Cyclic Agree

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We propose that agreement displacement phenomena sensitive to person hierarchies arise from the mechanism of Agree operating on articulated ϕ-feature structures in a cyclic syntax. Cyclicity and locality derive a preference for agreement control by the internal argument. Articulation of the probe determines (a) when the agreement controller cyclically displaces to the external argument and (b) differences in crosslinguistic sensitivity to person hierarchies. The system characterizes two classes of derivations corresponding empirically to direct and inverse contexts, and predicts the existence and nature of repair strategies in the latter. The properties of agreement displacement thus reduce to properties of syntactic dependency formation by Agree.

Keywords: Agree, person hierarchies, agreement displacement, features, cyclicity

1 Introduction

The operation Agree of recent minimalist syntax establishes a syntactic dependency correlating the morphosyntactic features of one terminal with those of another. The most direct evidence for the dependency defined by this operation is morphological covariance of two elements, of which verb agreement is a core example. Familiar examples of verb agreement, such as the well-studied Icelandic verb-subject agreement discussed with respect to Agree in Chomsky 2000 and related work, have fostered rich research that supports a syntactic treatment deriving conditions on it from the properties of narrow-syntactic dependencies, such as locality.

There also exist complex agreement systems for which the morphological expression of agreement appears to have a more uneasy correspondence to the syntax. Here we examine one class of such agreement patterns, which can be characterized as having a single core agreement slot, for the control of which multiple arguments compete. The outcome is sensitive to the values of person features on both the candidate controllers, leading to the characterization of such systems as sensitive to *person hierarchies* (PH).[1] We will argue that the basic patterns arise as *agreement*

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[1] On person hierarchies, see Silverstein 1976, Zwicky 1977, Delancey 1981, Allen and Frantz 1983, Jelinek and Demers 1983, Gerdts 1988, Rosen 1990, Klaiman 1992, Macaulay 1992, Jelinek 1993, Dixon 1994, Rice and Saxon 1994, Nash 1995, Fabri 1996, Aissen 1997, Lakämper and Wunderlich 1998, Hale 2001, Nichols 2001.

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displacement (Hale's (2001) *eccentric agreement*), whereby perfectly general mechanisms of the syntactic derivation—namely, constraints on Agree—result in an apparently noncanonical agreement pattern. The fundamental principles that enter into the account are the following:

(1) a. Intervener-based locality (Rizzi 1990), relativized to features (Chomsky 1995): Agree for a feature [F] is sensitive only to other elements with [F]
b. A fine-grained approach to cyclicity, where every syntactic operation defines a cycle and thus a potential feeding-bleeding relationship (Rezac 2003)
c. A fine-grained approach to ϕ-features (specifically person or π-features), and especially ϕ-probes, associating with each person value (π-value) a different feature structure and thus a different locality class (Béjar 2003)

These mechanisms will generate two natural classes of derivations for transitive clauses: one where the *internal argument* (IA) controls agreement, corresponding to so-called *inverse* contexts; and another where the *external argument* (EA) does, corresponding to *direct* contexts. Unlike in languages without PH effects, IA agreement emerges as the primary agreement relation, and EA agreement arises as agreement displacement, a pervasive empirical pattern in the paradigms we discuss. The inverse contexts thus characterized as a class of computations coincide with a set of EA-IA combinations known to disrupt core agreement patterns—for example, by introducing extra agreement or special morphology. Our mechanisms provide the basis for explaining the character of these disruptions: convergence requires an extra probe to enter an Agree relation (hereafter, Agree) with the EA and so license it, which is reflected as added agreement or special case marking.

The article is structured as follows. In section 2, we introduce the phenomenon of agreement displacement and the preference for IA as controller, illustrating with Basque, Georgian, Karok, and Erza Mordvinian. In section 3, we present the mechanics of our account of agreement displacement. We develop a proposal that spells out the interaction of π-feature structures with Agree in such a way as to allow parameterization of sensitivity to person. We argue that cyclicity derives the contrasting behavior of the IA and the EA as potential controllers, with Agree of a person probe (π-probe) on v preferring the IA but allowing Agree with the EA for any unvalued features. The interaction of Agree and cyclicity defines contexts where the EA fails to Agree, the inverse contexts; we argue that a (Case-)licensing problem independently known from the Person Case Constraint arises there and must be repaired for such derivations to converge. We illustrate the basic system with Nishnaabemwin. In section 4, we develop the details of two repair strategies found in inverse contexts: extra agreement morphology in Mohawk, Nishnaabemwin, and Basque, and special IA case morphology in Kashmiri. We develop a unified treatment where both strategies result from a derivationally driven addition of a probe.

2 Person Hierarchies and External Argument–Internal Argument Interaction

Our point of departure is a class of languages that have a (core) agreement system whose *controller* cannot be characterized in terms of its grammatical function. Instead, it appears to alternate in transitives between the EA and the IA. This is illustrated in (2) for *ergative displacement* in Basque (Laka 1993), where underlining indicates the relevant agreement slot and its controller. The notation *x*→*y* = *x* means that in a clause where the person specifications (π-specifications) of the EA are *x* and those of the IA are *y*, agreement tracks (i.e., is controlled by) *x*. In (2a), the underlined agreement slot marker tracks the π-features of the EA, but in (2b–d), this slot tracks the IA (we return to Basque in section 4.2).[2]

(2) *Basque*

a. ikusi z-in-t-u-da-n *1→2 = 2*
seen 2-X-PL-have-1-PAST
'I saw you.'

b. ikusi n-ind-u-en *3→1 = 1*
seen 1-X-have-PAST
'He saw me.'

c. ikusi n-ind-u-zu-n *2→1 = 1*
seen 1-X-have-2-PAST
'You saw me.'

d. ikusi n-u-en *1→3 = 1*
seen 1-have-PAST
'I saw him.'

Laka (1993) shows that neither case marking (EA ergative, IA absolutive) nor anaphora binding (EA binding IA) patterns are affected by ergative displacement, as (3) indicates (syntactically, Basque is nominative-accusative).

(3) *Basque*

Ni-k neure buru-a ikusten n-u-en. *1→3 = 1*
1-E my.own head-the.A seeing 1-have-PAST
'I saw myself.'
(Laka 1993:54)

Of the more complicated EA-IA oscillations discussed below, work on Algonquian confirms results for Basque: they may but do not need to correlate with a syntactic effect such as would be produced by movement (Dahlstrom 1986, Rhodes 1994; and see section 5 below).

The choice between the EA and the IA as controller is clearly sensitive to these elements' π-specification, since all other variables remain constant. We might characterize agreement displacement as a PH effect where the controller is given by some ranking of the EA and the IA

[2] Glosses are *1*, *2*, *3* person; *SG* = singular, *PL* = plural; *M* = masculine, *F* = feminine; *INV* = inverse; *OBV* = obviative; *N* = nominative, *E* = ergative, *A* = absolutive/accusative, *D* = dative, *GEN* = genitive, *ABL* = ablative; *T* = tense, *FUT* = future, *PAST* = past, *INF* = infinitive, *DFLT* = default; *X* = irrelevant/unclear. *INV* glosses the added probe.

on the basis of their π-specification, such as 1st > 2nd > 3rd person, where > means 'outranks'. This would indeed be an adequate characterization of a language like Algonquian or Mohawk, where the uniquely higher of the EA and the IA on such a scale is the agreement controller. However, it is inadequate for Basque-type languages. Any hierarchy of π-specifications will underdetermine the choice of controller in (2). This is because although a 1st/2nd person argument will always win over a 3rd person argument, as in (2b) and (2d), the choice between two 1st/2nd person arguments cannot be resolved by a hierarchy of π-specifications: in (2a), 2nd person wins over 1st person, while in (2c), 1st person wins over 2nd person. Thus, in Basque, IA agreement *bleeds* potential EA control of the agreement slot unless the IA is 3rd person, in which case the failure of IA agreement *feeds* EA agreement. This is the phenomenon we identify as *PH-driven agreement displacement*, where *displacement* refers to apparently noncanonical control of a typically IA-controlled agreement slot by the EA.

Taking our cue from the latter phenomenon, we will propose that despite their differences, Basque-type and Algonquian-type hierarchies arise from fundamentally identical cyclic derivations: a unique probe seeks to agree with the IA and the EA, in that order. Differences in the character of the PH effects in these languages emerge because languages have probes with distinct feature structures, giving rise to different valuation potentials, so that in Basque a probe distinguishes only 1st/2nd from 3rd person while in Algonquian 1st, 2nd, and 3rd person are fully differentiated. Agreement displacement from the IA to the EA occurs for the same reason in both languages. The IA values the probe *as much as it can*, and the EA ends up controlling only if it can add to the value contributed by the IA. Two determining conditions enter into our account: a preference for Agree with the IA over Agree with the EA, which we reduce to cyclicity, and a parameterizable sensitivity of Agree to different π-values of the controller, which we will reduce to the structure of π-features. The interaction between EA and IA control emerges from serial, locally determinable valuation of the probe by the closest DP at each step, with no direct EA-IA interaction. We refer henceforth to the sum of these proposals as the theory of *cyclic Agree*.

The IA > EA preference has been observed in Bobaljik and Wurmbrand 2002 for Itelmen (Chukotko-Kamchatkan). Analyses of this pattern as PH-driven agreement displacement can be found for Basque in Rezac 2003; for Georgian (Caucasian; Harris 1981, Nash 1995), Karok (Hokan; Bright 1957), and Erza Mordvinian (Uralic; Abondolo 1982) in Béjar 2003; and for Itelmen in Rezac 2006.[3] Table 1 illustrates the first four.

This convergence, across languages, suggests an account grounded in principles of Universal Grammar. We argue for a syntactic account, because we will show that the pattern arises through (a) feature-relativized conditions on Agree, giving rise to PH effects, and (b) conditions on the search space imposed by cyclic construction of the phrase marker, giving rise to the IA > EA preference. The basic idea that a class of PH effects arises via the Case/agreement mechanism is

[3] Karok and Erza paradigms have gaps in the agreement displacement pattern in certain cells, where agreement morphology lacks systematicity altogether: X > 2.SG in Karok, SG > 1/2.SG in Erza. Following Béjar (2003), we abstract away from these; they belong to feature combinations known to typologists for susceptibility to skewed forms (see Heath 1998, Beck 2003), and they make the systematicity of the rest of the paradigm all the more striking. Functionalist discussions relate these anomalies to politeness/formality coding.

Table 1
Person hierarchy–driven agreement displacement

Basque	Georgian	Karok	Erza	Translation
IA controller				
z-in-t-*stem*-zte-da-n 2-X-PL-*stem*-PL-1-T	g-*stem*-t 2-*stem*-PL	ki-*stem*-ap 2.PL-*stem*-X	*stem*-d-ad-yź *stem*-T-2-PL	I V you.PL
g-in-t-*stem*-zu-n 1.PL-X-PL-*stem*-2-T	gv-*stem* 1.PL-*stem*	kin-*stem* 1.PL-*stem*	*stem*-s-am-iź *stem*-T-1-PL	you V us
g-in-t-*stem*-n 1.PL-X-PL-*stem*-T	gv-*stem*-s 1.PL-*stem*-X	kin-*stem* 1.PL-*stem*	*stem*-s-am-iź *stem*-T-1-PL	he Vs us
EA controller				
z-en-it-*stem*-n 2-X-PL-*stem*-T	Ø-*stem* 2-*stem*	’i-*stem* 2-*stem*	*stem*-s-y-ŋk *stem*-T-PL-2	you V them
g-en-it-*stem*-n 1.PL-X-PL-*stem*-T	v-*stem*-t 1-*stem*-PL	nu-*stem* 1.PL-*stem*	*stem*-s-y-ńek *stem*-T-PL-1	we V them

due to Nichols (2001), who shows that oblique arguments, which do not interact with core Case/ agreement systems, are invisible to the class of PH effects she considers. A correct prediction is that whenever the argument of a lower clause falls within the scope of Agree, it behaves exactly like the IA of our discussion, as in exceptional-Case-marking, causative (Nichols 2001:523), or cross-clausal agreement constructions (Bruening 2001:chap. 5, Branigan and MacKenzie 2002). Here, we limit our examples to the IA of basic transitives. If Case and agreement are syntactic as in Chomsky 1995, 2000, Nichols's argument strongly supports a syntactic account. Further support can be found in Rhodes 1994, which demonstrates that in some Ojibwa varieties with PH oscillation between the EA and the IA as agreement controller, being a controller has syntactic correlates (e.g., ability to control cross-clausal obviation) that confirm the syntactic reality of PH effects (Rezac 2008a). One of the main goals of the present article is to provide a syntactic, derivational model of PH-driven agreement displacement.

