

# A Relativized Probing Approach to Person Encoding in Local Scenarios\*

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## Abstract

In this paper I discuss three empirical generalizations about local scenarios: (i) four different realization strategies found cross-linguistically, (ii) the asymmetry in the number of arguments encoded on the verb in languages with person hierarchy-effects in non-local scenarios and (iii) the fact that person portmanteaux are particularly prominent in local scenarios. I claim that all three generalizations can be derived if Agree is relativized to target only positively valued person features on a goal. (ii) falls out directly from the Agree mechanism. (i) is a purely morphological phenomenon arising as a consequence of the specification of local person exponents. Person portmanteaux are analyzed as inclusive markers in a derived inclusive context. Since such a context can only emerge in local scenarios, (iii) is derived as well. Local scenarios are thus far more systematic than has previously been thought. In general, the paper contributes to the discussion on how morphological theories that rely on discrete slots (DM, PFM) can handle portmanteau morphemes only by vocabulary insertion and without additional mechanism like fusion, head movement or spell-out of non-terminals.

*Keywords: Agree, relativized probing, person agreement, local scenarios, portmanteau morphemes, hierarchy effects, underspecification*

## 1 Introduction

In this paper, I address the exponence of the morphosyntactic feature person in local scenarios of verbal agreement paradigms. The term *local scenarios* characterizes contexts in which both arguments of a transitive verb are local person, i.e. 1st or 2nd person. The following non-reflexive combinations of subject person features X and object person features Y, abbreviated as X>Y, are local scenarios: 1>2 and 2>1, as in *I saw you* and *You saw me*.<sup>1</sup> All combinations of

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<sup>1</sup>The abbreviations used in this paper are the following: Acc = accusative; Abs = absolutive; DM = Distributed Morphology; DP<sub>ext</sub> = external argument of a verb; DP<sub>int</sub> = internal argument of a verb; Erg = ergative; excl = (1st person) exclusive; incl = (1st person) inclusive; INF = infinitive; intr. = intransitive; loc = local person (= 1st and

X and Y in which at least one argument of a transitive verb is 3rd person are called non-local scenarios in what follows. The focus of this paper is on the variation in exponence that is found in local scenarios and on how local scenarios are encoded in comparison to non-local scenarios. This is an important field of investigation because it has been repeatedly noticed in the literature on phi-agreement that local scenarios are unsystematic. This means that we do not find the person exponents that we would expect given the systematic distribution of person exponents in non-local scenarios. For this reason, local scenarios are often ignored in formal analyses of inflectional paradigms. Heath (1991: 80) puts it as follows: “In one language after another, 1st  $\leftrightarrow$  2nd forms [i.e. the scenarios 1>2 and 2>1, D.G.] are the messiest and most opaque of all transitive combinations, and grammarians have often despaired of analysing them structurally.”

The coding strategy in local scenarios that has received most attention in the literature is person portmanteau morphemes. Person portmanteaux are unsegmentable morphemes which encode person features of the external and internal argument of a transitive verb simultaneously. ‘Unsegmentable’ means that such a morpheme cannot in any obvious way be separated into two independent morphemes each of which expresses the person feature of only a single argument.<sup>2</sup> An example for a language with person portmanteaux is Umatilla Sahaptin (Sahaptian, Rigsby and Rude 1996: 676). The relevant part of the agreement paradigm is given in (1).

(1) *Person enclitics in Umatilla Sahaptin:*

A					B	
1sg	1pl excl	1pl incl	2sg	2pl	1sg>2sg	1sg>2pl, 1pl excl>2sg, 1pl excl>2pl
naš	nataš	na	nam	pam	maš	mataš

In Umatilla Sahaptin, second-position enclitics encode 1st and 2nd person agreement. If the single argument of an intransitive verb is 1st or 2nd person, then the corresponding enclitic from the marker set A in (1) is found in second position. In transitive non-local contexts, the enclitics in set A can encode either the person of the subject or the object, depending on which is 1st or 2nd person. If both arguments of a transitive verb are 1st or 2nd person, we find the forms *maš* and *mataš* from the marker set B in (1). These are person portmanteaux in the sense defined above because they are not composed of the markers for 1st and 2nd person from set A that we find if only a single argument is 1st or 2nd person (the exponents of the scenario 2>1 in Umatilla are discussed in section 5). Portmanteau morphemes are a challenge for approaches to inflectional morphology that assume that affixes are the realization of discrete slots which are independent of each other, as in Distributed Morphology (DM, Halle and Marantz 1993; 1994; Harley and Noyer 1999) and Paradigm Function Morphology (Stump 2001). The problem is that if features of the external and internal argument are located in different slots, then a portmanteau morpheme would have to realize more than one slot, but under standard assumptions a morpheme can only realize a single slot. Nevertheless, Distributed Morphology and Paradigm Function Morphology do provide theoretical means to cope with portmanteau morphemes: In the case of DM, there are operations (such as fusion of terminals, see section 3) that apply before the realization rules and that change the syntactic structure to which realization rules are sen-

2nd person); min = minimal (number value); Nom = nominative; sg = singular; pl = plural; PRES = present tense; REC.PAST = recent past; TAM = tense/aspect/mood; VERIF = verifier (evidentiality value); VI = vocabulary item;  $u\pi$  = person probe; X>Y = a scenario in which  $DP_{ext}$  of a transitive verb with the features X acts on  $DP_{int}$  of a transitive verb with the features Y;  $a \succ b$  = a outranks b on a hierarchy; 1, 2, 3 = 1st, 2nd, 3rd person.

<sup>2</sup>It is an important question when a morpheme is indeed unsegmentable and thus a real portmanteau. Georgi et al. (2011) provide evidence that there are no portmanteau morphemes in the verbal inflection of Uralic languages, contrary to what has traditionally been argued. They give three empirical arguments for a subanalysis of the alleged portmanteaux into two separate markers that each expresses the features of only a single verbal argument. These arguments are probably also valid for many so-called ‘portmanteaux’ from the literature. As far as I can see, the arguments for segmentation from the aforementioned paper do not apply to the portmanteaux that will be discussed in this article.

sitive. However, this means that additional machinery is needed to handle portmanteaux. The main focus of this paper is thus to develop an analysis of person portmanteaux that is compatible with the aforementioned morphological theories and that does not have to posit additional morphological operations like e.g. fusion. Importantly, this analysis will shed new light on three empirical generalizations about person encoding in local scenarios that have been corroborating the intuition that local scenarios are unsystematic and hardly amenable to formal analysis. The goal of this paper is to account for all of these generalizations with the same agreement mechanism. Person exponence in local scenarios is thus shown to be far more systematic than has previously been thought. The empirical observations to be derived are summarized in (i) to (iii): (i) There are four different coding strategies found cross-linguistically in local scenarios, some languages even mix different strategies; (ii) there is an asymmetry between local and non-local scenarios in the number of arguments encoded on the verb in a subclass of languages: In these languages, the verb cross-references only one argument of a transitive verb in non-local scenarios, but two arguments in local scenarios; (iii) person portmanteaux are particularly prominent in local scenarios.

I claim that these generalizations can be derived under a standard decomposition of person features combined with the assumption that Agree is relativized to target only positively valued person features (*relativized probing*, cf. Nevins 2007b; 2011; Preminger 2011). The cross-linguistic variation of exponence in local scenarios is then a purely morphological phenomenon that results from the specification of local person exponents. The underlying syntactic agreement mechanism is the same throughout languages with different coding patterns in local scenarios. Person portmanteaux are analysed as 1st person inclusive markers that arise in a derived inclusive context. In addition, the Case values of the arguments that take part in person Agree will be shown to play a central role in deriving gaps in the distribution of person portmanteaux across paradigms and the emergence of mixed coding strategies within the same language.

I will proceed as follows: In section 2 I present the three empirical generalizations about coding strategies in local scenarios in more detail. Section 3 summarizes why portmanteau morphemes, one of the coding patterns in local scenarios, are problematic for inflectional theories relying on discrete slots. Furthermore, the shortcomings of various solutions that have been proposed in the literature to handle person portmanteaux in these frameworks are discussed. Based on the insights gained from the discussion of person portmanteaux, I develop a relativized probing analysis in section 4 that accounts for person portmanteaux and that only relies on vocabulary insertion in the morphological component. I continue by showing how the approach developed for portmanteaux can also derive the other coding strategies in local scenarios and the asymmetry in the number of arguments encoded on the verb. Section 5 contains some extensions of the analysis. Section 6 concludes.

## 2 Generalizations

The analysis that will be presented in section 4 aims at accounting for the three empirical observations about the encoding of person in local scenarios that are presented in this section.

### 2.1 Observation I

Based on a typological survey of Australian and native American languages, Heath (1991; 1998) describes four realization strategies found in local scenarios:<sup>3</sup>

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<sup>3</sup>I will not discuss another phenomenon addressed by Heath which is also prominent in local scenarios: the neutralization of number. In several unrelated languages, the verb shows plural agreement although the two arguments it agrees with are singular, a pattern called “plural insertion” by Harbour (2003) or “constructed plural” by

1. **PORTMANTEAU MORPHEME:** There is an unsegmentable morpheme expressing person features of both local person arguments simultaneously, although person features of the external and the internal argument are realized by separate morphemes in non-local scenarios.
2. **HIERARCHY EFFECTS:** In both local scenarios 1>2 and 2>1 we find either only the 1st person exponent or only the 2nd person exponent. Both options amount to a person hierarchy effect. If the 1st person exponent is chosen, the pattern can be described by the hierarchy 1 > 2 (> 3) in which 1st person outranks 2nd person; if the 2nd person marker prevails in both contexts, the pattern can be described by the hierarchy 2 > 1 (> 3) in which 2nd person outranks 1st person.
3. **ZERO EXPONENCE:** There is no (overt) exponent in local scenarios although the respective languages use an overt 1st and 2nd person exponent in non-local scenarios and in an intransitive context. Zero exponence is ambiguous because the pattern could be analysed as a zero portmanteau expressing person features of the external and internal argument simultaneously (in which case it is a subclass of strategy 1), as a zero allomorph of the overt 1st or 2nd person exponent (in which case it is a subclass of strategy 2), or literally as the absence of an exponent. I will come back to this ambiguity in section 4.4.
4. **COOCCURRENCE OF 1ST AND 2ND PERSON EXPONENT:** Both the regular 1st and 2nd person exponent, which are also found in non-local scenarios and with intransitive verbs, are realized in local scenarios.

Often, languages do not only apply one of these strategies. Rather, they mix the strategies such that one strategy is used in 1>2 and another one in 2>1. This is another factor that contributes to the impression that local scenarios are unsystematic. I will present an analysis of these languages in section 5, but for illustration of the present approach I will first concentrate on languages that apply only a single strategy in both local scenarios. The central question related to Observation I is whether and how the cross-linguistic variation can be uniformly accounted for.

## 2.2 Observation II

It is important to note that most of the languages that Heath has looked at exhibit person hierarchy effects in non-local scenarios. In these languages, both arguments of a transitive verb can in principle agree with the verb. However, there is only a single slot on the verb such that the two arguments compete for realization of this slot. The competition is resolved by a hierarchy on which local person outranks non-local person. The abstract pattern of a language with person hierarchy effects in non-local scenarios and with the marker inventory in (2) is shown in (3) for agreement with the single argument of an intransitive verb and in (4) for agreement in transitive contexts. The local scenarios are left empty for the moment.

(2) *Marker inventory:*

- a. /a/ ↔ [1]
- b. /b/ ↔ [2]
- c. /c/ ↔ [3]

(3) *Intransitive agreement:*

DP	marker
1	a
2	b
3	c

(4) *Person hierarchy effects in non-local scenarios:*

DP <sub>ext</sub> \ DP <sub>int</sub>	DP <sub>int</sub>		
	1	2	3
1	–	–	a
2	–	–	b
3	a	b	c

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Trommer (2006). See these two references for some qualifications and formal approaches to this phenomenon.

The following tables illustrate the four realization strategies in languages with person hierarchy effects in non-local scenarios by filling the abstract paradigm in (4) with the corresponding exponents for local scenarios (set in boldface). (5) shows a person portmanteau morpheme /d/ (strategy 1); (6) shows zero exponence (strategy 2); (7) illustrates the hierarchy  $1 \succ 2 \succ 3$  with the marker /a/ in  $1 > 2$  and  $2 > 1$ , and (8) illustrates the hierarchy  $2 \succ 1 \succ 3$  with the marker /b/ in  $1 > 2$  and  $2 > 1$ ; in (9) the 1st and 2nd person exponent cooccur (their linear order is irrelevant for the present discussion). Concrete examples for all coding strategies will be given in section 4.4.

(5) *Portmanteau strategy:*

DP <sub>ext</sub> \ DP <sub>int</sub>	1	2	3
1		<b>d</b>	a
2	<b>d</b>		b
3	a	b	c

(6) *Zero exponence:*

DP <sub>ext</sub> \ DP <sub>int</sub>	1	2	3
1		∅	a
2	∅		b
3	a	b	c

(7) *Hierarchy  $1 \succ 2 \succ 3$ :*

DP <sub>ext</sub> \ DP <sub>int</sub>	1	2	3
1		<b>a</b>	a
2	<b>a</b>		b
3	a	b	c

(8) *Hierarchy  $2 \succ 1 \succ 3$ :*

DP <sub>ext</sub> \ DP <sub>int</sub>	1	2	3
1		<b>b</b>	a
2	<b>b</b>		b
3	a	b	c

(9) *Cooccurrence strategy:*

DP <sub>ext</sub> \ DP <sub>int</sub>	1	2	3
1		<b>ab</b>	a
2	<b>ab</b>		b
3	a	b	c

Depending on the strategy chosen in local scenarios, a hitherto unnoticed asymmetry between local and non-local scenarios in the number of arguments encoded on the verb arises. Due to the person hierarchy effect, only a single argument is encoded in non-local scenarios, whereas two arguments are encoded in local scenarios if a language applies the portmanteau or the cooccurrence strategy (or the zero exponence strategy if the ∅-marker is a portmanteau). Hence, the number of arguments seems to increase in local scenarios. With respect to the portmanteau strategy 1, there is still only a single morpheme, just as in the non-local scenarios. But this portmanteau morpheme expresses the person features of the external and internal argument of a transitive verb simultaneously because the morpheme is not identical to either the 1st person exponent or the 2nd person exponent found in the non-local scenarios and with intransitives. If a language applies strategy 4, the asymmetry is even more obvious because there are two morphemes in local scenarios but only one morpheme in the non-local scenarios.

The question that arises in connection to Observation II is how the asymmetry in the number of encoded arguments arises, a question that has received little attention in the literature on phi-agreement. A possible answer to this question is to assume that there is always agreement with both arguments in the syntax, but the features of one of the arguments in non-local scenarios are deleted in the morphological component. What needs to be answered in this case is how exactly and why the deletion of features only applies in a subset of the scenarios. I will present a different solution in which the asymmetries in languages with person hierarchy effects in non-local scenarios arises in the syntax due to the properties of the agreement mechanism. The analysis also predicts why the split precisely separates local from non-local scenarios and does not choose a different division of scenarios.

