idea of having a hidden pronoun in the representation is based on a subset-superset denotation of the focal DP and the associate. However, Feldman (2001) herself acknowledges that a semantic representation in and of itself cannot explain the morpho-syntactic properties of comitative constructions.

(32)

agreement?	variable
wh-extraction?	impossible
PCC in a DP?	yes
anaphors and pronouns not in complementary distribution?	no
recursion?	no
correlation of binding and agreement?	yes

The proposal to be developed in section 4 builds on the insights of the work on the structure of associative pronouns and indexical shifters and imposters but rejects the idea that the conflicting grammatical and semantic representation is part of the same level of representation.

Instead, I argue that the two representations arise in two distinct points in the derivation: one in narrow syntax, the other one when the relevant phase is labeled by the syntax-semantics interface. The distinction in derivational timing is thus closely tied to phases and their spell-out, and underlies the unexpected grouping of semantic and narrow-syntax operations. In turn, the proposal provides an empirical argument for a model of grammar where syntax is fully autonomous, and any reflex of a semantic interpretation arises only at the syntax-semantics interface via a new feature bundle formation in the label of a phase.

4   Putting the pieces together: features at the interface

Section 3 has provided an empirical argument that whenever anaphors and pronouns do not appear in complementary distribution, there is a systematic dissociation between the morpho-syntactic realization of the antecedent and its intended semantic interpretation. In addition, we have seen that this binding duality has a structural correlate in predicate agreement, i.e., when binding is based on morpho-syntactic features of the antecedent, then agreement is based on morpho-syntactic features of the goal, and when binding is based on the intended interpretation of the antecedent, then agreement is based on the intended interpretation of the goal.

Since the same comitative construction can systematically support both an anaphoric and a coreferential pronominal representation, and since the binding representations correlate with agreement, such a comitative construction must have two distinct feature structures within its derivation, and one or both of them must have overlapping features for agreement and binding. Because binding and agreement usually do not correlate and since plural agreement and pronominal binding are the unexpected properties, the 'semantically informed' representation is the likely locus of the correlation. As we will see later, the same representation is also the locus of the other unexpected properties of comitative constructions, i.e., restrictions on *wh*-movement, as well as the PCC. This section explores the grammatical nature of this representation and how it is derived.

The core idea is that narrow-syntax features must sometimes be re-bundled by the syntax-semantics interface in order to become legible to the semantic module, in a manner parallel to feature-alternation processes proposed for the syntax-morphology interface within the Distributed Morphology framework (e.g., Halle and Marantz 1993; Embick and Noyer 2007). The question is how this re-bundling arises and proceeds. I argue for a system where certain features present in narrow-syntax have a privileged role in the mapping between syntax and semantics. When such a feature is projected onto a phase label, the syntax-semantics interface can build a new feature

bundle around this privileged feature of the label (as part of labeling by CI, in the terminology of Chomsky 2013, 2015). Existing narrow-syntax features get bundled around these privileged features and can interact with the semantic module only indirectly via these privileged features that they are bundled around.[24] Consequently, when a syntactic operation takes place before the syntax-semantics labeling of a phase, it must be based on narrow-syntax features. If a syntactic operation targets the phase label after it has been licensed by the syntax-semantics interface, then such an operation must consider interface feature bundles in the label as well. When the interface feature bundle is when an interface feature bundle is able to license properties that are distinct from those licensed by a narrow syntax bundle, then we observe a dual behavior of the sort the Czech comitative data represent.

The proposed model is centered around two prevalent ideas about the syntax-semantics interface: that certain features - although syntactic, for example, person or tense (e.g., Ritter and Wiltschko 2014; Zubizarreta and Pancheva 2017; Pancheva and Zubizarreta 2017) - are critical for the semantic anchoring of parts of syntactic structure, and that if a syntactic feature is to take part in semantic anchoring, then it must be located at the edge of a phase or represented on a phase head (e.g., Basilico 2003; Adger and Ramchand 2005; Kratzer 2009; Johns and Kučerová 2017; Kučerová 2018).[25] The present proposal builds on these insights and proposes that the puzzling correlation among agreement, binding, PCC and restrictions on *wh*-movement in the domain of the Czech comitative constructions follows from the anchoring properties of *person* features on a phase head. Specifically, the derivation of a comitative construction involves a creation of a new feature bundle that is based on the person features of the focal noun and the associate. The formation of such a feature bundle is mediated by phase heads as part of bundling narrow-syntax features into a representation readable to the semantics module.

The task of this section is to explicate the derivation of these interface feature bundles and to show how they account for the data from sections 2 and 3. In order to do so, we will explore how person features are mapped onto a phase label, and how this new feature label interacts with the narrow syntax of the next phase. The central assumption throughout this exercise will be that syntax builds structure and interfaces interpret it. At no point we will see the effects of compositional semantics or semantic information being present within the narrow-syntax computation (such as interpretable syntax features). Instead, any semantic-like effect will arise only indirectly from the non-compositional mapping of narrow-syntax features onto a complex indexical bundle.[26] The primacy of syntax will turn out to be critical in ensuring that the proposed system is restricted and does not overgenerate.

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[24]See Kayne (2010) for an argument that there can be only one semantically interpreted feature per head.

[25]Some authors associate syntactic operations with anchoring, e.g., Rosengren (2002) argues that EPP is such an anchoring operations, and Truckenbrodt (2006) associates anchoring with head movement to a phase head. For related work on intensional interpretation of phases see, e.g., Larson (2011); Narita (2011); Arsenijević and Hinzen (2012).

[26]For proposal that independently argue that semantic information can be read off directly from narrow-syntax features, with no reference to compositional semantics, see, for instance, Schlenker (2014); Wood and Marantz (2017); Zhai et al. (2014). Note also that proposals that argue for a syncategorematic mapping of syntactic dependencies, such as *wh*-movement, onto a variable λ-abstraction structure implicitly assume a similar type of mapping. (See Heim and Kratzer 1998 for an argument why such a representation cannot be derived compositionally but instead must be present as part of the input for compositional semantics.)

4.1 Index in the label

As we have seen in section 3, for many speakers predicate agreement correlates with binding: if a possessive pronoun within a comitative structure is coreferential, corresponding predicate agreement is plural; if the pronoun is anaphoric, predicate agreement is singular. The relevant data is repeated below.

(33) %Marie se   svým mužem   ??navštívili/ navštívila kamarádku.
      Marie with self's husband visited.PL/   visited.SG friend
      'Marie$_i$ and her$_i$ husband visited a friend.'   ANAPHOR + SINGULAR

(34) %Marie s   jejím mužem navštívili/ ??navštívila kamarádku.
      Marie with her   husband visited.PL/ visited.SG   friend
      'Marie$_i$ and her$_i$ husband visited a friend.'   PRONOUN + PLURAL

    The question is what underlies this correlation. In order to answer it we need to be more precise about our assumptions about the structural underpinning of binding and agreement, specifically about their derivational timing and the features involved. Since no morpho-syntactic element comes to the derivation with plural number feature, the plural feature must be formed during the derivation. Instead of plurality being derived syntactically,[27] I argue that the formation of plurality involves *semantic indices*, namely, an index representing the focal DP and the associate.[28] In contrast, singular agreement is based on the morpho-syntactic representation of the focal noun. Furthermore, when agreement is based on narrow-syntax features,[29] then its structural underpinning is established *earlier* than when agreement is based on 'semantically informed' features because the 'semantically informed' features become part of the derivation only at a later derivational stage.

    As for binding, I argue, following Charnavel and Sportiche (2016), that anaphoric binding is established within a phase. However, I assume that the structural underpinning of anaphoric binding is established in narrow syntax.[30] Pronominal binding is like anaphoric binding in that it must be licensed by the semantic module but it is different from anaphoric binding in that it lacks a narrow-syntax structural underpinning. In turn, the structural underpinning of anaphoric binding is established at an *earlier* point of a derivation than pronominal binding. Furthermore, I follow Heim (1998) and Roelofsen (2008, 2011) in that coreferential binding requires *semantic indices* as part of the antecedent representation. That is, only an antecedent that contains a semantic index as part of its representation may participate in coreferential binding. Anaphoric binding also requires indexical information in order to have semantic licensing of the anaphoric relation. However, such information is not available in narrow syntax, but only after Spell-out.

    We can conclude that semantic index is the common denominator of plural agreement and pronominal binding, and that such an index becomes part of the structure only in a later state of a

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[27]Even though one probe can in principle have more than goal (e.g., Multiple Agree of Hiraiwa 2005), the values of the probes must be the same or undefined. Agree as matching and valuation cannot resolve conflicting values of features (e.g., Chomsky 2000; Pesetsky and Torrego 2007).

[28]The basic idea is rooted in accounts that analyze the plurality of coordinated DPs as being based on the sum of semantic indices (Munn, 1993; Bošković, 2009; Bhatt and Walkow, 2013). We will see, however, that although both conjunctions and comitatives manipulate indices, they do so in two rather distinct manners because comitative constructions form associative plurality.

[29]Or their morphological realization, as in Bobaljik (2008).

[30]Thus I side with the view argued for, e.g., by Sundaresan (2012); Hazel (2013) for whom anaphoric binding must be established in narrow syntax because of the nature of feature deficiency of anaphoric pronouns.

derivation. Specifically, the proposal to be put forward in section 4.2 postulates that the indexical representation is not part of the narrow-syntax representation of a DP. Instead, it is formed only when the label of such a DP is processed by the syntax-semantics interface.