We interpret the core pattern, where IA agreement bleeds EA agreement, to mean that the relevant π-probe is on the v head and so has only the IA in its search space at first.

(4) $[_{vP}$ EA [v + Agr $[_{VP}$ V IA]]]

By postulating a unique low locus of agreement (on v), we depart from the received practice of associating the core Agr in a clause with a higher head, usually T (Béjar 2000a,b). This is strongly motivated by the data. The very existence of the bleeding pattern shows that we are dealing with a single π-probe oscillating between two controllers, which correlates with the fact that in all cases we are dealing with a single agreement slot for the core pattern. The IA preference manifested in the bleeding pattern indicates that this single π-probe must be low. No bleeding pattern would be expected if the clausal architecture included one low Agr for the IA and another high Agr for the EA, since the availability of an Agr for the EA would then be independent of whether or not the IA had Agreed. A further argument for (4) will come precisely from situations where the core pattern of a single probe is disturbed by the addition of a second agreement slot dedicated to the EA. In the systems under discussion, this occurs only in contexts where the bleeding of EA-Agree by IA-Agree with the core probe on v would leave the EA without ϕ-Agree entirely, in turn leaving it without Case licensing (viewed as licensing of π-features). Our account will predict this distribution of extra EA-controlled agreement, as an added probe to repair the failure of EA licensing. Positing a dedicated high EA-controlled probe throughout would predict neither this distribution of added agreement nor its limitation to EA control; one would expect either two independent agreement slots or extra agreement added in contexts where the IA fails to be Case-licensed by ϕ-Agree.

We limit our discussion to π-features. The system predicts similar phenomena for other ϕ-features, of which Béjar (2003) explores number. Among PHs, our proposal applies to one class of PH phenomena only. For illustration of PH effects that fall outside the scope of our approach, we refer the reader to two recent analyses of certain transitive forms repaired by non-agreement, Bobaljik and Branigan 2006 for Chukchi (Chukotko-Kamchatkan) and Wiltschko 2003 for Thompson River Salish. In both cases, derivation of the transitive would yield a form that has no morphological spell-out because of idiosyncratic morphological gaps in agreement, such as 3.SG→1.SG but not 3.PL→1.SG/PL. One option then is to resort to another independently available numeration to achieve a similar meaning, such as the passive or nonagreeing strong pronouns (Wiltschko 2003). Another is to repair the derivation at the interface by removing the offending agreement (Bobaljik and Branigan 2006). If the analyses are correct, these phenomena make reference to conditions and operations within the postsyntactic component that are governed by properties other than those of narrow syntax—for example, idiosyncratic bans on the cooccurrence of certain features either on the same node or on linearly adjacent elements (see Noyer 1997, Bobaljik 2000, Embick and Noyer 2001, Embick and Marantz 2006). For the PH pattern we characterize as agreement displacement, a morphological analysis is of course possible (see Bobaljik 2000 for Itelmen, Halle and Marantz 1993 for Potawatomi). But in contrast to the special character of the phenomena in the analyses just discussed, those analyzed here conform under our mechanism to conditions and outcomes that are determined by the mechanics of narrow syntax itself. This predicts that there may be narrow-syntactic consequences beyond agreement, as seems correct (section 5). Our proposal thus draws a sharp line between syntactic and morphological PH phenomena (Béjar 2003, Rezac 2006).

There exist other approaches to PH phenomena within the same broad framework we adopt, although we cannot attempt a comparison here. One class differs from ours in that it assumes PHs as a primitive (e.g., Jelinek and Demers 1983). Closer to ours are proposals that derive PH effects from Case and agreement (e.g., Laka 1993, Hale 2001, Nichols 2001). Another family of approaches may be termed cartographic: different π-values map to different positions of the clause structure (see Johns 1993, Rice and Saxon 1994, Nash 1997). One example of the cartographic approach is Jelinek 1993, which exploits Diesing's (1992) Mapping Hypothesis, according to which specific and nonspecific arguments must map outside and inside the VP, respectively.

Jelinek differentiates groups of arguments within the PH (e.g., 1st/2nd from 3rd) by giving them different specificity values.

Given (4), two questions immediately arise: why does the IA fail to control agreement if it has a certain π-specification, and how does this allow the same π-probe to Agree with the EA? We turn to these questions in the next section.

3 The Theory of Cyclic Agree and Person Hierarchy–Driven Agreement Displacement

3.1 Articulated Probes, Feature-Relativized Locality, and Person Licensing

We refer to the pattern where first the IA, and then the EA, is evaluated with respect to Agree as *cyclic expansion*. In section 3.2, we argue that it follows from cyclic construction of the phrase marker, which makes the IA the first potential match for Agree by a probe on v, and EA the second (Rezac 2003). In this section, we address what it means for the IA to fail to control a π-probe on the first cycle, allowing subsequent Agree with the EA.

We situate our approach in the framework of Chomsky 2000, where the conditions on Agree are given as follows:

(5) Matching is a relation that holds of a probe P and a goal G. Not every matching pair induces Agree. To do so, G must (at least) be in the *domain* D(P) of P and satisfy locality conditions. The simplest assumptions for the probe-goal system are shown [below:]
a. Matching is feature identity.
b. D(P) is the sister of P.
c. Locality reduces to ''closest c-command.''
(Chomsky 2000:122)

Thus, D(P) is the c-command domain of P, and a matching feature G is *closest to* P if there is no G′ in D(P) matching P such that G is in D(G′) (for clarification, see footnote 7, and Collins 2002:57–59, Fitzpatrick 2002, Rezac 2004:24–26).

We articulate π-features into a set of hierarchically organized features each of which can Agree independently, and each of which therefore defines a separate locality class. The IA will fail to Agree for a particular feature [*u*F] (designating an uninterpretable/unvalued occurrence of [F]) of such an articulated π-probe simply when the IA lacks a matching [F] (interpretable/valued); [F] on the EA can then be the goal of Agree. Therefore, control by the IA, figure 1 (A), and bypassing of the IA in favor of control by the EA, (B), display the same logic as classical feature-relativized locality for two arguments, where DP_1 is a goal only if it bears [F], (C), and is bypassed otherwise, (D).

Both cyclic expansion and the standard locality patterns arise as a consequence of feature-relativized locality, which is encoded in (5a) as the condition on matching: a probe for a feature [*u*F] only sees the closest goal with a feature [F] in its search space. The criteria for halting a search can thus be manipulated simply by manipulating assumptions about features. We take the data in table 1 to establish that π-Agree must be sensitive to a fine grain of π-specifications, so

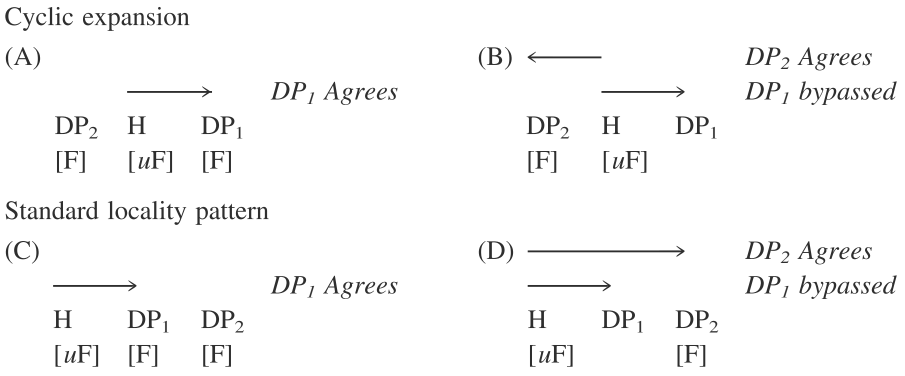

Figure 1
Locality patterns

that π-Agree of a probe looking for a 1st/2nd person argument can be undervalued by a 3rd person DP, simply because the DP lacks the features to fully value it. This suggests a system of features that lends itself to underspecification, so that the minimal contrasts within a subcategory like person can be captured in terms of the presence or absence of features.[4]

One such system is developed by Harley and Ritter (2002) for morphological ϕ-features, which we extend to the ϕ-features visible to Agree, both interpretable and uninterpretable, following Béjar (2000a,b, 2003). The ϕ-feature bundle is organized into subsets that reflect both natural classes and semantic entailment relations, as shown in figure 2 for person. Here, all persons include some shared feature, our π. In addition, 1st and 2nd persons are specified as discourse *participants* and thus grouped into a natural class to the exclusion of 3rd persons. Finally, 1st and 2nd persons are themselves differentiated from one another by a feature on 1st person distinguishing it as *speaker*. This yields the entailments in (6), given that a set containing a feature

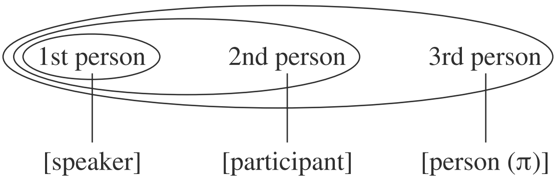

Figure 2
Entailment (subset) relations among person (π) features

[4] In principle, the same result could be obtained in a fully specified feature system with bivalent values (e.g., Halle's (1997) [±participant, ±author]), if the ability to match or enter an Agree relation were made contingent on having + or − values for [F], rather than on presence or absence of [F] (cf. Nevins 2007). However, this predicts a much broader typology of agreement systems than we can motivate empirically; see further Béjar 2003.

Table 2
Person specifications

A: Person specifications			B: Shorthand 1>2>3			C: Shorthand 2>1>3		
3rd	2nd	1st	3rd	2nd	1st	3rd	2nd	1st
[π]	[π]	[π]	[3]	[3]	[3]	[3]	[3]	[3]
	[participant]	[participant]		[2]	[2]		[1]	[1]
		[speaker]			[1]			[2]

(structure) [F] *entails* a feature (structure) [F′] if and only if [F′] is a subset (including identity) of the least set containing [F]. For example, being specified as [speaker] entails being specified as [participant] and as [π].[5] These entailments translate into degrees of privative feature specification through a heuristic of logical underspecification, where π-values are differentiated only by the presence versus absence of features, as in table 2 (A). This requires specifying default interpretations for underspecified representations: for example, [π] is common to all persons, but a bare [π] feature is interpreted as 3rd person.

(6) Entailment: [speaker] → [participant] → [π]

We adopt these feature specifications, but for convenience we employ a shorthand from here on: we write [π] as [3], [participant] as [2], and [speaker] as [1], and we refer to each of [3], [2], and [1] as a *segment*, meaning 'feature in a hierarchical feature structure'. The representations corresponding to table 2 (A) in this abbreviated system are given in table 2 (B). The notation is convenient because the interpretation can be transparently read by inspecting the bottommost segment in the feature bundle. It is important, however, that these segments not be read as person categories. For example, [1] in table 2 (B) does not refer to the category of 1st person; rather, it refers to [speaker]. It is only the feature structure as a whole that corresponds to a traditional category like 1st person.

The system assumes limited variation in the selection of features (see Harley and Ritter 2002). Of relevance below will be that some languages differentiate 1st and 2nd persons by specifying the latter as [addressee] rather than by specifying the former as [speaker], and by contrast interpreting a bare [participant] as 1st person. This is shown in table 2 (C).