## 2.3 Observation III

The third observation concerns the distribution of person portmanteaux. It has repeatedly been observed in the literature that portmanteau morphemes are particularly prominent in local scenarios 1>2 and 2>1, i.e. they are found almost exclusively in these contexts (cf. Heath 1991; 1998; Cysouw 2003; Wunderlich 2006; Nevins 2007a; Handschuh 2011).<sup>4</sup> I will thus call them *Local Person Portmanteaux (LPPM)* in what follows. The fundamental questions with respect to this observation are (i) what differentiates local from non-local scenarios that makes person portmanteaux show up virtually only in the former, but not in the latter scenarios, and (ii) how this can be formally implemented in a theory of agreement. I will show that the same syntactic agreement mechanism that derives the asymmetry presented under Observation II also derives the fact that person portmanteaux are prominent in local scenarios.

Before laying down the account of the empirical generalizations presented in this section, I briefly summarize the theoretical problems that arise with portmanteau morphemes in section 3. The challenges imposed by this phenomenon will then lead to a new analysis that will also account for the other coding strategies. Hence, the analysis developed for Observation III will derive Observations I and II as well.

## 3 Portmanteaux in Distributed Morphology

In this section I discuss why portmanteau morphemes are a challenge for morphological theories that rely on the realization of slots that are independent from one another. For concreteness, I concentrate on Distributed Morphology (DM) because recent approaches to portmanteaux and the discussion of how to solve the problems imposed by this phenomenon are couched in terms of this framework.<sup>5</sup>

In Distributed Morphology, a postsyntactic realizational morphological framework, the relevant slots are terminal nodes in the syntactic representation. These contain morphosyntactic features that are realized in the morphological component by vocabulary items (VIs) pairing phonological content with morphosyntactic features. Vocabulary items have to possess a subset of the features of a terminal node to be able to be inserted into this terminal node. What is important is that VIs can target only a *single* terminal node (Halle and Marantz 1993; 1994). Portmanteau morphemes are a problem for this approach because they realize features of more than one slot with a single morpheme by definition. With respect to person portmanteaux, the challenge arises because it is usually assumed that the subject and the object of a transitive verb copy their phi-features onto different terminals in the syntax each of which is realized by a morpheme. In a minimalist syntactic framework, these are the functional heads T and v, respectively.

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<sup>4</sup>This does not mean that there is absolutely no instance of a person portmanteaux in non-local scenarios. One counter-example is the portmanteau *pée* in Nez Perce (Sahaptian, Rude 1985) that occurs in the scenario 3>3sg. But there is a strong cross-linguistic tendency that person portmanteaux occur in local scenarios and I contend that this tendency is worth being derived. Furthermore, it is a step forward in the theory on phi-agreement that the generalization falls out almost automatically from a mechanism (relativized Agree) that has been proposed for completely different phenomena. In addition, it is interesting to pursue what the account of the generalization can teach us with respect to other coding strategies in local scenarios. As I will show in this paper, the analysis opens up the possibility to account for these strategies and for the asymmetry formulated under Observation II as well. The analysis thus derives a number of facts, not just the distribution of person portmanteaux. I take this to be a desirable outcome. Crucially, I do not claim that relativized probing is the only way through which portmanteaux can arise in languages. Other strategies may lead to portmanteaux in non-local scenarios.

<sup>5</sup>For another realizational theory of morphology that needs to invoke special concepts for portmanteaux see Stump (2001). In this framework, exponence rules can only apply to a single slot. Stump postulates a special position class for portmanteaux which can exceptionally block the morphemes of two otherwise independent position classes by a single morphological formative, a kind of blocking that is otherwise impossible in Paradigm Function Morphology.

Each of these terminals is then realized by a VI so that we expect to see two morphemes, one expressing the person of the subject on T and another one expressing the person of the object on v. A person portmanteau would have to be inserted into the terminal nodes T and v at the same time, an operation the framework excludes. Several solutions to this problem have been proposed in the literature in recent years. In the remainder of this section, I present these approaches and discuss potential shortcomings with respect to person portmanteaux.<sup>6</sup>

**SPELL-OUT OF NON-TERMINALS:** Ackema and Neeleman (2004) as well as Caha (2008; 2009) and Radkevich (2010), the three latter developing an idea of Starke (2009), propose that vocabulary items cannot only target terminal nodes but also non-terminals. A VI inserted into a non-terminal spells out all the terminals it dominates (see also Neeleman and Szendrői 2007). However, this solution is problematic when it comes to person portmanteaux. Remember that the person features of the subject and the object of a transitive verb are located on T and v, respectively. A person portmanteau must then spell out at least the TP which dominates both terminals. Since Starke (2009) and Caha (2009) assume that VIs always spell-out complete constituents, everything dominated by the TP node is realized by the portmanteau morpheme, including other functional heads, the verb and the argument DPs. This is unlikely because the actually used verb and arguments may of course vary.<sup>7</sup> Since this approach is not exclusively designed for person portmanteaux but for portmanteaux in general, it does not tell us anything about why person portmanteaux occur almost exclusively in local scenarios. It is, however, hard to see how such a restriction could be integrated in a non-stipulative way (e.g. by a feature cooccurrence restriction on the features that may be contained in a VI inserted into a non-terminal). VIs spelling out non-terminals can in principle encode any combination of person features on the terminals dominated by TP.<sup>8</sup>

**HEAD MOVEMENT FROM v TO T:** A subtype of the preceding proposal is the head movement account: The heads which carry subject and object agreement features, respectively, form a complex head by adjoining one head to the other head. In the case of phi-agreement, this would mean that v with the object phi-features adjoins to T, the locus of subject phi-features. The resulting complex head T has the following structure: [<sub>T</sub> v T]. A spell-out rule can then target the complex, non-terminal head T which dominates T and v and which thus includes the phi-features of both arguments. This approach to person portmanteau morphemes avoids the problematic fact of the previously discussed account that spell-out of a non-terminal for the purpose of realizing phi-features includes the spell-out of the argument DPs. This is not the case under the head movement account since the complex head T does not dominate the arguments. However, v in the complex T head is a complex head itself: v-to-T movement is preceded by V-to-v movement. V adjoins to v in order to pick up the inflection on v. But this means that

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<sup>6</sup>None of the solutions I discuss has exclusively been proposed for person portmanteaux, but rather for portmanteaux in general. Some of the shortcomings I put forward only arise in the context of person portmanteaux and may thus not apply to other kinds of portmanteaux.

<sup>7</sup>Note that the argument that spell-out of non-terminal with respect to phi-features leads to the situation that a vocabulary item also spells out argument DPs and the verb still holds if one assumes - as I will do in the analysis in section 4 - that both arguments of a transitive verb agree with one and the same head, i.e. with T or with v. The non-terminals dominating T and v, respectively, contain at least the main verb and its arguments and must thus be part of a VI targeting vP or TP.

<sup>8</sup>A related proposal is spanning (cf. Svenonius 2012 and references cited there): Vocabulary insertion can not only target terminal nodes but also spans. Spans are sequences of heads such that the head H<sub>1</sub> selects the projection of the head H<sub>2</sub>, i.e., H<sub>2</sub>P is the complement of H<sub>1</sub>. According to this definition, T and v, the loci of subject and object agreement, respectively, form a span that can be realized by a vocabulary item. No fusion or head movement is needed to account for person portmanteaux. However, this means that spell-out can target even non-constituents. Since spanning is not restricted to heads that carry local person features, it does still not follow why person portmanteaux are prominent in local scenarios.

the spell-out of the complex head T, still being an instance of the spell-out of non-terminals, must include the lexical verb. The vocabulary item must contain the verb root, but this would predict massive suppletion. Phi-agreement exponents are independent of the actual verb roots. Indeed, for local scenarios, one would have to postulate one VI for every verbal root. A similar situation arises if a head H intervenes between v and T (e.g. a head that encodes aspect). Due to the head movement constraint, v must first adjoin to H and the complex head then adjoins to T. The complex T head thus also dominates H and a vocabulary item realizing this complex T head would always have to spell out H as well, which is not borne out empirically (see section 5.3 for examples). Furthermore, the restriction of person portmanteaux to local scenarios does not fall out from the head movement account either (but see the discussion of such an approach in which this can be done in section 5.3).

**FUSION OF TERMINALS:** To handle portmanteaux, Noyer (1992) adopts the operation fusion proposed in Halle and Marantz (1993) which applies after syntax but before vocabulary insertion. It takes the features of two independent terminals and fuses them into a single terminal, hence it results in a reduction in the number of terminals and thus morphemes: one morpheme inserted for originally two terminals. Fusion of the heads T and v can be abstractly represented as in (10-a) with [A] the features of the subject and [B] the features of the object. The heads T and v fuse into a single head which contains the features of the two original heads. (10-b) shows a VI that can be inserted into the newly created head v+T.

(10) *Fusion:*

- a.  $T [A], v [B] \xrightarrow{\text{fusion}} v+T \{ [A] [B] \}$   
 b.  $VI: /X/ \leftrightarrow \{ [A] [B] \}$

The newly created terminal may contain features from more than one terminal in the syntax. This approach has two potential problems: First, an additional operation aside from the indispensable operation vocabulary insertion is needed in the morphological component just to account for portmanteau morphemes. It has thus a construction-specific flavour. Second, the context in which fusion applies must be stipulated. Portmanteaux occur in local scenarios but nothing in the definition of the operation fusion constrains its application to these contexts. We would thus expect to find portmanteaux in non-local scenarios as well.

**CONTEXT-SENSITIVITY:** Trommer (2006; 2007) maintains the basic idea of DM that vocabulary items can indeed only be inserted into a single terminal, but he adds that the insertion of a VI into a terminal X can be restricted by features on another terminal Y, e.g. 1st person on X is realized by marker M in the context of 2nd person on Y. M can be said to be a portmanteau. The features of the terminal Y are not realized by the VI, but they provide the context for the insertion into the terminal X. This approach avoids the additional assumptions made in the three accounts presented above: The only operation necessary is vocabulary insertion into terminals, there is no need for head movement or fusion. However, there are other potential problems: First, we would expect that the features on Y are realized *in addition* to the features on X because the former are not discharged by vocabulary insertion into Y, they only provide the context. Hence, the portmanteau M should cooccur with another marker A realizing features of on Y. However, the hallmark of portmanteaux is that they encode both arguments simultaneously and therefore, we usually do not find an additional exponent A; to encode one of the arguments twice, in the portmanteau M and by A, is redundant. This can be implemented in the context-sensitive spell-out account by positing that A is zero, i.e., that the features on Y are realized by a zero morpheme in the context of features on X. However, this is a coincidence, a restatement of the fact that the portmanteau M is the only exponent in a local scenario; it does not follow from the analysis.

Furthermore, context-sensitivity also leaves open why person portmanteaux are so prominent in local scenarios because without further constraints any combination of person features could be encoded in a VI. For example, we would expect to find a portmanteaux realizing a 2nd person subject in the context of a 3rd person object. Finally, note that there is a potential conceptual problem with this approach. Context-sensitivity presupposes that vocabulary insertion can scan the whole syntactic tree with all its terminals. Vocabulary insertion is thus a potentially non-local operation, which goes against current trends in Minimalist syntax. In the phase model (Chomsky 2001; 2008) only subparts of the derivation are sent to the morphological component where VIs are inserted into terminal nodes. This implies that only a subset of the terminals of a structure are accessible for vocabulary insertion and this might cause a problem for portmanteaux if the terminal whose features are realized and the context-providing terminal are in different phases. (This reasoning of course depends on the size of phases, a matter which is still under debate and which I will not go into here.) Note that the head movement account introduced above does not face this locality problem: In a head adjunction structure, *v* and *T* are adjacent and within the same phase.

To summarize, we have seen that all solutions proposed for the integration of portmanteau morphemes in DM suffer from empirical and/or conceptual problems. In particular, they do not address the observations on the distribution of portmanteaux in local scenarios presented in section 2. In the following analysis, I will pursue the basic idea of the third approach, namely that information about more than one argument is present on a single terminal. This will be a direct outcome of the syntactic agreement mechanism rather than the result of an additional morphological operation.

## 4 A relativized probing approach

There are two tasks to fulfill in order to gain a coherent analysis of person portmanteaux that will then also lead to an analysis of other coding strategies: First, under the assumption of the post-syntactic realizational framework of Distributed Morphology, in which a morpheme can realize the features of only a single terminal, the person features of both arguments of a transitive verb must be present on a single head. Second, the analysis should derive the observations made on the distribution of person portmanteaux in transitive paradigms, namely that they occur prominently in local scenarios and that there is an asymmetry in the number of arguments encoded on the verb in languages with hierarchy effects in non-local scenarios.

The solution to the first problem lies in the nature of the syntactic agreement mechanism *Agree* (Chomsky 2000; 2001), which transfers person features of the arguments to functional heads (terminal nodes), where these features are spelled out postsyntactically. The presence of two feature sets on one head is a natural consequence of *Agree* if this head agrees with both arguments of the verb. In the terminology of Chomsky (2000), this means that if a head contains two person probes, it can potentially check each of these probes against a different goal. This is possible since *Agree* targets the closest *matching* goal. Depending on the definition of matching, this is not necessarily the closest goal in the *c-command* domain of a probe but it can also be a goal further down in the structure if the closest goal does not match the probe. The idea that one head has more than one probe and checks them with different goals has been pursued in the literature before to derive e.g. PCC effects (cf. Anagnostopoulou 2005; Adger and Harbour 2007; Řezáč 2008; Richards 2008; Heck and Richards 2010) as well as case splits and inverse marking (Béjar and Řezáč 2009; Keine 2010; Georgi 2012*b*).

The distribution of person portmanteaux is derived by restricting *Agree* to the marked, i.e. the positive values of person features (*relativized probing*, Nevins 2007*b*; 2011; Preminger

2011). Since only 1st and 2nd person are represented by positive values, Agree can only target those, but not 3rd person arguments. In this way, Agree differentiates between local and non-local person in the syntax.

## 4.1 Assumptions

In order to be able to gain natural classes of person features, the privative person features are decomposed into two binary features  $[\pm 1]$  and  $[\pm 2]$  (decomposition based on Noyer 1992; Wiese 1994; Frampton 2002):

(11) *Decomposition of person features:*

1 <sup>st</sup> excl	[+1 -2]
2 <sup>nd</sup>	[-1 +2]
1 <sup>st</sup> incl	[+1 +2]
3 <sup>rd</sup>	[-1 -2]

Arguments and vocabulary items are specified for these binary features. But whereas arguments are fully specified for both, VIs can be underspecified (cf. Halle and Marantz 1993; 1994).

As for the syntactic derivation, I assume the Minimalist phrase structure in (12) for a transitive verb. The internal argument ( $DP_{int}$ , direct object) is introduced as the sister of V whereas the external argument ( $DP_{ext}$ , subject) is generated in the specifier of the functional head  $v$ . Above  $v$ , there are two other functional heads T and C. But since the C head will not play any role in the analysis, I leave it out in the structures that follow. In an intransitive context, the structure is identical except that one of the arguments is missing (with unaccusatives  $DP_{ext}$  is missing and with unergative verbs  $DP_{int}$  is missing).<sup>9</sup>

(12)  $[_{CP} C [_{TP} T [_{vP} DP_{ext} [_{v'} v [_{VP} V DP_{int}]]]]]$

The arguments enter into agreement with functional heads. This means that they copy their inherent features onto these heads where they are realized postsyntactically. The syntactic operation responsible for agreement is Agree, triggered by an uninterpretable probe feature [uF] on a functional head that has to be checked and valued by a matching interpretable feature on an XP. Agree is defined as follows (cf. Chomsky 2000; 2001):

(13) *Agree* between a probe P and a goal G applies if:

- a. P c-commands G
- b. P has an uninterpretable unvalued feature [uF] and G has a matching interpretable feature [F]
- c. G is the closest matching goal for P
- d. Result: [uF] on P is valued with F.

