

# On two types of underspecification: Towards a feature theory shared by syntax and phonology<sup>1</sup>

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## Abstract

*This article explores the application of the phonological notion of underspecification to syntactic features. Two notions of feature underspecification are introduced,  $\alpha$ -specification and 0-specification. This proposal is supported with data from agreement in relative clauses in various dialects of French. It is argued that the agreement features of  $C^0$  can be partly transparent ( $\alpha$ -value) or opaque (0-value). The system of transparent and opaque syntactic features is then compared to transparent and opaque vowel harmony systems (van der Hulst and van de Weijer 1993). An Attribute – Value system for the representation of features might allow for a feature theory that is accessible as a module of the grammar to both syntax and phonology.*

## 1. Syntactic underspecification

Recently there have been some interesting attempts to extend the phonological notion of feature underspecification (for example Archangeli 1984) to features of syntactic agreement. Burzio (1989) has made use of the notion of underspecification to describe the parameterization of anaphors across languages, and van Gelderen (1992) argues that Dutch *het* 'it' and Middle English *it* are

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1. I would like to thank Rose-Marie Déchaine, Yves d'Hulst, Teun Hoekstra, the audiences at *Going Romance 1993*, University of Utrecht 11–12 December 1993 and the *Morphology – Syntax Connection*, MIT 4–5 January 1994, as well as two anonymous and very helpful reviewers of *Probus* for useful discussions and comments. Special thanks to Harry van der Hulst for his invaluable help in formalizing the comparison of morphosyntactic and phonological features in terms of Scobbie's (1991) attribute – value feature system. The usual disclaimers apply.

unspecified for number. Kayne (1989) has argued in favor of an underspecified analysis of English so-called "third person" *-s* (*Rain falls*), suggesting that this morpheme does not mark [3rd person] but [+sg] in English. Kayne argues that first and second person are unmarked for number. Vanden Wyngaerd (1993) discusses Kayne's proposal, and convincingly argues that unmarkedness of features has to be represented by zero marked features, which can be taken to be [0 number, 1st person] in the case of *I*. Similarly, third person *-s* should be [+sg, 0 person, 0 gender]. Vanden Wyngaerd (1993: 164) shows that unmarkedness cannot correspond to the mere absence of features, since the mere absence of features cannot give rise to a feature clash. Vanden Wyngaerd (1993) argues that in *you sing* the [2nd person, +pl] *you* co-occurs with the bare form of the verb which is unmarked for features. Since in this case the absence of common features does not give rise to a feature clash, there should not be a feature clash either in the co-occurrence of [1st person] *I* and [+sg] *-s* in *\*I sings*. Vanden Wyngaerd concludes therefore that the absence of number in the feature specification of *I* should be marked by a zero number feature that would clash with [+sg] *-s*, on the plausible assumption that agreement requires strict identity of features. A feature [0 number] (= Vanden Wyngaerd's 1993 [0 sg]) would certainly clash with [+sg] *-s*.

The idea to extend phonological feature theory to syntactic feature theory dates back to the very beginnings of generative grammar. An interesting question is to what extent this conceptual similarity between underspecification in the syntax and underspecification in phonology reflects intrinsic properties of the representation of features in the language faculty. If phonology and syntax both make use of underspecified features, then the notion of underspecification itself, and, more generally, feature theory itself, might reflect a fairly deep property of the language faculty shared by representations in phonology and syntax. More specifically, the question arises as to whether the representation of features as being specified or underspecified is an intrinsic modular element of the faculty of language which is shared by planes of representation in phonology and syntax. There is no logical necessity that the answer to this question be positive: it might just as well be the case that the correspondence between (under)specification in the syntax and (under)specification in phonology is a fairly superficial one, and that we are in the presence of two entirely different mechanisms which only share some surface similarity in that, for instance, positive and negative values of features are present. Before any strong conclusions are warranted about feature theory as a plane of representation of both phonology and syntax, it remains to be shown that underspecification in the syntax and in phonology are sufficiently alike.

It is the purpose of this article to show that syntactic and phonological underspecification are indeed sufficiently similar to allow for a positive answer to the question raised. We would first like to show that two types of under-

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specified features should be distinguished in syntax and phonology. More in particular, it will be argued that there is a difference between *variable* underspecified features ( $\alpha$ -features) and *nonvariable* underspecified features (0-features). "Nonvariable" or 0-features should be thought of as "neutral" features: they have no positive or negative value for a given feature, they simply mark the absence of a specific feature *value*. In terms of an Attribute – Value feature system, this means that a given feature has an Attribute specification without a Value. More specifically, a 0-feature for [person] can be represented with the Attribute [person : ], while a positively specified feature for person can be represented with both an Attribute and a Value: [person : 1st]. The second type of syntactically underspecified  $\phi$ -features, which I introduced as *variable* underspecified features should be thought of as "chameleonlike" features, or  $\alpha$ -valued  $\phi$ -features: these features have [ $\alpha$  person,  $\alpha$  gender,  $\alpha$  number] values, that is, they are sensitive to *any* value of person, gender, number. "Variable" or  $\alpha$ -features do not have a value of their own: their value needs to be "filled in" by the features of the elements surrounding them. At first sight, underspecified  $\alpha$ -valued features simply appear to be *unspecified* features, but I argue that their complete absence of specification plays a role in the grammar: "variable" or  $\alpha$ -features have no "fixed" value, but can "pass on" the features of the elements surrounding them. This can be represented in terms of an Attribute – Value system by the complete absence of an Attribute – Value set: an  $\alpha$ -valued feature for [person] would be specified as [ : ]. Again, this *underspecification* does not merely mean that the Attribute – Value set is simply *unspecified*: if the Attribute – Value set were unspecified, it would mean that it plays no grammatical role whatsoever. In other words, 0-features are inherently neutral features,  $\alpha$ -features are inherently flexible and "open" or "transparent" for the features surrounding them. This yields the following three-valued system:

(1)		underspecified	specified
	variable	$\alpha$	
	non variable	0	+/(–)

To the extent that the distinction between 0- and  $\alpha$ -features is justified in both syntax and phonology, there is evidence that the notion of underspecification is neither phonology-specific nor syntax-specific, and that it should be viewed as an independent module of feature representation in the language faculty which is accessible to both syntax and phonology. The system of 0-features,  $\alpha$ -features and +/– -features then can be viewed as independent of its phonological or syntactic content.