There is in fact a long tradition of associating D with a referential index, be it in terms of D changing a predicate-denoting NP into an individual-denoting structure, or being the source of a referential index itself (Williams, 1981; Higginbotham, 1985; Grimshaw, 1990; Wiltschko, 1998; Winter, 2000; Borer, 2005; Longobardi, 2008; Landau, 2010, among many others). The current proposal builds on the close association of syntactic representation and its semantic denotation; however, it strictly removes the semantic component, i.e., the index, from narrow syntax. Instead, the index becomes part of the DP label, and as such gets associated with the D head, only at spell-out.

This derivational dissociation raises a worry that the proposed system might be countercyclic because agreement seems to be able to access a structure processed by the syntax-semantics interface. Upon a closer examination we see, however, that the ordering is an intrinsic property of the current theory of phases and their spell-out. Since only the complement of the phase head is sent to the syntax-morphology interface, the edge of the phase, including its label, remains accessible to narrow-syntax derivation until the spell-out of the next phase.

In turn, the correlation we see in (22)–(23) results from two different derivational routes. If the comitative DP is immediately labeled for the syntax-semantics interface, the person representation within the label of the comitative DP is mapped onto a semantic index. A complex indexical structure is formed and becomes part of the label. When a predicate probes for the DP, its number value reflects the indexical representation of the label. Similarly, the features of the bound possessive pronoun will reflect the complex indexical structure (enriched by gender and number features, associated with the indexical representation) and will surface as a coreferential pronoun. In contrast, if the comitative DP is not immediately labeled for the syntax-semantics interface, the complex-index is not part of the DP label yet. Consequently, agreement and binding are based on narrow-syntax features.

The rest of this section gives a technical formalization of the account and step-by-step derivations of comitative constructions, including how this basic account extends to PCC and *wh*-movement. The goal is to flesh out the core intuitions in a tangible form and to provide a proof of concept for the proposal that the syntax-semantics interface creates new feature bundles within the label of a phase as part of mapping narrow-syntax structures onto the interfaces.

4.2   Semantically-anchoring features trigger spell-out

Let us start with the derivation in which a comitative construction triggers singular agreement and the possessive pronoun within the associative PP is anaphoric.

(35)   %Marie se   svým mužem ??navštívili/ navštívila kamarádku.
       Marie with self's husband visited.PL/   visited.SG friend
       'Marie$_i$ and her$_i$ husband visited a friend.'   ANAPHOR + SINGULAR

I argue that in this case the predicate probes the comitative construction and the binding relation within the comitative construction is created *before* the phase is transferred to the syntax-semantics interface, i.e., the DP label is only based on features independently present in narrow syntax.

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For concreteness, I assume that a DP consists of a root and a nominalizing functional head (n) that comes to the derivation with valued gender, person and number. D itself is merged as a bundle of unvalued ϕ-features which gets valued by agree with n, as in (36).[31]

(36)   Derivation of the focal noun (to be revised)

    a.   Base generation & agree:
        [$_D$ D:{PER:_, GEN:_, NUM:_} [$_n$ n:{PER:3, GEN:f, NUM:sg} $\sqrt{Marie}$]]

    b.   Valuation:
        [$_D$ D:{PER:3, GEN:f, NUM:sg} [$_n$ n:{PER:3, GEN:f, NUM:sg} $\sqrt{Marie}$]]

The more difficult part is to spell out how anaphoric binding in narrow syntax works. Kratzer (2009) argues that bound pronouns do not value their features directly from their antecedent. Instead, a bound pronoun starts its life as a variable that inherits its features from their local phase head. I follow Kratzer and argue that the relevant phase head in a comitative construction is D.[32] In turn, D must have a variable-like representation. The question is how to implement a variable-like representation in narrow-syntax terms as there should be no semantic variable prior to spell-out.

A cue comes from the morphological realization of anaphoric and coreferential pronouns in Czech. Even though the structural underpinning of anaphoric binding must take place in syntax, Czech anaphors do not morphologically realize ϕ-features of their antecedent. If the relationship between the antecedent and anaphors involves agree (e.g., Sundaresan 2012; Hazel 2013), it cannot be upward agree between the unvalued features of the anaphor and the valued ϕ-features of the antecedent because such agree would automatically yield feature valuation. There must be another feature mediating the binding relation in narrow syntax.

A good indication as to the nature of this feature comes from current literature on DPs proposing an analysis where that DPs that are able to act as binders contain some form of a 'referential' index (e.g., Williams 1981; Higginbotham 1985; Grimshaw 1990; Wiltschko 1998; Winter 2000; Borer 2005; Longobardi 2008; Landau 2010).[33] Having a 'referential' index in narrow syntax is suspect because under the autonomous view of syntax articulated within the Y-model of the grammar and defended in this paper, there should be no semantic information available to a narrow-syntax derivation but the proposed function of the 'referential' index is to single out semantically referring individuals.[34] To solve this conflict I propose that the feature in and of itself does not make a DP referential. Instead, this feature formally identifies a DP as a phase which in turn makes it possible for a DP to obtain a referential interpretation.

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[31]For the current purposes we can dispense with other functional projections, such as Num(ber) (Ritter, 1993, 1995; Borer, 2005, among others). I also ignore arguments, such as that of Ritter (1995), that person is introduced on D.

[32]For Kratzer the relevant phase head is v as she investigates binding of internal arguments by external arguments, The domain of binding within a comitative structure must be smaller because comitative structures preserve the binding duality even if they are merged as an internal argument. If the bound pronoun associated with the v head, its features would be determined by the external argument, not the focal nominal.

[33]With some authors proposing that such an index is not part of D itself but instead is merged in the extended DP domain, for instance, as an external argument (Williams, 1981; Higginbotham, 1985; Grimshaw, 1990; Winter, 2000; Borer, 2005).

[34]There is some syntactic evidence that some Ds come with an indexical representation present in narrow syntax (see, for example, Wiltschko 1998) but most of the argumentation is theory-internal.

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To illustrate the logic of this proposal let me use the example of English DPs. Note that English DPs, including definite DPs, do not always behave like phases. Consider the examples in (37). The examples demonstrate that a definite DP in a predicative position agrees in number with the subject of a copular clause. The example is set up so the DP itself cannot be semantically plural, the plural marking must come from agreement. If the predicative DP ('the tallest student') was a phase, the DP should not be able to agree in number because the nominal complement would have been spelled-out before the agreement between the subject and the predicate DP could've taken place.

(37)   a.   *Kim and Sam are the tallest student in their respective class.
          b.   Kim and Sam are the tallest students in their respective class.

I propose that only a DP that contains a 'referential' index is a phase. More precisely, I propose that this feature is central in the formation of new feature bundles at the syntax-semantics interface and that it is a vehicle for semantic anchoring of strictly syntactic features, such as person. Furthermore, I argue that such a feature in the label of a potential phase *triggers spell-out*.[35]

Tying semantically-anchoring features with spell-out is appealing for three reasons: first, phases are syntactic but they correspond to semantically complete units. If spell-out is triggered by semantically-anchoring features, the dependency of a narrow-syntax derivation on semantic completeness is no longer surprising. Second, with a growing body of work that argues for phases being flexible in size (e.g., den Dikken 2007; Bošković 2014), it is not clear what determines when such a phase is spelled-out. It cannot be the presence of a fixed phase head since phase heads are defined structurally and can be different with each derivation. If spell-out is triggered by a feature that must be licensed by the syntax-semantics interface, the problem of what triggers spell out is resolved. Third, not all instances of a given syntactic feature participate in semantic anchoring. For instance, Zubizarreta and Pancheva (2017); Pancheva and Zubizarreta (2017) argue that person feature anchors event participants. There is a person feature on the predicative DP in (37) but in this case, the person feature does not semantically anchor. In other words, person features get semantically anchored only if they coincide with a 'referential' index in the structure.

For concreteness, I implement a 'referential' index as a numerical identifier merged as an external argument of D. After it merges, it projects into the label of the DP. At this point, the derivation terminates and spell-out takes place. As we will see, the numerical identifier eventually becomes part of a bundle with a person feature, namely, a complex semantics index. However, its narrow-syntax representation is not interpretable. It only serves as a placeholder for an interface feature bundle formation and its formal purpose is to terminate a narrow-syntax derivation. Technically, it is a privative feature in the representation of DP which projects into the DP label, as in (38). The value of the identifier is set to a random numerical value, here 5.
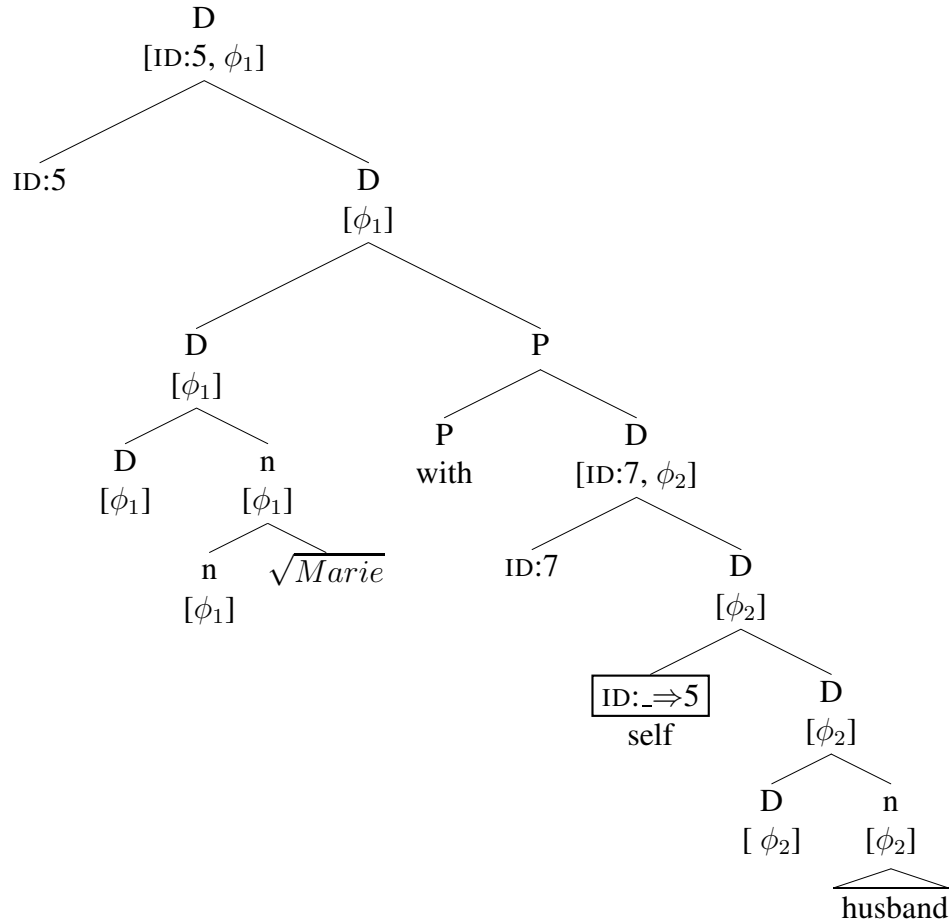
(38)   Derivation of the focal noun (revised)

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[35]Alternatively, one could say that if such a feature does not become a part of a syntax-semantics feature bundle, it is not legible to the semantics module and the derivation crashes.