In the case at hand, functional heads have person probe features that are valued by interpretable person features on the argument DPs. Crucially, I assume that both arguments of a transitive

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<sup>9</sup>It has sometimes been argued in the literature on argument structure and argument encoding that unergative verbs are hidden transitive verbs with a phonologically null internal argument (cf. Levin 1983; Bobaljik 1993; Hale and Keyser 1993; 2002; Laka 1993; Nash 1996; Bittner and Hale 1996). Preminger (2012) explicitly argues against this view and Assmann et al. (2012) also show that unergative verbs pattern with unaccusative verbs in that in languages with the ban on ergative movement the sole (overt) argument can be  $\bar{A}$ -extracted, whereas real transitives pattern differently in that the presence of a coargument makes the  $\bar{A}$ -extraction of the external argument impossible. As far as I can see, it does not make a difference for the present Agree-based account on portmanteau morphemes whether an unergative verb has a null internal argument or not: According to the literature, this hidden argument seems to be an NP, i.e., it is 3rd person and will thus not be able to value a probe anyway, exactly as if it was not present at all.

verb Agree with the same functional head, namely T.<sup>10</sup> This is necessary because the information about person features of both arguments needs to be located on a single head in order to account for person portmanteaux. Hence, there are two person probes  $[u\pi]$  on T. I assume that these two probe features are ordered on a stack such that only the topmost probe feature is available at any given point of the derivation; the lower probe can only initiate a search as soon as the topmost probe feature is discharged:

(16) *Initial feature specification of T:*

$$T \begin{bmatrix} [u\pi] \\ [u\pi] \end{bmatrix}$$

What still needs to be defined is what matching between the features of the probe and the goal means. I follow Nevins (2007b), building on Calabrese (1995), in that a probe can be relativized to target only certain features on a goal (*relativized probing*, see also Nevins 2011; Preminger 2011). For concreteness, I assume that the probes on T are relativized to the marked, i.e. the positive values of the binary person features.<sup>11</sup> This means that probe and goal are matching if the goal provides a positively valued person feature [+1] or [+2]. A consequence of this assumption is that the person probes on T can only Agree with local person arguments but not with 3rd person arguments because the latter are represented by negatively valued person features only, cf. (11). That means that due to the sensitivity of the probe and the decomposition of person features in (11), 1st and 2nd person form a natural class: Only 1st and 2nd person arguments can value a probe under Agree. Note that under this perspective 1st and 2nd person do not form a natural class because they share a feature value; instead, they form a natural class because they share a feature of a feature value, i.e., being positively valued. This is what distinguishes them from 3rd person. The natural class of local persons arises due to the relativization of the probe to the positive feature values. Since T contains two person probes that can only be valued by positively valued person features, one or two of the probes remain unchecked if one or both goals (the argument DPs) are 3rd person. Following Preminger (2011), I assume that a failure to find a goal is tolerated by the grammar and does not lead to a crash of the derivation. A probe that does not find a matching goal is valued by the insertion of a default value. Since default agreement in the case of a failure to Agree is cross-linguistically associated with the occurrence of unmarked 3rd person agreement morphology and since 3rd person is represented

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<sup>10</sup>In the present approach T must be able to access the internal argument of a transitive verb. However, this is excluded under the strong version of the Phase Impenetrability Condition (PIC) in (14):

(14) *Strong PIC (Chomsky 2000: 108):*

In phase  $\alpha$  with head H, the domain of H is not accessible to operations outside  $\alpha$ ; only H and its edge are accessible to such operations.

If  $v$  is a phase head, as is standardly assumed, elements in the complement of  $v$  are not visible for T. In order to maintain the present approach the search space for T must be enlarged. This is guaranteed by the weaker version of the PIC in (15) according to which material in the complement of  $v$  is accessible until the next higher phase head C is merged.

(15) *Weak PIC (Chomsky 2001: 14):*

In  $[_{ZP} \dots Z [_{HP} \alpha [_{H} YP]]]$ , where H and Z are phase heads, the domain of H is not accessible to operations at ZP; only H and its edge are accessible to such operations.

Note that such a strong-PIC-incompatible Agree relation between T and  $DP_{int}$  is also posited in a number of analyses of argument encoding patterns (ergative vs. accusative pattern, dependent marking) where T assigns the unmarked case (nominative or absolutive) to the internal argument, see e.g. Murasugi (1992); Jelinek (1993); Ura (2000); Müller (2009). Here, I transfer this Agree relation to head-marking.

<sup>11</sup>Nevins (2007b) proposed that probes can also be relativized to contrastive values of person features instead of being relativized to the marked features. The relativization to contrastive features does, however, not apply to the feature representation used in the present analysis.

by negatively valued person features in (11), I assume that a negatively valued person feature is inserted as a default value, thereby discharging the probe. The question is whether [-1] or [-2] is inserted. I assume that the choice between these two values is in principle optional, but that some of the resulting structures are filtered out on independent grounds. Only the combinations in (11) are well-formed representations of person with a coherent interpretation: [+1] encodes being the speaker and [-1] not being the speaker; [+2] stands for being the addressee and [-2] for not being the addressee. 1st person inclusive, represented as [+1 +2], includes both the speaker and the addressee whereas 3rd person [-1 -2] encodes neither of them. A representation like [+1 -1] would be ill-formed and filtered out because a referent cannot be the speaker and not be the speaker at the same time. If, for example, one probe on T is valued by [+1] and the other probe does not find a matching goal, [-2] will be inserted as a default value for this probe and [+1 -2] results on T. The insertion of [-1] would lead to an ill-formed representation [+1 -1].

Furthermore, I assume that a feature on a goal is deactivated for an Agree relation after having taken part in Agree before (cf. the *Activity Condition*, Chomsky 2001). This means that the feature is invisible for further Agree operations. This is necessary because if a goal feature could be targeted by Agree from the same head more than once, the two probes on T would always Agree with the same argument if it provides a matching feature. However, in order to derive portmanteaux, agreement with both arguments must be an option.<sup>12</sup>

The person features copied onto functional heads under Agree are realized postsyntactically. I adopt the framework of Distributed Morphology. Vocabulary items (VIs) are inserted into functional heads according to the *Subset Principle* and *Specificity*: The VI with the highest number of features that are a subset of the features of a terminal node is inserted into this terminal (Halle and Marantz 1993).

The following three examples illustrate the system. Valuation of a probe is indicated by a strike-through and deactivation of a goal feature by crossing out the value. Values inserted as a default are underlined. In example 1 in (17) the verb takes a 1st person exclusive subject and a 2nd person object. Once the vP is generated and T merges with the vP, T starts probing. The closest matching goal is the subject. It values the probe on T with [+1]. Next, the second person probe searches for a matching goal. Since the matching feature [+1] on the closest subject DP is deactivated and no longer accessible for Agree and since the subject does not provide another

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<sup>12</sup>The present approach makes crucial use of the Activity Condition. It is, however, often disputed whether this condition holds in general or only in some languages (see Baker 2008b on parameterization of activity in the languages of the world); it has also been proposed that the effects of the Activity Condition can be derived from other constraints such that Activity can be dispensed with entirely (see Nevins 2004; Bošković 2007 for defense of the latter view). I have two remarks with respect to this discussion: First, it is an implicit assumption in several two-arguments-against-one-head approaches that the two probes on the head H do not target the same goal twice. This is, for example, the case in Keine (2010: ch.6) where T also has two person probes that target different argument DPs of a transitive verb. The same issue arises in general with Multiple Agree approaches (Hiraiwa 2001; Anagnostopoulou 2005; Nevins 2007b): A probe can target multiple goals, although it is unclear why the first matching goal does not block the establishment of another relation between the probe and a lower goal; this should give rise to an intervention / minimality effect.

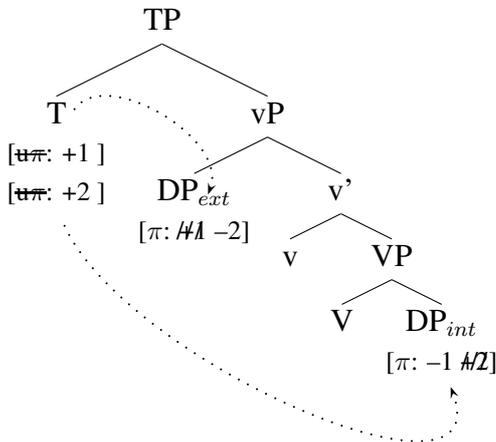
Second, the effect of the Activity Condition in the present approach can also be understood as a consequence of another constraint, namely as the maximization of the *Person Licensing Condition* (PLC) proposed in Béjar and Řezáč (2009). The PLC demands that person features of a goal (i.e., the positively valued ones in the present approach) need to take part in an Agree relation – this is the counterpart of the condition that (person) probe feature must enter into an Agree relation to be discharged. In a local scenario, e.g. in 1>2, this constraint would be violated if the two probes on T would both be valued with the feature [+1] on DP<sub>ext</sub>; [+2] on DP<sub>int</sub> would not be the goal in an Agree relation. However, the PLC is fulfilled if each probe on T targets a different DP in this scenario. Under this view, the Activity Condition is not needed as an additional concept in the analysis; it is replaced by the PLC, which has been shown to have a number of desirable effects in Béjar and Řezáč (2009).

See section 5.3 for an alternative approach to the encoding of person in local scenarios that does not assume that a single head agrees with two different DPs and that, consequently, does not have to make use of the Activity Condition. This approach, however, leads to other, mainly empirical problems.

positively valued person feature, T probes for the object. It supplies T with [+2]. The result on T is the person feature set [+1 +2]. If, however, the object is 3rd person as in example 2 in (18), the second probe on T cannot find a matching goal feature since 3rd person only consists of negatively valued features. In that case, the second person probe on T is valued per default with [-2] (valuation with [-1] would lead to the ill-formed representation [+1 -1]).

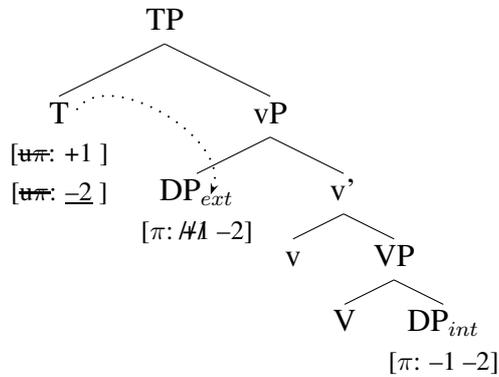
(17) *Example 1:*

*lexcl. DP<sub>ext</sub> > 2 DP<sub>int</sub>*



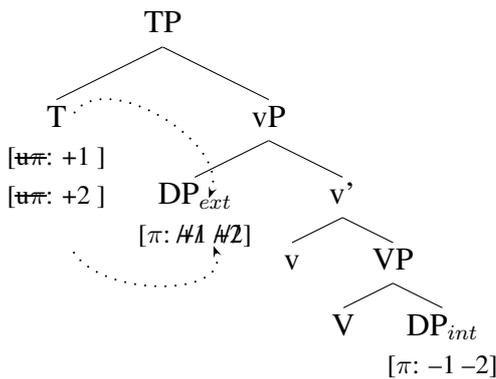
(18) *Example 2 (default values underlined):*

*lexcl. DP<sub>ext</sub> > 3 DP<sub>int</sub>*



(19) *Example 3:*

*incl. DP<sub>ext</sub> > 3 DP<sub>int</sub>*



In the third example in (19), a 1st person inclusive subject acts upon a 3rd person object. After T merges with the vP, it starts probing. The first person probe is valued by one of the positive values on the closest goal, the subject, e.g. by [+1] which is then deactivated. Now, the second probe also finds a matching goal feature on the subject, namely [+2]. The result on T is [+1 +2] (which of the two positive values is first copied onto T does not matter for the analysis).

The system runs parallel with an intransitive verb that takes only a single argument. If the single argument is 3rd person, T cannot agree with this argument and the two probes are valued per default with [-1] and [-2], respectively. If the argument is 1st person exclusive [+1 -2] or 2nd person [-1 +2], only one of the two probes on T will be valued by the positive value on the DP, i.e. by [+1] or [+2], the other probe is valued per default with the appropriate negative person value. Only if the single argument is 1st person inclusive can both probes on T agree with this argument, resulting again in [+1 +2] on T.

## 4.2 Results

The result of the proposed Agree mechanism is shown in (20) for all non-reflexive person combinations of the two arguments of a transitive verb and in (21) for all person features that the single argument of an intransitive verb can have. The column labeled ‘person on T after Agree’ shows the values on T after successful probing. The rightmost column contains the final representation after default valuation (values inserted by default are underlined). This representation is the basis for postsyntactic vocabulary insertion. Shading is intended to highlight those cells which end up with the same feature representation on T. This will become relevant in section 4.3 and can be ignored for the moment.

(20) *Transitive verb, combinations of  $DP_{ext}$  and  $DP_{int}$  ( $DP_{ext} > DP_{int}$ ):*

scenario	person on $DP_{ext}$	person on $DP_{int}$	person on T after Agree	person on T with default values
1excl>2	[+1 -2]	[-1 +2]	[+1 +2]	[+1 +2]
1excl>3	[+1 -2]	[-1 -2]	[+1]	[+1 <u>-2</u> ]
2>1excl	[-1 +2]	[+1 -2]	[+1 +2]	[+1 +2]
2>3	[-1 +2]	[-1 -2]	[+2]	[ <u>-1</u> +2]
1incl>3	[+1 +2]	[-1 -2]	[+1 +2]	[+1 +2]
3>1excl	[-1 -2]	[+1 -2]	[+1]	[+1 <u>-2</u> ]
3>2	[-1 -2]	[+2 -1]	[+2]	[ <u>-1</u> +2]
3>1incl	[-1 -2]	[+1 +2]	[+1 +2]	[+1 +2]
3>3	[-1 -2]	[-1 -2]	[ ]	[ <u>-1</u> <u>-2</u> ]

(21) *Intransitive verb, a single argument DP:*

scenario	person on the single argument	person on T after Agree	person on T with default values
1excl	[+1 -2]	[+1]	[+1 <u>-2</u> ]
1incl	[+1 +2]	[+1 +2]	[+1 +2]
2	[-1 +2]	[+2]	[ <u>-1</u> +2]
3	[-1 -2]	[ ]	[ <u>-1</u> <u>-2</u> ]

The consequences of the approach that can be read off from the tables are the following: With respect to transitive contexts, it derives the asymmetry in the number of arguments encoded on the verb. In the non-local scenarios, i.e. when at least one of the arguments is 3rd person, T agrees with only a single argument. If the local person argument is 1st person inclusive, both probes on T agree with that argument; if one of the arguments is 1st person exclusive or 2nd person, only one probe on T agrees with that argument, the other one is valued by default. In the local scenarios, however, T agrees with both arguments, resulting in [+1 +2]. Now, if both features on T are realized postsyntactically either by a portmanteau (strategy 1) or each by a separate exponent (strategy 4), the asymmetry in the number of arguments encoded on the verb follows from the syntactic agreement mechanism. How exactly the various coding strategies come about will be illustrated in section 4.4.