I will show that both types of underspecification are syntactically necessary and operative in the domain of agreement in  $C^0$ , that is, the familiar locus of *that*-trace effects in English and French *que*  $\rightarrow$  *qui* alternations (Kayne 1976; Rizzi 1990). The 0/ $\alpha$ -distinction eliminates some stipulations entailed by Rizzi's

(1990) analysis of agreement in  $C^0$ , and conforms to Chomsky's minimalist program where all variation is reduced to morphological differences.

The first section of this paper will focus on the syntactic motivation for a distinction between  $\emptyset$ -features and  $\alpha$ -features. Evidence for this distinction will be drawn from  $C^0$  agreement in French (*que* → *qui*), and from a curious *that*-trace effect in French matrix interrogatives. In both cases, it will be shown that Rizzi's (1990) solution, while essentially correct, is not morphologically refined enough to capture the relevant facts. Finally, I will briefly illustrate that the distinction between  $\emptyset$ -features and  $\alpha$ -features is also present in cases of phonological vowel harmony, although in a very different guise. This last section will be devoted to an attempt to represent the phonological and syntactic  $\emptyset/\alpha$ -distinction in the same way.

## 2. On $\emptyset$ -features and $\alpha$ -features in the domain of $C^0$

### 2.1. *Que* → *qui* agreement

Rizzi (1990) claims that the *that*-trace effect is a case of agreement between  $I^0$  and  $C^0$ . A zero  $C^0$  with Agr features appropriately head-governs a subject trace in SpecIP (2). By contrast, the  $C^0$  *that* is inert for government, hence the subject trace is not appropriately head-governed, violating the Empty Category Principle (ECP). Rizzi (1990) claims that the *that*-trace effect thus merely is a special instance of agreement in Comp, a process present in a variety of languages from Kinande to Modern Irish.

- (2) *Who<sub>i</sub> did you think* [<sub>CP</sub>  $t'_i$  \**that*/Ø-Agr $C^0$  [<sub>AgrSubjP</sub>  $t_i$  AgrSubj $^0$  *left*]]  
 (3) *The thing* [<sub>CP</sub>  $O_i$  *that*\*/Ø-Agr $C^0$  [<sub>AgrSubjP</sub>  $t_i$  AgrSubj $^0$  *happened*]] *is terrible*

Under these assumptions, the sentence in (3) raises a problem. Why is it the case that the  $C^0$  *that* can properly head-govern the adjacent subject trace in the relative clause of (3), while the very same *that* is excluded in the case of an embedded declarative as in (2)? Rizzi (1990) claims that this is due to the fact that the complementizer *that* in (3) is in a predicative relation with the NP *The thing* which is the "subject" of predication. Rizzi (1990: 70) reasonably assumes that predication involves agreement, and suggests that there is an abstract agreement relation between the head of the relative and the  $C^0$  *that*, which he calls A-agreement. Rizzi (1990: 67) suggests that besides the feature [ $\pm wh$ ], complementizers have a feature [ $\pm pred$ ]. Relative *that* in (3) is [+pred] while the declarative *that* in (2) is [-pred]. Agreement in a relative clause as in (3) then is a result of a [+pred]  $C^0$  being subject to A-agreement. In (3), the  $C^0$  *that* heading the relative clause has the additional feature [+pred], and is as such an appropriate head-governor. Zero (Ø)-Agr $C^0$  is [-pred] and is thus excluded in (3).

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- (4) a. *l'ho*  
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Rizzi's (1990) | theoretical side, it as predication as a syntactic primiti  $\emptyset$ -features clearly related to quantifi be expressed as a subject and objec the feature [ $\pm pred$  it amounts to little is predicated is governed by  $V^0$ . [ $\pm pred$ ]?

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2. As pointed out to  
 (i) *Ik denk aan*  
      'I think of y  
 (ii) *Jij die zo kn*  
      'You who so  
 (iii) *Wij die zo kn*  
      'We who so

to Chomsky's minimalist differences.

syntactic motivation for a ce for this distinction will and from a curious *that*-ases, it will be shown that ot morphologically refined briefly illustrate that the also present in cases of rent guise. This last section onological and syntactic

Rizzi (1990: 56) then suggests that the same analysis applies to the conversion of the French complementizer *que* 'that' to *qui* in *wh*-constructions (cf. Kayne 1976). French *qui* also marks agreement of AgrSubj<sup>0</sup> and AgrC<sup>0</sup>. Since *qui* appears in both relative (4c) and embedded (4a) contexts, Rizzi (1990) claims *qui* does not encode the difference between the features [+pred] and [-pred].

- (4) a. *l'homme<sub>i</sub> que je crois [t<sub>i</sub>' qui [t<sub>i</sub> viendra]]*  
 'the man who I think that will come'  
 b. *l'homme<sub>i</sub> que je crois [t<sub>i</sub>' que/\*qui [Jean connaît t<sub>i</sub>]]*  
 'the man that I think that Jean knows'  
 c. *l'homme<sub>i</sub> [O<sub>i</sub> qui t<sub>i</sub> est venu]*  
 'the man who came'

In this case, Rizzi (1990) suggests that *que* to *qui* conversion simply is a restricted form of Spec-head agreement of the C<sup>0</sup> *que*: *que* only becomes *qui* when a subject adjacent to C<sup>0</sup> is extracted. For Rizzi (1990), *qui* is a C<sup>0</sup> that agrees both with its specifier and with its complement, and agreement with the complement can only arise when the subject adjacent to *que* moves through Spec of CP. Since complementizer *qui* cannot appear in interrogative clauses, Rizzi (1990) suggests it is a *-wh*-C<sup>0</sup>.