In light of this feature-theoretic approach to π-specification, matching requirements can be relativized to specific π-structures by manipulating the specifications of a probe: the more highly *articulated* a probe is, the more highly specified a DP must be to match all of a probe's features (cf. Béjar 2003). (7)–(9) show this for the three possible articulations of the probe: a *flat* probe that is just [*u*π] ([*u*3] in our notation) in (7), a partially articulated probe in (8), and a fully articulated probe in (9). For each probe, a DP as highly specified as (or more highly specified

[5] The entailment relation between feature segments is integral to our formalization of the operations Match and Value, as we will show directly. This excludes feature systems that do not encode intrinsic entailment relations, like Anderson's (1992) [±me, ±you].

than) the probe will be a match for every feature of the probe (signified by a dash). However, a DP less specified than a probe will match only a subset of the probe's features, leaving an *active residue*, boldfaced in (8) and (9). This active residue can, by feature-relativized locality, Agree with another DP in the search space of the probe; it is this active residue that will lead to agreement displacement.

		v	DP		v	DP		v	DP
(7)	a.	v	DP	b.	v	DP	c.	v	DP
		[*u*3]—	[3]		[*u*3]—	[3]		[*u*3]—	[3]
						[2]			[2]
									[1]

		v	DP		v	DP		v	DP
(8)	a.	v	DP	b.	v	DP	c.	v	DP
		[*u*3]—	[3]		[*u*3]—	[3]		[*u*3]—	[3]
		[*u*2]			[*u*2]—	[2]		[*u*2]—	[2]
									[1]

		v	DP		v	DP		v	DP
(9)	a.	v	DP	b.	v	DP	c.	v	DP
		[*u*3]—	[3]		[*u*3]—	[3]		[*u*3]—	[3]
		[*u*2]			[*u*2]—	[2]		[*u*2]—	[2]
		[*u*1]			**[*u*1]**			[*u*1]—	[1]

(8) schematizes exactly what we are looking for to account for PH-driven agreement displacement in languages like those in table 1: a system like that of Basque or Georgian where a 1st/2nd person IA will fully match a probe, but a 3rd person argument will leave the probe with an active residue, the segment [*u*2], which may Agree with another argument.

The specification of probes may vary, giving rise to crosslinguistic differences in PH sensitivity (Béjar 2003). A language with no PH sensitivity in its agreement system is modeled by assuming the flat probe of (7); any DP will fully match a probe. A convincing example requires a language with genuine object agreement rather than the spell-out of a pronoun, as in the Swahili (Bantu) example (10), where the object marker *ki* agrees with *chochote* for the noun class 7, and not with the subject 'I' (*pro*), which controls the 1.SG subject marker (cf. Bresnan and Mchombo 1987:777–778, Morimoto 2002). Béjar (2003:91–97) posits a flat probe for Abkhaz and Choctaw, with overt noninteracting subject and object agreement, and for Germanic and Romance.

(10) *Swahili*
si-ja-ki_i-ona chochote$_i$
1.SG-NEG-7-see anything
'I haven't seen anything.'
(Morimoto 2002, Wald 1979; gloss adapted)

On the other hand, languages like Nishnaabemwin, Mohawk, and Kashmiri will be seen to have the fully articulated probe of (9), so that agreement displacement occurs also between two 1st/2nd person arguments. Languages therefore vary parametrically in their choice of a *characteristic probe* for π, which determines their PH sensitivity. The surface reflex of this variation lies precisely in the patterns of person sensitivity in cyclic displacement, presumably serving as input to acquisition of the structure of the probes.

Three details about the application of Agree to such feature structures require discussion. First, for uninterpretable features we assume that some match must be found. This is part and parcel of Full Interpretation, which requires uninterpretable features to have been deleted by LF, under the standard assumption that deletion is not free and requires an Agree relation to hold between an uninterpretable feature (bundle) and a corresponding interpretable one. What counts as correspondence requires spelling out. In our system, features are organized into structures whose internal properties determine both feature classes (e.g., person) and values (e.g., speaker). We take the deletion-licensing requirement to be the Match Requirement (11), which allows correspondence between two nonidentical feature structures if the interpretable one is identical to a subset of the uninterpretable one (cf. Chomsky 2000:124, where identity of feature, not value, matters).

(11) *Match Requirement*
For a probe segment [*u*F], a subset [*u*F′] of [*u*F] must match.

If an uninterpretable feature structure satisfies the Match Requirement, its deletion at the interface is licensed. Unmatched segments within such a structure pose no problem. This will be the case for the active residue (e.g., (9a)), if not later valued.

Second, our use of feature structure in characteristic probes must be kept distinct from the use of features as a PF instruction expressing valuation as a consequence of Agree. The characteristic probe delimits conditions on matching and deactivation of the probe, but *not* the values expressed by agreement. Clearly, languages with a flat probe like Icelandic or Spanish are not restricted to 3rd person agreement; valuation of their probes can distinguish 1st and 2nd persons as well. Likewise for a partially articulated [*u*-3-2] probe language like Basque. Intuitively, this contrast between feature structure of the probe and feature structure of the *spell-out* of the probe can be captured by construing valuation as copying features to the target. There are various ways to model this; we adopt the following:

(12) *Assumptions for Agree*
a. Each feature that seeks to Agree is *active* upon being inserted into the derivation.
b. When a feature [*u*F] matches with a goal [F′], Agree *copies* the feature structure containing [F′] (i.e., all features that entail [F′]) to [F]; this constitutes valuing.
c. An active feature that is locally related to a nonactive feature (i.e., a feature that stands in the configuration created by (12b)) is no longer active.

Technically, then, what happens in (8c) is that the [*u*3] and [*u*2] segments of the probe, active, match the [3] and [2] segments of the IA; then the entire feature structure of the IA, including the unmatched [1] segment, is copied to the probe, a process that deactivates both the [*u*3] and [*u*2] segments. In (8a), on the other hand, copying of the [3] segment of the goal to the probe upon match by the [*u*3] segment of the probe leaves the [*u*2] segment of the probe still active. For simplicity, we dispense henceforth with indicating copying (valuation), because what is important here is the deactivation or lack thereof of individual π-features. This can be discussed more simply by indicating only match relationships between active features as in (8) and by speaking of checking between individual features/segments, with the understanding that the dash in fact indicates copying (valuation) and consequent deactivation, and that copying transfers as much of the π-structure as there is on the goal, not just those segments that are active on a probe.

(11) and (12) together indicate the role played in Agree by organizing features into structures characterized by subset relations (entailment). In a sense, the entire structure behaves as a unit, in that it is the entire structure that is characterized by the Match Requirement, and in that matching by any feature in the structure copies the entire structure of the goal to the probe, with attendant deactivation. However, individual features in the structure are capable of matching on their own; that is, a feature like [*u*2] in (8a) is crucially capable of matching once [*u*3] has been deactivated.[6]

Third, the decomposition of person into combinations of syntactically independent units interacts with proposals that (certain) ϕ-features must be licensed—for example, by Case (the Case Filter) or in designated configurations. We adopt the following condition:

(13) *Person-Licensing Condition (PLC)*
A π-feature [F] must be licensed by Agree of some segment in a feature structure of which [F] is a subset.

Elsewhere (Béjar and Rezac 2003:53) we propose the PLC to account for the Person Case Constraint (Bonet 1991), where 1st and 2nd person DPs (and sometimes 3rd person, if animate) have a restricted distribution in contexts where a single π-probe c-commands two DPs (Anagnostopoulou 2003, Rezac 2008b,c; cf. Albizu 1997, Boeckx 2000, Chomsky 2000:127–128, Adger and Harbour 2007, Ormazabal and Romero 2007).

(14) *Person Case Constraint (PCC)*
In [$_{\alpha}$ Agr . . . DP_1-oblique . . . DP_2 . . .], where α includes no other person Agr, DP_2 cannot have a marked person feature (1st/2nd, sometimes 3rd animate).

The closer DP_1 is ''quirky'': visible to and movable by the π-probe, but at the same time oblique so that it cannot value it. After DP_1 is moved, there is no π-probe left on Agr for DP_2. This leads such derivations to crash if the farther DP_2 does not have another sufficiently local probe to Agree with it and license its π-feature. In Béjar and Rezac 2003:54, we posit that inherent Case and focus, which both protect a DP from PCC effects, involve shells around a DP that contain a local ϕ-probe for this purpose (cf. Cardinaletti and Starke's (1999) γ′); these are missing on clitics, on *pro*, and on *ni* in (15).

[6] The matter is unclear for one occurrence of a probe c-commanding two DPs, where the closer DP_1 is less specified (e.g., [3]) than the farther DP_2 (e.g., [3-1-2]). The [*u*-3-1-2] probe might be expected to Agree first for [3] with DP_1 and then for [1–2] with DP_2. Assuming that double object constructions fit this description, this does not seem to be the case: the Person Case Constraint (see (14)) bans a 3rd person goal DP_1 + 1st/2nd person theme DP_2 in [*u*-3-1-2] or [*u*-3-2-1] probe languages (e.g., Baker 1996:194 for Mohawk), indicating that the non-[3] segments of DP_2 were never matched. This is evidence that a segment (e.g., [*u*2]) cannot match past a feature structure that intervenes for any segments it entails (e.g., [3]) (or alternatively, for the root segment entailed by all the others). Such a condition is consistent with the letter and spirit of our system. When reprojection of a probe brings another DP into the search space, earlier-matched segments encounter no interveners.

(15) *Basque*
Zu-k$_i$ etsaia-ri$_j$ misil-ak$_k$ / *ni$_k$ saldu d-i-zki$_k$-o$_j$-zu$_k$ / *n$_k$-(a)-i-o$_j$-zu$_i$.
you-E enemy-D missile-A.PL me.A sold X-have-PL-3.D-2.E 1-X-have-3.D-2.E
'You have sold the missiles / *me to the enemy.'
(cf. Albizu 1997)

As the PCC indicates, a derivation may fail to satisfy the PLC. In the PH phenomena we discuss, this will occur whenever the IA fully controls the unique π-probe of v in a transitive structure, leaving π-features of the EA unlicensed by Agree. In such environments, *repair strategies* may surface to Agree-license the EA through otherwise impossible agreement or case morphology. These are the subject of section 4, where we propose that they reflect the derivational addition of a π-probe to v. We adopt the proposal of Adger and Harbour (2007) that in contrast to an IA, where some 3rd persons have no π-features in the sense relevant to the PLC, an EA always has one: in our system, a 3rd person EA is always at least [3].

We intend the PLC to fall under the *Case Filter*, articulated to take into account structured ϕ-feature bundles. To be fully identified with the Case Filter, the PLC must be generalized to those 3rd person IAs that can be DP_2 in the PCC context (14). Since these Agree for number even there, we need simply assume that their ϕ-content is a subset of and thus licensed by a number probe (cf. Anagnostopoulou 2003:274). In Chomsky 2000, 2001, the Case Filter is implemented by [*u*Case] on DPs that renders their ϕ-feature set visible to Agree. Being uninterpretable, [*u*Case] must be deleted for Full Interpretation, and those classical Case Filter effects that do not follow from the need of ϕ-probes to delete do so from that of [*u*Case]. Assuming this implementation of the Case Filter, then the PLC, like the Match Requirement (11), determines when Agree licenses the deletion of [*u*Case] in a system with feature structures. Such a full statement of the Case Filter would look like the PLC, with *person feature* replaced by *feature* and *licensing* referring to the valuation of [*u*Case]. However, our discussion only assumes the PLC as formulated, and we do not address the asymmetries between ϕ-probes and [*u*Case] that this view of the Case Filter inherits from Chomsky 2000.