Furthermore, a person hierarchy effect in the non-local scenarios arises (which leads to the aforementioned asymmetry in languages applying the encoding strategies 1 or 4 in local scenarios). Due to the relativization of the probe, only the local person argument enters into Agree with T in non-local scenarios and hence the hierarchy local  $\succ$  non-local person is derived.<sup>13</sup>

<sup>13</sup>The derivation of the person hierarchy 1/2  $\succ$  3 in non-local scenarios is not a new outcome of the present analysis with the combination of all its assumptions, but rather the general result of relativized probing if a probe is relativized in such a way that it targets only local person DPs. Nevins (2007b) proposes relativized probing to account for PCC effects that also work on the basis of this hierarchy.

Importantly, 1st and 2nd person are not ranked with respect to each other. The hierarchies  $1 \succ 2$  and  $2 \succ 1$ , which only arise in the local scenarios, will be derived in 4.4.

Coming back to the initial question on the nature of person portmanteaux, it is important to note that, after Agree, the local scenarios are the only scenarios in which a representation of person arises on T which was not present on any of the two arguments of a transitive verb. T ends up with [+1 +2] in these contexts, but neither  $DP_{ext}$  nor  $DP_{int}$  provides this feature set. It is only the combination of the features of  $DP_{ext}$  and  $DP_{int}$  under the current relativized probing account that leads to this representation. I will call [+1 +2] on T in local scenarios a *derived inclusive context* in what follows because it is identical to the representation of 1st person inclusive on a DP. The fact that in local scenarios the person feature set on T is not identical to the set on any of the DPs is in sharp contrast to the non-local scenarios: In the latter, the person feature set that arises on T is identical to the feature set on one of the arguments, namely to the one of the local person argument, if there is one. Since the representation on T differs from the one on the DPs in the local scenarios, it is expected that we find an exponent which is different from the exponent for 1st and 2nd person in non-local scenarios or with an intransitive verb. If the inventory of vocabulary items in a language is as in (22), with a VI  $\alpha$  encoding [+1 +2] and two underspecified VIs  $\beta$  and  $\gamma$  encoding [+1] and [+2], respectively, then  $\alpha$  is inserted into T in local scenarios because it is more specific than  $\beta$  and  $\gamma$ . The latter two are inserted in an intransitive context, where the single argument is 1st person exclusive or 2nd person, and in non-local scenarios, where only one of the two arguments is local person. Note that  $\alpha$  is also expected to encode intransitives and non-local scenarios where the sole argument / the only local person argument is 1st incl with [+1 +2] on T.

- (22) a.  $\alpha \leftrightarrow [+1 +2]$   
 b.  $\beta \leftrightarrow [+1]$   
 c.  $\gamma \leftrightarrow [+2]$

Since  $\alpha$  is neither identical to the 1st nor to the 2nd person exponent and since it realizes features that may come from two different arguments, we may call  $\alpha$  a portmanteau morpheme. But in the present analysis, person portmanteaux are simply inclusive markers that arise in a derived inclusive context. Surinam Carib (Carib, Gildea 1998), a language that will be discussed in more detail in the following subsection, instantiates the abstract pattern in (22). The exponent for the sole 1st person exclusive internal argument of an intransitive verb is /j/; the exponent for the sole 2nd person external argument of an intransitive verb is /m/. In local scenarios, we find the portmanteau morpheme /k/: In  $2 > 1$  we would expect a combination of /j/ and /m/, but instead, the completely different morpheme /k/ is chosen. According to the present analysis, the markers have the following lexical entries:<sup>14</sup>

- (23) a. /k/  $\leftrightarrow [+1 +2]$   
 b. /j/  $\leftrightarrow [+1]$   
 c. /m/  $\leftrightarrow [+2]$

In  $2 > 1$ , a local scenario, T bears the person features [+1 +2]. Since /k/ is the most specific matching VI, it realizes this scenario. However, in non-local scenarios and in intransitive contexts, /k/ does not have a subset of the features on T because in these contexts, there is at least one negatively valued person feature on T: In  $3 > 1$  and in  $1_{int}$  (internal 1st person argument of an intransitive verb), T bears [+1 -2]; in  $2 > 3$  and in  $2_{ext}$  (external 2nd person argument of an

<sup>14</sup>For ease of exposition, these entries are kept as simple as possible at this point of the discussion. Since it matters for the choice of the exponents in Surinam Carib whether the person feature on T comes from the external or the internal argument, this difference must be represented in the lexical entries in addition. But for the moment this is of no importance. I will discuss Surinam Carib in more detail below. In section 5.1 a solution to this problem will be provided.

intransitive verb), T bears [-1 +2]. As a consequence, only /j/ and /m/, respectively, can be inserted into T. /k/ is just an inclusive marker that shows up in local scenarios because T ends up with the representation for 1st person inclusive, which emerges as a consequence of Agree with two local person arguments – it is thus a derived inclusive context.

Finally, the analysis predicts why person portmanteaux occur almost exclusively in local scenarios: Portmanteaux are inclusive markers realized in a derived inclusive context. But since a derived inclusive context can only emerge if both arguments of a transitive verb are local person, it follows automatically why person portmanteaux are found only in local scenarios. Notice that under the present account, vocabulary insertion targets only a single terminal node, even if a portmanteau morpheme (an inclusive marker) is inserted, i.e., a marker which by definition seems to realize features of two distinct terminals. This is possible because in local scenarios both arguments agree with the same syntactic head, and if there is an inclusive marker in a given language, it will realize both features on that head, even if they originate from two different arguments. Hence, none of the additional assumptions that have been proposed to integrate portmanteaux into DM is needed, neither spell-out of non-terminals, nor head movement, nor an additional operation like fusion, nor context-sensitive markers. The only operation needed is vocabulary insertion.

To summarize this section up to this point, the relativized probing approach derives two of the observations that have been presented in section 2: (i) Observation II on the asymmetry in the number of arguments encoded on the verb in languages with hierarchy effects in non-local scenarios and strategy 1 or 4 in local scenarios, and (ii) Observation III on the distribution of person portmanteaux in local scenarios.<sup>15</sup> Before I turn to the derivation of Observation I (the different coding strategies in local scenarios) in section 4.4, I will discuss two predictions of the present

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<sup>15</sup>The same results can be obtained with a different representation of person features as long as the combination of the representation of 1st person exclusive and 2nd person results in the representation of 1st person inclusive. As a reviewer remarks, this can, for example, be done with the feature geometric representation of person proposed by Harley and Ritter (2002), see also Béjar 2003 – presupposed that the representations of 1st excl and 2nd person on T in local scenarios are unified. In their work, person is represented by an internally structured feature geometry consisting of privative features. In Béjar's version of the geometry, 1st person exclusive can be represented as [[[Speaker] Participant]  $\pi$ ], 2nd person as [[[Addressee] Participant]  $\pi$ ] and 1st person inclusive as [[[Speaker Addressee] Part]  $\pi$ ] (in Harley and Ritter's (2002) version, the  $\pi$ -node is absent; the participant node is dominated by the root node of the geometry, [R] (= referring expression)). In the local scenario 1>2, T would end up with the representation [[[Speaker] Participant]  $\pi$ ] for 1st excl and with [[[Addressee Participant]  $\pi$ ] for 2nd person. In the present approach without the feature geometry, the representation that arises after T agreed with the two arguments in that scenario is identical to the representation for 1st incl (which will be supported by syncretism patterns in e.g. Surinam Carib in section 4.3). This is, as it stands, not the case with the feature geometry, because the representation for 1st incl is [[[Speaker Addressee] Part]  $\pi$ ]. This representation can be obtained if the representations for 1st excl and 2nd person are unified such that identical privative features are deleted and [Participant] dominates [Speaker] and [Addressee] after unification. Hence, the present relativized probing analysis can in principle also be combined with the person feature geometry instead of the decomposition of person in (11). Note, however, that a presupposition for the use of the feature geometry is that a language uses both the features [Speaker] and [Addressee] in its person feature geometry. McGinnis (2005) argues that this can only be the case in a language that distinguishes 1st person exclusive and inclusive. It remains to be seen whether this is true for all or at least the vast majority of languages with one of the coding patterns in (5) to (9). If it turns out that this is not true, the representation of person in (11) is to be preferred over the one proposed by Harley and Ritter (2002) and Béjar (2003) for the present analysis. I thank Omer Preminger for pointing this restriction in McGinnis (2005) out to me.

As pointed out by another reviewer, a problem for the feature decomposition in (11) is that it predicts a You-first PCC effect. In contrast to the Me-first PCC, this version of the PCC is not attested (cf. Nevins 2007*b*). In Nevins's (2007*b*) person representation with the binary features [ $\pm$ Author] and [ $\pm$ Participant] this follows because a probe relativized to marked (i.e. positive) features cannot exclusively refer to 2nd person ([+Participant] characterizes 2nd and 1st person exclusive). However, Nevins' feature representation would also require a kind of unification of the representation of 1st person excl and 2nd person to result in the representation of 1st incl, if his system was adopted in the present analysis. But this can definitely be implemented. So, this feature representation could also be a viable alternative.

analysis of person portmanteaux.

### 4.3 Predictions

#### 4.3.1 Prediction I

The present relativized probing analysis entails that five scenarios altogether end up having the same representation on T, namely [+1 +2]. These are the four shaded cells in (20), including the local scenarios and the two non-local scenarios in which one argument is 3rd person and the other one 1st person inclusive. Furthermore, it includes the context where the single argument of an intransitive verb is 1st person inclusive, cf. the shaded cell in (21). The analysis thus predicts that – without further restrictions (see section 5.1) – these five contexts are realized by the same exponent. A language that actually shows a syncretism in exactly these five contexts is the Carib language Surinam Carib (Gildea 1998: 16):

(24) *Surinam Carib, verbal inflection:*

a. *Intransitives:*

	DP <sub>ext</sub>	DP <sub>int</sub>
1excl	∅-	j-
1incl	<b>k-it-</b>	<b>k-</b>
2	m-	aj-
3	n-	

b. *Transitives:*

DP <sub>ext</sub> \ DP <sub>int</sub>	1excl	2	1incl	3
1excl		<b>k-</b>		s-
2	<b>k-</b>			m-
1incl				<b>k-ijf-</b>
3	j-	aj-	<b>k-</b>	n-

Surinam Carib exhibits an active alignment system: The prefix attached to an intransitive verb reflects whether the single argument is an internal argument (unaccusative verb) or an external argument (unergative verb). In the transitive paradigm, the same exponents are used. However, only a single argument can agree with the verb in non-local scenarios, namely the one which is higher on the hierarchy local  $\succ$  non-local person. Depending on whether the local argument is the internal or the external argument of the transitive verb, the set for the unergative or unaccusative verbs is chosen (the only exception being *s-*, the 1st person exponent of a *transitive* subject). The marker *k-* occurs in all of the five contexts where the present account predicts the representation [+1 +2] on T. What is remarkable is that *k-* seems to play a double role. When looking at the intransitive paradigm and the non-local scenarios of the transitive paradigm, it seems to be a simplex marker, i.e. it encodes the features [+1 +2] of only a single argument. Thus, it is an inclusive marker. In the local scenarios, however, *k-* would be called a portmanteau morpheme because none of the two arguments is [+1 +2], only the combination of the two arguments can lead to this feature combination. Hence, if we take the syncretism seriously, that means if we assume that having the same phonological form in different contexts implies having the same function, then we are dealing with what at first sight seems to be a paradox: One and the same marker is a simplex marker in some, but a portmanteau morpheme in other scenarios. Trommer (2006), who first described this pattern, calls such markers *ambiguous exponents* due to their apparent double role. The current analysis predicts the existence of such exponents since the contexts in which they occur are all represented by the same feature set on T at the point where vocabulary insertion takes place. The paradox emerges because the feature set [+1 +2], which the ambiguous exponent realizes, arises either by agreement with a single 1st person inclusive argument or by agreement with two local person arguments. Trommer (2007: 52) notes that “[a]mbiguous Exponence is pervasive in portmanteaux [...]” Indeed, it is found in a number of other Carib languages such as Wayana (Tavares 2005), Tiriyo (Meira 1999) and Ikpeng (Pachêco 2001). On the whole these languages work like Surinam Carib with an active

split and hierarchy effects in the non-local scenarios of the transitive paradigm. In all of them we find a syncretism between the verbal affixes encoding a 1st person inclusive argument of an intransitive and one or both local scenarios (*k-* in Wayana and Tiriyo and *ugw-* in Ikpeng). Importantly, ambiguous exponents are not restricted to Carib languages but are found in languages all over the world. Trommer (2006) describes the pattern for the Kiranti languages Belhare (Bickel 2003) and Dumi (van Driem 2003). Furthermore, it is found in the Australian languages Jawony, Nunggubuyu, Anindilyakwa (Heath 1991) and Alawa (Sharpe 1972) as well as in the Algonquian language Arapaho (Cowell and Moss 2008) and in Tibeto-Burman languages (DeLancey 1981), to name just a few examples. In some of these languages, the ambiguous exponent is not found in all of the five contexts that it is predicted to occur according to the present analysis. Instead, it shows up in a subset of these five contexts, including at least one local scenario and one non-local scenario, see for example the data from Ikpeng (Pachêco 2001: 64-68) in (25) and (26). *ugw-* is an ambiguous exponent because it encodes the features of the single argument of an intransitive verb (or more precisely, of an unaccusative verb) and the local scenario 2>1. However, it does not occur in 1>2 or with a 1st person inclusive external argument.

(25) *Person prefixes in Ikpeng, non-local scenarios and intransitives:*<sup>16</sup>

	DP <sub>ext</sub>	DP <sub>int</sub>
1excl	k-	g- (i-)
1incl	kut-	ugw- (wi-)
2	m-	w- (o-)
3	∅	y- (i-)

(26) *Person prefixes in Ikpeng, local scenarios:*

2 > 1excl	ugw-
1excl > 2	k-

In order to account for the fact that in many languages the ambiguous exponent does not occur in all of the five contexts in which T ends up with the features [+1 +2], I propose the following (in a nutshell): Case is assigned in the vP to the DPs. Person Agree goes hand in hand with Case Agree: If a DP is the goal for person Agree, its Case value is copied onto T as well. The vocabulary items that realize the person features on T can be sensitive to Case values. In this way, the five contexts can be distinguished by the Case values that are copied onto T. If, for example, an inclusive marker M is restricted to the context { [+1 Nom] [+2 Acc] }, it can only be inserted on T if the external (nominative marked) argument is 1st person and the internal (accusative marked) argument is 2nd person. However, this marker M cannot realize T in the second local scenario 2>1 or if the verb is intransitive (in this case, there is no accusative marked argument). In these contexts, the regular local person exponents realize the remaining instances of [+1 +2] on T that M cannot be inserted into. See section 5 for more details and concrete examples of languages that instantiate such a pattern. What is important is that the present account predicts the existence of ambiguous exponents. Cross-linguistically, they always occur in a subset of the contexts that are represented by [+1 +2] on T in the present analysis.