Rizzi's (1990) [±pred] is inadequate both theoretically and empirically. On the theoretical side, it is not plausible to represent a relational syntactic notion such as predication as a morphosyntactic feature. This equals viewing predication as a syntactic primitive rather than as a structurally derived notion. As features go, φ-features clearly have morphosyntactic import, and the *wh*-feature can be related to quantificational properties, but it is less likely that predication should be expressed as a feature on heads, since it is essentially a relational notion like subject and object, not a semantic or a morphosyntactic one. Moreover, while the feature [±pred] does the job of distinguishing both types of complementizers, it amounts to little more than a diacritic stating that a C<sup>0</sup> of a (relative) CP that is predicated is somehow different from a (complement) CP whose C<sup>0</sup> is governed by V<sup>0</sup>. The real question remains: what is the nature of the feature [±pred]?

Empirically, Rizzi (1990) glosses over the fact that AgrC<sup>0</sup> *qui* transmits φ-features of the NP to the AgrSubjP of the relative clause.<sup>2</sup> This feature

2. As pointed out to me by Teun Hoekstra, in Dutch this transfer of φ-features is Case-sensitive:

- (i) *Ik denk aan jou die zo knap is/ \*bent.*  
 'I think of you who so smart is-3SG/are-2SG.'  
 (ii) *Jij die zo knap \*is/bent ...*  
 'You who so smart is-3SG are-2SG ...'  
 (iii) *Wij die zo knap zijn      Aan ons die zo knap zijn /      Aan mij die zo knap is*  
 'We who so smart are-PL / 'To us who so smart are-PL' / 'To me who so smart is-3SG'

transmission comes about via Spec-head agreement with the operator in Spec of CP and the coindexation of this operator with its trace in Spec of IP.

- (5) a. *vous-2PL qui êtes-2PL venez*  
 'you who have come'  
 b. *nous-IPL qui sommes-IPL là*  
 'we who are there'

However, there are varieties of French where *qui* does not fully transmit all  $\phi$ -features.<sup>3</sup> In one variety, the value for person is not transmitted as in (6). This is most obvious in (6c) where the adjective bears gender and number agreement, but the verb form is third person, which is unexpected from the point of view of the standard variety of French.

- (6) a. *C'est moi-1SG qui est-3SG venu.*  
 'It is me who has come.'  
 b. *C'est nous-IPL qui sont-3PL venus.*  
 'It is us who have come.'  
 c. "(...) *c'est moi qui sera infiniment reconnaissante envers vous.*"  
 'It is I who will be-3SG extremely grateful-SG:FEM to you'  
 (*Lettres adressées à l'agence des Prisonniers de Guerre, Comité International de la Croix-Rouge, Genève 1914 sv.* quoted by Frei 1929: 163)

In another variety of French, no features seem to be transmitted into the relative clause at all. The verb form in the relative unvariably is third person, the "default" form of agreement in French:

- (7) a. *Il n'y a que vous qui peut le faire; C'est pas nous qui peu(t) y aller.*  
 'There is only you who can-3SG do it; It is not us who can-3SG go there.'  
 (Frei 1929: 163)  
 b. *Au lieu que c'est nos hommes qui boit, c'est nous qui s'souïle, à çt'heure.*  
 'Instead of it being our men who drink-3SG, it is us who get-3SG drunk at this hour.'  
 (H. Bauche, *Le langage populaire*, Paris Payot, p. 27n, quoted by Frei 1929: 163)

*Jij* is the nominative form of 'you', *jou* is the oblique form. If the Case of the NP *jij* 'you' governing the relative CP coincides with the Case of the trace of the *wh*-operator in Spec of CP, the embedded verb form agrees in person and number. If the Case of the NP does not coincide with that of the trace of the *wh*-operator in Spec of CP, agreement is only in number, while agreement in person reduces to a "default" 3rd person verb form (*is* 'is' / *zijn* 'are').

3. Thanks to Rose-Marie Déchaine for pointing this out to me.

Importantly, Rizzi's (1986) variation: the presence of person, number and gender partial agreement presupposes stipulation is necessary in these varieties of these varieties of complementizer *qui* itself and "passes on" the feature. How should this "feature" in (5) simply has  $\alpha$ -value can pick up any value it to the AgrSubj of which is [0 person, 0 number] transmitted to the AgrSubj "neutralized" showing of the relative clause. (and presumably [0 gender agreement on the AgrSubj [0 person, 0 number] to account for the fact very similar to imperfect agreement. It seems as if impersonal *il* has arguments to endow *il* [singular, masculine, 3rd] assume *il* 'it/he' is [0 gender share the morpheme /i/ featurewise. The evidence corroborated in section empirically superior to