D
[ID:5, PER:3, GEN:f, NUM:sg]

ID:5   D
            [PER:3, GEN:f, NUM:sg]

...
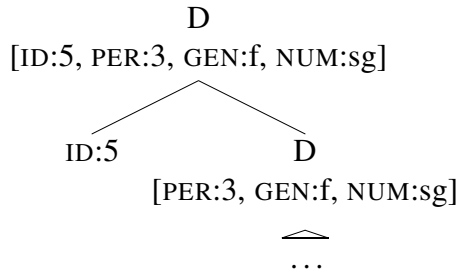
Thus if a DP is be able to participate in a binding relation it must also have a numerical identifier which will ensure that such a DP will be a phase in addition to its existing syntactic ϕ features. With this assumption in place we can now return to the derivation of a comitative construction. Since the associative DP does not yield an intersective interpretation of the focal noun and the PP, I assume that the PP is base-generated as a DP adjunct, as in (39). For concreteness, I treat the DP within the PP as a phase as well. I generate the possessive pronoun as an unvalued identifier.[36] Even though there is a valued numerical identifier within the PP, the pronoun cannot get valued by it because it is not in the right structural configuration. The D head of the focal noun is the closest head that merged with the extended projection containing the unvalued identifier. The minimal pronoun gets valued by this higher identifier that is associated with this D head (here valued as 5). Note that even though the identifier of the lower DP within the PP (here valued as 7) triggers spell-out, the minimal pronoun remains within the derivation because only the complement of the lower D head gets spelled-out. The edge of the lower DP remains accessible.

(39)   Anaphoric binding within a comitative construction:

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[36]Essentially, Kratzer's minimal pronoun.

D
[ID:5, ϕ_1]

ID:5　　D
　　　　[ϕ_1]

D　　　　　　　P
[ϕ_1]

D　　　n
[ϕ_1]　[ϕ_1]

n　　$\sqrt{Marie}$
[ϕ_1]

P　　　　D
with　　[ID:7, ϕ_2]

ID:7　　　D
　　　　　[ϕ_2]

ID:_⇒5　　D
self　　[ϕ_2]

D　　　n
[ϕ_2]　[ϕ_2]

husband

Since the identifier itself is not associated with any ϕ-feature, the possessive pronoun gets spelled-out as morphologically anaphoric, i.e., devoid of ϕ-features.[37] As for predicate agreement, the only number feature in the label is singular. If the predicate probes for the comitative structure in (39), its number feature will get valued as singular.

With this baseline in place we now turn to the more complex version of the derivation.

4.3   Deriving comitatives: plural agreement + coreferential binding

In section 4.1, we identified the presence of a semantic index as the common denominator of plural agreement and coreferential binding, (40). We have also established that a semantic index becomes part of the comitative structure only at the syntax-semantics interface, as part of a procedure that rebundles features in the label into objects legible to the semantic module.

(40)   %Marie s   jejím mužem navštívili/ ??navštívila kamarádku.
　　　 Marie with her   husband visited.PL/ visited.SG   friend
　　　 'Marie$_i$ and her$_i$ husband visited a friend.'

---

[37]Charnavel and Sportiche (2016) point out that although the domain of binding is determined by a phase, binding cannot be based on locality of agree as a narrow-syntax operation. The reason is that condition A is an interface condition and must hold at LF. Their observation within the present system corresponds to the relevant relationship being established at the phase head level. Since the phase head is the locus, it acquires feature from the immediately accessible local domain. In turn, the newly formed object becomes part of the interface representation.

The basic intuition follows the treatment of narrow-syntax features in the Distributed Morphology framework (e.g., Halle and Marantz 1993; Embick and Noyer 2007; Embick 2015). The role of the interfaces is to make a narrow-syntax representation into an input readable to the external modules. On the syntax-morphology side, the interface may merge features, impoverish features, reset unvalued features to a default etc. but ultimately the morphologized feature bundles are directly based on the features already present in narrow syntax. It is within this process when language-specific feature properties fully manifest themselves.

I argue that features at the syntax-semantics interface undergo operations parallel to the features at the syntax-morphology interface. That is to say, no information in the label may come from compositional semantics but the information from the label may feed compositional semantics. The proposal thus explores the consequences of the Y-model of Chomsky (1995, 2013) in which semantics cannot feed syntax for principled reasons.[38] This paper concentrates on the formation of semantic indices but the idea of a mapping algorithm for syntactic features at the syntax-semantics interface is more general.

In order to formalize the formation of a semantic index, we take as a starting point insights from formal semantic literature on semantic indices in the domain of pronouns. Pronouns have been extensively studied with respect to which ϕ-features are morphologically realized and which are semantically interpreted, and what role do semantic indices play in the process.

According to Minor (2011) and Sudo (2012), following Heim (2008) and others, a semantic index is a complex structure which includes reference to ϕ-features. In its simplest version, a semantic index is an ordered pair of a numeral and a person feature. For instance, $<5, ③>$ is a complex indexical structure that maps numerical index 5 to 3rd person feature. The interpretation of the complex index in the given situation is determined by an assignment function (Heim and Kratzer, 1998). For example, such an assignment function may map $<5, ③>$ onto an individual named Peter. Such a semantic index can be further associated with other ϕ-features, namely, number and gender, but only if such a feature is semantically interpreted. In this line of reasoning, gender and number – unlike person – come with presuppositional semantics (Cooper, 1979, 1983; Heim, 2008; Sudo, 2012, among others) and are added to the complex semantic index only if their presupposition is satisfied.

Under this view, a semantic index is a semantic object that makes a reference to syntactic features. I propose a strict interpretation of this approach where a semantic index is a new feature bundle formed from narrow-syntax features in the label of a phase. Previous sections provided an argument that certain features have a privileged status at the interface feature mapping procedure: when a numerical identifier projects into a label, it triggers spell out and becomes a central feature for semantic anchoring. I furthermore argue that a numerical identifier initiates a search through the syntactic features at the edge of the phase (minimal search in the terminology of Chomsky 2013) and gathers syntactic features that can restrict the semantic interpretation of this newly formed

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[38]This paper investigates only the formation of new feature bundles but the idea of the interface mapping a syntactic feature or a structure onto a semantic interpretation is more general and has been explored, for example, by Schlenker (2014) for iconic features. Mapping syntactic structures onto interpretation has been extensively explored in recent work on theta roles that argues that theta roles are a result of interpretive rules applied onto the output of a syntactic computation, instead of being assigned in narrow syntax (Schäfer, 2008; Wood, 2015; Myler, 2016; Wood and Marantz, 2017). I hypothesize that any syncategorematic objects such as lambda abstraction over a movement chain are a good candidate for such a mapping as well.

object, i.e., a semantic index. In the case of DPs, the relevant feature is person.[39] For simplicity, I will treat this new object as an ordered pair of a numerical identifier and a person feature. This is a simplification as other ϕ-features might become part of this new bundle as well but it will do for our purposes.[40]

As a result, the label of a structurally simple DP contains not only syntactic features projected into the label but also a new object – the semantic index – formed from the numerical identifier (5) and the person feature from the ϕ-bundle (③[41]), as in (41).

(41)   Semantic index added to the label of a DP:

D
$[<5, ③>, \phi]$
ID:5   D
$[\phi]$
D   . . .
$[\phi]$
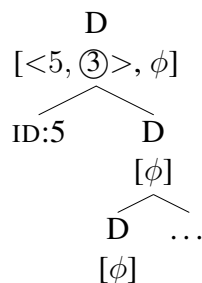
We can now extend the reasoning to a comitative structure. As before, let us assume that the associative DP is a phase as well, and that P inherits person feature from its complement.[42] When the phase is licensed by the syntax-semantics interface, the numerical identifier in the label start searching the edge of the phase for all instances of a person feature. There are, however, two person features the identifier can consider: the person feature of the focal noun and the person of the PP (a DP-level adjunct). I argue that the numerical identifier indeed considers both these person features and makes them part of the semantic index.

A relevant insight comes from two recent papers by Pancheva and Zubizarreta (Zubizarreta and Pancheva, 2017; Pancheva and Zubizarreta, 2017). Pancheva and Zubizarreta argue that in some languages a person feature has a privileged position in the representation of phase heads. According to them, such a privileged person feature (interpretable person feature in their terminology) semantically anchors an event with respect to its speech participants.[43] In order to anchor all relevant DPs, such an anchoring person feature checks all syntactic person features within its

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[39]That person feature provides a connection between the narrow-syntax representation and associating a DP with a semantic index has been proposed in the syntax literature as well, based on data outside of the pronoun domain (Longobardi, 2008; Landau, 2010; Kučerová, 2018, among others).

