ARGUING AGAINST OBLIGATORY FEATURE INHERITANCE:

EVIDENCE FROM FRENCH TRANSITIVE PARTICIPLE AGREEMENT

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1. Introduction

Chomsky (2005) and Richards (2007) argue that the uninterpretable case/agreement features carried by T and V originate on the phase head which selects them (viz. C and *v* respectively). This claim gains empirical support from the phenomenon of *complementiser agreement* (See Rizzi 1990, Haegeman 2002, Boeckx 2003, Carstens 2003, Kornfilt 2004, Miyagawa 2005), which can be illustrated by the following data from West Flemish, showing that 'the complementiser of the finite clause agrees in person and number with the grammatical subject of the sentence it introduces' (Haegeman 1992, p. 47):

(1) a.   Kpeinzen *dank* **ik** morgen goan

   I.think that$_{1.Sg}$ I tomorrow go ('I think that I'll go tomorrow)
   b.   Kpeinzen *daj* **gie** morgen goat
   I.think that$_{2.Sg}$ (you) tomorrow go ('I think that you will go tomorrow')
   c.   Kpeinzen *dan* **Valère en Pol** morgen goan
   I.think that$_{3.Pl}$ Valère and Pol tomorrow go ('I think that Valere
   and Paul will go tomorrow')

In these examples, the (italicised) complementiser overtly inflects for agreement in person and number with the (bold-printed) subject of its clause, lending plausibility to the claim that C is the locus of the agreement features on T[1].

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[1] As pointed out by Radford (in press), the claim that the agreement features carried by T are inherited from C is potentially problematic for defective T (T$_{def}$) which Chomsky (2005) takes to carry person but not to be selected by C.

The claim that C is the locus of the case assigned to subjects is argued for in Radford and Vincent (2007) and Radford (in press) on the basis of sentences such as (2) where the difference in the case of the italicised subjects in the two bracketed infinitive clauses would appear to correlate with the (accusative or nominative) case-assigning properties of the underlined complementisers heading the relevant CP phases.

(2) a. [For *me* to stand as a candidate in the elections] would require a lot of money
    b. [Para *yo* presentarme a las elecciones] sería necesario mucho dinero
       For I present.myself at the elections would.be necessary much money
       'For me (literally: 'I') to stand as a candidate in the elections
       would require a lot of money (Mensching 2000: 7)

A further conclusion suggested by the contrast in (2) is that the case assigned by a particular complementiser is a lexical property of the complementiser. More generally, we can suppose that each phase head carries a case assignment feature which determines what case it assigns to its goal.

A key additional claim made by Chomsky and Richards is that uninterpretable case/agreement features on a phase head obligatorily percolate down from the phase head onto the selected head (e.g. from C onto T, and from *v* onto V) in order to ensure that they are deleted as part of Transfer, since only the domain of a phase head undergoes Transfer at the end of a phase: let us call this the *Percolation Hypothesis*. If percolation did not take place, the relevant uninterpretable features would fail to be deleted on the next phase by virtue of having already been assigned a value (e.g. via agreement) and thereby having become indistinguishable from interpretable features.

In this article, we accept the view that the relevant type of case/agreement features originate on phase heads, but argue against a strong view of the Percolation Hypothesis on which uninterpretable features *obligatorily* percolate down from a phase head onto a selected head: on the contrary, we maintain that there are structures in which uninterpretable case/agreement features remain on the phase head throughout the derivation. The main empirical evidence we adduce in support of our claim comes from a novel analysis of *French past participle agreement* which builds on earlier work by Radford and Vincent (2007) and Vincent (2007). In section 2, we briefly characterise French past participle agreement, and outline the key assumptions which our analysis makes. We show how our analysis handles past participle agreement with a local direct object in section 3, and go on to show how it correctly specifies when (and why) agreement can take place with the subject of an embedded infinitive complement in section 4. In section 5, we present further empirical evidence against the *Percolation Hypothesis* from a range of independent phenomena, and highlight some theoretical inadequacies of the hypothesis, as well

as reconsidering the motivation for feature percolation. Finally, in section 6 we summarize our overall conclusions.

2. A brief overview of French past participle agreement

In French transitive clauses containing the auxiliary *avoir*$_{\text{have}}$ and a complement headed by a past participle, the participle (in **bold**) optionally agrees in number and gender with an (underlined) preceding specific local direct object in structures like (3) below, so that the participle can either be spelled out with the same number/gender properties as the object, or be spelled out in the default/Def (masculine singular) form:

(3)   <u>Quelles femmes</u> a-t-il a **mis/mises** en prison?
         Which women$_{\text{F.Pl}}$ has-he put.$_{\text{Def}}$/put$_{\text{F.Pl}}$ in prison
         'Which women did he put in prison?'