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Importantly, Rizzi's (1990) notion of  $[\pm\text{pred}]$  cannot explain this type of variation: the presence of the feature  $[\pm\text{pred}]$  either allows for or prevents full person, number and gender agreement, but it cannot be used to explain the partial agreement present in (6)–(7). In Rizzi's (1990) system, some additional stipulation is necessary besides  $[\pm\text{pred}]$  to exclude person agreement in relative clauses of these varieties of French. From a descriptive point of view, complementizer *qui* itself seems to be either partly or entirely "flexible" in features, and "passes on" the features of the NP of which the relative CP is predicated. How should this "feature transfer" property be conceived of? We claim that *qui* in (5) simply has  $\alpha$ -valued  $\phi$ -features,  $[\alpha \text{ person}, \alpha \text{ gender}, \alpha \text{ number}]$ , which can pick up any value from the NP the relative CP is adjoined to, and transmit it to the AgrSubj of the relative clause. The variety of French in (6) has a *qui* which is  $[0 \text{ person}, \alpha \text{ gender}, \alpha \text{ number}]$ ; number and gender features are transmitted to the AgrSubj of the relative clause, but person features are "neutralized" showing up as a "default" third person agreement on the AgrSubj of the relative clause. The variety in (7) has a *qui* which is  $[0 \text{ person}, 0 \text{ number}]$  (and presumably  $[0 \text{ gender}]$ ), which again shows up in default 3rd person agreement on the AgrSubj of the relative clause. I have chosen the features  $[0 \text{ person}, 0 \text{ number}]$  here rather than the "positive" features  $[3\text{rd person}, +\text{sg}]$  to account for the fact that morphosyntactically, relative *qui* behaves in a way very similar to impersonal *il* which also triggers "default" 3rd person sg agreement. It seems a plausible assumption that a nonreferential element such as impersonal *il* has no positively specified features at all: what could be the arguments to endow *il* 'it/he' in *il pleut* 'it rains' with a positive specification  $[\text{singular}, \text{masculine}, 3\text{rd person}]$ ? In the absence of such arguments, I will assume *il* 'it/he' is  $[0 \text{ number}, 0 \text{ gender}, 0 \text{ person}]$ .<sup>4</sup> Also note that *qui* and *il* share the morpheme */i/*, which is a further argument for their nondistinctness featurewise. The evidence for 0-features in the domain of  $C^0$  will be further corroborated in section 2.2. In any case, the notion of  $\alpha$ -valued features is empirically superior to  $[\pm\text{pred}]$ .

Returning now to the problem of *that*-trace effects in English, I still have to say something about the theoretical problems Rizzi's (1990) analysis faces with respect to the nature of agreement in  $C^0$ . Recall Rizzi (1990) stipulates a  $[\pm\text{pred}]$  feature to distinguish between  $[-\text{pred}]$  declarative and  $[\pm\text{pred}]$  relative agreeing

4. In its "personal" use, the pronoun *il* 'it/he' marks third person masculine nouns, both animate and inanimate (*Le train/Jean, il est arrivé* 'the train/Jean, it/he arrived'). I would like to suggest that this is not an inherent property of *il* 'it/he', but one that is contributed by the selectional restrictions on the subject of particular verbs. *Il* 'it/he' then always has the feature specification  $[0 \text{ person}, 0 \text{ gender}, 0 \text{ number}]$ , the fact that it seems to mark masculine simply follows from the fact that masculine is the "default" gender in French, as is evident from agreement *Jean et Marie sont heureux* 'John and Mary are happy' and the "default" masculine gender exocentric compounds receive (*un* 'a' MASC *lave-vaisselle* 'a dishwasher').

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1. If the Case of the NP *jjj* 'you' of the *wh*-operator in Spec of CP, Case of the NP does not coincide agreement is only in number, while form (*is* 'is' / *zijn* 'are').

$C^0$  in English, and that he introduces a corresponding difference between A- and  $\bar{A}$ -agreement (resp. predication agreement and Spec-head agreement).

We are now in a position to do away with the  $[\pm pred]$  feature, while capitalizing on Rizzi's distinction between predication (A-)agreement and Spec-head ( $\bar{A}$ -)agreement.

$\alpha$ -features are by their very nature "transmitters" of features. Transmission of features in declarative  $C^0$  straightforwardly obtains via Spec-head agreement. In relative CPs, the possibility of Spec-head agreement to transmit features from outside of the clause is of course not available. Now,  $\alpha$ -features have no fixed value of their own, but "await" features which they can transmit into the clause. As a result, any feature index of the projection of  $N^0$  to which a relative CP is adjoined will automatically percolate to the  $\alpha$ -featured  $C^0$  head of the relative clause. An  $AgrC^0$  with  $\alpha$ -features is sensitive to whatever nominal features are near.<sup>5</sup>

In the analysis presented here, both declarative and relative  $AgrC^0$  have  $\alpha$ -features. Declarative  $AgrC^0$ s have  $\alpha$ -features because subject NPs with any features can be extracted from an embedded clause, without triggering morphological differences on the  $AgrC^0$  *qui* of the embedded clause. Feature-wise, declarative and relative  $AgrC^0$  are identical, contrary to Rizzi's (1990)  $[\pm pred]$  distinction. This analysis immediately eliminates Rizzi's (1990) stipulation that French *qui* is the agreeing form of the complementizer, which is both insensitive to the  $[\pm pred]$  distinction and to the  $A/\bar{A}$ -agreement distinction. In the analysis advocated here, the identity of French relative and declarative *qui* follows straightforwardly from their identity in features: *qui* is an element expressing  $I^0-C^0$  agreement with  $\alpha$ -valued  $\phi$ -features.

We have not yet quite shown however that  $[\pm pred]$  can be done away with altogether: recall Rizzi (1990) uses  $[\pm pred]$  as a descriptive device to distinguish between  $[+pred]$  relative  $C^0$  which must appear as *that* in a configuration where an empty operator is moved to SpecCP from subject position in a relative clause, and  $[-pred]$  declarative  $C^0$  which cannot appear as *that* when an empty operator, or any other *wh*-NP has moved through SpecCP from subject position. In all other cases when an empty operator is moved to SpecCP (from object position), *that* is optional. The relevant sentences are repeated here for convenience:

5. The existence of  $\alpha$ -features not only makes reference to a feature  $[\pm pred]$  unnecessary, but it also provides a straightforward explanation of how the features of the head of the relative CP end up inside that CP. One might even formulate this a little more strongly: it might be that all predication of adjuncts simply involves agreement with  $\alpha$ -features, for example *John drank his tea fully dressed* where an  $Agr$  projection can be assumed to "cap off" the AP headed by *dressed*. With  $\alpha$ -features which is adjoined to  $AgrSubjP$  and therefore absorbs the features of  $AgrSubj$ , namely those of the subject. Déchaine (1993) has shown that subject depictives are adjoined to  $AgrSubjP$ , and that the usual "VP internal" tests suggesting that subject depictives are inside the VP are misdirected.