### 4.3.2 Prediction II

In the relativized probing account both arguments of a transitive verb agree with the same head T. This is necessary to account for portmanteaux in a realizational framework like DM that relies on discrete slots. Otherwise, additional morphological operations that form one slot out of originally two slots would have to be applied. This assumption predicts that if Agree initiated by T is suppressed, this should affect agreement with *both* arguments. For concreteness, in embedded infinitives T is defective in the sense that it cannot initiate agreement (and perhaps also case assignment, which does, however, not play any role in the present context). This can

<sup>16</sup>The prefixes encoding DP<sub>int</sub> that are put in brackets are allomorphs which are chosen if the verb stem is consonant initial. Vowel initial stems are combined with the prefixes that are not in brackets.

be seen for example in English, where the verb in an embedded infinitive (cf. (27-b)) is invariant and cannot track the phi-features of the subject as it does in finite clauses (cf. (27-a)):

(27) *Suppression of phi-agreement in infinitives in English:*

- a. John \*leave/leaves the hotel.
- b. John wants to leave/\*leaves the hotel.

If T agrees with both arguments of a transitive verb in finite clauses and T loses the ability to agree in embedded infinitives, then we expect that agreement with both arguments is suppressed. If the subject and the object agreed with different heads, i.e. T agreed with the subject and v with the object, as is standardly assumed, then object agreement should not be affected in infinitives because only T becomes defective.<sup>17</sup>

In De'kwana (Carib, Hall 1988) the prediction that both arguments of the verb cease to be cross-referenced on the verb in embedded infinitives is borne out. The De'kwana agreement system works very similar to the one in Surinam Carib and Ikpeng. There is a split between the encoding of the single argument of an unergative and an unaccusative verb, cf. (28). In transitive contexts, only one of the arguments can be cross-referenced on the verb, depending on the person hierarchy local  $\succ$  non-local person. The exponents are identical to the ones used with intransitive verbs: If the internal argument of the transitive verb is higher on the person hierarchy than the external argument, the set of markers used with unaccusatives is applied; and if the external argument of the transitive verb is higher on the person hierarchy than the internal argument, the set of markers used with unergatives is chosen. In the local scenarios, there are two portmanteaux, *mən* for  $1 > 2$  and *kə* for  $2 > 1$ , cf. (29) (for an account of such a system with more than one inclusive marker see section 5).

(28) *Person prefixes in De'kwana*  
(Hall 1988: 151):

	DP <sub>ext</sub>	DP <sub>int</sub>
1sg	w-	∅ (y-)
1incl	k-	k(i)-
1excl	nña: n-	nña: ∅-
2	m-	ə(d)-
3	n- / k(i)n (past)	

(29) *Person prefixes in De'kwana*  
*local scenarios, (Hall 1988: 151):*

1sg > 2	mən-
2 > 1sg	kə-

An example with an unaccusative finite verb is given in (30-a). (30-b) shows that in an embedded infinitive neither the subject nor the object of the embedded transitive verb is cross-referenced on the verb, although 3rd person arguments are marked by an overt exponent in De'kwana.

(30) *De'kwana (Hall 1988: 154, 341):*

- a. əd-a:wo-a  
2-swell-PRES  
'You swell'

<sup>17</sup>Note that the crucial assumption in the present analysis is that both the external and the internal argument of a transitive verb agree with the same head. The account would also work if both arguments agreed with v instead of with T, as long as it is ensured that v has access to the external argument in its specifier (this can be done either by assuming that Agree takes place under m-command or by assuming that the search space of a probe increases throughout the derivation from the complement domain to the specifier domain (cf. Béjar and Řezáč 2009)). If the two probes are located on v, the prediction for embedded infinitives is that both arguments still show agreement with the verb since v is not defective in infinitives. Hence, the generalized prediction of the present account is that subject and object agreement should pattern alike in infinitives. Either there is agreement with none of the arguments (if they agree with T in finite clauses) or with both of them (if they agree with v in finite clauses). They should, however, not pattern differently, one argument being cross-referenced on the verb in infinitives while the other is not.

- b. [motto ti'ka:di] kin-anənt-a'-to ya:wə  
 [worms dig-INF] 3-begin-TAM-PL VERIF  
 'They began to dig worms'

The following example from Surinam Carib (Gildea 1998: 146) also shows that the embedded verb does not agree:<sup>18</sup>

- (31) [waaretaa-no] s-eeta-i tuuna ta  
 [sing-INF] 1ERG-hear-TAM river in  
 'I have really heard someone singing on the river.'

Unfortunately, it is not possible to check whether this prediction is borne out in all of the languages that are discussed in this paper because they simply do not have infinitives of the type used in Indo-European languages. Regarding native American languages, from which most of my data come, Gildea (2008: 11) states the following: "In some language families, especially common in the Americas, the primary (or the only) subordination strategy is nominalization." Similarly, Heath (1975) and Mithun (1984) state that there are no subordination structures in polysynthetic languages. According to Evans (2003), there is also no language in the Biniñ Gun-wok group of languages (from which I will discuss the language Kunwinyku in section 4.4) that has embedded infinitives. Furthermore, many of these languages use a switch-reference system in clause-linkage and it is far from clear whether these constructions involve coordination or subordination (for discussion see Haiman and Munro 1983; Finer 1985; Keine 2011; Weisser 2012).

This second prediction can thus not be tested for all the languages with person portmanteaux that I have looked at. But it is a strong, falsifiable prediction that can be checked in case infinitival structures can be clearly identified in the respective languages.

Note that at its present stage, the analysis cannot account for the fact that De'kwana, just as Surinam Carib, uses different exponents to realize agreement with the sole argument of an unergative and an unaccusative verb. In both contexts, the T head ends up with the same feature representation [+1 -2] for 1st person, [-1 +2] for 2nd person and [-1 -2] for 3rd person arguments, regardless of whether these are internal or external arguments. This will be accounted for in detail in section 5. The idea is again that person Agree involves copying the Case value of the DP. Since the Carib languages have an active alignment system, the internal and external argument of an intransitive verb can be distinguished by their Case values if the exponents are sensitive for Case.

#### 4.4 Deriving the coding strategies in local scenarios

Up to now, we have derived person hierarchy effects in non-local scenarios, the (potential) asymmetry in the number of arguments encoded on the verb between local and non-local scenarios and the emergence of portmanteau morphemes as one of the coding strategies in local scenarios. Although the analysis was designed to derive the distribution of person portmanteaux, I will show in this subsection how the other realization strategies that arise in local scenarios are derived in the present account. I claim that the variation we can see on the surface is due to the (under)specification of the local person exponents, which is a language-specific factor. The underlying syntactic agreement mechanism is identical throughout the languages with different coding strategies in local scenarios. Hence, variation is restricted to the lexicon.

Recall that in local scenarios, the T head ends up with the person feature set [+1 +2] after

<sup>18</sup>One might object that the example in (31) involves nominalization of the verbal element in brackets. However, Gildea uses the term infinitive for this construction because it differs from real nominalizations in the language in that the embedded clause lacks a possessive suffix indicating the phi-features of the matrix subject.

relativized Agree with the two arguments of a transitive verb. These are the features that can be realized postsyntactically by insertion of VIs. The person features that encode the insertion context of a VI are built on the basis of the same two binary person features  $[\pm 1]$  and  $[\pm 2]$  that are found on DPs. All possible combinations of these two features were given in (11). In addition, VIs can be underspecified, that means that they do not have to be specified for both  $[\pm 1]$  and  $[\pm 2]$ . The choice of an exponent that is inserted into the T head is regulated by the Subset Principle and Specificity (Halle and Marantz 1993; 1994): The vocabulary item with the highest number of features that are a subset of the features of T is inserted into T. Furthermore, I adopt the concept of fission proposed by Noyer (1992): Vocabulary insertion leads to discharge of the features on the functional head that the VI was specified for, i.e. these features are no longer available for further vocabulary insertion. However, if there are features left on the head after the first insertion, subsequent insertion of other VIs is still possible. The relevant exponents in local scenarios are the 1st person exponent, represented as /a/ in what follows, the 2nd person exponent, represented as /b/, and the 1st person inclusive exponent /d/. Given (i) the possibility of underspecification of /a/ and/or /b/ and (ii) the (non-)existence of an inclusive marker in the marker inventory of a language, there are six logically possible cases resulting from the two parameters, but only four of them will result in a different coding pattern. These arise from the following choices of VIs: (i) Both /a/ and /b/ are fully specified and there is no inclusive marker; (ii) one of the two exponents is underspecified, the other one is fully specified and there is no inclusive marker; (iii) both /a/ and /b/ are underspecified and there is no inclusive marker; (iv) there is an inclusive exponent - the specification of /a/ and /b/ is then of no importance, any combination will have the same result. These differences in the inventory of local person exponents will result in the four different coding strategies introduced in section 2.

#### 4.4.1 Portmanteau morpheme

The portmanteau strategy arises if there is a VI /d/ which is a 1st person inclusive marker, i.e. which is fully specified as  $[+1 +2]$ . In this context, it is of no importance whether the 1st and 2nd person exponents /a/ and /b/ are underspecified or not. Underspecification is illustrated by brackets in (32). This means that the features in brackets are optional. If they are present, the VI is fully specified; if not, they are underspecified.

(32) *Portmanteau strategy, inclusive marker available:*

- a. /a/  $\leftrightarrow$   $[+1 (-2)]$
- b. /b/  $\leftrightarrow$   $[(-1) +2]$
- c. /d/  $\leftrightarrow$   $[+1 +2]$

In local scenarios the inclusive marker /d/ will be inserted into T because it fully matches the features on T. This will be the case regardless of whether /a/ and /b/ are underspecified. If they are underspecified (realizing  $[+1]$  and  $[+2]$ , respectively), all three exponents in (32) are a subset of the features on T, but /d/ blocks the insertion of /a/ and /b/ because it is more specific. If /a/ and /b/ are fully specified (realizing  $[+1 -2]$  and  $[-1 +2]$ , respectively), /d/ is the only exponent that has a subset of the features on T  $[+1 +2]$ . In non-local scenarios, where one argument is 1st excl or 2nd person and the other one is 3rd person, or in an intransitive context where the sole argument has these features only /a/ or /b/ can be inserted. /d/ is not a subset of either  $[+1 -2]$  or  $[-1 +2]$ . The portmanteau morpheme will thus never be inserted in non-local scenarios and in an intransitive context - of course apart from the scenarios where the single argument of an intransitive or an argument in non-local scenarios is 1st person inclusive; in these, /d/ can also be inserted, giving rise to ambiguous exponence. In Surinam Carib (cf. (24)), the exponent /k/ is represented by the features  $[+1 +2]$ , whereas the 1st and 2nd person exponents are represented

by [+1 (–2)] and [(–1) +2], respectively.<sup>19</sup> Hence, a portmanteau arises through the interaction of the syntactic agreement mechanism (where a single head agrees with two arguments) and the specification of local person exponents. No additional postsyntactic operations are necessary to derive the distribution of portmanteaux.

#### 4.4.2 Hierarchy effects

Hierarchy effects in the local scenarios arise if there is no inclusive marker and if one of the local person exponents is underspecified while the other one is fully specified. The hierarchy  $1 \succ 2 \succ 3$  emerges if /a/ is underspecified and the hierarchy  $2 \succ 1 \succ 3$  emerges if /b/ is underspecified.<sup>20</sup>

(33) *Hierarchy  $1 \succ 2 \succ 3$ , /a/ underspecified, no inclusive marker:*

- a. /a/  $\leftrightarrow$  [+1]
- b. /b/  $\leftrightarrow$  [–1 +2]

(34) *Hierarchy  $2 \succ 1 \succ 3$ , /b/ underspecified, no inclusive marker:*

- a. /a/  $\leftrightarrow$  [+1 –2]
- b. /b/  $\leftrightarrow$  [+2]

In the case of the specifications in (33), only the 1st person exponent /a/ has a subset of the features [+1 +2] on T in local scenarios. /b/, containing a negatively valued feature, is not a subset of [+1 +2]. Hence, in both local scenarios the 1st person exponent is inserted into T. The resulting pattern can be described by a hierarchy on which 1st person outranks 2nd person. The reverse pattern arises in a language with the specifications in (34). Here it is the 2nd person exponent that will be inserted into T; the fully specified /a/ does not have a subset of the features T provides. The result is that, descriptively, 2nd person outranks 1st person.

The generalization that arises from the analysis of hierarchy effects in local scenarios is the following: Person X outranks person Y on a hierarchy only if the VI for X, but not the VI for Y, is compatible with the features on the terminal according to the Subset Principle; this (in)compatibility is due to the fact that X is *underspecified*, whereas Y is fully specified. To rephrase the intuition, X outranks Y because the VI for X is *less* specific than the VI for Y and as a consequence only the VI for X can be realized. This is the reverse of what is often assumed. Usually, hierarchy effects are thought to arise because VI<sub>1</sub>, encoding the feature  $\alpha$ , blocks the insertion of VI<sub>2</sub>, encoding  $\beta$ , if  $\alpha$  outranks  $\beta$  on a hierarchy, because VI<sub>1</sub> is *more* specific than VI<sub>2</sub> (cf. e.g. McGinnis 1995; Noyer 1992). Data from Nishnabemwim (Algonquian, Valentine 2001) provide evidence that this is not the case and that rather the less specific VI is inserted in local scenarios, as proposed in the present analysis. As in other Algonquian languages, the verb in Nishnabemwim has a proclitic position which indicates the person of an argument. In

<sup>19</sup>In the Carib languages, there are indeed two markers /a/, /b/ and /c/, i.e. two markers for each person value. This is because these language have active alignment and hence different markers for internal and external arguments of 1st, 2nd and 3rd person. See section 5 on how to differentiate between the two variants of the VIs /a/, /b/ and /c/. I will propose that the markers can be distinguished by Case features. Crucially, this will not affect the general approach to the coding strategies presented in this subsection.

<sup>20</sup>Since in the present account the hierarchies  $1 \succ 2$  and  $2 \succ 1$  arise as a consequence of how the local person exponents are specified, it is no problem to account for languages for which it has been argued that more than one hierarchy governs the realization of person exponents. In a number of Algonquian languages, for example, the prefix/proclitic position of the verb is realized by the exponent that encodes the person (and number) features of the argument which is highest on the hierarchy  $2 \succ 1 \succ 3$ , whereas the hierarchy  $1 \succ 2 \succ 3$  determines the realization of arguments in the suffix slots (cf. Macaulay 2005 and Zúñiga 2008 for an overview of the facts). In the present account, one would simply have to say that the 2nd person exponents for the prefix/proclitic positions are underspecified whereas it is the 1st person exponents for the suffix positions that are underspecified. In each case, the other local person exponent is fully specified.

an intransitive context, this is the person of the sole argument. The exponents are given in (35) with the intransitive animate verb *dagoshin* ‘to arrive’ in the independent order:<sup>21</sup>

(35) *Nishnabemwim* proclitics, intransitive verb (Valentine 2001: 269-274):

1sg	n-dagoshin
1pl excl	n-dagoshin
1pl incl	g-dagoshin
2sg	g-dagoshin
2pl	g-dagoshin
3sg	∅-dagoshin
3pl	∅-dagoshin

Note that the 1st person inclusive is marked by the same proclitic as the 2nd person. Under the representation of person features in (11), this syncretism can be resolved if the exponent /g/ is underspecified and realizes the feature [+2] which 1st inclusive and 2nd person share. The 1st person exclusive exponent /n/ must be fully specified (otherwise both the 1st and the 2nd person exponent could be inserted in an inclusive context [+1 +2] given Noyer’s definition of fission).