However, there are a number of conditions which govern participial agreement in structures with *avoir*$_{\text{have}}$. For instance, a participle can only agree with a *preceding* direct object (as in (3) above), and not with a following (e.g. in situ) object like that underlined in (4) or with a preceding non-specific object as in (5)[2]:

(4)   Il a **mis/*mises** <u>ces femmes</u> en prison
         He has put$_{\text{Def}}$/*put$_{\text{F.Pl}}$ these$_{\text{Pl}}$ women$_{\text{F.Pl}}$ in prison
         'He put these women in prison'

(5)   Des femmes pareilles, il <u>en</u> a souvent **mis/*mises** en prison
         Some$_{\text{Pl}}$ women$_{\text{F.Pl}}$ similar$_{\text{F.Pl}}$, he some has often put$_{\text{Def}}$/*put$_{\text{F.Pl}}$ in prison
         'Similar women, he has often put in prison'

A participle can also agree with a subject extracted out of an embedded infinitive complement in a structure such as (6) below:

(6)   <u>Quelles femmes</u> a-t-il **jugé/jugées** être complices?
         Which$_{\text{F.Pl}}$ women$_{\text{F.Pl}}$ has-he judged$_{\text{Def}}$/*judged$_{\text{F.Pl}}$ be accomplices?
         'Which women did he judge to be accomplices?'

However, while participle agreement is possible with a matrix verb like *juger*$_{\text{judge}}$, it is not possible with a matrix verb like *dire*$_{\text{say}}$, as we see from:

(7)   <u>Quelles femmes</u> a-t-il **dit/*dites** être complices?
         Which$_{\text{F.Pl}}$ women$_{\text{F.Pl}}$ has he said$_{\text{Def}}$/*said$_{\text{F.Pl}}$ be accomplices?
         'Which women did he claim to be accomplices?'

A key assumption which we will make in order to account for the agreement patterns illustrated in (2-7) above is that an item only carries a given feature if the

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[2] See Obenauer (1994), Richards (1997), and Déprez (1998) for relevant discussion.

latter is *detectable*, in the sense that it has an overt reflex on X or on some Y agreeing with X (**Detectability Criterion**)[3]. In other words, when a participle does not inflect for number and gender, we assume that it carries no such features. This assumption is at odds with Chomsky (2000, 2005) for whom case assignment is a reflex of Agree whether the agreement features of the case assigner are detectable or not. In other words, for Chomsky, the transitive participle *mis* 'put' assigns accusative case to the object *quelles femmes* 'which women' in (3) via agreement even when the agreement features of the participle are not detectable. However, the claim that agreement is a necessary correlate of case assignment has been argued against by authors such as Iatridou (1993) who maintains that in Modern Greek, it is tense, not agreement, which is responsible for nominative case assignment[4]. In a similar spirit, Radford and Vincent (2007) and Vincent (2007) have proposed that accusative case is assigned to a (pro)nominal expression by an accusative-case-assigning feature on *v* (see also Chomsky 1995, Radford 1997 and Adger 2003) which *v* may only carry if it has a thematic external argument.

In order to account for the correlation between agreement, movement and specificity, we propose the following. We follow Chomsky (2005) in assuming that movement to the edge of a phase is driven by an edge feature (EF) on the phase head. However, unlike Chomsky who argues that EF is always unselective and can attract any kind of expression to the edge of a phase, we propose instead that EF can be specified for a value. More specifically, we propose that an interrogative wh-expression is attracted to the edge of a phase by an uninterpretable [*wh-edge*] feature on the phase head[5], and that a specific (i.e. definite/D-linked/topicalised) expression is attracted to the edge of a phase by an uninterpretable feature [*sp$_{(ecific)}$-edge*] feature on the phase head. The uninterpretable edge feature is deleted via movement of a

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[3] For present purposes, we take a feature to be detectable if it has a phonetic or orthographic reflex. Thus, the feminine plural participle *jugées* 'judged$_{F.Pl}$' has detectable gender and number features by virtue of carrying the orthographic feminine gender and plural number suffixes *-e* and *-s* respectively, although these do not normally receive a phonetic spell-out.