- (8) a. *Who<sub>i</sub> t<sub>i</sub>*  
 b. *The th<sub>i</sub>*  
       *is terr<sub>i</sub>*  
 c. *Who<sub>i</sub> t<sub>i</sub>*  
 d. *The th<sub>i</sub>*

Recall also that in R to SpecCP triggers I in the domain of IP, SpecCP, the compl Rizzi's system:

- (9)  $C^0 \rightarrow t\bar{t}$   
        $\rightarrow \emptyset$   
        $\rightarrow (t$

Under this analysis, same time express a capable of expressing be so?

I would like to agreement and the distribution of *that* is agreement in the Spec-head agreement and triggers agreement "absorbed" the feature [person, number, gender] a sense "exchanges" that a bidirectional  $S_j$  spelled out overtly. Spec-head agreement [person, number, gender] agreement and [person, number, gender] through SpecCP (Spe

6. It has come to my *unidirectional* agreement appear). Rizzi's (to appear) against the features of when a specifier provides these notions to account

- (8) a. *Who<sub>i</sub> did you think* [<sub>CP</sub> *t<sub>i</sub>* \**that/∅-AgrC<sup>0</sup>* [<sub>AgrSubjP</sub> *t<sub>i</sub>* AgrSubj<sup>0</sup> *left*]]  
 {-pred}  
 b. *The thing* [<sub>CP</sub> *O<sub>i</sub>* *that*/\**∅-AgrC<sup>0</sup>* [<sub>AgrSubjP</sub> *t<sub>i</sub>* AgrSubj<sup>0</sup> *happened*]]  
 {+pred}  
*is terrible*  
 c. *Who<sub>i</sub> did you think* [<sub>CP</sub> *t<sub>i</sub>* (*that*) *Sue saw t<sub>i</sub>*]  
 d. *The thing* [<sub>CP</sub> *O<sub>i</sub>* (*that*) *Sue saw t<sub>i</sub>*]

Recall also that in Rizzi's system, movement of an element from subject position to SpecCP triggers I<sup>0</sup>-C<sup>0</sup> agreement by transitivity of Spec-head agreement (first in the domain of IP, and then in CP). With an empty element (operator/trace) in SpecCP, the complementary distribution of English C<sup>0</sup> then is as follows in Rizzi's system:

- (9) C<sup>0</sup> → *that*    / I<sup>0</sup>-C<sup>0</sup> agreement, C<sup>0</sup> {+pred}  
 → ∅        / I<sup>0</sup>-C<sup>0</sup> agreement, C<sup>0</sup> {-pred}  
 → (*that*)   / no I<sup>0</sup>-C<sup>0</sup> agreement, {±pred}

Under this analysis, it remains quite odd that the complementizer *that* can at the same time express a [±pred] C<sup>0</sup> if there is no I<sup>0</sup>-C<sup>0</sup> agreement, while it is only capable of expressing a [+pred] C<sup>0</sup> if there is I<sup>0</sup>-C<sup>0</sup> agreement. Why would this be so?

I would like to say that there is no such causal relation between I<sup>0</sup>-C<sup>0</sup> agreement and the feature [±pred] because there is no feature [±pred]. The distribution of *that* is not as in (9), but it rather depends on the directionality of agreement in the domain of C<sup>0</sup>. Obligatory *that* expresses *bidirectional* Spec-head agreement in C<sup>0</sup>: the subject of the relative clause moves to SpecCP and triggers agreement of C<sup>0</sup> with I<sup>0</sup>, and the relative C<sup>0</sup>, whose α-features have "absorbed" the features of the N<sup>0</sup> heading the relative clause, in turn checks the [person, number, gender] features of the element in SpecCP. Obligatory *that* in a sense "exchanges" agreement with the element in SpecCP. The idea here is that a bidirectional Spec-head agreement is "strong" agreement and needs to be spelled out overtly. The obligatory absence of *that* is related to *unidirectional* Spec-head agreement by the element in SpecCP: a declarative C<sup>0</sup> has no [person, number, gender] features to check: rather, it only "receives" both I<sup>0</sup>-C<sup>0</sup> agreement and [person, number, gender] features from the element passing through SpecCP (Spec-head agreement).<sup>6</sup> Optional *that* then simply marks the

6. It has come to my attention that the distinction drawn here between *bidirectional* and *unidirectional* agreement in the domain of C<sup>0</sup> has been independently proposed by Rizzi (to appear). Rizzi's (to appear) *static agreement* involves matching of features instantiated on a head against the features of the specifier (bidirectional agreement), and his *dynamic agreement* occurs when a specifier provides the head with its features (unidirectional agreement). Rizzi introduces these notions to account for French *Qui as-tu vu?* 'Who have you seen' where *qui* 'who' endows

difference between A- and head agreement).

c. [±pred] feature, while operation (A-)agreement and

features. Transmission of a Spec-head agreement. In order to transmit features from the α-features have no fixed position to transmit into the clause. C<sup>0</sup> to which a relative CP is attached C<sup>0</sup> head of the relative clause. However nominal features are

and relative AgrC<sup>0</sup> have to cause subject NPs with any clause, without triggering an embedded clause. Feature-contrary to Rizzi's (1990) analysis eliminates Rizzi's (1990) complementizer, which is the A/Ā-agreement distinction. In relative and declarative *qui* clauses: *qui* is an element in SpecCP.

ed] can be done away with a descriptive device to distinguish *that* in a configuration where *that* is in SpecCP from *that* when an empty operator, from subject position. In all SpecCP (from object position), and here for convenience:

feature [±pred] unnecessary, but it features of the head of the relative CP are more strongly: it might be that all features, for example *John drank his* is attached to "cap off" the AP headed by *that* and therefore absorbs the features of *that* as shown that subject depictives are not suggesting that subject depictives

absence of  $I^0-C^0$  agreement.<sup>7</sup> French *qui*, marking  $I^0-C^0$  agreement, then is not sensitive to the directionality of agreement in  $C^0$ , while English  $C^0$  expresses  $I^0-C^0$  agreement by the obligatory presence or absence of *that*, depending on the directionality of the additional [person, number, gender] features.