(36) *VIs for the person proclitics in Nishnabemwim*:

- a. /n/ ↔ [+1 -2]
- b. /g/ ↔ [+2]
- c. /∅/ ↔ [-1 -2]

In the transitive paradigm, hierarchy effects arise. In non-local scenarios only the local person argument is indicated by the proclitic. This pattern is derived with the relativized probing account. What is important is that in both local scenarios the [+2] exponent /g/ (set in bold in (37)) shows up. Compare the local scenarios paradigm of the transitive animate verb *miiN* ‘to give’ in the independent order:

(37) *Nishnabemwim* proclitics, transitive verb:

DP <sub>ext</sub> \ DP <sub>int</sub>	1sg	1pl excl	1pl incl	2sg	2pl
1sg				<b>g-miiN</b>	<b>g-miiN</b>
1pl excl				<b>g-miiN</b>	<b>g-miiN</b>
1pl incl					
2sg	<b>g-miiN</b>	<b>g-miiN</b>			
2pl	<b>g-miiN</b>	<b>g-miiN</b>			
3sg	<b>n-miiN</b>	<b>n-miiN</b>	<b>g-miiN</b>	<b>g-miiN</b>	<b>g-miiN</b>
3pl	<b>n-miiN</b>	<b>n-miiN</b>	<b>g-miiN</b>	<b>g-miiN</b>	<b>g-miiN</b>

Here the less specific VI is chosen in local scenarios. This seems to be counter-intuitive in a framework like DM where the more specific 1st person VI should block the less specific 2nd person VI. This would indeed be expected if the verb agreed with both of its argument in all of their features. Under the relativized probing account, however, the pattern follows automatically. The reason for this is that T only agrees with the positively valued person features on a goal. As a result, T bears [+1 +2] and fully specified VIs containing negative values are not a subset of the features on T, only the underspecified ones containing exclusively positive values can be inserted.

<sup>21</sup>In *Nishnabemwim*, the contexts are further disambiguated by different suffixes that encode person and number of the argument(s). These are not included in the paradigms because I do not address the suffixes in this paper. They must be the result of other person and number probes besides the two person probes on T that are responsible for realization of the proclitic (a conclusion also reached by Halle and Marantz 1993), because there is massive extended exponence.

A further desirable outcome of the present account of hierarchy effects is that hierarchies are not primitives of the theory, i.e., no mental entities that grammatical rules refer to. Rather, they are derived by the interplay of the syntactic agreement mechanism and the specification of VIs (on the derivation of hierarchies differentiating between the local persons from the properties of the agreement mechanism see also Béjar 2003; Béjar and Řezáč 2009; Nevins 2007*b* and Preminger 2011). Hierarchies are assumed to be primitives for example in Noyer (1992) and Aissen (1999; 2003) among others, and in the literature on Algonquian e.g. by Halle and Marantz (1993); McGinnis (1995); Macaulay (2007).

#### 4.4.3 Zero exponence

Zero exponence in local scenarios can arise in a number of ways. One of them is that there is literally no morpheme that can be inserted in the context specified on a syntactic head. This situation emerges in the present system if both the 1st and 2nd person exponent, /a/ and /b/, are fully specified and if there is no inclusive exponent:

(38) *Zero exponence: /a/ and /b/ are fully specified, no inclusive marker:*

- a. /a/ ↔ [+1 -2]
- b. /b/ ↔ [-1 +2]

Since fully specified VIs contain negative feature values, they are not a subset of the positively valued features [+1 +2] on T. If there is no default VI, i.e. a completely underspecified VI, then no VI will be inserted in local scenarios.

Zero exponence can, however, not only be interpreted as the absence of a marker, but also as the presence of a phonologically zero marker. The phonologically null exponent could be a zero portmanteau. In this case, there is a marker /d/ specified as [+1 +2] as in (32). The only difference is that /d/ is  $\emptyset$ . The following paradigms from Kunwinyku (Evans 2003: 399ff) suggests that at least in this language there is a zero portmanteau. But before going into the details of person marking, I will introduce the number system of Kunwinyku. Kunwinyku distinguishes the two numbers minimal and augmented. In this number system, ‘minimal’ characterizes the minimal number of participants in the speech act that satisfy the person descriptions. ‘Augmented’ characterizes context in which the number of participants exceeds the minimal number. For 1st person excl, 2nd and 3rd person, minimal is equal to singular, it is used for a single referent; augmented is used for more than one referent and is thus equal to the more common plural. For 1st person inclusive, however, the minimal number of participants is not equal to singular, since it includes at least two participants – the speaker and the addressee. The augmented inclusive is used in contexts where the 1st person inclusive pronoun comprises other persons beside the speaker and the addressee (see Cysouw 2003 for a typological overview of minimal/augmented systems). The intransitive paradigm and a part of the transitive paradigm of Kunwinyku is given in (39) and (40), respectively.

(39) *Intransitives:*

	minimal	augmented
1excl	nga-	ngani-
1incl	ngarr-	<b>kane-</b>
2	yi-	ngune-
3	ka- (non-past) $\emptyset$ (past)	kabene- bene-

(40) *Transitives, minimal:*

DP <sub>ext</sub> \ DP <sub>int</sub>	1min	2min	3min
1excl min		∅	nga-
1incl min			ngarr-
2min	<b>kan-</b>		yi-
3min	ngan-	ngun-	ka-/∅-

In the local scenario 1>2 there is no overt morpheme although there are overt 1st and 2nd person markers in the intransitive paradigm.<sup>22</sup> In this case the zero morpheme is better analysed as an instantiation of a zero portmanteau. The reason is that in 2>1 and in the context where the single argument of an intransitive verb is 1st person inclusive, the same marker *kan(e)* occurs, hence, *kan(e)* is an ambiguous exponent. To resolve this syncretism, *kan(e)* must be the default inclusive marker specified as [+1 +2]. If the absence of an exponent in 1>2 was due to the full specification of the 1st and 2nd exponent, the inclusive marker *kan(e)* should spread into 1>2 as well. To avoid this, there must be another portmanteau which is zero and which can block *kan(e)*. How exactly the zero portmanteau can block *kan(e)* will be shown in section 5. The idea is that ∅ is more specific because it also realizes Case features, which /*kan(e)*/ does not. But for the point to be made here it suffices to see that absence of a phonologically overt marker is not the result of failed insertion, but rather of insertion of a zero morpheme realizing [+1] and [+2] simultaneously. Other data from Australian languages that Evans (2003) provides are of the same type. Even if a language had no exponent in both local scenarios, the data could be analysed in two ways: Either by failed insertion of an overt exponent or by insertion of a zero portmanteau.<sup>23</sup>

#### 4.4.4 Cooccurrence of 1st and 2nd person exponent

The 1st and 2nd person exponent can cooccur if the respective exponents are both underspecified and if there is no inclusive exponent:

(41) */a/ and /b/ are both underspecified, no inclusive marker:*

- a. /a/ ↔ [+1]
- b. /b/ ↔ [+2]

In the local scenarios, T bears the features [+1 +2] after Agree. Given the concept of fission by Noyer (1992), /a/ and /b/ can be inserted because after insertion of the first exponent which discharges the corresponding features on T, there is a feature left which can be realized by the second marker. Languages that exhibit hierarchy effects in non-local scenarios and show cooccurrence of the 1st and 2nd person exponent in local scenarios are e.g. Yavapai (Yuman, Kendall 1976), Diegueño (Yuman, Langdon 1970), Chepang (Tibeto-Burman, DeLancey 1981), and Sierra

<sup>22</sup>Note that in the transitive paradigm the augmented forms from the intransitive paradigm are used if the object is local person, although both arguments are minimal. For an account of such patterns where the combination of two singular arguments results in plural exponence see Harbour (2003); Trommer (2006) and footnote 3. Trommer proposes that under an iconic representation of number the combination of two singular icons is identical to the representation of plural and for this reason plural exponents are inserted into transitive paradigms if two singular DPs are combined. This approach presupposes that number features are copied under Agree as well, which is compatible with the present proposal to person encoding. Crucially, this phenomenon does not affect the main point of person marking in local scenarios argued for in this paper.

<sup>23</sup>A reviewer points out that the absence of an appropriate vocabulary item may not always result in zero exponence; rather it may lead to ungrammaticality / ineffability. This might be an explanation for the absence of forms such as the past/participle of the verb *dive* in modern American English. Even if the failure to insert any VI always had this effect, zero exponence can still be analysed as the insertion of a phonologically zero portmanteau marker that realizes the features [+1 +2]. The Kunwinyku data seem to point in the same direction.

Popoluca (Mixe-Zoque, adopting the analysis in Müller 2006). For illustration of the pattern, I will concentrate on the two Yuman languages, which have an identical agreement paradigm:<sup>24</sup>

(42) *Yavapai and Diegueño, intransitive and transitive paradigm of person prefixes:*<sup>25</sup>

DP <sub>ext</sub> \ DP <sub>int</sub>	intr.	1	2	3
1	?-/Ø-		n <sup>y</sup> -	?-/Ø-
2	m-	?-n <sup>y</sup> -m-		m-
3	Ø-	n <sup>y</sup> -	m-	Ø-

/?/, specified as [+1], and /m/, specified as [+2], cooccur in the scenario 2>1.<sup>26</sup> The same markers are found in non-local scenarios, where one of the arguments is local person, and in the intransitive paradigm with a single 1st or 2nd person argument. This falls out from the specification of VIs because nothing constrains them to the local scenarios. The absence of the two markers in 1>2 is accounted for by assuming a zero portmanteau to block the regular 1st and 2nd person exponents. Why this zero portmanteau does not also block /?/ and /m/ in 2>1 will again be accounted for in section 5.

Let me briefly summarize the results of this subsection. All variation in exponence that we find in local scenarios is due to the specification of exponents, this means it is located in the functional lexicon. There are two interacting parameters: (i) The 1st and 2nd person exponent can both be underspecified, fully specified or only one of them is underspecified, and (ii) there can be an inclusive marker or not. The combination of these two parameters results in the four different realization strategies given the Agree mechanism proposed in section 4.1. Hence, the variation is a purely morphological phenomenon, the underlying agreement in the syntax is constant throughout languages with different coding strategies.

<sup>24</sup>Chebang (Caughley 1978; DeLancey 1981) is another languages with the cooccurrence strategy. Chebang shows hierarchy effects in non-local scenarios: Only a single argument is cross-referenced on the verb in transitive contexts and this is always the local person argument. In local scenarios, however, there are always two markers: the 1st and 2nd person exponent cooccur, accompanied by some allomorphy of the local person exponents. The only exception is the combination 2sg>1sg, where the 1st person exponent is replaced by a dual marker.

<sup>25</sup>The alternation between ? and Ø is phonologically conditioned: ? is used with vowel initial stems, Ø is used elsewhere.

<sup>26</sup>There is another marker n<sup>y</sup> which occurs in the contexts 1>2, 2>1 and 3>1. I propose that this marker is an exponent of a Case feature and does not interact with the 1st and 2nd person exponents that are under discussion in this section. In the next section, I will suggest that person agreement goes hand in hand with agreement in the Case feature of the respective argument. VIs can be sensitive to these Case features. n<sup>y</sup> is then the exponent of the case feature that the internal argument of a transitive verb in Yavapai and Diegueño bears (accusative), because T agrees with the local person internal argument in all contexts in which n<sup>y</sup> occurs. The absence of n<sup>y</sup> in contexts with a 3rd person internal argument follows because T will not Agree with a 3rd person argument under the relativized probing approach proposed in this paper and hence it will not copy the Case feature of a 3rd person argument (Case agreement depends on phi-agreement, see section 5.1 for discussion). The lack of n<sup>y</sup> in the scenario 3>2 must be accounted for by language-specific rules like e.g. impoverishment. But this is a more general problem that does not relate to the present account. It arises because the contexts in which n<sup>y</sup> occurs do not form a natural class.

## 5 Extensions

Up to this point we have seen how relativized probing derives (i) the characteristic distribution of person portmanteaux (analysed as inclusive markers) and (ii) the asymmetry in the number of arguments that arises between local and non-local scenarios in some languages. Furthermore, the different realization strategies found in local scenarios are shown to be the natural consequence of the specification of VIs. What still needs to be discussed is how the present analysis handles languages that mix different coding strategies in the two local scenarios. The answer to this question is closely related to the fact that most languages with portmanteaux have more than one inclusive morpheme, unlike Surinam Carib; the distribution of these inclusive markers over the five (in part derived) inclusive contexts must be guaranteed. Finally, languages in which there is no asymmetry between local and non-local scenarios, i.e., languages without hierarchy effects in non-local scenarios but with person portmanteaux must be integrated into the analysis. This section introduces some extensions that are necessary in order to account for these facts.

### 5.1 Languages with more than one inclusive exponent and a mixture of coding strategies

As a result of the relativized probing account, five contexts end up having the same representation on T, namely [+1 +2], see (20) and (21). Hence, we expect to find a syncretism between these five contexts (cf. the discussion in section 4.3). This was shown to be borne out in e.g. Surinam Carib. However, in the course of the analysis we have also come across languages in which not all of the five contexts but only a subset of them was encoded by the same exponent. In this subsection I will show how these languages can be integrated into the analysis.

Take, for example, the data from Kunwinyku repeated below.

(43) *Kunwinyku, intransitives:*

	minimal	augmented
1excl	nga-	ngani-
1incl	ngarr-	<b>kane-</b>
2	yi-	ngune-
3	ka- (non-past) ∅ (past)	kabene- bene-

(44) *Kunwinyku, transitives, minimal:*

DP <sub>ext</sub> \ DP <sub>int</sub>	1min	2min	3min
1excl min		∅	nga-
1incl min			ngarr-
2min	<b>kan-</b>		yi-
3min	ngan-	ngun-	ka-/∅-

In section 4.4, we came to the conclusion that Kunwinyku must have two portmanteau morphemes: *kan(e)* and a zero portmanteau. The former occurs if the single argument of an intransitive verb is 1st person inclusive (and augmented) and in the scenario 2>1; the latter shows up in the context 1>2. Hence, we need to distinguish between two different inclusive markers. The same situation occurs in Ikpeng, repeated in (45) and (46), although the two inclusive markers have a different distribution: The marker *ugw* encodes the single 1st person inclusive argument of an unaccusative verb and the scenario 2>1, whereas the single 1st person inclusive argument of an unergative verb is marked by *kut*. But both are inclusive markers realizing the features [+1 +2] in the present analysis. The scenario 1>2 will be discussed below.