[4] Case and agreement have also been argued to be dissociated in Ancient Hebrew (Mensching 2000), Bantu (Carstens 2001; Henderson 2006), and Lithuanian (Franks and Lavine 2006).

[5] An alternative possibility (not pursued here) is that movement to the edge of a phase can either be selective or unselective, and that movement of a specific expression to the edge of a phase is driven by a selective edge feature [*sp-edge*] working in conjunction with agreement, while unselective movement of any wh-constituent α to the edge of a phase is driven by an unselective edge feature [*α-edge*] without agreement. There could then be parallels with EPP, which can either be a selective feature driving movement of a specific expression to the edge of TP (and working in conjunction with agreement), or unselective (and working without agreement) in e.g. locative inversion structures like 'He could see that [*out of a tiny hole in the ground* had emerged an army of red ants].'

matching expression to the edge of the phase. We further assume that *v* can carry an accusative case feature if it has a thematic external argument, and that if *v* has accusative case and [*sp-edge*] features, it will also carry a set of (number and gender) agreement features. The fact that number and gender features are obligatorily present when *v* carries [*sp-edge*] and case features ensures that these last two features have an overt morphophonological exponent, since specificity and case are not directly spelled out on *v*. A further (standard) assumption we make is that when (person, number, or gender) agreement features probe, they can only 'see' a constituent in an A-position, not one in an A-bar position. Finally, we assume that case/agreement features on a phase head H remain on H if they locate an accessible goal within the immediate domain of H, but otherwise percolate down onto the head selected by H.

We summarize our overall assumptions in (8) below:

(8)   In a transitive *v*P headed by a past participle serving as the   complement of *avoir*have

        (i)   The lexical verb originates in V and subsequently raises to adjoin to a participial light verb *v*, so ensuring that the verb is spelled out in a participial form.

        (ii)   *v* can carry an edge feature/EF, which may be valued either as [*wh-edge*] or [*sp-edge*]. If *v* has a [*sp-edge*] feature, it attracts a specific (i.e. definite/D-linked/topicalised) goal to move to the edge of *v*P; if *v* has a [*wh-edge*] feature, it attracts an interrogative wh-expression (whether specific or non-specific) to move to the edge of *v*P

        (iii)   If *v* has a thematic external argument, *v* can carry a structural (accusative) case feature which enables it to value an unvalued case feature on a goal as accusative.

        (iv)   If *v* has accusative case and [*sp-edge*] features, it also carries a set of (number and gender) concord/agreement features.

        (v)   A-agreement features (= person-/number-/gender-agreement features) can only 'see' a goal in an A-position (i.e. in a thematic argument position, or in the specifier position of an A-head like T: *Visibility Condition*)

        (vi)   A phase head H retains its case/agreement features just in case it locates a visible goal within its immediate domain (i.e. a goal which is within the domain of H, but not within the domain of any head c-commanded by H), but otherwise the case/agreement features of H percolate down onto the head of its complement (*Percolation Condition*)

In the context of the key theoretical question addressed here of whether phase heads obligatorily pass on their uninterpretable case/agreement features to the head of the complement they select, it should be noted that (8vi) posits that case/agreement features in French past participle structures remain on the phase head if they are able to locate a goal in their immediate domain. In the next two sections, we show how these assumptions help us provide a principled account of past participle agreement with direct objects and embedded subjects.

3. Past participle agreement with a direct object

The first example which illustrates that the uninterpretable agreement features carried by a phase head must sometimes remain on the phase head is (3) repeated in (9) below:

(9)   Quelles femmes il a **mis/mises** en prison?
        Which women$_{F.Pl}$ he has put.$_{Def}$/put$_{F.Pl}$ in prison
        'Which women did he put in prison?'

Consider first the derivation of the agreeing structure in (9) and assume that we have reached the stage of derivation represented by the simplified structure shown below[6] (where uninterpretable features are italicised, and interpretable features are in non-italic print):

(10)   [$_{vP}$ il$_{he}$ [$_v$ ∅] [$_{VP}$ [$_{QP}$ quelles$_{which}$ femmes$_{women}$] [$_V$ mis$_{put}$] en$_{in}$ prison]]
        [*sp-edge*]   [3-Per]
          [*u-Num*]   [Pl-Num]
          [*u-Gen*]   [F-Gen]
        [*Acc-Case*]   [*u-Case*]

The order of merger of the arguments here is in accordance with the *Merger Hypothesis* of Radford (in press), which specifies that nominal arguments are the last internal arguments to be merged with V, and hence occupy the highest position within VP.