We can conclude that the notion of  $\alpha$ -valued feature advantageously subsumes the feature [ $\pm$ pred] which has been shown to give rise to a fair number of stipulations.

## 2.2. That-trace effects in French matrix interrogatives

The evidence in favor of the existence of 0-valued  $\phi$ -features in  $C^0$  comes from a restricted *that*-trace effect in French matrix interrogatives.

French has a complex interrogative complementizer *est-ce que*, which is restricted to matrix interrogatives in Standard French. This complementizer can also appear in embedded interrogatives in colloquial varieties of French.

- (10) a. *Est-ce que Euphrasie est arrivée?*  
'Is-it-that Euphrasie has arrived?'  
b. *Je me suis demandé quand (\*est-ce que) Euphrasie est arrivée?*  
'I wondered when is-it-that Euphrasie has arrived.'  
c. *Quand est-ce que Euphrasie est arrivée?*  
'When is-it-that Euphrasie has arrived?'

As a complex complementizer, *est-ce que*, which I will gloss as 'that<sub>1</sub>', should not be analyzed as an intervening sentence containing an inflected form of *être* 'be'. This analysis is of course possible, but the formal properties of *est-ce que* as a complex  $C^0$  and *est-ce que* as an intervening sentence are quite different. As an intervening sentence, with *est* a verb, *est-ce que* bears a descending intonation, and the sentence is interpreted as 'Does this mean that Euphrasie has arrived?'

<sup>7</sup>  $C^0$  with a *wh*-feature, thus satisfying his *wh*-criterion. The distinction between bidirectional/static agreement and unidirectional/dynamic agreement therefore seems to be justified independently of the distribution of relative and declarative  $C^0$ . As a result, the introduction of the notion of bidirectional agreement is not merely dependent on the presence of a predicative relation between  $C^0$  and the nominal head. In other words, bidirectional agreement is justified independently in the domain of  $C^0$ , while Rizzi's (1990) [ $\pm$ pred] is not.

7. A reviewer notes that the solution proposed here for "optional" *that* does not address the "ineliminable ambiguity of *that*". Why should *that* optionally surface to mark absence of agreement? I think this objection presupposes a reductionist view of morphological marking: only the presence and absence of morphemes "count" as *bona fide* morphological manifestations of a syntactic relation. It is my contention that the optionality of *that* should be viewed as a morphological property in and by itself: in this way, obligatory *that* and optional *that* are two elements that are formally and morphosyntactically different.

The correct answer to this means that as a complex complementizer, *est-ce que* means 'Is it true that she has arrived?', without triggering the movement of *est-ce que* to the specifier of  $C^0$ . This much should be clear from the fact that *est-ce que* is not expressed in embedded interrogatives.

The  $C^0$  *est-ce que* is moved to the specifier of  $C^0$  and subsequent to other *wh*-pronominals, including other *wh*-NPs, including *est-ce que* is not expressed in embedded interrogatives.

- (11) a. *Qui?*  
'Wh'  
b. *Que?*  
'Wh'  
c. *Quel?*  
'Whi'  
d. *Comment?*  
'How'

To the best of my knowledge, this is the only literature. Important literature on SpecIP, or, for that matter, on the

8. The careful reader will notice that the analysis of the interrogative *qui* 'who' is that only interrogative *wh*-pronominals trigger the movement of *est-ce que* to the specifier of  $C^0$ . Hirschbühler (1986) has argued that the *est-ce que* +  $V^0-T^0$  properties in  $C^0$ .

(i) *Que fait M?*  
what does M do?

As such, *que* 'what' is not a *wh*-pronominal out of the  $V^0-T^0-A$  class in  $C^0$ .

(iii) *Qu'est-ce que M a dit?*  
what that<sub>1</sub> M has said

This excorporation of *est-ce que* from the class of *wh*-pronominals (Kayne (1991) has argued that clitics are adjoined to the *wh*-pronominal)

The correct answer to the question would be: *Oui, c'est qu'elle est venue* 'Yes, this means that she came'. In this case, *être* 'be' can be used in the past tense. As a complex complementizer, *est-ce que* does not bear any intonation, and means 'Is it true that Euphrasie has arrived?', with a corresponding answer 'Yes, she has arrived'. In this use of *est-ce que*, *être* cannot be put in the past tense without triggering falling intonation and a corresponding change in interpretation. This much should make it clear that *est-ce que* functions as a single complex interrogative C<sup>0</sup>.

The C<sup>0</sup> *est-ce que* also undergoes *que/qui* conversion if an adjacent subject is moved to the domain of C<sup>0</sup>. It appears however that movement to the domain of C<sup>0</sup> and subsequent conversion to *est-ce qui* is limited to the interrogative animate *wh*-pronoun *qui* 'who' and the inanimate *wh*-pronoun *que* 'what'.<sup>8</sup> No other *wh*-NPs, including simplex *wh*-pronouns such as *combien* 'how many', can similarly trigger *est-ce qui* conversion if they originate in SpecIP. When *est-ce que* is not expressed in C<sup>0</sup>, the sentences are fine.

- (11) a. *Qui/Qu'est-ce qui est arrivé?*  
'Who/what that, has arrived?'  
b. *Quels enfants (\*est-ce qui) [t sont arrivés?]*  
'Which children (that,) have arrived?'  
c. *Quel paquet (\*est-ce qui) [t est arrivé?]*  
'Which package (that,) has arrived?'  
d. *Combien (\*est-ce qui) [t en sont arrivés?]*  
'How many (that,) of-it have arrived?'

To the best of my knowledge, this fact has gone unobserved in the generative literature. Importantly, *est-ce que* is possible if the *wh*-NP does not transit through SpecIP, or, for that matter, if any "non subject" *wh*-element moves to SpecCP:

8. The careful reader will have noted that I use the term "movement to the domain of C<sup>0</sup>" for interrogative *qui* 'who' and *que* 'what' rather than "movement to SpecCP". The reason for this is that only interrogative *qui* is a *wh*-NP, which moves to SpecCP. As shown by Bouchard and Hirschbühler (1986), interrogative *que* 'what' is a +*wh*-clitic in French which forces movement of the *que* + V<sup>0</sup>-T<sup>0</sup>-AgrSubj<sup>0</sup> complex to C<sup>0</sup> so that interrogative *que* 'what' can check its +*wh*-properties in C<sup>0</sup>.