To summarize, we adopt an approach to π-features that allows us to distinguish individual π-values by representing them as subsets of a single feature structure. Given feature-relativized locality for matching, this means that the PH sensitivity of agreement displacement can be modeled by the facts that (a) matching of a proper subset of the features of a probe by a goal leaves an active residue able to match another goal, and (b) different crosslinguistic PH sensitivities follow from different articulations of the probe. This now provides for correct interaction between π-probes and IAs; in the next section, we will derive the IA > EA preference of the cyclic expansion pattern.

3.2 Cyclicity and Agree

The pattern of PH-driven agreement displacement is preference for an IA controller, which is superseded by an EA controller if the IA does not suffice to check all segments of a language's characteristic probe. The explanation for the IA-to-EA displacement lies in the derivational mechanics of cyclic construction of the phrase marker (Rezac 2003), combined with locating the relevant π-probe on an Agr head, v, between EA and IA (Béjar 2000a,b, 2003). We will now show how the EA falls into the search space of a probe on v as v projects, if it retains an active probe.

In a strongly cyclic interpretation of syntactic derivation, each operation can potentially be ordered with respect to other operations. Suppose that the ordering of operations triggered by features on a single *locus* of the derivation (Frampton and Gutmann 1999, Chomsky 2000:132, Collins 2002:46) such as v is given by the Earliness Principle, which requires a feature to probe as early as possible (cf. Pesetsky and Torrego 2001). Suppose further that we take seriously the ideas that upon Merge, the label of the selector projects and that labels are nondistinct from lexical items, modulo the effects of Agree (Chomsky 2000:126, 133–134). This proposal has two consequences: (a) any probe on v will first seek a match in the object first merged with v, the VP, because of the Earliness Principle; and (b) upon subsequent Merge of the EA and further projection of v, Spec,v falls into the domain of any remaining probe on v according to (5b) because v′ is the sister of the new projection of v under the bare phrase structure approach (Chomsky 1995:241–249, 2000:116, 133). We illustrate this proposal for a transitive construction in (16), annotating the projections of v as v_n. Each v_n is identical to v_{n-1} modulo checking/valuation, but in a different configuration (that of a label to the item that projects it); we annotate instances of v with numbers for convenience only.

(16) *Derivation of a transitive vP*
Step 0: VP constructed as {V, {V, IA}}; v becomes locus
Step 1: Merge(v, VP) ⇒ {v_I, {v, {V, {V, IA}}}}
Step 2: Agree(v_I, IA)
Step 3: Merge(vP, EA) ⇒ {v_{II}, {EA, {v_I, {v, {V, {V, IA}}}}}}
Step 4: Agree(v_{II}, EA), if there is still a probe on v_{II}

It is thus the cyclic architecture of the derivation, and locating a π-probe on v, that is responsible for PH-driven agreement displacement: we term this *cyclic expansion of the search space*. Figure 3 schematizes this for two features [*u*F], [*u*G] on the Agr head v. What is crucial are the derivational mechanics and the position of the π-probe between the EA and the IA, not the actual identification of the Agr head with v, the introducer of the EA.[7]

[7] The interaction of projection with search space needs spelling out. Under the bare phrase structure approach, but assuming labels in syntax, Merge of v with VP creates {v, {v, VP}}. If x is the sister of y if and only if $x, y \in z$, then the sister and search space of the lowest position of v is VP, and the sister and search space of the first label are both v and VP. These two search spaces do not give distinct goal potentials. Therefore, it is these that we refer to as v_I (we could notate them v_0, v_I). The next Merge, of the EA, yields {$\underline{v}$, {EA, {v_I, {v_0, VP}}}}. The new label v, underlined, has as its sister and search space a constituent that includes the EA as its highest element; this is our v_{II}. Alternatives viewing the label of the object α resulting from Merge(v, VP) as the sister of the EA, along with α itself, give the same results for v_I, v_{II}. In this discussion, we assume the projection of labels in narrow syntax, as in Chomsky 1995, Hornstein 2005, Donati 2006, and Boeckx, to appear, but not Collins 2002, Chomsky 2005. A label is a copy of the projecting item, except for the consequences of Agree (cf. Chomsky 2000:133), in our approach specifically the interpretable features

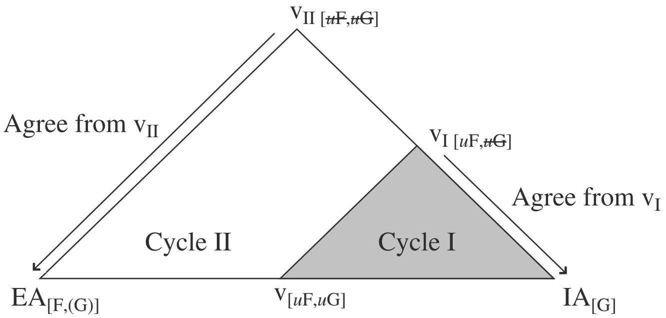

Figure 3
Cyclic expansion of the search space

Consider how this works for Nishnaabemwin (Algonquian; Valentine 2001), a language that has a fully articulated probe with the structure [π [participant [addressee]]] so that 2nd person is the most specified, as noted in section 3.3. In our shorthand, this is notated [*u*-3-1-2]. If the IA is 3rd person, a 1st/2nd person EA controls agreement because the probe segments [*u*1], [*u*2] are not affected by Agree with the IA, and they project unchecked to v_{II}. Similarly, if the IA is 1st person, the segment [*u*2] projects. Examples illustrating this fully articulated agreement displacement are shown in (17). The core agreement slot is underlined; the slot glossed *INV* is treated in section 4.2. The corresponding derivations are given in table 3, where a probe valued and thus deactivated on a lower projection of v is enclosed in parentheses, and overstriking indicates a segment that never matches in the derivation.

(17) *Nishnaabemwin*
a. g-waabm-in *1→2 = 2*
2-see-1.INV
'I see you.'
b. g-waabm-i *2→1 = 2*
2-see-DFLT.1
'You see me.'

that are copied to the probe that deactivate it and license its deletion. The basic cyclic Agree proposal does not require labels (Rezac 2003), but our specific mechanics here do (Rezac 2002, Béjar 2003). However, our mechanics can be reformulated by treating v_{II} as v raised to some head above the EA like T (Béjar 2000a,b, Rezac 2006), from which any active features remaining on it at that point can probe. This captures some effects of Baker's (1988:64) Government Transparency Corollary (cf. Roberts 1991, Chomsky 1995).

Table 3
Core agreement in Nishnaabemwin

EA→IA	2				1			
2	—				v_{II}	EA	v_I	IA
					([*u*3])	[3]	[*u*3]—	[3]
					([*u*1])	[1]	[*u*1]—	[1]
					[*u*2]—	[2]	[*u*2]	
1	v_{II}	EA	v_I	IA	—			
	([*u*3])	[3]	[*u*3]—	[3]				
	([*u*1])	[1]	[*u*1]—	[1]				
	([*u*2])		[*u*2]—	[2]				
3	v_{II}	EA	v_I	IA	v_{II}	EA	v_I	IA
	([*u*3])	[3]	[*u*3]—	[3]	([*u*3])	[3]	[*u*3]—	[3]
	([*u*1])		[*u*1]—	[1]	([*u*1])		[*u*1]—	[1]
	([*u*2])		[*u*2]—	[2]	~~[*u*2]~~		[*u*2]	

c. <u>n</u>-waabm-ig *3→1 = 1*
1-see-3.INV
'He sees <u>me</u>.'

d. <u>g</u>-waabm-ig *3→2 = 2*
2-see-3.INV
'He sees <u>you</u>.'

The same logic accounts for the PH-driven agreement displacement discussed in section 2 for languages like Basque (see (2)); there the structure of the probe is [*u*-3-2], so a 3rd person IA will not check the [*u*2] segment, while both a 2nd and a 1st person IA will. In a language with a flat probe like Swahili, the IA will always count as a match for the sole segment of the probe, and no active residue will ever remain on v_{II} to license the EA.

As the derivations in table 3 show, we posit a single articulated probe whose individual segments can match segments on different DPs through its reprojection. As each segment matches, valuation ensues via copying of the whole π-value of the matching DP, and all segments of the probe that have a corresponding segment in the copied value are deactivated (see (12)). Given the Nishnaabemwin [*u*-3-1-2] probe with a [3-1] DP in its scope, it does not matter whether [*u*3] or [*u*1] or both match; in all cases, the [3-1] value of the DP is copied and the [*u*3], [*u*1] segments of the probe are deactivated. Projection of the category hosting the probe (v_I to v_{II}) can add a new DP to the search space of the copy of the probe on the projection (v_{II}). From here, any unmatched segments of the probe can match again.

The logic of entailment among segments, such that [2] entails [1] and [1] entails [3] in a [3-1-2] structure, has as its consequence that matching deactivates and values the probe in a continuous monotonic fashion. Given the ''lowest'' unmatched segment [*u*α] (the one entailed by all other unmatched segments), any segment entailed by [*u*α] will necessarily have been matched and deactivated, and any segment that entails [*u*α] will not have been. It is not possible to end up with [*u*1] matched and [*u*2], [*u*3] unmatched. Thus, as a probe projects, any unmatched segments are in a contiguous bundle at its ''bottom,'' and their match can only assign the probe a value that is a superset of (entails) the earlier value (say, from [3-1] to [3-1-2]). This renders moot the question of what happens to the original value. It is always represented as a subset of the new value, and no questions about delinking arise as they would if (re)valuation to a lower value were possible.

At the same time, the syntax retains the representation of the valuation of a probe on each phrase-structural locus until Spell-Out deletes it (Rezac 2002). Thus, the cyclic expansion mechanism for agreement displacement predicts the possibility of *second-cycle effects* (Béjar 2003:79), where the occurrences of a probe that result from projection of the active residue can create conditioning environments for contextual allomorphy. Agree with the IA takes place on a different cycle or different projection of v than Agree with the EA, and this difference in derivational mechanics is reflected in the morphology of agreement in languages like Georgian and Karok (both with [*u*-3-2] probes). In such languages, a particular value of a π-probe on v is systematically spelled out using one morpheme if the probe has been valued on the first cycle (IA ≥ EA), and using a different morpheme if it has been valued on the second cycle (EA > IA). A second-cycle effect differs from the morphological contrast that might arise in a language with separate Agr heads for the IA and the EA, because second-cycle morphology correlates precisely with PH-driven agreement displacement in a language. It occurs only with those EAs that are more specified than IAs with respect to a language's characteristic probe (e.g., 1→3 = 1 but not 1→2 = 2 in Georgian), whereas a system that has a dedicated π-probe for each of the EA and the IA (e.g., on v for the IA, on T for the EA) predicts distinct morphology for the EA regardless of the value of the IA (e.g., 1→3, 1→2).

Georgian 1.SG yields an example of second-cycle morphology (Béjar 2003:127, 151–159; cf. 159–161 for Karok). When 1.SG IA controls the π-probe, which occurs regardless of the value of the EA, 1.SG is spelled out as *m*, (18a). When 1.SG EA controls the π-probe, which occurs when the IA is 3rd person, 1.SG is spelled out as *v*, (18b).

(18) *Georgian*
  a. m-xedav-s *3→1 = 1.I*
     1.I-see-x
     'He sees me.'
  b. v-xedav *1→3 = 1.II*
     1.II-see
     'I see him.'

Second-cycle morphology shows up when the π-probe is valued on the second cycle, the locus of which is the v_{II} projection c-commanding the EA; first-cycle morphology shows up when it is valued on the first cycle, on v_I (↔ symbolizes Agree; [F′], [F″] are the π-specifications of the EA and the IA; [*u*F] is the [*u*-3-2] probe of Georgian).