In (10), the light verb (by hypothesis) has a [*sp-edge*] feature in conformity with (8ii). Since it has a thematic external argument, the light verb can also carry an accusative case feature in accordance with (8iii), and if so will also carry uninterpretable number and gender features via (8iv), and these will look for a goal with matching valued features in order to value and delete them. When *v* probes in (10), it can 'see' the QP goal on the edge of VP in accordance with (8v), since QP is

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[6] In order to avoid visual clutter, we simplify structures throughout by showing only uninterpretable features and the corresponding interpretable features which serve to value them. This means, inter alia, that we do not show the interpretable features marking QP as interrogative (or otherwise) and as specific (or otherwise).

in an A-position (by virtue of being in a thematic argument position): let us suppose that QP (as used here) is specific and interrogative in interpretation, albeit these features of QP are not shown in the simplified structural representation in (10). Since *v* locates a suitable goal within its own immediate domain, it retains its case/agreement features via (8vi), and these do not percolate down onto V. Accordingly, *v* assigns accusative case to the QP and the case features of both *v* and of the QP get deleted. The number and gender features of the QP value those of *v* as feminine plural and delete them. In addition, the [*sp-edge*] feature of *v* gets deleted by attracting the specific QP *quelles femmes* 'which women' to spec-*v*, ultimately deriving the structure in (11):

(11)   [$_{vP}$ [$_{QP}$ qu.$_{which}$ fe.$_{women}$]   il$_{he}$ [$_v$ ø]   [$_{VP}$ [$_{QP}$ t] [$_V$ mis$_{put}$] en prison]]
         [3-Per]   [*sp-edge*]
          [Pl-Num]   [*Pl.Num*]
         [F-Gen]   [*F.Gen*]
         [*Acc-Case*]   [*Acc-Case*]

The derivation proceeds by merging the T auxiliary *avoir* 'have' and subsequently a null C complementiser carrying an uninterpretable [*wh-edge*] feature as in (12) (where we omit the features carried by the QP and *v* whose uninterpretable features have all been deleted)[7]:

(12) [$_{CP}$ [$_C$ ø]   [$_{TP}$ [$_T$ avoir$_{have}$] [$_{vP}$ [$_{QP}$ qu.fe.] il$_{he}$ [$_v$ mis] en pr]]
      [*wh-edge*]   [Past-Tns]   [M-Gen]
             [*u-Pers*]   [3-Pers]
             [*u-Num*]   [Sg-Num]
             [*Nom-Case*]   [*u-Case*]
                 [EPP]

Given the *Visibility Condition* (8v), the T-probe will not be able to 'see' the QP *quelles femmes* (because this is in an A-bar position), but will be able to see the pronoun *il* (because this is in an A-position by virtue of occupying a thematic argument position): this is consonant with the assumption made by Boeckx (2007, p.83) that a wh-moved QP on the edge of vP is 'transparent' to T. Consequently T agrees with, case-marks and (by virtue of its EPP feature) attracts the pronoun *il* to

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[7] We assume that, in the same way as accusative case is assigned by an uninterpretable accusative case feature on *v*, so too nominative case is assigned by a nominative case feature which T inherits from C. As should be obvious, the nature of such features challenges the claim that uninterpretable features enter the derivation unvalued. The EPP feature on T can be treated as an [*A-edge*] feature which attracts the closest constituent with an active A-feature to move to the edge of TP. It makes little difference for our purposes whether C is assumed to carry a [wh-edge] or a [sp-edge] feature.

move to the edge of TP. The [*wh-edge*] feature on C in turn attracts the interrogative QP to move to the edge of CP, ultimately deriving *Quelles femmes il a mises en prison?* 'Which women did he put in prison?'.

A key premise of the analysis outlined above is that the uninterpretable case/agreement features on the light verb remain on *v* and do not percolate down onto V - contra the Chomsky/Richards Percolation Hypothesis. Let us now examine what would happen if (contrary to what we claim here) the case and agreement features of the light verb were to percolate onto V. In such a case, the structure in (10) would be replaced by that in (13):