[40]Strictly speaking other ϕ-features become part of an index only if they satisfy the Maximize Presupposition principle. See, for example, Sudo (2012) for complex representations of this sort.

[41]Using the numeral notation for person is a simplification. A more accurate implementation is in terms of [±participant] (Nevins, 2007; Harbour, 2016, among others). We will refer to the participant feature at some point but for the visual clarity of the index representation I will use the circled numeral convention in derivations. The important thing to note that unlike its narrow-syntax counterpart, the person feature in the index becomes indirectly interpretable, while its syntactic counterpart is not. Thus, the interpretive dissociation captures an old intuition about person feature being of two sorts, already expressed in Jespersen (1924, 217)'s terms of 'notional' and 'grammatical' person and in newer incarnations of this dissociation, e.g. in the notion of grammatical feature versus semantic index in Wechsler and Zlatić (2000)

[42]That P inherits a person feature from its nominal complement has independently been argued for in work on Dative intervention. See, for instance, Béjar and Rezac (2003); Rezac (2008); Richards (2008).

[43]In other languages, such a privileged feature is a tense feature that provides temporal anchoring of an event. Cross-linguistically there might be other anchoring options as well, as suggested in Ritter and Wiltschko (2014).

local domain (defined as the edge of the phase). The derivation converges only if multiple values of person features in the local domain may be reconciled on the phase head. If they are not, the PCC effect (and other effects, such as inverse agreement) arises.

We have seen in section 2 that Czech comitative constructions indeed constitute a PCC configuration. The relevant example from (14) is repeated here as (42). Thus the result of the search procedure of the numerical identifier in the label of the comitative DP should return a person configuration that lends itself not only to explaining the binding and agreement patters, but should also provide a formal account of the PCC facts.
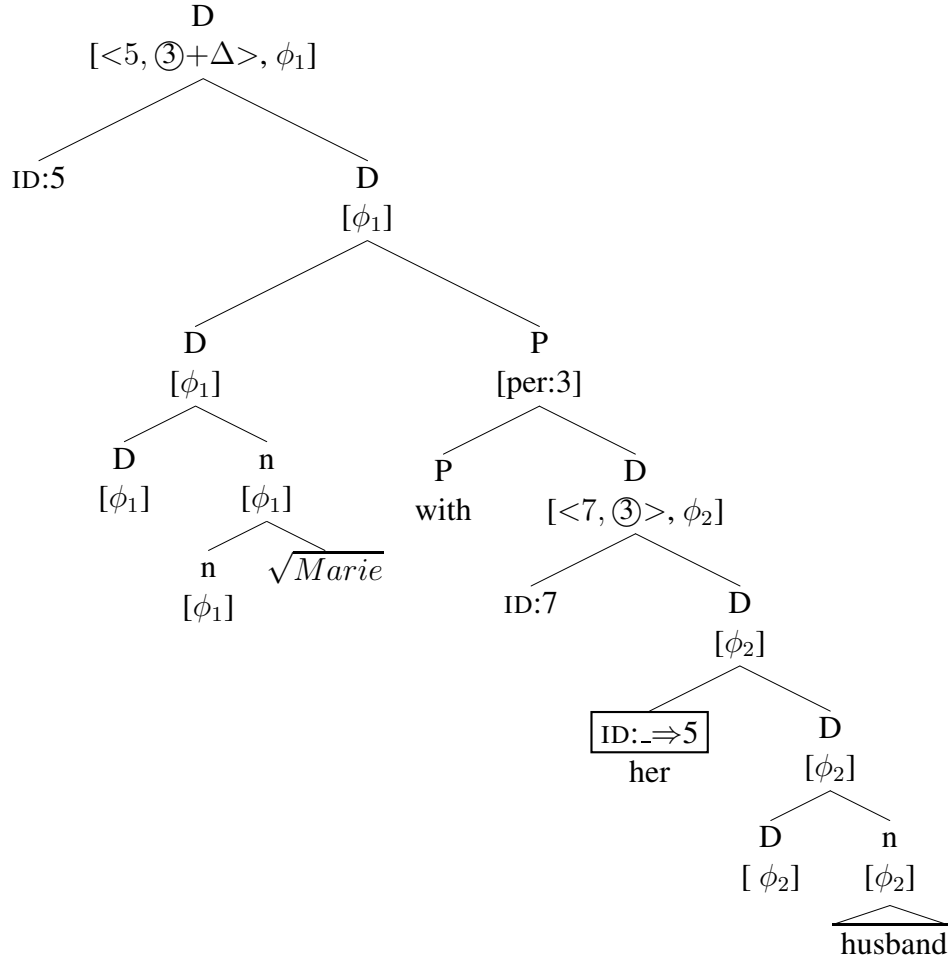
(42)   a. *Petr se   mnou/ s   tebou/ s   ním šli   do kina.
             Petr with me/   with you/   with him went.PL to cinema
       b. *Petr se   mnou jsme   šli   do kina.
             Petr with me   aux.1PL went.PL to cinema
       intended: 'Peter and I/you/he went to the movies.'

I propose that the numerical identifier first selects the person feature of the focal noun as this person feature has already projected into the label. In the next step, the search algorithm checks for the presence of any other person feature in the minimally searchable domain. Once the search algorithm identifies the person in the associative PP, it compares its value to the person value of the focal noun; the derivation converges only if the new person value can be subsumed under the former value. I.e., [−participant] may be subsumed under the first [−participant] value, while adding any [+participant] value yields a clash, and a PCC violation obtains.

When no PCC arises and the second person feature can be subsumed under the first value, the label still has to indicate that there is more than one person feature associated with the privileged person feature in the label; not a trivial task if the feature may be represented only by its value (here, ③, i.e., [−participant]). I follow the insight of Vassilieva and Larson (2005) and argue that the problem with the addition of the second person feature is ameliorated by the lexical semantics of the associative proposition 'with.' In their account, the preposition contributes the so called associate (Δ, in their notation). I.e., instead of another person feature value being added directly to the first person feature, the primary person feature is modified by Δ, indicating that there is an additional person feature in the structure. I formalize Δ as a joiner, which can be translated into a meet or an intersection (Szabolcsi, 2015). In turn, we obtain ③+Δ for the person part of the semantic index.[44] The corresponding structure is given in (43).

(43)   Labeled comitative construction (final):

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[44]Another option would be to include a [group] feature of Kratzer (2009). Kratzer argues, following Corbett (2000) and others, that number is not a unified concept. In particular, associative structures contain a [group] feature instead of a [sum] feature of regular pluralities (Moravcsik, 2003; Cysouw, 2003). Although I agree with Kratzer (2009) that a distinction along these lines is needed, having such a feature in the syntactic representation would incorrectly predict that the comitative structure should be recursive. Instead, the [group] feature might be an LF outcome of the meet interpretation of the joiner.

```
                              D
                        [<5, ③+Δ>, φ₁]
                       /              \
                    ID:5               D
                                      [φ₁]
                                   /        \
                                 D            P
                               [φ₁]         [per:3]
                             /     \        /       \
                           D        n      P         D
                         [φ₁]     [φ₁]   with   [<7, ③>, φ₂]
                                 /    \          /        \
                                n    √Marie    ID:7        D
                              [φ₁]                       [φ₂]
                                                    /          \
                                              ID:_⇒5            D
                                               her            [φ₂]
                                                            /      \
                                                           D        n
                                                         [φ₂]     [φ₂]
                                                                    |
                                                                husband
```

The addition of the joiner to the person feature captures the intuitive meaning of associative plurality, i.e., a group formation around an individual pivot. Since there is only one semantic index associated with a comitative construction, the comitative construction behaves as a semantic unit. Yet, since the actual composition of the index contains a specific person feature and an indication of another person feature in the structure, the individual denoted by the focal noun retains its pivotal status.

Before we turn to predicate agreement, let us briefly consider four consequences of this implementation. First, the advantage of using Szabolcsi's implementation instead of the original semantics in Vassilieva and Larson (2005) is that we do not need a separate lexical semantics for 'with' within a VP-adjoined PP. These two meanings of the same preposition fall under the underspecified denotation of a joiner, i.e., "meet" for the comitative structure and "join" for the accompaniment structure.[45] Second, the main work in the structure is done by the formation of the person+Δ bundle. The prediction is that if there was another argument in the structure that in principle could check the anchoring person feature on D as well, such a feature could not be faithfully represented as part of the $+\Delta$ joiner, as the joiner itself is not interpreted (it only contributes to the interpretation of the surrounding structure; see Szabolcsi 2015 for a detailed discussion of this point).[46]

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[45]We thus indirectly derived the desideratum of Ionin and Matushansky (2002) who argue for the PP in the comitative and accompaniment structure being of the same type.

[46]Thus the joiner is a prima facia example of an interface feature. It is not present in narrow syntax as it arises only

Thus, there is no meaningful double Δ joiner. In turn, we do not expect comitative constructions to be recursive. This is correct, as we have seen in (18). Yet, since comitative constructions end up being labeled as regular DPs, they may freely become conjuncts in a coordination of DPs, as we have seen in (19). Third, the joiner representation is formed only because the associative PP is in the local domain of the phase label. If the PP was adjoined lower in the structure, its person feature would have not been visible to the anchoring feature in the label. I suggest the reason the PP is merged at the very edge is because of the pre-existent relationship between the focal noun and the associative PP, discussed in section 2. Without the pre-existing relationship, the PP could be new information and used to restrict the denotation of the focal noun which would correspond to a lower attachment. Finally, since the joiner does not include the actual person feature of the associative PP but only points to it, we effectively obtain an anaphoric-like interpretation and indirectly capture the prevalent intuition that there is a *pro*-like element in the associative structure (e.g., den Dikken et al. 2001; Feldman 2001; Skrabalova 2003, 2004; Rooryck 2006).