(19) [v_{II} EA [v_I [V IA]]]
[uF] ↔ [F′] [uF] ↔ [F″]

This morphological sensitivity to stages of syntactic derivation can be accounted for naturally in a realizational theory of morphology like Distributed Morphology (Halle and Marantz 1993). With postsyntactic vocabulary insertion, the second-cycle effect can be modeled as sensitivity of vocabulary insertion to the difference between two occurrences of v: a lower one (the lowest being the head) and a higher one that the lower occurrence projects. The two differ configurationally, and a vocabulary insertion rule for one may therefore refer to one or the other, as an instance of contextual allomorphy. This presupposes two important points, both of which are natural in the bare phrase structure approach: first, that the projection of v is a potential vocabulary insertion site (see Béjar 2003, 2004); second, that the lowest projection (the head) remains differentiated from higher ones (labels) configurationally, in the same way that the lowest copy in a chain differs from higher ones. Adjacent projections of v are sufficiently local to one another to trigger alternations that can be captured by vocabulary insertion rules of the form in (20).

(20) Spell out the feature set Γ of v_n using the exponent σ in the environment of $v_{n\pm1}$.

Thus, in the example of Georgian 1.SG agreement (18):[8]

(21) a. First-cycle vocabulary item: m ↔ [3-2-1] / [____]$_v$
b. Second-cycle vocabulary item: v ↔ [3-2-1] / [____]$_v$ [. . .]$_v$

As with allomorphy in general, the occurrence of this alternation cannot be said to be predicted. Whether or not a language manifests it is a language-specific and (at least synchronically) idiosyncratic property, up to complete absence (in Basque, Nishnaabemwin, and Mohawk). Cyclic expansion merely creates a plausible conditioning environment for such allomorphy. Its plausibility rests on the locality between the target and the trigger of the alternation (Lieber 1980, Sproat 1985, Bobaljik 1995, Adger, Béjar, and Harbour 2001), which follows automatically from the intrinsic locality between subsequent projections. Other variants of this kind of allomorphy might be expected. For example, vocabulary insertion on v_{II} could be sensitive not only to the presence of the adjacent projection v_I, but also to particular features on v_I; or v_{II} could be realized by morphology distinguishing it from v_I independently of Agree. Examples of both follow in section 4.

In this section, we have shown how the search space of any probe on v expands, including first the IA and then, if the probe remains active, the EA. The pieces of our account are now in place: an articulated structure of π-features, which permits PH effects; and the mechanics of cyclic displacement, which captures the IA > EA preference and predicts the existence of second-cycle effects.

[8] We thank an anonymous reviewer for helping us to clarify the formalism.

3.3 Nishnaabemwin: The Core Probe

In this section, we show how the cyclic Agree mechanism developed above derives the basic pattern of PH-driven agreement displacement in Nishnaabemwin, a fully articulated [*u*-3-1-2] probe language (2nd person being the most highly specified).

The Nishnaabemwin singular agreement paradigm is given in table 4.[9] For the moment, our interest lies in the prefix agreement morphemes in small capitals, a unique agreement slot that is so far fully predicted by our proposed system; we call it the *core agreement slot*. Its spell-out is *n-* for [3-1], *g-* for [3-1-2], and *w-* for [3] (proximate). (See section 4.2 for discussion of the symbol ‡.) This prefix cross-references the person of the EA when it is more highly specified than the IA, and of the IA otherwise. Table 5 summarizes the derivations for this paradigm. Instances of Agree are represented by dashes. First- and second-cycle Agree (i.e., Agree taking place from the first (v_I) or second (v_{II}) projection of v) are represented by a dash to the right of the probe (first cycle) or to the left of the probe (second cycle). The shaded cells in the paradigm

Table 4
Singular agreement paradigm for Nishnaabemwin (core agreement in small capitals, theme suffix underlined)

EA→IA	2	1	3
2	—	G-*see*-<u>i</u>‡ 2-*see*-DFLT.1 'You see me.'	G-*see*-<u>aa</u> 2-*see*-DFLT 'You see him.'
1	G-*see*-<u>in</u> 2-*see*-1.INV 'I see you.'	—	N-*see*-<u>aa</u> 1-*see*-DFLT 'I see him.'
3	G-*see*-<u>ig</u> 2-*see*-3.INV 'He sees you.'	N-*see*-<u>ig</u> 1-*see*-3.INV 'He sees me.'	W-*see*-<u>igw</u>-n 3-*see*-3.INV-OBV 'That sees this.'

[9] Our discussion of Nishnaabemwin focuses exclusively on the agreement pattern known as the ''independent order.'' In the ''conjunct order,'' there are no PH effects (Rhodes 1976). We take this to mean that the v probe introduced in the conjunct is flat. Certain tangential details of the independent paradigm, relating to further articulation of the person geometry, are deliberately not addressed here. First, the language distinguishes proximate 3rd and obviative 3rd′ person, where 3rd outranks 3rd′ (cf. footnote 12). The two interact identically with 1st and 2nd person, as shown in the column for 3rd person in table 4. The agreement prefix in 3(′)→3(′) combinations is Ø; the theme suffix is *-igw* in inverse contexts (3′→3), as shown in the table, and *-aa* for direct contexts (3→3′). 3→3′ is not discussed in the text; it is fully predicted by our system. Second, besides 1st and 2nd person, there is a 1st person inclusive, leading to a more complete decomposition of the π-feature geometry (see Harley and Ritter 2002 for specific proposals). That the 1st person inclusive has properties of both 1st and 2nd person is clear from its inability to cooccur with another 1st or 2nd person argument, just as 1→1 and 2→2 cannot cooccur; it can be notated 21. It also has the well-known property of behaving like 2nd person with respect to person agreement, but like 1st person with respect to number agreement. This asymmetry is beyond the scope of our discussion, and not clearly relevant to it. What is relevant is that the 21 category behaves as we predict a category with 2nd person features should: it fully deactivates a [*u*-3-1-2] probe. For further discussion, see Lochbihler 2007, McGinnis 2008.

Table 5
Cyclic Agree for the Nishnaabemwin singular agreement paradigm

EA→IA	2	1	3
2	—	EA Agr IA [3] [*u*3]—[3] [1] [*u*1]—[1] [2]—[*u*2]	EA Agr IA [3] [*u*3]—[3] [1]—[*u*1] [2]—[*u*2]
1	EA Agr IA [3] [*u*3]—[3] [1] [*u*1]—[1] [*u*2]—[2]	—	EA Agr IA [3] [*u*3]—[3] [1]—[*u*1] ~~[*u*2]~~
3	EA Agr IA [3] [*u*3]—[3] [*u*1]—[1] [*u*2]—[2]	EA Agr IA [3] [*u*3]—[3] [*u*1]—[1] ~~[*u*2]~~	EA Agr IA [3] [*u*3]—[3] ~~[*u*1]~~ ~~[*u*2]~~

are those having only one Agree step, with the IA; the probe has no segments left that can Agree with the EA. The remaining cells are those where the characteristic [*u*-3-1-2] probe of Nishnaabemwin does have an active segment left after Agree with the IA, and this segment Agrees with the EA on its second cycle. Cyclic Agree thus directly characterizes two classes of derivations, which turn out to be natural classes because they are found independently in the data, as we will show in section 4.

(22) *Direct/Inverse contexts*

a. *Inverse context* (shaded): The IA checks the characteristic probe of a language as fully as possible, so that the EA cannot Agree with it at all. For Nishnaabemwin, (2)/1/3→2; (1)/3→1; 3→3; for Basque, 1/2→1/2, 3→1/2/3; for Swahili, every EA-IA combination is an inverse context. In inverse contexts, the core π-probe of v does not Agree with the EA.

b. *Direct context* (unshaded): The EA is more highly specified than the IA, so that after the characteristic probe has Agreed as fully as possible with the IA, it Agrees for its unchecked segments with the EA. For Nishnaabemwin, 2→1/3, 1→3; for Basque, 1/2→3; for Swahili, no EA-IA combination is a direct context. In direct contexts, the core π-probe of v Agrees with both the IA and the EA, for different segments.

The core agreement slot is not all there is to the Nishnaabemwin paradigm. There is a second slot, underlined in table 4, whose realization refers to features of both the EA and the IA. However, setting aside the 2→1 form *i*, there is a direct/inverse pattern: in inverse contexts, the suffix depends on the EA (1st person *-in*, 3rd person *-igw*), while direct contexts show an invariable, defaultlike exponent (*-aa*). In the next section, we argue that this is the correct generalization, and that there is an *added probe* Agreeing with the EA in all and only inverse contexts in Nishnaabemwin, Mohawk, and Basque. It is added to Agree with the EA (whose π-features need to be licensed) in inverse contexts alone, because only there is the core probe fully valued by the IA, not reaching the EA at all.

4 Person Licensing and the Added Probe

4.1 Inverse Contexts: Person-Licensing Failure and Repair

The insertion of extra agreement morphology only in inverse contexts turns out to fit a more general pattern characterizing languages with PH sensitivities. Inverse contexts are typically distinguished from direct contexts by special morphology; one might speak of disruption to the core paradigm. In Nishnaabemwin, Mohawk, and Basque, the core agreement slot is controlled by the IA, but an extra agreement slot appears for the EA. In the same inverse configurations where the extra agreement appears in Mohawk, also a [*u*-3-2-1] probe language, Kashmiri instead puts the IA into a special Case, which we will call *R-Case* (homophonous with the dative), and its sole agreement slot is controlled by the EA rather than the IA. For reasons that will become clear, we will speak of both of these phenomena as repair strategies: namely, the *added-probe* and *R-Case* strategies (table 6). We examine them in detail in sections 4.2 and 4.3.

Both strategies are precisely coextensive with the inverse, and they are thus *derivational* strategies: their availability depends on the π-specifications of the EA and the IA in a particular derivation. In this they contrast with other strategies for avoiding inverse-context PLC violations, such as the use of periphrasis (e.g., choosing an independently available passive to avoid having to license the IA), which are not limited to inverse contexts. It is therefore significant that the mechanics of agreement displacement developed in section 3 independently distinguish two classes of computations by whether or not the core π-probe Agrees with the EA; inverse derivations are those where it does not (see table 5). A consequence of the EA failing to Agree is a violation of the PLC (13), developed to account for the PCC (14): the π-features of the EA are not (Case-)licensed through π-Agree. It is these derivations that are characterized by repair strategies. Therefore, we propose that the special character of inverse contexts arises from the fact that the EA never Agrees with the core probe, and this failure is what must be repaired.

The exact nature of PLC violations is suggested by the nature of the repair strategies. An added-probe language adds an extra agreement slot for the EA in the inverse. Basing our analysis

Table 6
Repair strategies in inverse contexts (for a [3-2-1] probe language)

	Added-probe language	R-Case language
Direct context (EA > IA: 1/2→3)	EA-controlled Agr only	EA-controlled Agr only IA has regular v-assigned Case
Inverse context (EA ≤ IA: 3→1/2/3)	IA-controlled Agr + *EA-controlled Agr*	EA-controlled Agr only *IA has special R-Case*

on this added-probe strategy, we propose that inverse contexts converge because they permit a derivational mechanism that adds a π-probe to Agree with the EA. In an R-Case language, the IA appears in a special Case and the language's core probe Agrees with the EA rather than with the IA as would be expected in an inverse context. Since the R-Case strategy is coextensive with the added-probe strategy, it is desirable to seek a unified analysis. On our proposal, R-Case emerges as simply an alternative spell-out of the added-probe strategy.

The boundary conditions on a unified mechanism behind both strategies are the following:

(a) The EA must enter into Agree, either by what is spelled out as (i) an added π-agreement slot distinct from that of the core probe (Nishnaabemwin, Mohawk, Basque), or by what is spelled out as (ii) the sole π-agreement slot of a language, whose control by the EA is anomalous for an inverse context (this will be the situation in Kashmiri).
(b) Under option (ii) of (a), the IA must receive a Case different from the Case it would receive in direct contexts, the R-Case of Kashmiri.
(c) The mechanism must occur only in inverse contexts.