(13) $[_{vP}$ il$_{he}$ $[_v$ ø$]$ $[_{VP}$ $[_{QP}$ quelles$_{which}$ femmes$_{women}]$ $[_V$ mis$_{put}]$ en prison$]]$
$\qquad\qquad$ [*sp-edge*] $\qquad$ [Pl-Num] $\qquad\qquad\qquad$ [*u-Num*]
$\qquad\qquad\qquad\qquad\quad$ [F-Gen] $\qquad\qquad\qquad\qquad$ [*u-Gen*]
$\qquad\qquad\qquad\qquad\quad$ [*u-case*] $\qquad\qquad\qquad\quad$ [*Acc-case*]
$\qquad\qquad\qquad\qquad\quad$ [3-Per]

In (13), QP is not an accessible goal for V, since QP lies outside the c-command domain of V: this means that the number/gender features on V remain unvalued and undeleted (causing a crash at the PF interface), and the uninterpretable number/ gender/case features on V remain undeleted (causing a crash at the semantics interface). The conclusion we therefore reach is that the agreement features on *v* in (the agreeing counterpart of) sentences like (9) cannot percolate down onto V but rather must remain on *v*.

Now consider how we handle the agreementless counterpart of (9). Suppose we have reached the stage of derivation shown in (14) below:

(14) $[_{vP}$ il$_{he}$ $[_v$ ø$]$ $\qquad$ $[_{VP}$ $[_{QP}$ quelles$_{which}$ femmes$_{women}]$ $[_V$ mis$_{put}]$ en pr.$]]$
$\qquad\qquad$ [*wh-edge*] $\qquad\qquad\qquad$ [3-Per]
$\qquad\qquad$ [*Acc-Case*] $\qquad\qquad\qquad$ [*u-Case*]
$\qquad\qquad\qquad\qquad\qquad\qquad$ [F-Gen]
$\qquad\qquad\qquad\qquad\qquad\qquad$ [Pl-Num]

The difference between the agreementless structure in (14) and its agreeing counterpart in (10) is that this time *v* carries a [*wh-edge*] feature in accordance with (8ii), and therefore cannot carry agreement features (because 8iv specifies that *v* only has agreement if it also has a [sp-edge] feature). The case feature on *v* will locate QP as a visible local goal, and value its case feature as accusative (with the case features on *v* and Q both being deleted thereby). The [sp-edge] feature on *v* will likewise target the specificity feature on QP (not shown above), and thereby attract QP to move to the edge of *v*P. The derivation will then continue in familiar ways,

ultimately yielding the convergent structure associated with the agreementless sentence *Quelles femmes il a mis en prison?*[8]

The key conclusion to be drawn from our discussion in this section is that the agreement features of the participle in agreeing structures like (1) *Quelles femmes il a mises en prison?* must remain on the light-verb heading the phase if the derivation is not to crash.

4. Participle agreement with an embedded subject

Let us now consider the derivation of a sentence like (6) repeated in (15):

(15) Quelles femmes a-t-il **jugé/jugées** être complices?
Which$_{F.Pl}$ women$_{F.Pl}$ has-he judged$_{Def}$/*judged$_{F.Pl}$ be accomplices?
'Which women did he judge to be accomplices?'

Sentences such as (16) below suggest that *juger*$_{judge}$ can function as an ECM (Exceptional Case Marking) verb selecting a TP complement:

(16) Il a jugé l'attitude des syndicalistes être la cause directe des grèves
He has judged the attitude of the unionists be the cause direct of the strike
'He judged the attitude of the trade union members to be the direct cause of the strikes'

Let us suppose that we have reached the stage shown in (17) below in the derivation of the agreeing counterpart of sentence (15):

(17) [$_{vP}$ il$_{he}$ [$_v$ ø][$_{VP}$ [$_V$ jugé$_{judged}$] [$_{TP}$ quelles$_{which}$ femmes$_{women}$ [$_T$ être] compl.]]]

[*sp-edge*]	[3-Per]
[*u-Num*]	[Pl-Num]
[*u-Gen*]	[F-Gen]
[*Acc-Case*]	[*u-Case*]

v carries an uninterpretable [*sp-edge*] feature via (8ii), and so attracts a specific expression to the edge of the *v*P projection it heads. Since matrix *v* has a thematic external argument, it can also carry an accusative assigning case feature via (8iii). By virtue of carrying case and [*sp-edge*] features, *v* also carries number and gender agreement features, in accordance with (8iv).

However, the case/agreement features on the phase head v cannot target QP, because this is not within the immediate domain of *v* (rather, QP is within the immediate domain of V: see 8vi). Thus, in accordance with the Percolation

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[8] Although we lack the space to discuss this here, it should be noted that a past participle can only agree with its own object, not with the object of a subordinate verb: this is because a subordinate object will have been rendered inactive for agreement with a matrix verb after being case-marked by the subordinate verb.