- (i) *Que fait Marie?* (ii) *\*Que Marie fait*  
what does Marie what Marie does

As such, *que* 'what' is the counterpart of clitic *le* 'it'. Interrogative *que* 'what' can also move out of the V<sup>0</sup>-T<sup>0</sup>-AgrSubj<sup>0</sup> complex to C<sup>0</sup> if the complex complementizer *est-ce que* is present in C<sup>0</sup>:

- (iii) *Qu'est-ce que tu fais?* (iv) *Qu'est-ce qui est arrivé?*  
what that, you do? What that, happened?

This excorporation out of the V<sup>0</sup>-T<sup>0</sup>-AgrSubj<sup>0</sup> complex into C<sup>0</sup> *est-ce que* is not surprising: Kayne (1991) has demonstrated that attachment to V<sup>0</sup> is not an intrinsic property of clitics, but that clitics are adjoined to functional projections.

- (12) a. *Quels enfants est-ce que [tu as vus t]*  
 which children is-it-that you have seen  
 b. *Combien est-ce que [tu en a vus t]*  
 how many is-it-that you of-it have seen  
 c. [Quand/comment/avec quels arguments] *est-ce que tu as*  
 when/ how/ with which arguments is-it-that you have  
*convaincu Nestor?*  
 convinced Nestor'

Clearly then, the sentences (11b–d) testify to an unadulterated *that*-trace effect in French matrix interrogative clauses. The question now is: why is *est-ce qui* possible with interrogative *qui* 'who' and *que* 'what' in SpecCP and C<sup>0</sup> respectively? Clearly, Rizzi's (1990) [ $\pm$ pred] is of no avail here.

The question raised by the examples in (8) is why interrogative *qui* and *que* can agree with the C<sup>0</sup> *est-ce qui*, while full *wh*-NPs and quantifying pronouns cannot. I would like to suggest that *est-ce qui* represents an AgrC<sup>0</sup> with  $\phi$ -features that are specified as [0 person, 0 gender, 0 number]. When in SpecCP, only interrogative *qui* and *que* can agree with this 0-specified *est-ce qui*, since they also have 0 specified  $\phi$ -features. Full *wh*-NPs and pronouns such as *combien* 'how many' have positively specified features, at least for number. As a result, they cannot agree with 0 specified AgrC<sup>0</sup> *est-ce qui*. The fact that *est-ce que* is also prevented from appearing in these contexts is due to the fact that the AgrC<sup>0</sup> agreeing with full *wh*-NPs and pronouns originating in SpecIP is a null morpheme.

At this point, one might ask why 0-features are introduced rather than the minus value of the widely adopted binary [ $\pm$ ] system for features.<sup>9</sup> For one thing, it is not very clear what would be the import of features of the type [ $-$ person,  $-$ gender,  $-$ number]. As far as I know, these never trigger any syntactic processes of agreement. Moreover, a growing body of work in phonology (for example, Ewen and van der Hulst 1985; Rennison 1986; Anderson and Ewen 1987) argues in favor of a unary system of features, and the question raises as to whether the same move should not be made in the morphosyntactic feature system. In what follows, the reasons for my choice of the 0-value will become clearer.

There is independent evidence that interrogative *qui* and *que* have indeed 0-specified features. If it is assumed that agreement involves identity of features, this evidence will indirectly testify to the 0-specified nature of *est-ce qui*. A first argument for the 0-specified nature of *qui* 'who' comes from binding theory. Interrogative *qui* 'who' can agree with the anaphor *soi* 'self':

9. For a carefully worked out binary [ $\pm$ ] system of syntactic features, see Kerstens (1993).

- (13) *Qui ne p*  
 'Who dc

Burzio (1989) cl:  
 it with [0 person,  
 and number. Th  
 restricted set of q  
*le monde* 'everyc  
 Importantly, it al

- (14) a. *Cha*  
 'Evi  
 b. *La l*  
 c. \**Goc*

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 'all' (cf. Doetjes 1  
 not interrogative *q*

- (15) [*Quels en*  
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 therefore cannot co  
 to be corroborated  
 [+sg] floating *tout*.

- (16) a. *Qui e*  
 who i  
 b. *Qu'*  
 what



- (13) *Qui ne pense jamais à soi?*  
'Who doesn't ever think of himself?'

Burzio (1989) claims that the anaphor *soi(-même)* has no  $\phi$ -features, and marks it with [0 person, 0 gender, 0 number] features, undetermined for person, gender and number. The anaphor *soi(-même)* indeed only takes for antecedents a restricted set of quantifiers such as *chacun* 'everyone', *quiconque* 'whoever', *tout le monde* 'everyone', *personne* 'nobody' (Grevisse 1980: sections 1083–1084). Importantly, it also binds an empty *pro* object, as in (14).

- (14) a. *Chacun/ tout le monde pense toujours à soi.*  
'Everybody always thinks about oneself'  
b. *La bonne musique réconcilie \_\_ avec soi-même.*  
c. \**Good music reconciles \_\_ with oneself.*

Rooryck (1992) has suggested that object *pro* is [0 person, 0 number, 0 gender] to explain the different restrictions on binding of *pro* by anaphors in French, Dutch and English. Note that it would not make much sense to attribute [-person, -gender, -number] features to *pro*, and correspondingly to *soi-même* 'oneself'. Rooryck (1992) argues that English *one*, and hence *oneself*, is [+sg] since it agrees with third person *-s*. Similarly, Dutch *zichzelf* arguably has [+3rd person, 0 number, 0 gender] features. As a result, these anaphors clash with the 0-featured antecedent *pro*. For French, Rooryck (1992) assumes Burzio's (1989) claim that *soi-même* is entirely underspecified for features. Since both *pro* and *soi-même* are [0 person, 0 gender, 0 number], the anaphor *soi-même* can be bound by *pro*. Since interrogative *qui* 'who' also agrees with *soi* 'self', the requirement of identity of features implicit in binding suggests that interrogative *qui* 'who' is also endowed with 0-specified features.