We can now turn to the predicate agreement facts. The label now contains the semantic index with the associative person feature (③+Δ). I argue that for the purposes of number feature valuation and its morphological realization, this representation corresponds to plural. Note that morphology does not see the corresponding associative plural interpretation. It can only access the bundle in the label.[47] An agree operation that targets the label of the comitative DP after transfer will then realize its number value as plural.

In addition, since the individual syntactic person features are represented via a single anchoring person feature in the label, no syntactic process that targets a person feature in the label, such as *wh*-movement (Adger and Ramchand, 2005), can access the individual person features embedded within the phase. Instead, it may only target the unified representation in the label.[48] In turn, *wh*-movement cannot target a subpart of a comitative construction. Only the whole comitative construction can undergo *wh*-movement.

Finally, we can account for the binding facts. When the realization of the possessive pronoun is established after the phase has been labeled by the syntax-semantics interface, the pronoun shares the numerical identifier of the semantic index in the label, and in turn – through some form of feature transmission (Heim, 2008; Kratzer, 2009) – it also inherits presuppositional ϕ-features associated with the index.[49] However, since only the person feature of the focal noun is fully realized in the index, only the ϕ-features associated with this person feature can be added to the index, and in turn, only the ϕ-features of the focal noun are transmitted onto the possessive pronoun within the associative PP. Thus we obtain coreferential 'her' in example (40).

So far, the proposed implementation crucially relies on the speakers who correlate agreement and binding. There are, however, speakers whose grammar allows any combination of agreement and binding. Within-speaker variation is notoriously difficult to account for in a deterministic

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when the complex index is formed. It is also not a genuine semantic object because it does not come with a unique semantic denotation. Instead, the denotation is determined by the syntactic environment of the joiner.

[47]In Czech morphological marking of plurality never reflects the type of plurality. The plural valuation in the agree chain may result from a default realization or the number system may be represented as [±singular]. I am not aware of any data that would distinguish between these two possibilities.

[48]Section 4.4 explores the consequence of this unified representation for cumulative and distributive operators.

[49]According to Heim (2008), feature transmission is a morphological process which refers to an LF representation. She noted that this is problematic under the Y model (Sudo 2012 is an explicit attempt to remedy this grammar-architecture problem). Observe that under the present proposal, the problem goes away because indexical information becomes part of the label before the relevant chain is spelled-out.

model, however, we have a cue in the derivations as to where such a variation might come from. The reader might have noticed that even after the interface processes the features within the label and the semantic index is added, the original ϕ-feature bundle is still part of the label. I suggest that it is this inherent duality of the features within the label which makes it possible for speakers to access the syntactic ϕ-feature bundle even when the semantic index is already present. Thus when agreement and binding are established before the comitative label is processed by the syntax-semantics interface, singular agreement and anaphoric binding are the only option. When agreement and binding are established after the transfer of the comitative construction, all combinations are possible. This being said, the fact that about 50% of the speakers correlate binding and agreement suggests some preference for a uniformity of representations across derivations within a phase. To fully explore the nature of such uniformity principle goes beyond the scope of the present work.

There are, however, syntactic operations that discriminate between interface-specific features and narrow-syntax ones. We will now turn to investigating them.

4.4 Predictions: when semantic index is the only player in town

Adger and Ramchand (2005) argue that phase heads play a crucial role in *wh*-movement. Specifically, they argue that there is an variable-like representation at the label of the relevant phase head and that this variable mediates the process of the identification of the *wh*-element with its base-generated position (in their implementation via the Trace Conversion Rule of Fox 2002). I argue that their proposal extends to *wh*-movement properties of comitative constructions. Since there is only one semantic index representing the comitative construction as a DP phase, the trace conversion rule may only use this index for establishing the connection between the moved *wh*-element and a trace within a comitative structure. Consequently, even if *wh*-extraction of the focal noun or the associative PP was syntactically possible, the movement would yield incoherent semantic interpretation as any moved element from within the comitative construction would be incorrectly identified with the whole comitative construction. This prediction is correct: As we have seen in section 2, neither the focal noun nor the associative PP may be *wh*-extracted.

Another place where we see a crucial role of the semantic index in the transferred label is in the domain of predicates that select for semantically plural arguments. The prediction is that a comitative construction can be successfully selected by such a predicate only after its label has been transferred and a semantic index has been formed. Since the plurality expressed by the semantic index participates in the external merge of the predicate with the comitative construction, the unvalued number feature in the predicate representation is obligatorily valued as plural. In turn, the prediction is that instead of the familiar optional agreement, the only grammatical agreement is plural. This prediction is borne out, as can be seen in (44).[50]

(44)   Petr s   Marií se   *sešel/ sešli   na náměstí.
        Petr with Marie REFL met.SG/ met.PL on main_square
        'Petr and Marie met at the main square.'

A related prediction concerns distributive operators, such as reciprocals. When such an operator refers to a semantic index, it inevitably treats the comitative construction as a unit, as there is only

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one semantic index in the label. In turn, we expect reciprocals to be compatible with coordinations but not with comitative constructions. This prediction is borne out, as seen in (45) and (46) for reciprocals and distributive quantifiers, respectively.[51]

(45) *Jan s   Marií mávali jeden na druhého z   okna.
       Jan with Marie waved one   on second   from window
       intended: 'Jan and Marie waved at each other from their windows.'

<div align="right">(Skrabalova, 2004, 181, (34b))</div>

(46) ??Petr s   Janem přemístili každý   židli.
       Petr with Jan   moved   each.M.SG chair.F.SG
       intended: 'Petr and Jan each moved a chair.'

<div align="right">(Skrabalova, 2004, 182, (35b))</div>

Relatedly, we expect that comitative constructions should not lend themselves easily to individual-level predication because there is no semantic-index representation that would correspond to an individual in the label. This prediction is borne out, as first pointed out by McNally (1993). As we see in (47), stage-level predicates freely combine with comitative constructions. In contrast, individual-level predicates do not, (48).

(47) Petr s   Marií odjeli na prázdniny.
       Petr with Marie left.PL on vacation
       'Petr and Marie left for vacations.'

<div align="right">(Skrabalova, 2004, 182, (36))</div>

(48) ??Pavel se   sestrou jsou inteligentní.
       Pavel with sister   are   intelligent.PL
       intended: 'Pavel and his sister are intelligent.'

<div align="right">(Skrabalova, 2004, 182, (37b))</div>

    Finally, since the proposed formalization crucially relies on the presence of a numerical identifier in the focal noun, we predict that nominal structures without a numerical identifiers, such as quantifiers, cannot be focal nouns. The associative PP itself could be based on a quantifier, however, such a structure is predicted to be downgraded because it is contextually improbable that the presuppositional requirement on the relationship between the focal noun and the associative PP would be satisfied. As the data in (49) shows, this prediction is borne out as well.

(49) a. *Každý mladík s   každou slečnou tančili   uprostřed   sálu.
           every boy   with every   girl   danced.PL in-the-middle-of ballroom
           intended: 'Every boy danced with every girl in the middle of the ballroom.'
       b. *Karla   s   každým studentem   napsali dopis.
           Karla.F.SG with every   student.M.SG wrote.PL letter
           'Karla wrote a letter with every student.'
       c. ??Matěj   s   každou slečnou zatančili   valčík.
           Matěj.M.SG with every   girl   danced.PL waltz

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[51]The grammatical judgements are as reported in Skrabalova (2004). My understanding is that the ?? sign reflects the fact that structures that are syntactically well formed but cannot be semantically interpreted are judged as less ungrammatical than structures that are not well formed syntactically. The same holds for (48).

'Matěj danced a waltz with every girl.'

(Skrabalova, 2004, 180, (31))

5   Conclusions

This paper presents a case study of comitative constructions in Czech. The construction displays unusual correlations among unexpected syntactic properties, namely, variable agreement in the domain that otherwise does not allow a variable agreement, an obviation of biding Condition A in an environment that otherwise displays strict Condition A properties, blocked *wh*-movement from a domain that otherwise allow *wh*-extraction, and Person-Case Constraint (PCC) violation in the domain that otherwise does not display sensitivity to PCC. In addition, the construction correlates anaphoric binding with grammatical agreement and pronominal binding with semantic agreement. I have argued that this complex data set provides evidence for existence of feature bundle formations that arise only when the label of a phase is licensed by the syntax-semantics interface.

The core idea is that narrow-syntax features must be re-bundled by the syntax-semantics interface in order to become legible to the semantic module, in a manner parallel to feature-alternation processes proposed for the syntax-morphology interface within the Distributed Morphology framework (e.g., Halle and Marantz 1993; Embick and Noyer 2007). I have proposed a model in which certain features present in narrow-syntax have a privileged role in the mapping between syntax and semantics. When such a feature is projected into a phase label, the syntax-semantics interface can build a new bundle around this privileged feature of the label (as part of labeling by CI, in the terminology of Chomsky 2013, 2015). Other narrow-syntax features get bundled around these privileged features and can interact with the semantic module only via them. Consequently, when a syntactic operation takes place before the syntax-semantics labeling of a phase, it must be based on narrow-syntax features. If a syntactic operation targets the phase label after it has been licensed by the syntax-semantics interface, then such an operation must consider interface feature bundles in the label as well. When the interface feature bundle is distinct from its narrow-syntax counterpart, we observe a dual behavior of the sort the Czech comitative data represent.