Hypothesis (8vi), the case/agreement features on *v* percolate down onto V, so deriving the structure shown below:

(18) [$_{vP}$ il$_{he}$ [$_v$ ø]   [$_{VP}$ [$_V$ jugé$_{judged}$] [$_{TP}$ qu$_{which}$ femmes$_{women}$ [$_T$ être] compl.]]]
　　　　 [*sp-edge*]　　　 [*u-Num*]　　 [Pl-Num]
　　　　　　　　　　　 [*u-Gen*]　　　 [F-Gen]
　　　　　　　　　　　 [*Acc-Case*]　 [*u-Case*]
　　　　　　　　　　　　　　　　　　 [3-Per]

V then agrees with and assigns accusative case to QP[9], with the relevant uninterpretable case/agreement features being valued and deleted thereby. The [spec-edge] feature on v triggers movement of QP to the edge of *v*P, and the derivation then continues in familiar ways and ultimately leads to a convergent outcome, thereby accounting for the possibility of agreement between a past participle and an extracted ECM subject.

　　Although we lack the space to go into full details here, the agreementless counterpart of (15) will have a parallel derivation to that sketched above, save that v will carry a [wh-edge] feature in place of the [sp-edge] feature in (17), and hence will lack agreement features in consequence of (8iv).

　　Having shown how agreement between a past participle and an extracted ECM subject can be dealt with, let us now consider why agreement is not possible in infinitival structures such as (7), repeated as (19) below:

(19)　Quelles femmes a-t-il **dit/*dites** être complices?
　　　Which$_{F.Pl}$ women$_{F.Pl}$ has he said$_{Def}$ /*said$_{F.Pl}$ be accomplices?
　　　'Which women did he claim to be accomplices?'

　A significant property of verbs like *dire* is that they cannot be used in ECM structures like (20):

(20)　*Il a dit ces femmes être complices
　　　He has said those women be accomplices
　　　'He said those women to be accomplices'

This can be accounted for if we follow Kayne (1984) in taking *dire* to be a verb which selects an infinitival CP complement. Let us therefore assume that a series of merger operations have formed the agreeing structure in (21) (with outline font marking constituents which have already undergone Transfer):

(21) [$_{vP}$ il$_{he}$ [$_v$ ø] [$_{VP}$ [$_V$ dit$_{said}$] [$_{CP}$ quelles$_{which}$ femmes$_{women}$ [$_C$ ø] [$_{TP}$ être ...]]]]
　　　 [*sp-edge*]　　　　　　 [3-Per]

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[9] A descriptive detail which we set aside here is the possibility that V may also attract QP to move to the edge of VP.

[*u-Num*]	[Pl-Num]
[*u-Gen*]	[F-Gen]
[*Acc-Case*]	[*u-Case*]

We have assumed here that *v* has an accusative-assigning case feature by virtue of having a thematic external argument, and carries agreement features by virtue of having a [sp-edge] feature. However, the Visibility Condition (8v) means that the number/gender agreement features on *v* cannot 'see' QP, because QP is in an A-bar position by virtue of being in a nonthematic position on the edge of a phase. Moreover, the Percolation Condition (8vi) bars the case/agreement features on *v* from targeting QP as a goal, because QP is not within the immediate domain of *v* (rather, QP lies within the immediate domain of V). Accordingly, the uninterpretable number/gender agreement features on *v* (and the uninterpretable case feature on QP) remain unvalued and undeleted, so causing the derivation to crash.

Because they cannot locate a visible goal in (21), the case/agreement features on *v* will percolate down onto V in accordance with the Percolation Condition (8vi), so deriving the structure (22) below:

(22)   [$_{vP}$ il$_{he}$ [$_v$ ø]   [$_{VP}$ [$_V$ dit$_{said}$] [$_{CP}$ quelles$_{which}$ femmes$_{women}$ [$_C$ ø] [$_{TP}$ être...]]]
         [*sp-edge*]   [*u-Num*]   [Pl-Num]
                        [*u-Gen*]   [F-Gen]
                        [*Acc-Case*]   [*u-Case*]
                                     [3-Per]

However, the Visibility Condition (8v) prevents the number/gender features on V from locating QP as a goal, since QP is in an A-bar position. Accordingly, the derivation will once more crash, for familiar reasons.