We assume local determinability at each point in a cyclic derivation, and in our approach Agree between the core probe on v and the IA crucially takes place on an earlier cycle than Agree with the EA. This severely constrains our analytic options, because the operation referred to in (b)—that is, Case assignment by v to the IA—occurs at the point where the core probe has only the IA in its search space, yet it must be so restricted that it succeeds only in inverse contexts (c), without making reference to properties of the yet unmerged EA.

We posit the following mechanism behind both strategies: the ability of the core π-probe on v to add a probe, (23), reflected most transparently in an added-probe language. In any particular derivation, the core probe may or may not have this property P, and thus add a probe or not. We leave open whether the availability of P itself needs to be parameterized. The [*u*-3-2-1] probe languages in our data have P available (as added probe or R-Case). Of the [*u*-3-2] probe languages, Basque has P available, while the situation is unclear in Georgian, Karok, and Erza Mordvinian.

(23) *Property P*
If the core probe α on Agr has property P, a probe is added to Agr upon Agree by α.

P's addition of a probe to the core probe on a projection of v—say, v_I—creates a modification of v_I and therefore requires the added probe to be inserted on the next higher projection, v_{II}, assuming that once inserted into the structure a term may not be modified without projecting (Rezac 2002; cf. Chomsky 2000:126). An added probe (convergent only in inverse contexts) and the second cycle of the unmatched segments of the core probe (occurring only in direct contexts) thus have this similarity: they are both located on v_{II}, standing in some relation to an earlier probe on v_I. This immediately makes an added probe unavailable in constructions lacking an EA for v. First Merge creates {v, {v, VP}}, after which Agree by the core probe can insert the added probe on v. However, as noted above, v cannot be modified without projecting. Only Merge of EA creates a new projection of v, yielding {v, {EA, {v, {v, VP}}}} (see footnote 7).

The locus of difference between added-probe and R-Case languages is spell-out.

(24) *Spelling out the added probe*

a. In Nishnaabemwin, Mohawk, and Basque, agreement morphology spells out both probes of v once they are fully valued, using potentially distinct morphology for the two probes; in Kashmiri, it spells out only the probe valued on the highest projection of v. (Details of spell-out follow in the respective sections.)

b. Case assigned to the IA by v can have a spell-out that reflects whether the core probe of v has P (Kashmiri R-Case).

(24) does not resort to any mechanisms that are not independently available. P and its spell-out options unify the identically distributed but disparately realized behavior of added probes and R-Case. Nothing forces overt spell-out of any probe or Case: Georgian is like Basque in terms of syntax, but it does not spell out the added probe. Richness of morphology may bear on (24). Kashmiri (R-Case) has poor agreement and rich case morphology, while Nishnaabemwin (an added-probe language) lacks case morphology. Interplay between the two may result in an absence of languages that spell out both R-Case and the added probe.

Consider now how desideratum (c), the limitation of P to inverse contexts, can be derived without lookahead from the v-IA Agree step to properties of the EA. The locus of the problem is at step 3 of the direct/inverse derivations in (25) for a probe with P. In these derivations, for a [*u*-3-2-1] probe language, added probes are boxed, the segments of a probe still active at any point in the derivation (not matched on a previous cycle) are boldfaced, and segments that have been previously matched and are thus deactivated are set with overstrikes.

(25) *1→2 (direct)* *2→1 (inverse)*

Step 1: Agree with the IA

1→2 (direct):

v_I	IA
[*u*3]—	[3]
[*u*2]—	[2]
[*u*1]	

2→1 (inverse):

v_I	IA
[*u*3]—	[3]
[*u*2]—	[2]
[*u*1]—	[1]

Step 2: Add the EA, project v to v_{II}, and add a probe on v_{II} following (23)

Step 3: Agree with the EA from v_{II}

1→2 (direct):

v_{II}		EA	v_I	IA
~~[*u*3]~~	**[*u*3]**—	[3]	[*u*3]—	[3]
~~[*u*2]~~	**[*u*2]**—	[2]	[*u*2]—	[2]
[*u*1]—	**[*u*1]**—	[1]	[*u*1]	

2→1 (inverse):

v_{II}		EA	v_I	IA
~~[*u*3]~~	**[*u*3]**—	[3]	[*u*3]—	[3]
~~[*u*2]~~	**[*u*2]**—	[2]	[*u*2]—	[2]
~~[*u*1]~~	**[*u*1]**		[*u*1]—	[1]

At step 3, the inverse context converges without further comment: the core (original) and added probe both Agree. However, when a probe is added in a direct context, there will always be a segment (feature) of the original probe that has not Agreed with the IA and corresponds to a segment on the EA. On our approach, this segment must enter into regular second-cycle Agree with the EA, because there is no intervener and the EA falls into this segment's search space upon projection to v_{II}; this Agree is indicated as a boldface dash. The added probe also Agrees with the EA, since nothing prevents it from doing so. This double Agree by two probes with a single EA segment takes place in all and only direct contexts.

It is here that the problem arises. We propose that the resulting structure crashes because a single phrase-structural locus, v_{II}, ends up having two probes on it that match from it and receive the same value from the EA;[10] two identically valued elements that are not phrase-structurally distinguished stand in no asymmetric relationship that could be used by the mapping to PF to achieve the asymmetry required for the application of spell-out rules, for the establishment of linear order, or indeed (as an anonymous reviewer observes) for distinguishing them as two separate elements in the first place. This problem does not arise if the two identical elements are structurally differentiated by being placed on different projections of v; this can establish their linear order (e.g., under a top-down vocabulary insertion algorithm). The problem also does not arise if there are two distinct symbols on one phrase-structural locus.[11]

In the next two sections, we examine in detail the two derivational strategies used for avoiding PLC violations in inverse contexts.

4.2 *Added Probe*

Mohawk (Iroquoian; Lounsbury 1953, Beatty 1974, Postal 1979, Baker 1996) exemplifies the added-probe phenomenon more clearly than Nishnaabemwin, to which we return presently; see the partial paradigm of the Mohawk transitive singular given in table 7. Control of the core agreement slot in small capitals clearly varies between the IA and the EA as determined with

[10] Multiple Agree with the EA violates the Activity Condition: a ϕ-feature (set) is deactivated upon Agree through Case assignment so that further Agree cannot take place (Chomsky 2000:122–123, 128, Rezac 2003). In an earlier version of this article, we proposed that this condition is violated in the derivations we wish to ban (direct contexts and unaccusatives). However, the condition is problematic for multiple Agree with a single controller, both within a clause (C and T in Dutch dialects; Carstens 2003, Van Koppen 2005), and in cross-clausal agreement (Polinsky and Potsdam 2001, Branigan and MacKenzie 2002, Rezac 2004, Bhatt 2006). We concur with Jonathan Bobaljik (pers. comm.) in having doubts about its status. In an alternative approach where the added probe is on a separate Agr head such as T above the EA (see Nichols 2001:533n19, recalled to our attention by an anonymous reviewer), the Activity Condition could be deployed to limit Agree with the EA to inverse contexts only, when the core probe on v has not Agreed with it. In direct contexts, the high probe would have no goal, violating the Match Requirement (11). Locating the added probe on a separate Agr head from that of the core probe makes the unification with R-Case more difficult. However, fundamentally, cyclic Agree has as large a role to play in this approach as in the one we adopt. See Laka 2000 for a closely related proposal for secondary probes filtered by convergence.

[11] In the 3→3 combination, while v_{II} also has two identically valued probes, the core probe has been valued on v_I and is not modified on v_{II}, so it may be ignored on v_{II} and spelled out from v_I. Not so for the 1→2 combination (see example (25)), where both the core probe and the added probe crucially receive a new value on v_{II}. It is tempting to suppose that there may be a more general ban against the probes in any projections of a head having identical values, and that all languages underlyingly distinguish the ϕ-values of the two arguments in a 3→3 combination, analogously to the proximate/obviative distinction of Algonquian. Such a proposal would require explaining why the phrase-structural difference between v_I and v_{II} does not distinguish two identically valued probes; but it would derive the fact that 1→1 and 2→2 combinations in languages with both EA and IA agreement are typically gaps, as in Basque, deploying strategies such as detransitivization (deletion of one of the valued probes).

Table 7
Transitive singular agreement paradigm for Mohawk (core agreement in small capitals; added probe underlined)

EA→IA	1	2	3
1	—	KU-*see*‡ 1/2-*see* 'I see you.'	K-*see* 1-*see* 'I see him.'
2	(h)s-K-*see* 2-1-*see* 'You see me.'	—	HS-*see* 2-*see* 'You see him.'
3	wa-K-*see* 3.INV-1-*see* 'He sees me.'	(H)S-(w)a-*see* 2-3.INV.*see* 'He sees you.'	hra-wa-*see* > hra-o-*see* 3.M-DFLT-*see* 'It sees him.'

respect to a [*u*-3-2-1] probe, creating the direct/inverse context split. This is the only agreement in a direct context. All and only inverse contexts have an extra agreement slot, underlined: an added probe. Both agreement slots use the same morphology: *k* [3-2-1], *hs* [3-2], *wa* [3] (we return to the allomorph *ku* marked ‡ directly).[12]

The role of the added probe in PLC-licensing the EA becomes clear when we consider the actual derivations. It is exactly in inverse contexts where π-features of the EA would not enter into Agree were it not for the added probe. This is shown in table 8, for any [*u*-3-2-1] language like Mohawk (added probe boxed).

The added probe is a derivational option that depends for its existence on the EA ≤ IA relationship of inverse contexts; it does not occur independently, as passive morphology does for example. In the theory proposed in section 4.1, the probe is inserted on the projection v after the core probe Agrees with the IA, and thus the lower bound of its insertion is the projection v_{II} above the lowest position of v. From its position on v_{II}, the EA is the first goal the added probe encounters; the added probe therefore correctly Agrees with it and does not interact with the IA. Placing the added probe on v_{II} rather than on a higher Agr head localizes it on the same lexical item, v, as the core probe, which permits the added-probe strategy to be unified with the R-Case strategy, which must be determinable at v as it implicates the case assigned by v to the IA (see section 4.3). It also leads to the explanation advanced above for the added probe's limitation to

[12] We illustrate 3→3 combinations in Mohawk with 3rd persons of differing specifications (neuter→masculine) such that EA≤IA, just as in Nishnaabemwin (obviative→proximate; footnote 9). There are also direct 3→3 forms where EA > IA, and these turn out as expected: only the core agreement slot is valued to [3]. Intransitives split according to whether their sole argument controls the same agreement morphology as the IA in the 3→IA transitives or as the EA in the EA→3 transitives, a split that does not correlate with unaccusativity (Baker 1996:212–213). The former class includes the 3rd person added-probe exponent *wa* exactly as if there were a 3rd person EA. This suggests for IA-class intransitives a default EA as in derived-causative analyses of unaccusatives (Davis and Demirdache 2000), perhaps comparable to the *se* of Romance inchoatives like Spanish *abrir se* 'open (inch.)' < *abrir* 'open (trans.)' (Baker 1996:201–202). In the latter class, in our approach, the subject must be base-generated higher than the core π-probe, although the subject's position is not necessarily the same as the position of the transitive EA (cf. Travis 2003).

Table 8
Cyclic Agree and added probe in Mohawk

EA→IA	1	2	3
1	—	EA v IA [3] [*u*3] — [3] [2] [*u*2] — [2] [1] — [*u*1]	EA v IA [3] [*u*3] — [3] [2] — [*u*2] [1] — [*u*1]
2	EA v IA [3]— [*u*3] [*u*3]—[3] [2]— [*u*2] [*u*2]—[2] ~~[*u*1]~~ [*u*1]—[1]	—	EA v IA [3] [*u*3] — [3] [2] — [*u*2] ~~[*u*1]~~
3	EA v IA [3]— [*u*3] [*u*3]—[3] ~~[*u*2]~~ [*u*2]—[2] ~~[*u*1]~~ [*u*1]—[1]	EA v IA [3]— [*u*3] [*u*3]—[3] ~~[*u*2]~~ [*u*2]—[2] ~~[*u*1]~~ ~~[*u*1]~~	EA v IA [3]— [*u*3] [*u*3]—[3] ~~[*u*2]~~ ~~[*u*2]~~ ~~[*u*1]~~ ~~[*u*1]~~

inverse contexts: in direct contexts adding a probe leads to a crash because the core and added probes receive identical values from the EA on the same phrase-structural locus v_{II}, while in inverse contexts the core probe is valued from the IA on v_I and the added probe from the EA on v_{II}.