(45) *Person prefixes in Ikpeng, non-local scenarios and intransitives:*

	DP <sub>ext</sub>	DP <sub>int</sub>
1excl	k-	g- (i-)
1incl	kut-	ugw- (wi-)
2	m-	w- (o-)
3	∅	y- (i-)

(46) *Person prefixes in Ikpeng, local scenarios:*

2 > 1excl	ugw-
1excl > 2	k-

Factors that seem to play a role in the distribution of the person portmanteau morphemes are (i) by which of the two arguments of a transitive verb the probe is valued and (ii) whether the inclusive context that arises on T is a derived inclusive context, as in local scenarios, or underlying, i.e., whether it was already present on the argument with which the probe agreed. The distinction between derived and underlying inclusive contexts is necessary e.g. in De'kwana, cf. (28) and (29). In this language, the single 1st person inclusive argument of an intransitive verb is encoded by a VI which is different from the VIs used in local scenarios. I propose that the relevant factors can be differentiated by the Case a DP that agrees with T bears. I thus suggest that person agreement goes hand in hand with Case agreement. This means that T does not only probe for person, but it also copies the Case value of the argument with which it agrees in person (for case agreement see Rackowski 2002; Richards 2011; Hamann 2011). This presupposes that Case is assigned early in the derivation, before T probes, within vP (see Sigurðsson 2000 and Bobaljik 2008; Preminger 2011 for a similar view). Importantly, Case agreement depends on person agreement, i.e., the Case probe targets the same goal as the phi-probe and the Case probe cannot initiate Agree if the person probe does not enter into an Agree relation. Thus, T has thus two sets of probes each of which consist of a person probe and a Case probe:

$$(47) \quad T \left\{ \left[ \begin{array}{l} u\pi : \_ \\ uCase : \_ \end{array} \right] \succ \left[ \begin{array}{l} u\pi : \_ \\ uCase : \_ \end{array} \right] \right\}$$

Case agreement makes it possible to distinguish locally on T which argument the person values on T come from. VIs realizing person features can then be sensitive to Case features and in this way the distribution of different inclusive markers can be encoded in the VIs. Blocking between them works as follows: Inclusive markers underspecified for case are the default markers that can be inserted in every context represented by [+1 +2] on T, i.e., in any of the five contexts that end up with this representation on T. Inclusive markers with Case specifications are more specific and block the default inclusive marker in the contexts that are encoded in the Case features of the VI. Let us go through some examples.

As other Carib languages, Ikpeng is a language with an active alignment pattern: The external argument gets ergative case (Erg) and the internal arguments gets absolutive (Abs), regardless of the transitivity of the verb.<sup>27</sup> If person agreement goes hand in hand with Case agreement, then the resulting features on T are as in (48). The subscripts 'ext' and 'int' indicate whether the single argument of an intransitive verb is an external or an internal argument. Note that negative valued features are not accompanied by a case value because Case agreement depends on person agreement, and negative person values are not the result of Agree but rather default values.

<sup>27</sup>There is no overt Case marking in the Carib languages. The alignment pattern can only be determined in the agreement paradigm. But I assume that all languages have abstract Case features in the syntax. In fact, nothing in this approach hinges on the actual names of the Case features, the only thing that is important for the analysis of the Carib languages is that internal and external arguments (of transitive and intransitive verbs) get different structural Cases, so that they can be distinguished.

(48) *Ikpeng, transitive verb, active alignment:*

scenario	features on T
1>2	[+1 Erg] [+2 Abs]
1>3	[+1 Erg] [-2]
2>1	[+2 Erg] [+1 Abs]
2>3	[+2 Erg] [-1]
1incl>3	[+1 Erg] [+2 Erg]
3>1	[-2] [+1 Abs]
3>1incl	[+1 Abs] [+2 Abs]
3>2	[-1] [+2 Abs]
3>3	[-1] [-2]

(49) *Ikpeng, intransitive verb, active alignment:*

1excl <sub>ext</sub>	[+1 Erg] [-2]
1incl <sub>ext</sub>	[+1 Erg] [+2 Erg]
2 <sub>ext</sub>	[-1] [+2 Erg]
3 <sub>ext</sub>	[-1] [-2]
1excl <sub>int</sub>	[+1 Abs] [-2]
1incl <sub>int</sub>	[+1 Abs] [+2 Abs]
2 <sub>int</sub>	[-1] [+2 Abs]
3 <sub>int</sub>	[-1] [-2]

The two inclusive VIs *ugw* and *kut* in *Ikpeng* are specified for Case in order to block the insertion of an inclusive marker in 1>2.

(50) *Inclusive VIs in Ikpeng:*

- a. /ugw/ ↔ { [+1 Abs] [+2] }
- b. /kut/ ↔ { [+1 Erg] [+2 Erg] }

*ugw* can thus only be inserted in inclusive contexts with a 1st person inclusive internal argument, whether the 2nd person argument is an external argument or an internal argument is not relevant since [+2] is underspecified for Case. *kut* is fully specified for person and Case and can only be used to cross-reference the single argument of an unergative verb or the external argument in the scenario 1incl>3 because the presence of two ergative features on T can only arise if T agrees twice with the external argument.

In *Kunwinyku*, the portmanteau *kan(e)* is underspecified for case and can thus be inserted in transitive as well as intransitive inclusive contexts. It is, however, blocked by the zero portmanteau in 1>2 because the latter is specified for case and thus more specific than the default inclusive marker *kan(e)*.<sup>28</sup>

(51) *Inclusive VIs in Kunwinyku:*<sup>29</sup>

- a. /kan(e)/ ↔ { [+1] [+2] [augmented] }
- b. /Ø/ ↔ { [+1 Erg] [+2 Abs] [augmented] }
- c. /ngarr/ ↔ { [+1] [+2] [minimal] }

In *De'kwana*, another Carib language with an active alignment system (cf. the paradigms in (52) and (53)), there are three distinct inclusive markers under the present account: *k*, *kə* and *mən*.

(52) *De'kwana person prefixes (Hall 1988: 151):*

	DP <sub>ext</sub>	DP <sub>int</sub>
1sg	w-	Ø (y-)
1incl	k-	k(i)-
1excl	nña: n-	nña: Ø-
2	m-	ə(d)-
3	n- / k(i)n (past)	

(53) *De'kwana person prefixes local scenarios (Hall 1988: 151):*

1sg > 2	mən-
2 > 1sg	kə-

<sup>28</sup>Since *Kunwinyku* does not have overt case marking on nouns and shows hierarchy effects in verbal agreement, it is not clear which alignment type it follows. In (51), I assume an underlying ergative pattern, but nothing hinges on this choice. What is important is that the internal and external argument of a transitive verb get different abstract Cases, which is also the case if the underlying alignment pattern is accusative or three-way.

<sup>29</sup>Recall that I assume, following Trommer (2006), that the combination of two DPs with the feature [minimal] results in a representation of number on T that is identical to the representation of the number feature [augmented] and hence, *kan(e)* can be inserted in this context, cf. footnote 20.

This system emerges if there are three inclusive exponents (person portmanteaux) of which at least two are sensitive to Case:

(54) *Inclusive VIs in De'kwana:*

- a. /k/ ↔ { [+1] [+2] }
- b. /kə/ ↔ { [+1 Abs] [+2 Erg] }
- c. /mən/ ↔ { [+1 Erg] [+2 Abs] }

*k* is the default inclusive marker. It is blocked by *kə* and *mən* in local scenarios.

To summarize, Case agreement, which is parasitic on person agreement, allows one to distinguish the five inclusive contexts. If there are different inclusive VIs in a language, their distribution can be derived by making the inclusive VIs sensitive to Case features.

The Case agreement account has another desirable consequence. It can also be used to derive the marker distribution in languages that mix coding strategies in local scenarios. These languages use a portmanteau in one of the local scenarios but apply another strategy in the other local scenario. The basic idea is the following: Inclusive VIs can be restricted to certain contexts by the Case features (as is needed to account for languages with more than one inclusive VI, see the discussion above). An inclusive VI realizing Case features is thus blocked from occurring in all of the five inclusive contexts that the present analysis derives; the respective VI only occurs in a subset of these five contexts. If this blocking results in the realization of the portmanteau in only one of the two local scenarios, but in blocking it from the other local scenario then the following consequence is predicted: The regular 1st and 2nd person exponents that are also found in non-local scenarios and with intransitives are expected to be inserted in the local scenario that is not realized by the portmanteau. This is, of course, only possible if at least one of the two 1st and 2nd person exponents is underspecified, otherwise insertion in an inclusive context is impossible (cf. section 4.4 for illustration). Since underspecification of the 1st and/or 2nd person exponent only occurs in languages applying strategies 3 and 4 in local scenarios, we expect to find mixed languages with a portmanteau in one of the two local scenarios, but with hierarchy effects or cooccurrence of the regular 1st and 2nd person exponent in the other local scenario. This prediction is borne out in Ikpeng, Umatilla Sahaptin and Yavapai.

In Ikpeng, the two inclusive markers *kut* and *ugw* are distributed in a way that they do not show up in the local scenario 1>2, cf. (45), (46) and (50). This scenario is realized by *k*, the 1st person exponent that is also found in non-local scenarios if only one of the two arguments of a transitive verb is 1st person exclusive, and with the single 1st person exclusive argument of an unergative verb. This is expected if /k/ is underspecified as [+1 Erg], whereas the 2nd person exponent for an unaccusative verb is fully specified (with respect to person) as { [+1] [-2 Abs] }. Since the 2nd person exponent contains negative values, it is not a subset of the inclusive context { [+1 Erg] [+2 Abs] } on T in 1>2. Thus, when ignoring the scenario 2>1, which is realized by a portmanteau, Ikpeng looks as if it followed the person hierarchy 1 > 2 > 3. The same pattern with the reverse hierarchy is found in Umatilla Sahaptin, briefly discussed in the introduction. There is a portmanteau in the local scenario 1>2, but hierarchy effects following the scale 2 > 1 > 3 arise in the other local scenario 2>1. The paradigms are given below.

(55) *Umatilla enclitics, intransitive verb:*

1sg	naš
1pl excl	nataš
1pl incl	na
2sg	nam
3sg	pam

(56) *Umatilla enclitics, transitive verb:*

	DP <sub>int</sub>	1sg	1pl excl	2sg	2pl
DP <sub>ext</sub>					
1sg				maš	mataš
1pl excl				mataš	mataš
2sg		nam	nam		
2pl		pam	pam		

In Umatilla, second position enclitics encode local person arguments. The clitics that mark the single argument of an intransitive verb are shown in (55). In the transitive paradigm, hierarchy effects arise: Only a single argument can be cross-referenced in non-local scenarios. Note that this is also the case in the combinations with a 2nd person subject and a 1st person object: It is always the exponent for 2nd person that we also find with intransitive verbs, viz. *nam* or *pam*, that shows up. However, in the scenario 1>2 a portmanteau morpheme occurs. Under the present analysis, this can be captured if the two portmanteaux *maš* and *mataš* are restricted to the context 1>2 by Case feature sensitivity. They are thus blocked from occurring in 2>1 and the regular 1st and 2nd person exponents occur in this scenario. If the 2nd person exponent is underspecified and the 1st person exponent is fully specified, then the hierarchy  $2 \succ 1$  arises in 2>1. The VIs are given in (57). Note that number agreement is also necessary to account for the distribution of the markers and that Umatilla follows an ergative alignment pattern.<sup>30</sup> Under this analysis, Umatilla has three different inclusive markers.

(57) *Local person VIs in Umatilla:*

- a. /naš/ ↔ [+1 -2 -pl]
- b. /nataš/ ↔ [+1 -2]
- c. /na/ ↔ [+1 +2]
- d. /nam/ ↔ [+2 -pl]
- e. /pam/ ↔ [+2]
- f. /maš/ ↔ { [+1 -pl Erg] [+2 -pl Abs] }
- g. /mataš/ ↔ { [+1 Erg] [+2 Abs] }

Yavapai shows the mixture of a portmanteau and cooccurrence of the 1st and 2nd person exponent in local scenarios. The regular 1st and 2nd person exponent occurs in the scenario 2>1, it does, however, not show up in 1>2 (cf. (42)). To block the 1st and 2nd person exponent in 1>2, we concluded that a zero portmanteau, restricted to this scenario by Case features, must be present. Since Yavapai is a language with an accusative alignment pattern (a marked-nominative language, cf. Handschuh 2010), the scenarios 1>2 and 2>1 can be distinguished by the distribution of the Case features nominative (Nom) and accusative (Acc) with person features on T. The zero portmanteau thus has the specification in (58-a). In 2>1, this portmanteau cannot be inserted because it does not have a subset of the features { [+1 Acc] [+2 Nom] } on T in 2>1. The cooccurrence of the 1st and 2nd person exponent in 2>1 is the expected consequence, if both exponents are underspecified, which is compatible with the data in non-local scenarios and intransitive contexts.

(58) *Local person VIs in Yavapai:*

- a. /∅/ ↔ { [+1 Nom] [+2 Acc] }
- b. /ʔ/ ↔ [+1]
- c. /m/ ↔ [+2]

<sup>30</sup>The arguments of a verb in Umatilla are zero marked, but in the scenario 3sg>1/2 the external argument of a transitive verb gets an overt Case marker (Rigsby and Rude 1996), hence Umatilla instantiate an ergative alignment pattern. For an account of this case split see Keine (2010); Georgi (2012b).

In this subsection, I proposed that relativized person agreement goes hand in hand with case agreement. If VIs are sensitive to the case values copied onto T, languages with more than one inclusive exponent can be integrated into the analysis; the distribution of the different inclusive markers is regulated by restricting them to certain Case values. As a consequence, a situation may arise in which a portmanteau morpheme, i.e., an inclusive marker in a derived inclusive context, appears only in one of the two local scenarios, due to restrictions to certain case features. The other local scenario is then realized by the default local person exponents, which on the surface leads to a mixture of realization strategies.<sup>31</sup>

## 5.2 Person portmanteaux in languages without non-local hierarchy effects

The present analysis is designed to capture an asymmetry in languages with person hierarchy effects in non-local scenarios and portmanteau morphemes in local scenarios: Only a single argument agrees in the former scenarios, whereas both arguments of a transitive verb agree with T in the latter. However, there are also a number of languages that do not exhibit hierarchy effects in non-local scenarios but do have person portmanteaux in 1>2 and/or 2>1. Hence, there is no asymmetry in the number of arguments encoded on the verb; in a transitive context both arguments agree, regardless of the scenario. A language that exhibits this pattern is Lakhota (Siouan, Buechel 1939), see the paradigms in (59) and (60).<sup>32</sup>

(59) *Intransitives:*

	DP <sub>ext</sub>	DP <sub>int</sub>
1sg	wa-	ma-
1pl	uŋ(k)-	
2	ya-	ni-
3sg	∅-	
3pl	wica-	

(60) *Transitives:*

DP <sub>ext</sub> \ DP <sub>int</sub>	1sg	1pl	2	3pl
1sg			ci-	wica-wa-
1pl			uŋ-ni-	wica-uŋ
2	ma-ya	uŋ-ya		wica-ya
3	ma-∅	uŋ(k)-∅	ni-∅	wica-∅

With intransitives, Lakhota shows a split just as the Carib languages: The single argument of an unaccusative verb is encoded differently from the single argument of an unergative verb (at least in some forms). In a transitive context, the verb bears an object agreement marker, taken from the intransitive marker set for internal arguments, which precedes the subject agreement marker, taken from the intransitive marker set for external arguments. But in the scenario 1sg>2 a portmanteau morpheme, *ci*, occurs.