But now consider what happens if the light verb carries a [wh-edge] feature and so lacks agreement features, as in (23) below:

(23) [$_{vP}$ il$_{he}$ [$_v$ ø]   [$_{VP}$ [$_V$ dit$_{said}$] [$_{CP}$ quelles$_{which}$ femmes$_{women}$ [$_C$ ø] [$_{TP}$ être ...]]]
        [*wh-edge*]   [3-Per]
        [*Acc-Case*]   [*u-Case*]
                                 [F-Gen]
                                 [Pl-Num]

As before, QP is invisible to the case feature on *v*, because QP is not in the immediate domain of *v*. Consequently, the case feature on *v* percolates onto V, as in (24) below:

(24) [$_{vP}$ il$_{he}$ [$_v$ ø] [$_{VP}$ [$_V$ dit$_{said}$]   [$_{CP}$ qu$_{which}$ femmes$_{women}$ [$_C$ ø] [$_{TP}$ être ...]]]
        [*wh-edge*]   [*Acc-Case*]   [*u-Case*]
                                     [3-Pers]
                                     [F-Gen]
                                     [Pl-Num]

Nothing now prevents the case feature which has percolated down onto V from serving as a probe which locates QP as its goal (since QP is within the immediate domain of V), thereby valuing the unvalued case feature on QP as accusative, and resulting in the uninterpretable case feature of both constituents being deleted. Likewise, the [*wh-edge*] feature on *v* can target the interrogative QP as its goal, thereby attracting QP to move to the edge of vP (and concomitantly deleting the edge feature on *v*). Thus, the analysis outlined here correctly specifies that the derivation can only converge in structures like (19) if the participle is unspecified for agreement.

5. Implications and Issues

Thus far, we have presented evidence from past participle agreement in French that phase heads must sometimes retain uninterpretable case/agreement features. There is independent cross-linguistic evidence in support of this conclusion from the phenomenon of *complementiser-subject agreement* found in a number of languages, and illustrated earlier in relation to the West Flemish data in (1). What is significant about the data in (1) is that the (italicised) complementiser overtly inflects for agreement in person and number with the (bold-printed) subject of its clause. However, since the finite verb in the clause also inflects for agreement with the subject, it would seem that the agreement features of C do not percolate onto T but rather are *copied* from C onto T so that both C and T end up bearing a copy of the relevant agreement features.

A parallel phenomenon of complementiser agreement is found in a non-standard variety of English spoken by people who come from the Boston area of Massachusetts, in which C agrees with a preposed (italicised) wh-expression that it attracts to move to spec-C, e.g. in structures such as the following (from Kimball and Aissen 1971, p.246):

(25) Where are the boys [*who* Tom **think** [Dick **believe** [Harry **expect** to be late]]]

Here, the head C constituent of each of the bracketed CPs attracts the italicised relative pronoun *who* (which is plural by virtue of having the plural noun *boys* as its antecedent) to move to spec-C. C ultimately 'hands over' these agreement features to the bold-printed verbs in the head *v* position of *v*P (perhaps via a downward feature-percolation operation in the PF component, of which Affix Lowering may be a particular instance).

A further challenge to the claim that the uninterpretable A-features of *v* must always percolate onto V comes from our claim that phase heads carry a case-assigning feature which enters the derivation valued but uninterpretable. Recall that a crucial assumption made by Chomsky (2005) and Richards (2007) is that value and interpretability are indissociable. For this reason, uninterpretable features must be deleted at the point where they are valued. Moreover, because the edge of a phase

and its complement are transferred separately, the uninterpretable features of a phase head must percolate onto the non-phase head they select in order to ensure that uninterpretable features are valued and transferred simultaneously. However, if value and interpretability are not necessarily two faces of the same coin, Chomsky and Richards' argumentation falls apart.

We note that support for the claim that phase heads carry a case assigning feature comes from the data in (2) above which suggests, as pointed out by Radford (in press), that 'the case assignment properties of complementisers are language-specific, and hence unpredictable'. Radford further concludes that 'complementisers need to carry some uninterpretable feature in their lexical entry specifying what case they (hand over to T to) assign to an active goal within their domain'.