In the Mohawk paradigm, the ‡-marked 1→2 combination has a portmanteau form *ku* deviating from the expected *k*, but deviating differently from the added probe. Like the inverse contexts, the direct context, 1→2, shows morphological sensitivity to both the EA and the IA, but instead of two prefix slots a single slot with special morphology occurs: *ku* is an allomorph of *k* [3-2-1] and there is no realization of *hs* [3-2]. Our system singles out the 1→2 combination as the only direct context where the two arguments are both [participant]. The use of a special morpheme here will reappear in Nishnaabemwin. In restricting portmanteaus to a particular agreement configuration, Mohawk and Algonquian differ from languages such as Cherokee and Kiowa, where portmanteaus occur throughout the paradigm. It is striking that this ϕ-feature configuration is precisely the one where a single probe Agrees successively with two arguments that are both [participant], and we posit that the recurrence of portmanteau morphology here reflects this fact. Portmanteau morphology arises when features of more than one syntactic terminal are spelled out by a single vocabulary item. Two paths that can lead to portmanteaus are (a) the occurrence of two ϕ-feature sets on a single spell-out terminal (position of exponence), bundled in the syntax or by morphological operations like merger and fusion (Halle and Marantz 1993, Bonet 1995, Embick and Noyer 2001, Harbour 2003), and (b) contextual allomorphy, whereby a morpheme is the primary exponent of one element and a secondary exponent of another (Noyer 1997, Bobaljik 2000). In 1→2 direct contexts, a single probe is valued on two projections of v: on the lower v_I

by the IA and on the higher v_{II} by the EA. This seems like a natural environment for contextual allomorphy or fusion/merger. Under the allomorphy analysis, the contexts for insertion of *k* versus *ku* are as shown in (26). Plausibly, one could say that Mohawk and Algonquian restrict portmanteaus to [participant] direct contexts rather than to direct contexts in general because the former are more marked, though it remains to be determined whether Universal Grammar actually disallows insertion rules differentiating the context $[3\ (\ldots)]_v$ from the context $[(\ldots)]_v$.

(26) a. k ↔ [3-2-1] / [____ $]_v$
b. ku ↔ $[3\text{-}2\text{-}1]_v$ / [____ $]_v$ $[3\text{-}2]_v$

The crosslinguistic recurrence of portmanteau morphology in [participant] direct contexts is notable given that contextual allomorphy is generally unforced. We leave to future research why it seems prevalent or even forced here. Intuitively, one might expect this to relate to v_{II}'s being a reprojection of v_I. Since they are copies of the same item distinguished only by differently valued versions of the same probe, it may be that the morphology must somehow reconcile their inconsistent feature structures, recalling the morphological resolution of case conflict via syncretism (McCreight 1988). See further Béjar 2004.

Mohawk shows clearly the correlation between added-agreement morphology and the independently characterized inverse contexts. The added probe is responsible for PLC-licensing of the EA, which is required precisely there. [*u*-3-2] probe languages like Basque can also signal inverse contexts morphologically, indicating the added probe. Besides the underlined agreement slot in the Basque PH-driven agreement displacement illustrated in (2), there is extra agreement morphology *in(d)* that has not been discussed. An example comes from the dialect of Bolívar (Bizkaian; Yrizar 1992:502); see table 9. The core agreement prefix (in small capitals) is controlled by the EA in direct contexts (clear) and by the IA in inverse contexts (shaded), as determined

Table 9
Added probe in Bizkaian Basque (core agreement in small capitals; added probe underlined)

EA→IA	1	2	1.PL	3
1	—	S-iñdd-u-te-n 2.SG-INV-*have*-1.SG-PAST 'I had you.'	—	N-eb-en 1.SG-*have*-PAST 'I had him.'
2	N-iñdd-u-su-n 1.SG-INV-*have*-2.SG-PAST 'You had me.'	—	G-iñdd-u-su-n 1.PL-INV-*have*-2.SG-PAST 'You had us.'	S-eb-en 2.SG-*have*-PAST 'You had him.'
1.PL	—	S-iñdd-u-gu-n 2.SG-INV-*have*-1.PL-PAST 'We had you.'	—	G-eb-en 1.PL-*have*-PAST 'We had him.'
3	N-iñdd-u-en 1.SG-INV-*have*-PAST 'He had me.'	S-iñdd-u-en 2.SG-INV-*have*-PAST 'He had you.'	G-iñdd-u-en 1.PL-INV-*have*-PAST 'He had us.'	eb-en *have*-PAST 'He had him.'

by the [*u*-3-2] probe of Basque. In our system, the underlined morphology reflects the added probe (Gómez (1994:109) also relates it to the Algonquian theme marker, as we do below).[13]

The characteristic probe determines when the added probe shows up. It appears in Basque in the 1→2 context because there 1→2 is an inverse context with respect to a [*u*-3-2] probe (and the IA controls core agreement), but not in Mohawk because there 1→2 is a direct context with respect to a [*u*-3-2-1] probe (and the EA controls core agreement). We end up with a strong relationship between the cyclic Agree account for core agreement, which determines when IA > EA agreement displacement occurs and when it does not, and the distribution of the added probe, which shows up exactly when there is no displacement: in inverse contexts.

Nishnaabemwin strikingly illustrates the range of possible variation with respect to the spell-out of an added probe. So far, we have discussed the core agreement slot, realized as the prefix (in small capitals) in table 4. We focus now on the suffix position closest to the root, known as the *theme suffix* (underlined in table 4). In our analysis, this position realizes the second projection of v, and it is here that the added probe in Algonquian is spelled out. We suggest that the prefixal agreement and the theme suffix are fundamentally different kinds of morphemes. Instructions to PF for spelling out the prefix have a ''mobile'' source, originating either on v_I or on v_{II} depending on whether the probe was deactivated on the first or second cycle. Thus, the prefix does not have a structural locus as the spell-out of a particular syntactic head. Empirically, it seems to be always the case that the partial agreement on v_I in direct environments does not receive a dedicated exponent (none or a portmanteau, as discussed for Mohawk), suggesting that vocabulary insertion only discharges valued features of a probe *on the projection where the probe is deactivated*, be that v_I or v_{II} (Béjar 2003, 2004).

On the other hand, spell-out of the theme suffix is obligatory for transitive verbs in Algonquian across the direct/inverse split, and we propose that it is the systematic spell-out of a specific syntactic terminal, v_{II}. This distinction between spelling out ϕ-features and spelling out a head is one that is independently motivated on empirical grounds. In an extensive typological study of verbal morphology, Julien (2002) observes striking crosslinguistic generalizations correlating the syntactic and linear positions of functional heads, but finds that no such generalizations are possible about agreement morphology. This indicates that the spell-out of agreement typically does not discharge (in Noyer's (1997) sense) a head, but merely the ϕ-features on a head (compare Distributed Morphology's *fission* operation); discharge of the head is potentially distinct.

Despite being fundamentally distinct, spell-out of the v_{II} head interacts with spell-out of the core probe in crucial ways. If we suppose (without further justification) that the core probe is discharged before v_{II}, there may or may not be ϕ-features on v_{II} when it comes to spelling out

[13] The realization of this ''theme marker'' varies across the Basque dialects; it is analyzed in Rezac 2006, along with the other aspects of Basque agreement mentioned here. The relevance lies not in the presence of morphology between the prefix and the root (following a sustainable traditional analysis, *e* in *eb* in table 9 is a theme marker), but in the properties to which it is sensitive and their delimitation. These are the direct/inverse split, as predicted; the number feature of the EA in inverse contexts, which our system models and properly restricts to the inverse if the added probe includes number; and the possibility of cyclic expansion (''ergative displacement''), which is restricted to the nonpresent (cf. Algonquian; footnote 9). This can be modeled in various ways—for example, by positing that [present] T selects v with a flat probe. The remaining agreement morphology on the right periphery results from agreement or cliticization targeting a higher Agr head such as T.

of v_{II} itself. In direct contexts, v_{II} is the locus of a probe by virtue of second-cycle agreement. In inverse contexts, v_{II} hosts the added probe. Direct and inverse derivations are given in (27), with the corresponding theme markers in boldface capital letters. Shading indicates where the core probe is discharged. For each derivation, the remnant on v_{II} after vocabulary insertion of the agreement morphology for the core probe is indicated in the unshaded box. With this in place, generalizations about the form of the theme suffix start to emerge. The default *-aa* surfaces whenever v_{II} hosts the core probe, discharged prior to v_{II} itself, leaving a bare head to be spelled out. (27c) is an exception, marked ‡ in the paradigm in table 4, but this we have already discussed; it falls into the class of portmanteau morphology in [participant] direct contexts (Nishnaabemwin 2→1) and, like the Mohawk case, we take it to reduce to allomorphy of the core probe in the context of a [participant] valuation of the same probe on v_I. In inverse contexts, the core probe is discharged on v_I. The added probe on v_{II} (boldfaced in (27a′–c′)) and the v_{II} position itself are then discharged jointly, so the valuation of the added probe affects the form of the theme marker: v_{II} is realized as *-igw* when it has an undischarged [*u*-3] probe, and as *-in* when it has an undischarged [*u*-3-1] probe. Thus, in inverse contexts the theme spells out the added probe.

(27) *Direct contexts*

	v_{II}	EA	v_I	IA		
a.	v_{II}	EA	v_I	IA	*1→3=1*	
	([*u*3])	[3]	[*u*3]—[3]		***AA***	
	[*u*1]—[1]		[*u*1]			
	~~[*u*2]~~		[*u*2]			
b.	v_{II}	EA	v_I	IA	*2→3=2*	
	([*u*3])	[3]	[*u*3]—[3]		***AA***	
	[*u*1]—[1]		[*u*1]			
	[*u*2]—[2]		[*u*2]			
c.	v_{II}	EA	v_I	IA	*2→1=2*	
	([*u*3])	[3]	[*u*3]—[3]		***I***	
	([*u*1])	[1]	[*u*1]—[1]			
	[*u*2]—[2]		[*u*2]			

Inverse contexts

	v_{II}	EA	v_I	IA		
a.′	v_{II}	EA	v_I	IA	*3→1=1*	
	[***u*3**]—[3]		[*u*3]—[3]		***IGW***	
			[*u*1]—[1]			
			~~[*u*2]~~			
b.′	v_{II}	EA	v_I	IA	*3→2=2*	
	[***u*3**]—[3]		[*u*3]—[3]		***IGW***	
			[*u*1]—[1]			
			[*u*2]—[2]			
c.′	v_{II}	EA	v_I	IA	*1→2=2*	
	[***u*3**]—[3]		[*u*3]—[3]		***IN***	
	[***u*1**]—[1]		[*u*1]—[1]			
			[*u*2]—[2]			

We have shown three examples of languages with added probes. The morphology of the phenomenon varies considerably but is bounded in all cases by derivational properties imposed by cyclic Agree. In the three languages, the added probe is a derivational strategy that appears only in inverse contexts, characterized by cyclic Agree, and that avoids violating the PLC by Agreeing with the EA. We have proposed that this added probe appears on the projection v_{II} from which the second cycle of the core probe takes place in direct contexts, and we have formulated the property that permits the probe to be added and explains why it appears in inverse contexts only.