The proposal thus furthers our understanding of feature representations and their bundling throughout the derivation, the cornerstone of the Minimalist Program. At the very core of our theorizing, we assume that a larger structure is represented by a label of its maximal projection or a phase (e.g., Chomsky 2013, 2015) but we do not have a good theory of what features form a label and what happens if there is more than one feature of the same type present in the search domain of a label. This paper provides in part a model of what happens in such cases.

The proposed system is in many ways intellectually indebted to the Distributed Morphology framework. Yet, the implementation highlights a fundamental difference between the syntax-semantics and the syntax-morphology interface, namely, the fact, that the syntax-morphology interface can in principle realize any chunk of a narrow-syntax structure but the semantic module requires a semantically complete unit. To account for the asymmetry between the two interface I have proposed that there is a class of narrow-syntax features that underlies the formation of interface feature bundles but that also triggers spell-out. Since the corresponding interface feature bundles have a semantically anchoring function, they ensure semantic completeness of the spell-out units. In turn, the proposal provides a suggestive answer to the general question of how narrow

syntax determines when to terminate structure building and transfer the built structure to the interfaces.

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A   Extension: Pronominal associative constructions

In addition to comitative construction, Czech has another syntactically formed associative construction, namely, a pronominal associative construction (PAC).[52] As seen in (50) and (51), PAC consists of a focal pronoun accompanied by an associative PP. The pronoun itself has the morphological form of either 1st, or 2nd person plural pronoun but under the relevant reading it is interpreted as their singular counterpart, i.e., as 1st or 2nd person singular pronoun, respectively. As in the comitative construction, the associative preposition 'with' is interpreted as a conjunc-
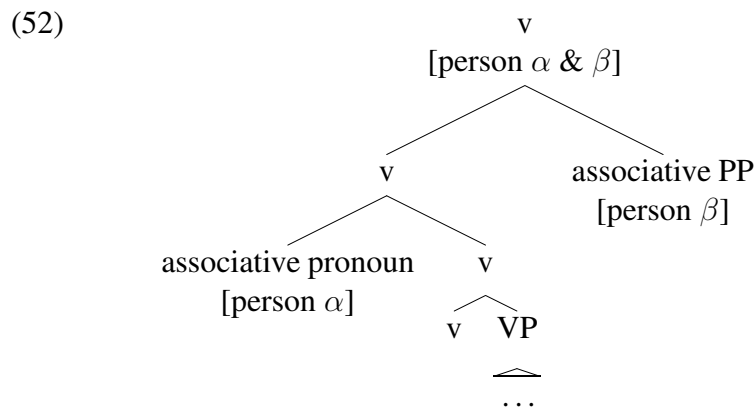
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[52]Schwartz (1988a,b) and following literature call these constructions personal pronominal constructions, i.e. PPC, or plural pronoun constructions (PPC; Feldman 2001). I changed the name to make the acronym easily distinguishable from the person case constraint (PCC), a concept crucial for the current proposal.

tion. The examples demonstrate that the same string gives rise both to the expected plural and the unexpected singular pronoun interpretation.[53]

(50) My s Petrem jsme   tam nešli.
     we with Petr AUX.1PL there not-went.PL
     'We and Peter didn't go there.'
     'I and Peter didn't go there.'

(51) Vy s Petrem jste   tam nešli.
     you.PL with Petr AUX.2PL there not-went.PL
     'You.PL and Peter didn't go there.'
     'You.SG and Peter didn't go there.'

I argue that PACs are structurally similar to comitative constructions in that their derivation is centered around an interface feature bundle in the label of a phase, and that this interface bundle involves double-person checking. Consequently, they display plural morphology, restrictions on *wh*-movement, PCC sensitivity, and they are not recursive. At the same time, PACs are unlike comitative constructions in that the focal pronoun and the associative PP do not form a constituent. Instead, they are derived via a feature formation on a verbal phase head (v or Appl), where the focal pronoun is in the specifier of such a head, and the PP is adjoined to it, as in the simplified structure in (52).

(52)
```
                           v
                    [person α & β]
                   /            \
                  v          associative PP
                /   \         [person β]
   associative pronoun   v
      [person α]        / \
                       v   VP
                          ___
                          ...
```

Let us first overview core syntactic properties that PACs share with comitative constructions. As we have seen in (50)–(51), PACs display plural morphology on the pronoun and consequently plural predicate agreement. The plural morphology is obligatory. If the pronoun is singular, as in (53-a), despite word order similarities with (53-b),[54] the structure is not a singular version of the pronominal associative construction: instead, the PP is a VP-adjunct. In this example the structural difference is demonstrated by using a predicate of the 'hate' class that is semantically incompatible with the VP-adjunction structure.[55]

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[53]Czech is *pro*-drop. The examples in (50) and (51) contain negation to make the overt pronouns more natural.

[54]Since Czech is a *pro*-drop language, an overt focal pronoun is either focused or topicalized which triggers changes in word-order properties. Consequently, a VP adverbial (PP) can be adjacent to the focal pronoun.

[55]I thus differ from Skrabalova (2004) who considers the constructions with singular focal pronouns to be associative as well. Further evidence for singular pronouns not being PACs come from *wh*-questions. As we can see in (i), if the question asks about the conjunction of the focal pronoun and the associate, (i-a), only the plural pronoun is a felicitous answer, (i-b) vs. (i-c).

(53) a. #Já s   Petrem nesnášíme brokolici.
         I with Petr hate   broccoli
         #'I hate broccoli with Peter.'
      b. My s   Petrem nesnášíme brokolici.
         we with Petr   hate   broccoli
         'Peter and I hate broccoli.'

Second, PACs display restrictions on *wh*-movement, (54).

(54) a. S   kým jsme   šli   …?
         with whom AUX.1PL gone.PL
         *'With whom did I go to the party?'
         OK: 'With whom did we go to the party?
      b. *Kdo jsme   s   Marií šli   …?
         whom AUX.1PL with Marie gone.PL
         *'Who and Mary went to the party?

One could argue that the ungrammaticality of *wh*-extraction stems from independent focus require-
ments on the associative structure that are not satisfied in *wh*-questions. Evidence that focus re-
quirement is not the correct explanation comes from other constructions that require a pre-existent
relationship between two arguments, such as possessive datives. In Czech, a possessive pronoun,
i.e., adjectival form, as in (55), can become an independent personal pronoun in the dative, (56),
but only if there is a presupposed relationship between the pronoun and the nominal modified by
the possessive. This is demonstrated by the wait-a-minute test, designed to identify a presupposi-
tion failure (e.g., von Fintel 2008). The test identifies a presupposition in the dative version but it
yields an odd interpretation as a follow up to the possessive version which may solely introduce a
new information.

(55) a. Policie zabavila   našeho   klokana.
         police confiscated our.ADJ.ACC kangaroo.ACC
         'The police confiscated our kangaroo.'
      b. #Wait a minute! I didn't know you had a kangaroo. (vs. Oh how interesting, you had
         a kangaroo?)

(56) a. Policie nám   zabavila   klokana.
         police us.DAT confiscated kangaroo.DAT
         'The police confiscated our kangaroo.'
      b. Wait a minute! I didn't know you/we had a kangaroo.

(i)   a. Co ty a Petr budete dělat o víkendu?
         what you and Petr will   do   on weekend
         'What will Petr and you do this weekend?'
      b. My s   Petrem jenom pojedeme do Prahy.
         we with Petr   only go.PL   to Prague
         'Peter and I will only go to Prague.'
      c. #Já s   Petrem jenom pojedu do Prahy.
         I with Petr   only go.PL to Prague
         #'I will only go to Prague with Petr.'

With this baseline in place, we can test whether the dative part can be *wh*-extracted despite the presupposed relationship between the dative and the object. As we can in (57), there is no problem with extracting the dative in a regular or an echo question.

(57) a. Komu   (že) policie zabavila   klokana?
          whom.DAT that police confiscated kangaroo.ACC
          'On who did you say the police confiscated a kangaroo?'
      b. Nám!
          us.DAT
          'On us!'

We can thus conclude that restrictions on *wh*-movement are a core structural property of PACs and cannot be explained away by information-structure properties of the construction.

   Third, PACs display a PCC sensitivity,[56] (58).

(58) *My s   tebou/ s   ním ... jsme   tam nešli.
       we with you.SG/ with him   AUX.1PL there not-went.PL
       intended: 'I and you/he ... didn't go there.'

Fourth, PACs are not recursive, (59).

(59) *My s   Petrem s   Lucií jsme   se   potkali na náměstí.
       we with Petr   with Lucie AUX.1PL REFL met   on square
       intended: 'I, Petr and Lucie met at the main square.'

Finally, the construction is restricted to 1st and 2nd person. 3rd person PACs do not exist in Czech, (60).[57]

---

[56]The PCC restriction cannot stem from the head nominal being a pronoun. In the corresponding accompaniment structure, i.e., if the plural pronoun itself is interpreted as plural, (i), or if the pronoun is morpho-syntactically singular, (ii), and the PP is a VP adjunct, no PCC effect arises.

(i)   My jsme   tam s   tebou/ s   ním ... nešli.
      we AUX.1PL there with you.SG/ with him   not-went.PL
      'We didn't got there with you/him ....'

(ii) a. Já s   tebou pojedu   do Prahy.
          I with you go.FUT.1SG to Prague
          'I will go to Prague with you.'
      b. Ty se   mnou pojedeš do Prahy.
          you with me   go-will to Prague
          'You will go to Prague with me.'
      c. On se   mnou/ s   tebou pojede   do Prahy.
          he with me   with you go-will.3SG to Prague
          'He will go to Prague with me/ with you.'

[57]3rd person PACs are possible in Russian. Russian, however, differs from Czech in a number of related properties: Russian pronouns can bind outside of c-command, Nikolaeva (2014) and Russian has semantic agreement in a local syntactic domain (Babyonyshev, 1997; Pereltsvaig, 2006). I do not speculate on the nature of the variation as Russian properties are cross-linguistically extremely rare and to my knowledge no satisfactory theoretical account of them has been proposed.