Additional support for the dissociation between value and interpretability comes from the morphosyntax of expletive pronouns. Under the analysis of English expletives in Radford (in press), expletive *there* enters the derivation carrying an uninterpretable (lexically specified and intrinsically valued) third-person feature, and expletive *it* likewise enters the derivation carrying uninterpretable (but intrinsically valued) third-person and singular-number features. Likewise, under the analysis of French expletives in Vincent (2007), expletive *il*$_{it}$ enters the derivation carrying uninterpretable (but lexically specified and intrinsically valued) third-person, singular-number and masculine-gender features. If the analysis of English/French expletives outlined in the relevant works is correct in essence, it provides further evidence that the Chomsky-Richards correlation between the interpretability and valuation of features cannot be maintained.

It may be that we can reach a similar conclusion in relation to the gender feature carried by nouns in languages like French. French has two genders: masculine and feminine. In some cases, these two genders correspond to the biological property of an entity being male or female respectively, but this is true only of a small number of nouns. In fact, most French nouns carry a purely arbitrary gender which does not relate to any biological property of the entities the nouns refer to. This might lead us to the conclusion that it is more appropriate to look at grammatical gender as a purely formal grammatical, uninterpretable feature. Another property of gender is that it is a lexical feature of nouns (lexical features being inherent features), so that (e.g.) the noun *chaise* 'chair' in French is inherently feminine and can never be masculine (*la/*le chaise* 'the$_{F/*M}$ chair$_F$'). Although it is uninterpretable, gender is an inherent feature of nouns which are necessarily masculine or feminine when entering the derivation. We might therefore conclude that French nominals enter the derivation with a valued but uninterpretable gender feature, so reinforcing the claim that value and interpretability do not necessarily work hand in hand[10]. As we pointed

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[10] However, the issue of whether gender features in French are indeed uninterpretable (and get deleted in the course of the derivation) is a vexed one - as can be illustrated by a question-

out earlier in this section, if value and interpretability are dissociable notions, the kind of motivation for feature inheritance argued for by Richards is heavily compromised. But if this is so, we need an alternative way of motivating feature percolation.

Ouali (2007) suggests that feature percolation takes place because of **closeness**. More specifically, he claims that the goal valuing the uninterpretable features carried by the phase head is closer - in terms of the c-command path - to the head selected by the phase head than to the phase head itself. As a result, it is 'more computationally efficient' (p. 4) for *uF*s to percolate onto the head selected by the phase than to remain on the phase head. However it is far from clear whether adding a feature transmission operation to shorten the c-command path of a probe by one node only is more computationally efficient than the opposite: moreover, Chomsky (1995) explicitly rejected node-counting views of economy.

Nonetheless, the intuition that *economy* and *computational efficiency* lie behind percolation seems to us to be right. In our version of the Percolation Condition in (8vi), we suppose that (in the relevant class of participial structures in French), case/agreement features on a phase head only percolate down onto the head they select when they fail to locate a visible goal within their immediate domain. Thus, percolation is a form of crash-avoidance strategy designed to avoid unnecessary operations (e.g. avoiding percolation where this is unnecessary, as *economy* considerations would lead us to expect), while at the same time serving as a means for rescuing derivations which would otherwise fail (as considerations of *computational efficiency* would lead us to expect).

6. Conclusions

In this article, we started by outlining the rationale behind Chomsky and Richards' claim that the uninterpretable features of a phase head must obligatorily percolate onto the head it selects. After providing the reader with a summary of the assumptions we make concerning the mechanisms of agreement and case assignment in French transitive participial clauses, we showed in sections 3 and 4 how our assumptions correctly specify that agreement can take place between a past participle and an extracted direct object or ECM subject, but not between a past participle subject and the extracted subject of an infinitival CP complement. A key assumption in our analysis was that case/agreement features remain on *v* when they

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answer dialogue such as the following:

(i) Cette maison a été vendue? - Non, elle est toujours en vente

    This house has been sold? - No, it (= she) is still for sale

If the gender feature of the DP *cette maison* is deleted in the course of the derivation, how are we to know that it is the antecedent of the feminine pronoun *elle*?

locate a goal within the immediate domain of *v*. The claim that agreement features sometimes remain on a phase head was supported in section 5 by the observation that in languages like West Flemish, finite complementisers like those in (1) must also retain their agreement features. In addition to providing empirical evidence for the claim that uninterpretable features may remain on the phase head, we pointed to the existence of inherently valued uninterpretable features which falsify the argumentation put forward by Richards. If the notions of value and interpretability are not indissociable, the need for uninterpretable features to be deleted at the point where they are transferred no longer holds, as a result of which uninterpretable features are no longer required to obligatorily percolate onto the head selected by the phase head. We proposed instead that percolation is motivated by considerations of economy and computational efficiency.

7. References

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