<sup>31</sup>As a reviewer points out, in languages without portmanteaux and with separate exponents for subject and object agreement Case Agree is not sufficient to distinguish between the features of the two arguments: In ECM constructions, object agreement cannot track the features of the subject in the embedded clause although it is marked accusative. In order to integrate such languages into the present system, I assume that there is a parameter which determines the locus of probes in the structure: The two person probes may be on the same head (which potentially gives rise to portmanteaux) or on different heads, i.e., on T and v. Under the latter setting, subject and object agreement exponents can be distinguished by the category of the head on which the probe resides. See Béjar (2003) for a study on the different loci of probes in the syntactic structure and the effects that follow from that assumption.

<sup>32</sup>The final sound *k* in the 1st person plural exponent *uŋ(k)* only occurs before vowels.

The question is how the occurrence of portmanteau morphemes but the absence of person hierarchy effects in such languages can be accounted for in the present analysis. I suggest that the analysis of person portmanteaux is exactly the same as proposed in section 4, since this analysis avoids the problems with other accounts of portmanteaux (cf. section 3): The portmanteau is an inclusive marker in a derived inclusive context that arises because both arguments of a transitive verb agree with the same head, T. To account for the absence of hierarchy effects in non-local scenarios, we have to assume that T agrees with both arguments in *all* of their features, not just in the positively valued features. In a relativized probing approach, language variation is due to the relativization of the probe (cf. Nevins 2007*b*). In languages with hierarchy effects it only targets the positive values of a probe, in languages where both arguments of a transitive verb are cross-referenced, the probe is not restricted to positive values, it can copy all features of a goal, positive and negative values. For languages like Lakhota, T must have four such probes. If it had only two as do languages with non-local hierarchy effects, it would only agree with the subject of a transitive verb: Probe 1 agreed with the negatively valued and probe 2 agreed with the positively valued person feature of the subject. With four probes, T agrees in all features with both arguments. Hence, no hierarchy effects can arise. If, for example, the subject is 1st person exclusive and the object is 2nd person, then T ends up with the features [+1 -2 -1 +2] (plus the Case values of the respective arguments, left out here). It is still possible to insert an inclusive VI (a portmanteau) that realizes [+1 +2] in this context. This is possible if the 1st and 2nd person marker are underspecified. The VIs for Lakhota are given in (61). Recall that T in Lakhota agrees with all person features on both arguments of a transitive verb and that it has an active split, the Case values of the arguments are thus Erg for all external arguments and Abs for all internal arguments. The inclusive marker *ci* blocks the insertion of the regular 1st person singular subject marker *wa* and the 2nd person object marker *ni* in 1sg>2 because it is more specific than these two markers. *ci* cannot be inserted in the other local scenarios. In these contexts, the regular 1st and 2nd person exponents are chosen.

(61) *VIs in Lakhota:*

- a. /wa/ ↔ [+1 Erg -pl]
- b. /ma/ ↔ [+1 Abs -pl]
- c. /uŋ(k)/ ↔ [+1 +pl]
- d. /ya/ ↔ [+2 Erg]
- e. /ni/ ↔ [+2 Abs]
- f. /Ø/ ↔ [-1 -2]
- g. /wica/ ↔ [-1 -2 abs +pl]
- h. /ci/ ↔ { [+1 Erg -pl] [+2 Abs] }

To summarize this subsection, the present analysis can equally account for portmanteau morphemes in languages with and without hierarchy effects in non-local scenarios, they are always inclusive markers in a derived inclusive context. They can realize features of more than one argument because the arguments of a transitive verb agree with the same head T. The presence or absence of hierarchy effects is related to (a) the number of probes on the agreeing head and (b) the relativization of these probes. Hence, there are two points of variation, but both seem to be very natural; the parameter (i) is needed anyway to account for the difference between languages with only subject agreement and languages with subject and object agreement. (ii) is shown to derive variation in Nevins (2007*b*); Preminger (2011).<sup>33</sup>

<sup>33</sup>The present account of the Lakhota pattern requires four probes coupled with the Activity Condition (but see footnote 12 for qualifications). A reviewer proposes a potentially simpler account: The two person probes are on different heads. The probe on *v* agrees with  $DP_{int}$  and the probe on  $DP_{ext}$  agrees with  $DP_{ext}$ . *v* moves and adjoins to T. The portmanteau *ci-* is the realization of the feature [+1sg] on T in the context of feature [+2] on the adjoined head *v*. The feature [+2] on *v* is in turn realized by a zero morpheme in the context of [+1sg] on T. In all other

### 5.3 An alternative account in terms of head-movement

As pointed out in section 4, the present analysis has two potential shortcomings: First, it is not compatible with the strong version of the PIC because the probes on T must be able to access the internal argument of a transitive verb (at least in some scenarios). Since  $DP_{int}$  is in the domain of the phase head  $v$ , it is not visible to T. Hence, the analysis is only compatible with the weaker version of the PIC according to which the complement of a phase head H does not become inaccessible until the next higher phase head Y is merged (see footnote 10 for details). Second, the analysis needs to invoke the Activity Condition: In order to get a derived inclusive context on T e.g. in  $1excl>2$ , the second probe on T must be prevented from targeting the same goal feature [+1] on  $DP_{ext}$  that the first probe already targeted. If the second probe could do that, T would be valued with [+1] twice in this scenario. This was excluded by assuming that a feature that has participated in an Agree relation is no longer accessible for another Agree relation, an instance of the Activity Condition (Chomsky 2001, see footnote 12 for discussion).

A reviewer points out that these problems can be circumvented under a head movement account that is combined with relativized probing. S/he proposes that the two relativized probes are not located on the same head; rather,  $v$  and T each have a single person probe. T agrees with  $DP_{ext}$  and  $v$  agrees with  $DP_{int}$ . Due to the relativization of the probes as introduced in section 4.1, they can only agree with local person features and copy all of the relevant features (i.e., [+1] and [+2] are copied onto a functional head if an argument is  $1incl$ ). This derives the hierarchy effects in non-local scenarios as before. Then,  $v$  moves and adjoins to T, forming a complex head  $T_{compl}$  [ $T_{compl}$   $v$  T].  $T_{compl}$  can be targeted by vocabulary items, i.e., there is spell-out of non-terminals. If  $T_{compl}$  is spelled out by a VI we get a portmanteau morpheme that realizes the features on  $v$  and T, e.g. [+1] on  $v$  and [+2] on T, a derived inclusive context. Spell-out can also target the non-complex heads  $v$  and T directly, realizing the features of each head individually (the corresponding VIs are less specific than the VI realizing  $T_{compl}$  and are thus blocked in local scenarios). This account yields the correct result for intransitives and non-local contexts. In the latter, one of the heads is unvalued anyway because Agree cannot access 3rd person arguments. Provided that a VI realizing features of  $v$  and T, respectively, can be made more specific than the “portmanteau” VI realizing  $T_{compl}$  in some contexts, languages that mix different encoding strategies in local contexts (cf. section 5.1) can also be derived.

This alternative analysis avoids the aforementioned problems with respect to the PIC and Activity as follows: First, since  $v$  agrees with  $DP_{int}$ , T does not need to access the domain of  $v$  anymore.  $DP_{int}$  is accessible to  $v$ , even under the strict version of the PIC. Second, due to the different structural positions of the probes on T and  $v$ , the probes necessarily Agree with different DPs:  $DP_{int}$  is the only available goal for  $v$  because it does not c-command  $DP_{ext}$ ;  $DP_{ext}$  is the closest goal for T and  $DP_{int}$  is not accessible for T under the strict PIC. Since no probe can access more than one goal, Activity is not necessary in order to avoid that a goal is targeted by more than

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contexts the features on  $v$  and T are realized by overt morphemes that are not sensitive to the features of the sister head, resulting in separate subject and object agreement markers (distinguished by the category of the head on which the probe is located and not by Case as in the present approach). Since  $v$  and T probe different goals, the Activity Condition is not required. This alternative head movement analysis can also account for the data. Notice, however, that it is an instance of the context-sensitive-spell-out type of approach discussed in section 3 and thus has the general problems laid down there. In particular, it is a coincidence that the features on  $v$  are not realized by an overt exponent in the scenario  $1sg>2$  (this objection is also valid if we adopt the person feature representation by Harley and Ritter (2002), as the reviewer suggests; with this representation, only two person probes are needed for Lakhota). We would expect an overt marker, realizing features on  $v$ , to cooccur with the portmanteau (*ci-* in Lakhota), realizing features on T, at least in some languages. Even if such a pattern exists, it is definitely not the common strategy. The analysis misses the point that the portmanteau encodes features of *both* arguments. In the account presented in 4 this follows because the portmanteau VI indeed discharges features of both arguments and therefore, this VI it is the only exponent that shows up in local scenarios. Since in the context-sensitive spell-out account the portmanteau only realizes features of a single argument, this does not fall out automatically.

one probe. Furthermore, the alternative head movement approach does not need Case Agree to distinguish between person features coming from the internal and the external argument: The distinction can be made by referring to the category of the functional head on which the probe is located since *v* bears only features of  $DP_{ext}$  and *T* only those of  $DP_{ext}$ . VIs can be context-sensitive to this categorial information: A VI with the context /*v*\_\_ realizes features of the object whereas a VI with the context /*T*\_\_ realizes features of the subject.

Note that under the head-movement account the problem with the spell-out of non-terminals put forward in section 3 vanishes: If spell-out could target XPs it is predicted that the VI inserted into TP not only realizes the relevant person features on functional heads but also the arguments DPs dominated by TP. This problem does not arise if spell-out targets the complex head  $T_{compl}$  because *v*-movement strands the internal argument DP and *T* does not dominate the external argument. Spell-out of XPs is not necessary, the relevant person features are dominated by the minimal complex head  $T_{compl}$ .

On the whole, the alternative account is also successful in deriving the data. This is because of the following fact: The main ingredient of the analysis is that probes are relativized in such a way that they target only local person features ([+1] and [+2]). Relativized probing derives hierarchy effects in non-local scenarios and creates derived inclusive contexts in local scenarios. It is thus the core of the proposal. The second component of the analysis of portmanteau morphemes is that the valued person features of the two arguments of a transitive verb must be in a local relationship such that they can be targeted simultaneously by a single VI. In the analysis presented in section 4, this is achieved by assuming that the two probes reside on the same head. In the alternative account summarized above this is done via head movement plus the assumption that spell-out can target complex heads created by head adjunction. Up to this point, this seems to be a question of preferences of implementation. Let me stress again that the core assumption is relativized probing and this can be combined with head movement or with the idea that a single head bears more than one probe. So, in principle, the head movement account is a viable alternative.

Nevertheless, it seems to me that the head movement approach has empirical problems. Being an instance of the spell-out of non-terminals (cf. section 3), it inherits the problems of this type of approach. First of all, it predicts that if a portmanteau VI realizes the complex head  $T_{compl}$  in a local scenario, tense on *T* (dominated by  $T_{compl}$ ) must be realized by this VI as well. Second, it predicts that other heads dominated by  $T_{compl}$  are also realized by the VI targeting  $T_{compl}$ . This can be any head *H* that intervenes between *v* and *T*, e.g. an aspect head *Asp* or negation. Due to the Head Movement Constraint (Travis 1984), *v* must first adjoin to *H* and this complex then adjoins to *T*. However, in Ikpeng and De'kwana, for example, tense and/or aspect are realized by a separate VI in the local scenarios that are encoded with a portmanteau (1sg>2 and 2>1sg in De'kwana and 2>1excl in Ikpeng), cf. (62):

(62) *Person portmanteau and tense/aspect marker are separate exponents:*

- a. mən-edant(ə)-a  
1SG>2-meet-PRES  
'I meet you.'
- b. ugw-eneŋ-li  
2>1-see-REC.PAST  
'You saw me.'

*De'kwana, Hall 1988*

*Ikpeng, Pachêco 2001*

Furthermore, *v* in the complex head  $T_T$  is a complex head itself: *V* adjoins to *v* in order to pick up the inflection for the internal argument. Then, the *V-v* complex adjoins to *T*. In a local scenario where a portmanteau VI realizes  $T_{compl}$ , a non-terminal, this VI must include the lexical verb. This predicts massive suppletion, as another reviewer points out. Phi-agreement exponents, in particular the portmanteau morphemes in local scenarios in the languages I have looked at, occur

independent of the actual verb root. But since the VI realizing  $T_{compl}$  includes V, this means that for every verb a VI realizing the scenario 1>2 and 2>1 for that VI has to be posited.

To conclude, let me briefly summarize the discussion: The head movement account is in principle a viable alternative to the “two-arguments-against-one head” approach put forward in this paper. In particular, the central insight that Agree with a 1st and a 2nd person argument yields the representation of 1st person inclusive (a derived inclusive context) can be translated into a system with head movement. The core assumption that does most of the work, relativized probing, is compatible with both types of approaches. Needless to say, both analyses have shortcomings: The head movement approach makes empirical predictions that are not borne out (at least not across-the-board); the issues arising with the one head-two probes approach are of a more conceptual / architectural level. Since these conceptual issues (Activity, phases) are a matter of ongoing debate and the latter approach does not make the disputable empirical predictions of the former, I maintain the analysis with two probes on a single head.

## 6 Conclusion

In this paper I have presented an analysis of person encoding in local scenarios. These scenarios have long been taken to be unsystematic because (i) there is cross-linguistic variation in the realization of local scenarios, some language even mix different strategies, (ii) there is an asymmetry in the number of arguments encoded on the verb that arises in a subset of languages with person hierarchy effects in non-local scenarios, and (iii) portmanteau morphemes, one of the coding strategies, occur almost exclusively in local scenarios and are a challenge for morphological theories that rely on the realization of discrete slots. I have shown that all these generalizations can be derived if Agree is relativized to target only positively valued person features on a goal. Local scenarios are thus far more systematic than has previously been thought.

I started with an analysis of person portmanteaux that assumes that both arguments of a transitive verb enter into agreement with the same syntactic head. In this way, the only operation necessary to account for portmanteaux in the morphological component is the indispensable operation of vocabulary insertion into terminal nodes. Additional mechanisms that have been put forward in the literature in order to integrate portmanteau morphemes in DM can thus be dispensed with. Portmanteau morphemes are analyzed as inclusive markers that arise in a derived inclusive environment. And since they are inclusive markers, one expects to find a syncretism between local scenarios and non-local scenarios where one argument is 1st person inclusive. This prediction is confirmed by the existence of ambiguous exponents. I have argued that if Agree is relativized to target only positively valued person features on a goal, it falls out from the analysis that person portmanteaux are particularly prominent in local scenarios because it is only in these scenarios that a derived inclusive context can arise. Furthermore, relativized probing derives the asymmetry in the number of arguments encoded on the verb in a subset of languages that exhibit hierarchy effects in non-local scenarios. This effect follows because agreement is only possible with local person arguments of which there is only one in non-local scenarios but there are two in local scenarios. I continued by arguing that the account of person portmanteaux can also be used to account for the other three coding strategies found in local scenarios. I proposed that these various strategies are a purely morphological phenomenon. They are the result of the (under)specification of local person exponents. Which strategy arises depends on the availability of an inclusive marker and the specificity of vocabulary items in a language. The underlying agreement mechanism is the same throughout languages with different coding patterns. All variation is thus restricted to the lexicon (cf. the *Borer-Chomsky-Conjecture*, Baker 2008a). Finally, I showed how person agreement in interaction with Case agreement makes it possible to account for languages that have more than one inclusive marker (as e.g. Kunwinyku, Ikpeng, De'kwana) and that mix different coding strategies (as Umatilla Sahaptin and Yavapai).

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