(60) ?Oni s   Petrem tam nešli.
      they with Petr   there not-went.PL
      'They and Peter didn't go there.'
      *'He and Peter didn't go there.

As for binding and and correlations with agreement, these properties cannot be tested for PACs. As we have seen in section 3, associative pronouns in and of themselves already display variable binding. Furthermore, since the morpho-syntactic realization of the focal pronoun is plural, no variation in agreement is expected to arise.

Thus there is a number of properties in which comitative constructions and PACs are syntactically alike. However, PACs are unlike comitative constructions in that the focal pronoun and the associative PP *do not form a constituent*. The first indication of differing constituency properties comes from the observation that PACs, unlike their comitative counterparts, cannot be embedded in a recursive conjunction, (61).

(61) ??My s   Petrem a   Lucie jsme   se   potkali na náměstí.
      we with Petr   and Lucie AUX.1PL REFL met   on square
      intended: 'I, Petr and Lucie met at the main square.'

Furthermore, the associative PP in PACs does not need to be immediately adjacent to the focal pronoun for the construction to obtain the associative reading, (62).

(62) My (s   Marií) jsme   (s   Marií) šli   %(s Marií) na večírek *(s   Marií).
      we with Marie AUX.1PL with Marie gone.1PL with Mary on party   with Marie
      'Marie <u>and I</u> went to the party.'

The example is in the past tense so we can use the syntactic distribution of the auxiliary and the past participle to control for the structural height (see Veselovská 1998 and Kučerová (2012) for positional tests). The auxiliary is base-generated in T, the participle moves to v, but may optionally move to a higher functional head.[58] Assuming that the locational adverbial is VP adjoined, we can conclude that the associative PP may be attached anywhere between T and the edge of vP.[59]

Finally, the distribution of PACs does not match the distribution of other arguments. In the previous examples, PACs are structural subjects. They can also be direct objects in ditransitive

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[58]The % sign by one of the locations of the PP indicates that speakers differ in their judgement. I collected data from 20 speakers, about 10 of them found this position acceptable, although somewhat dis-preferred. The other speakers found it ungrammatical. I hypothesize that the judgements reflect the optionality of the participle raising.

[59]ra Matushansky, p.c., suggested that the order facts might reflect syntactic height but instead they could be relativized with respect to information structure requirement on ordering in Slavic. The following example controls for this possible confound by adding focus particles, i.e., enforcing a rather information structure that that of our baseline examples. As we can see, the positional restriction on the PP remains unchanged, thus it cannot be a property of information structure but it must follow from structural height. (Thanks to Léa Nash, p.c. for her help with constructing the relevant example.)

(i)   My (s   Marií) jsme   (s   Marií) vždycky %(s Marií) četli   *(s   Marií) romantické romány *(s
      we with Marie AUX.1PL with Marie always   with Marie read.PL with Marie romantic   novels   with
      Marií) jenom v sobotu   *(s   Marií).
      Marie only   in Saturdays with Marie
      'Marie and I always read romantic novels only on Saturdays.'

constructions, (63-a), and structural subjects of psych verbs, (64). Strikingly, PACs cannot be direct objects in transitive constructions, (65), and indirect objects in ditransitive constructions, (66).

(63) a. Marie   nás   s   Petrem představila Lucii.
          Marie.NOM us.ACC with Petr   introduced Lucie.DAT
      b. Marie   nás   představila s   Petrem Lucii.
          Marie.NOM us.ACC introduced with Petr   Lucie.DAT
          'Marie introduced us and Peter to Lucie.'
          'Marie introduced me and Peter to Lucie.'

(64) Nás s   manželem přepadl strach.
      us   with husband   attacked fear
      'We and the husband became scared.'
      'My husband and I became scared.

(65) Petr   viděl nás s   manželem.
      Petr.NOM saw   us   with husband
      'Petr saw us with a/his/?our husband.'
      *'Petr saw me and my husband.'

(66) Marie   Lucii   představila nám   s   Petrem.
      Marie.NOM Lucie.ACC introduced us.DAT with Petr
      'Marie introduced Lucie to Peter and us.'
      ??'Marie introduced Lucie to Peter and me.'

That is, a PAC can be an argument only if it is merged in a specifier of a verbal head (v or Appl).

The table in (67) gives an overview of the similarities and the differences between these two constructions.

(67)

	CC	PAC
agreement?	variable	(plural)
wh-extraction?	impossible	impossible
PCC?	yes	yes
anaphors and pronouns in complementary distribution?	no	(no)
recursion?	no	no
correlation of binding and agreement?	yes	n/a
DP?	yes	no
restrictions on being an argument?	none	only spec,vP or spec,ApplP

The core of the analysis proposed for comitative constructions in section 4 extends to PACs, only with minor modifications. As with comitative constructions, the locus of the unexpected syntactic behavior of PACs is in an interface feature formation that involves two person features in the minimally-searchable domain of the label: the person feature of the focal noun and the person feature of the associative PP. The difference is that the relevant phase head is not D as for comitative constructions, but it is v (or Appl).

For simplicity of the presentation, let us consider only formation around v. In this case, the focal pronoun is an external argument, i.e., it is base-generated in spec,vP. Pronouns have phrasal structure, yet, they cannot be modified by adjuncts (e.g., Cardinaletti and Starke 1999; Déchaine and Wiltschko 2002). Thus the associative PP cannot be attached within the pronoun itself (unless it would obtain a modification reading, as in 'we linguists'). Instead, I argue that the associative PP is base-generated as a VP modifier and optionally moves to vP. If the PP remains in the lower position, then it behaves a VP-adjunct and the pronoun is singular, (53-a). If, however, the PP adjoins to vP, then the PP partakes in the formation of the associative construction, (68).

(68)
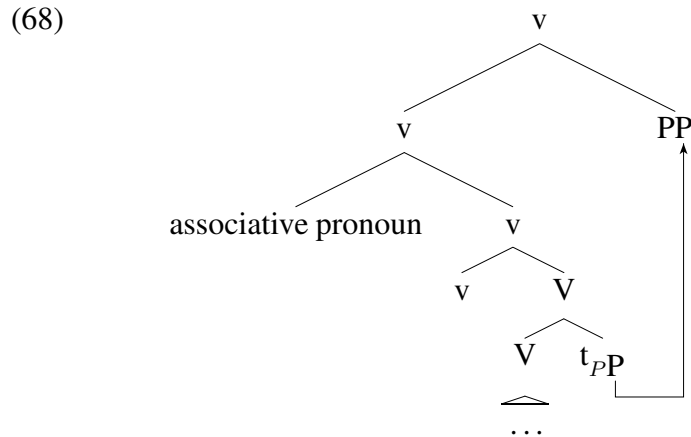
Positing a person feature and the related semantic index formation for a label of a DP is fairly un-controversial. To do the same for the v head requires more justification. Zubizarreta and Pancheva (2017) and Pancheva and Zubizarreta (2017) argue that in some languages the v head carries a person feature that must be 'semantically' licensed. The reasoning is that in these languages events are semantically anchored not via tense as in English but via event participants. They specifically propose that Czech is a language with such a semantically privileged person feature on v. This person feature associates itself with all the person features in its local domain and ensures that the configuration of person features in the local domain of the phase head does not give rise to a perspectival conflict, namely, PCC.

However, we have seen in this paper an argument that person feature cannot directly interact with the semantic module. Instead, it becomes part of a bundle readable to the semantic module only via a formal association with a semantic index created as part of labeling of a phase by CI. The idea that the v head contains a semantic index representation has been independently put forward in Kratzer (2009) in order to account for complex interactions of ϕ-Agree and morphological realization of bound pronouns. In the system proposed here a semantic index is formed in a phase label only if a numerical identifier has been projected to the label in narrow syntax. A numerical identifier does not seem to be a feature associated with v. Instead, I propose that a numerical identifier projects to the vP label from spec,vP, i.e., the external argument.[60] Once the phase label is processed by the syntax-semantics interface, a semantic index is formed around this projected numerical identifier.

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[60]The paper proposes that a numerical identifier triggers spell-out. This hypothesis makes a strong prediction, namely, that only a v head with an external argument triggers spell-out. Although the question of whether all types of vP are (strong) phases has not been satisfactorily answered, there is some evidence that this prediction is correct. See, e.g., Legate (2003).

Let us explore the exact derivational steps of this process. As a starting point, I follow Kratzer (2009) in assuming that Czech 1st and 2nd person pronouns are minimal pronouns. I model these pronouns as a D head that comes to the derivation with unvalued ϕ-features and with a (valued) numerical identifier. The ϕ-features become valued only via features present on the corresponding phase head, v (or Appl).[61] The numerical identifier projects into the label of the vP and triggers spell-out.

Once the syntax-semantic interface processes the vP label, the numerical identifier searches its minimal local domain and registers all person features at the phase edge in order to anchor event participants (Pancheva and Zubizarreta, 2017). I propose that the process considers the [±speaker] dimension of the event expressed by the vP as well,[62] and, in turn, registers the [+participant, ±speaker] value on the phase head. For concreteness, let us assume that the value of person on v is [+participant, +speaker], i.e., ①, and that the numerical identifier projected from the external argument is 7, as in (69-a) . Then we obtain $<7, ①>$ as the semantic index in the vP label, (69-b). Because the numerical identifier in the vP label is identical with the numerical identifier in the spec,vP (technically, projection is an identity merger), the semantic index and in turn the person feature value is shared with the minimal pronoun in the spec,vP. Once the edge of the vP phase is spelled-out[63] the minimal pronoun gets morphologically realized as the 1st singular person pronoun, (69-c).[64]

(69) a. Minimal pronoun is generated in the spec of vP and its numerical identifier projects to the syntactic label of vP:
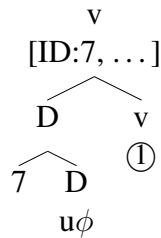
 b. Numerical identifier triggers a formation of a semantic index:

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[61]To remind readers who might not be familiar with Kratzer (2009), the core observation is that pronouns get their features from their antecedent but the relation is not direct; instead it is structurally mediated by a phase head, which is to say, the pronoun will get whatever ϕ-features are present. The empirical support comes from data where other ϕ-features become part of the phase head and the pronoun is licensed if its features match the features of the phase head, but not necessarily those of the antecedent.