It is worth briefly comparing the added-probe proposal with an alternative: both the EA and the IA control separate probes—say, on T and v—whose exponents can refer to them individually or as fused to yield portmanteau morphology (e.g., Bruening 2001:117ff. for Passamaquoddy (Algonquian)). This kind of bird's-eye view misses the generalizations about the distribution of EA/IA control of agreement that our approach seeks to address. To take the core examples that belie the fusional view of EA/IA control: (a) Only the EA or the IA controls the core agreement slot, following the direct/inverse split. (b) The added-probe slot is limited to inverse contexts (clearly in Mohawk and Basque) and controlled only by the EA (clearly in Mohawk, which qualitatively differentiates allomorphy in the 1→2 *ku* combination from the added probe; the complexity of the Algonquian theme obscures the added-probe/allomorphy distinction on the surface). These generalizations follow from our approach. The next section contributes to this point by finding an identical direct/inverse split in a different domain, Case assignment, and showing how it follows from the same underlying system.

4.3 R-Case

In Kashmiri, inverse contexts are special because the IA receives a superficially oblique Case, distinct from the Case it receives in direct contexts; furthermore, it does not control the π-probe as cyclic Agree suggests. We call the special Case the *R-Case*. Like the added probe, R-Case assignment is a derivational strategy limited to inverse contexts, and as such it cannot be inherent. We will propose that R-Case is assigned by a probe as a reflex of Agree with the IA if the probe has the morphological property P, the same property that adds a probe, which converges only in inverse contexts (section 4.1).

Kashmiri (Indo-European; Wali and Koul 1997) has a nominative-accusative system in the present and an ergative-nominative system in the past. Table 10 gives the Cases of the core arguments, with the argument that controls core agreement underlined; the core agreement slot is also underlined in the following examples. Besides the core agreement slot tracking the underlined argument, there are two clitic-doubling series, one for the ergative subject and the unmarked object, glossed E/A, and one for the agreeing nominative subject, glossed N; there is also an independent dative clitic series, glossed D.

The ergative occurs on EAs in the past/perfective, and it behaves like an inherent Case in Kashmiri (Mahajan 1989, Nash 1996, Woolford 1997, 2006, Nichols 2001): it does not interfere with assignment of the nominative (the unmarked case tracked by the N-clitic series) or with core

Table 10
Kashmiri Case/agreement system

	EA	IA	Dative
Present/Future	<u>Unmarked</u>, N-clitic	Unmarked, E/A-clitic	Dative, D-clitic
Past/Perfective	Ergative, E/A-clitic	<u>Unmarked</u>, N-clitic	Dative, D-clitic

agreement (tracking the nominative). Similarly, there is also a dative that has fully inherent properties; for example, it is assigned to the goal argument of ditransitives, and, crucially, it is retained under passivization.

(28) *Kashmiri*
mohnas a:yi̲ kəmi:z aslamni zəriyi dinɨ
Mohan.M-D pass.F.SG shirt.F Aslam.M by give
'Mohan was given the shirt by Aslam.'
(Wali and Koul 1997:154)

Table 10 omits the fact that there is a case morphologically identical to the dative that is borne by the IA of transitives in the present tense in all and only inverse contexts, as determined with respect to a [*u*-3-2-1] probe.

(29) *Kashmiri*
a. bɨ chu̲-s-ath tsɨ parɨna:va:n *1→2*, *direct*
I.N be.M.SG-1.SG.N-2.SG.E/A you.N teaching
'I am teaching you.'
b. tsɨ chu̲-kh me parɨna:va:n *2→1*, *inverse*
you.N be.M.SG-2.SG.N me.D teaching
'You are teaching me.'
(Wali and Koul 1997:155)

This is the R-Case. It is tied to the person interaction of the EA→IA combination rather than to a θ-role. Therefore, it disappears under passivization, when the inverse context is removed. (30a) shows this, in the context of an independent inherent dative; and (30b) shows that R-Case dative disappears in passives, unlike the inherent dative in (28).

(30) *Kashmiri*
a. su kari-y tse me hava:lɨ *3→2*, *inverse*
he.N do.FUT-2.SG.D you.D me.D handover
'He will hand you over to me.'
b. tsɨ yi-kh me hava:lɨ karnɨ təm'sɨndi dəs'
you.N come.FUT-2.SG.N me.D handover do.INF.ABL he.GEN by
'You will be handed over to me by him.'
(Wali and Koul 1997:208)

Only EAs and IAs with structural Case count for establishing an inverse context, as in (29) and (31a). Neither the dative in (30a) nor the ergative in (31b) counts, as expected of inherent Cases inaccessible to ϕ-Agree (Nichols 2001); and the IA is nominative.

(31) *Kashmiri*
a. tsɨ vuch-a̲-kh me *2→1 present*, *inverse*
you.N see-2.SG-2.SG.N me.D
'You will see me.'

Table 11
Kashmiri person hierarchy effect

EA→IA	1	2	3
1		1/Ø	1/Ø
2	2/D		2/Ø
3	3/D	3/D	3/D

b. tse vuch-u-th-as bɨ *2→1 past, direct*
you.E saw-M.SG-2.SG.E-1.SG.N me.N
'You saw me.'
(Wali and Koul 1997:156)

In both direct and inverse configurations, the sole agreement slot of Kashmiri tracks the EA. We model this by having this agreement spell out the core probe (see the discussion of Nishnaabemwin in section 4.2). Thus, the pattern in table 11 emerges, where the numeral to the left of / reflects the π-value of core agreement (always the EA), and the letter or symbol to the right reflects the Case assigned to the IA: Ø in direct contexts, R-Case in inverse ones.

The Kashmiri pattern is important for two reasons. First, it employs the direct/inverse patterning determined by cyclic Agree. Second, it uses a novel strategy to avoid PLC violations, which is intuitively consistent with the PLC: somehow the EA ends up controlling overt agreement where it should not and in turn the IA fails to control overt agreement, and this is coextensive with R-Case assignment to the IA.

The limitation of R-Case to inverse contexts, defined by the configuration of π-features on the EA and the IA, means that R-Case is radically different from homophonous inherent Case. True inherent Case on a DP is introduced at base-generation, is not sensitive to the π-specification of any other DP, and remains under passivization. The sensitivity of R-Case to the interaction of EA and IA agreement features suggests that R-Case is Agree-related, structural Case. The task, then, is to account for its morphological differentiation from normal IA structural Case and for the limitation to inverse contexts that gives it a last-resort, global-economy flavor (cf. Nichols 2001:529n14): it is assigned to the IA only if the EA is not more highly specified, so the core probe of v will not reach it. We have proposed that R-Case is assigned when the probe on v has a property P whose consequences are illegitimate in direct contexts. Since the identity of assigned Case is determined by the identity of the probe, R-Case can be different from the Case assigned by v without P (Kashmiri ''nominative''). This difference is simply not used in Basque, which has case morphology, and Mohawk, which does not. The consequence of P is the addition of a probe to Agree with the EA, licensing it for the PLC. In spelling out the consequences, Kashmiri differs from Mohawk in always spelling out only the highest π-probe of v and in having a special morphology for R-Case distinct from the morphology for regular v-assigned Case. These parametric spell-out choices are encoded in (24).

There exist striking parallels to the R-Case phenomenon beyond PH phenomena, if one views R-Case as the assignment of an atypical structural Case to a DP by a probe [*u*F] when [*u*F] ''needs,'' for convergence, to Agree with another DP. We do not explore these parallels here for reasons of space, but we refer the reader to an earlier version of this article, Béjar and Rezac 2007, for explicit application of the above mechanism to two cases: 2–3 Retreat in K'ekchi' (Mayan; Berinstein 1985, 1990; cf. Davies and Sam-Colop 1990, Hale 2001), whereby an IA receives structural dative rather than absolutive just in case the EA needs the absolutive for Ā-extraction; and Bobaljik and Branigan's (2006) proposals whereby the ergative in Chukchi and the causee dative in French are dependent on a probe's regular Case assignment (absolutive and accusative, respectively) to another DP. These examples suggest a pattern in which an Agree relation between a ϕ-probe and a DP can, because of some property P of the ϕ-probe, allow the probe to Agree with a different DP; for further discussion, see Rezac 2007.

Returning to R-Case in Kashmiri, we have proposed to unite the R-Case strategy there with the added-probe strategy because both are derivational strategies coextensive with inverse contexts. R-Case suggests that choice of the strategy occurs at the point where the core probe Agrees with the IA—therefore, at v_1 before the EA is added. We have thus analyzed both as the reflex of a single underlying mechanism: the presence of property P on v and the resulting addition of a probe (23), spelled out in different ways depending on the morphological properties (24) of a language. The theory of cyclic Agree is crucial in characterizing the class of inverse contexts where these strategies occur, and the Person-Licensing Condition, perhaps a statement of the Case Filter, identifies what goes wrong there and the nature of the repair strategies.[14]

5 Conclusion

We have displayed a pattern of PH-driven agreement displacement and argued that it follows from simple assumptions about the mechanics of syntactic derivation, (32a–b), combined with an independently motivated understanding of ϕ-features, (32c).

(32) a. Feature-relativized intervener-based locality
b. A fine-grained approach to cyclicity, giving each operation its own cycle
c. A decomposition of ϕ-features that associates with each π-value a different feature structure and thus a different locality class

Once the core π-probe of a language is placed between the EA and the IA, PH-driven agreement displacement patterns emerge from this system.

[14] Other inverse-only derivational mechanisms may exist. The Tanoan languages (e.g., Southern Tiwa, hierarchy 1/2 > 3; Allen and Frantz 1983) have agreement with the EA and the IA in direct contexts, have intransitive-like agreement with the IA alone in inverse contexts, put the EA in an instrumental-like PP, and add special inverse voice morphology. This strategy occurs in all and only inverse contexts and is thus derivational, and we would like to see in it another reflex of the added-probe mechanism: the inverse morphology reflects a v with an added probe, and the EA PP arises perhaps through selection by this v. In a different direction, in a flat-probe language the core probe will never Agree with the EA, so this type of language always needs an added probe or a separate higher probe for the EA (all transitives are inverse contexts). This raises the interesting possibility that what is normally taken as the π-probe of T in languages like English is in fact due to P, with the accusative as R-Case.

(33) a. Partial agreement sensitive to specifications of the goal arises from interaction between the articulation of the characteristic probe (giving PH sensitivity: a [*u*-3] probe has no sensitivity, a [*u*-3-2] probe distinguishes 1st/2nd person from 3rd person, and a [*u*-3-2-1] probe distinguishes all persons) and π-specification of the goal.

b. The agreement displacement pattern, going from the IA (preferred) to the EA, follows from cyclic expansion, determined by a bottom-up derivational mechanism whereby the EA is added later than the IA.

c. The same prioritization of the IA characterizes a natural class of computations where the EA does not Agree with the core probe (i.e., the inverse contexts), which map into an empirically distinguished class. The Person-Licensing Condition identifies these derivations as those where the EA is not licensed as such, and correspondingly identifies the nature of the repair strategies.

These results support a syntactic treatment of a class of PH effects: they result from the way featural syntactic dependencies are formed in a cyclic derivation.

We conclude by noting that the syntactic approach to PH effects based on Agree is fully compatible with possible syntactic displacement correlates of PH effects, though it correctly does not require them (section 2). In some Algonquian varieties, syntactic phenomena single out the EA of direct contexts and the IA of inverse contexts; moreover, they do so only in clause types where agreement morphology shows the direct/inverse contrast (see Rhodes 1994 on Ojibwa independent vs. conjunct orders). If these syntactic phenomena rely on a designated clausal position, it is occupied by the EA in direct contexts and by the IA in inverse ones (cf. Bruening 2001 for Passamaquoddy). Our Agree-based system can readily model this correlation of positions and Agree controllers given an analysis of movement as Agree followed by (internal) Merge of the goal of Agree (Chomsky 2000, 2005). In direct contexts, the EA controls core agreement, while in inverse contexts the IA does, leading to Merge of the one or the other depending on which ends up controlling the core probe. The only mechanism required is linking of the trigger of movement (e.g., the EPP/OCC feature) to core probe valuation.

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