The present proposal differs somewhat from the exact mechanics of Kratzer's proposal, partially because of the syntactic component being more explicit here. For Kratzer (2009) a pronoun with an interpretable person feature comes to the semantic computation with a valued person feature, unlike its bound counterpart. Since this paper is primarily concerned with the narrow syntax derivation, feature valuation plays out somewhat differently. Note, however, that once the phase is transferred and all features valued, the input to LF is identical to that assumed by Kratzer.

[62]How this is technically done is not critical for the present proposal. The only relevant fact is that the [+participant] dimension must be part of the event-participant anchoring process.

[63]As part of the next phase; recall only the complement of a phase head is sent to the morphology module.

[64]This is where the semantic insight of Kratzer (2009) meets the syntactic implementation of Zubizarreta and Pancheva (2017); Pancheva and Zubizarreta (2017).
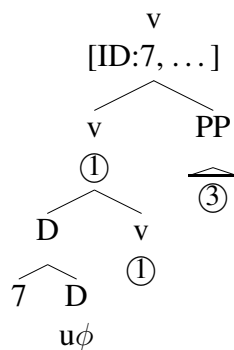
$$v$$
$$<7, ①>$$

```
        v
     <7, ①>
      /    \
     D      v
    / \     ①
   7   D
       uφ
```
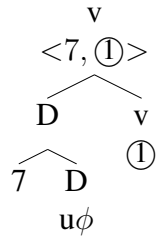
c. Minimal pronoun gets valued from the v label, and gets spelled out:

```
            v
         <7, ①>
         /     \
        D        v
     <7, ①>      ①
      /   \
     7     D
           ①
           |
           I
```
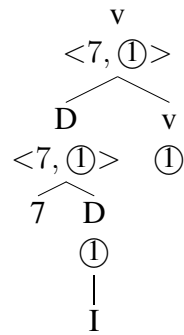
Let us now turn to the derivation of a PAC. In PACs, there is another person feature in the minimal-search domain of the vP label, namely, the associative PP adjoined to vP. The numerical identifier will consider this additional person feature as well. If this new person value can be innocently added to the first value – [+participant], then the derivation converges. If the value cannot be added without a rise of perspectival conflict, PCC arises.

If no PCC arises the person feature of v gets modified by a joiner ($+\Delta$) to indicate that there is an additional person feature in the structure, precisely as in the label of comitative constructions. The v phase label now contains a semantic index with a ①$+\Delta$ or ②$+\Delta$, depending on the [$\pm$speaker] value of the [+participant] feature. For example, the semantic index can be $<7, ①+\Delta>$, as in the derivation in (70). This semantic index gets shared with the minimal pronoun in the spec of vP because of its shared numerical index. Since [$\pm$speaker]$+\Delta$ is a valid person value in Czech – otherwise plural pronouns couldn't be uniquely labeled – the derivation converges and the pronoun in the spec of vP is necessarily realized morphologically as plural.
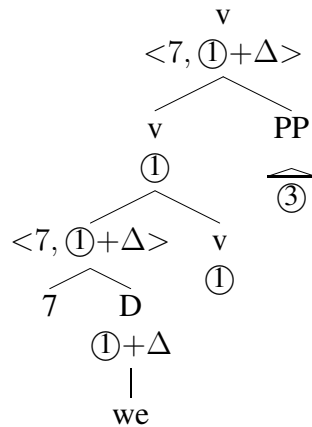
(70) a. Minimal pronoun is generated in the spec of vP and the PP adjoins to vP; the numerical identifier projects:

```
               v
          [ID:7, . . . ]
           /        \
          v          PP
          ①          ③
        /   \
       D     v
      / \    ①
     7   D
         uφ
```

b. Anchoring person feature establishes [+participant] value and adds the other person value to the bundle:

v
$<7, \text{①}+\Delta>$
v   PP
①   ③
D   v
7 D ①
uϕ
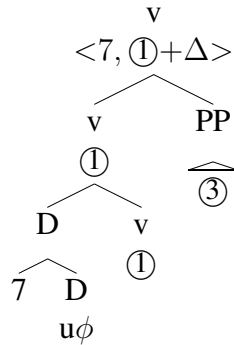
c.   Minimal pronoun gets valued from v and gets spelled out as plural:

v
$<7, \text{①}+\Delta>$
v   PP
①   ③
$<7, \text{①}+\Delta>$ v
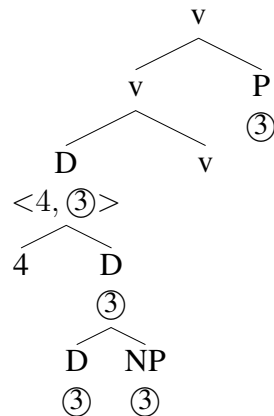7 D ①
①$+\Delta$
we

In the next step, the external argument, i.e., the focal pronoun, can raise to Spec,TP. When the corresponding feature on T (be it due to EPP or whatever other feature that might trigger such movement) probes for the focal pronoun, the associative PP can be pied-piped because both the pronoun and the PP are now technically part of the same chain (represented by the modified person feature). Crucially, even if the pronoun moves without the PP, it still remains plural because of its valuation through the v head.

What about *wh*-extraction? Even though the focal pronoun can A-move without the associative PP, *wh*-extraction is not licensed. As we have seen in the previous section, the problem with *wh*-extraction from a comitative structure was not in the movement itself, instead lack of movement resulted from the trace not being identifiable with the moved element because the trace conversion rule works with the variable representation on the phase head and that variable representation does not discriminate the individual parts of the comitative construction. The same problem extends to PACs, as both the v head and the pronoun itself share the same complex person representation. The indistinguishability of these two objects makes it impossible for the trace conversion rule to associate the *wh*-element with only a subpart of the associative construction.
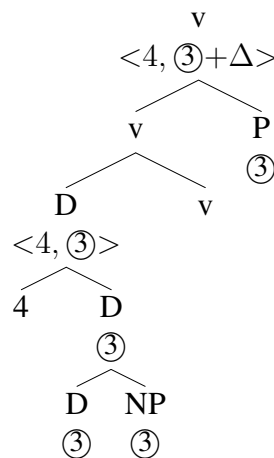
The question that arises is why 3rd person pronouns and R-expressions cannot form associative constructions at the vP level. The reason is that the associative formation is done via feature sharing between the minimal pronoun and the phase head. This is possible because the pronoun comes to the derivation without a valued person feature and this value cannot be supplied by narrow syntax. 3rd person pronouns are different from 1st and 2nd person pronouns in that they contain an NP complement. Even though this complement is not overtly realized because it is elided (Postal,

1969; Elbourne, 2005),[65] it is present in narrow syntax and equipped with valued ϕ-features. The unvalued ϕ-features on D probe the valued features of the complement NP. In turn, the features on D get valued by the features of the complement NP (as in the derivation in (36)). Since narrow-syntax operations have primacy over interface processes (any unvalued feature that can be valued by agree before spell-out must be valued), the syntactically valued person feature takes precedence over a value that might be provided by the interface bundle. Thus, even if there were a person feature on v valued as $+\Delta$, this value couldn't be shared with the DP or the PP. A simplified derivation for an R-expression is given in (71).

(71)   a.   All ϕ-features in the DP are valued before the vP label is created:

$$
\begin{array}{l}
\text{v} \\
\quad \text{v} \qquad \text{P} \; ③ \\
\quad\quad \text{D} \qquad \text{v} \\
\quad\quad \langle 4, ③ \rangle \\
\quad\quad\quad 4 \qquad \text{D} \; ③ \\
\quad\quad\quad\quad \text{D} \; ③ \quad \text{NP} \; ③
\end{array}
$$

   b.   A semantic index in the vP label cannot rewrite valuation from narrow syntax:

$$
\begin{array}{l}
\text{v} \\
\langle 4, ③{+}\Delta \rangle \\
\quad \text{v} \qquad \text{P} \; ③ \\
\quad\quad \text{D} \qquad \text{v} \\
\quad\quad \langle 4, ③ \rangle \\
\quad\quad\quad 4 \qquad \text{D} \; ③ \\
\quad\quad\quad\quad \text{D} \; ③ \quad \text{NP} \; ③
\end{array}
$$

Note that in the comitative construction, the [person+Δ] value is never part of the focal noun itself,[66] it arises only at the level of labeling of the DP that combines the focal noun and the associative PP. Thus, the DP itself cannot become associative, neither can it form a new unit with the associative PP. This explanation extends to R-expressions, as they also come with a syntactically valued person feature. Finally, even if the [person+Δ] value is part of the v head, *wh*-movement of the 3rd person noun, or the associate-like PP, is licensed because the representation of the person feature on the v head is distinct from that on the DP and the PP.

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[65]The identity of the elided NP is established via parallelism requirements on ellipsis with the corresponding linguistic antecedent. See Merchant (2001) for an explicit model of such ellipsis licensing.

[66]Consequently, any agreement within the focal DP is singular.

We have thus derived all properties of PACs. In turn, the analysis of PACs proposed here provides further support for the theoretical proposal in the main body of the paper.