A second argument in favor of the idea that interrogative *qui* and *que* have 0-specified features comes from its interaction with the floating quantifier *tous* 'all' (cf. Doetjes 1992 for a recent analysis). *Tous* 'all' can modify a *wh*-NP, but not interrogative *qui* 'who' or *que* 'what':

- (15) *{Quels enfants/\*qui/qu' } est-ce que tu as tous vu?*  
which children/who/what is-it-that you have all seen

It might of course be argued that interrogative *qui* and *que* are [+sg], and therefore cannot co-occur with [+pl] *tous* 'all'. At first sight, this objection seems to be corroborated by the fact that interrogative *qui* and *que* can co-occur with [+sg] floating *tout*, in the standard variety of French spoken in Belgium:

- (16) a. *Qui est-ce que tu as (tout) vu à la fête?*  
who is-it-that you have all seen at the party  
b. *Qu' est-ce que tu as (tout) fait pendant les vacances?*  
what is-it-that you have all done during the holidays

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t]  
n  
| est-ce que tu as  
is-it-that you have

ulterated *that*-trace effect  
now is: why is *est-ce qui*  
'hat' in SpecCP and C<sup>0</sup>  
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*soi* 'self':

In this case, floating *tout* adds a specification to the possible answer to the question. Without *tout*, the answer to (16a) might include a single person, several people, or even a group. With *tout*, (16a) can only have a (plural) list answer, never a group. This suggests that the addition of *tout* pares down the interpretive possibilities of interrogative *qui*. *Mutatis mutandis*, the same is true for *que* 'what'.

If one is to claim that *quel/que* are [+sg] syntactically, it will have to be argued that at least semantically *quel/que* can be both plural and singular. However, if *qui* is syntactically singular, it remains distinctly odd that no other singular *wh*-NP can co-occur with *tout* in this way. Floating *tout* with a list reading is possible with a plural *wh*-NP, but list-reading *tout* cannot co-occur with any singular NP.<sup>10</sup>

- (17) a. *Quels tableaux est-ce que tu as (tout) vendus cet été?*  
 which paintings is-it-that you have (all) sold this summer  
 b. *Quel livre est-ce que tu as (\*tout) lu?*  
 which book is-it-that you have (all) read

This of course could again be attributed to the fact that interrogative *qui* and *que* are the only elements to combine syntactic [+sg] features with semantic [0 number] features. But this answer of course begs the question as to how the syntactic [+sg] features can be distinguished from the interpretive [0 number] features on theoretical grounds. The conceptually simpler analysis is to say that interrogative *qui* and *que* are 0-specified for all  $\phi$ -features. As such, they are semantically compatible with both singular and plural answers. List-reading *tout* functions as a distributive adverb that does not agree with its antecedent.

The behavior of *tout* in (16) can be interpreted as an argument in favor of the 0-specified status of interrogative *qui* and *que*. First, *que* and *qui* cannot be [+pl], since they trigger [+sg] agreement. Secondly, it is clear that *que* and *qui* cannot be simply [+sg] either, since [+sg] NPs cannot co-occur with list-reading *tout*.

10. At first sight, floating *tout* with interrogative *qui* and *que* resembles Dutch *zoal* 'among others' or *allemaal* 'all', which also trigger a list reading with interrogative *wie* 'who':

- (i) *Wie heb je allemaal/zoal gezien?*  
 who have you all/ among others seen

Since the appearance of *quel/que ... tout* seems to be limited to Belgian French, it is tempting to see influence from Southern Dutch dialects here. Nevertheless, Dutch *allemaal* is not adequately translated as *tout/tous*. Unlike French *tout/tous* 'all', the Dutch quantifiers *allemaal/zoal* can also co-occur with a plural *wh*-NP, and always yield a list reading:

- (ii) *Welke boeken heb je allemaal/zoal gelezen?*  
 which books have you all/ among others read

Agreeing *tous* 'all' in (17b) does not impose a list reading, while *tout* in (16) requires a list reading. If Belgian French *quel/que ... tout* were due to Dutch influence, it is not immediately obvious why the quantifier *tout/tous* was picked, since it does not require a list reading in Standard French.

If it is argued that *qui* and *que* are [+pl] with number, and *qui* is not reconciled: 0 numbr interpreted either a semantically plural: 'who' and *que* 'wh agreement should b on the verb with int impersonal or weath *que* are identical in also carry semantic

We may conclude  $\phi$ -features that can interrogative *qui* 'wh of the analysis is tha *ce qui* have totally 0  $\alpha$ -num] features in [0 person, 0 gender, Frei (1929).<sup>12</sup> Note in conformity with C

11. In fact, it should be underspecified as [0 called impersonal or is not just a result properties associated the personal ( $\alpha$ anima 'he/it' explains why t the only morpheme is only morpheme comp clitics are heads in c Rizzi's (1990) analys viewed as head move since its under Notice that this analy of subject clitic *il* fro *i(l)* 'he/it' in compler interrogative *qui* 'whc [ $\alpha$  person,  $\alpha$  gender, c in Nonstandard Frenc presented here at leas

12. 0-specified features an extraction out of an er *que* would be able to result, 0-featured Agrt in matrix and embedd

If it is argued that interrogative *qui* and *que* have no specific feature associated with number, and in fact have [0 number] features, both observations can be reconciled: 0 number implies that the number feature can be semantically interpreted either as singular or as plural. List reading *tout* then selects the semantically plural reading. Morphosyntactically, the fact that interrogative *qui* 'who' and *que* 'what' originating in Spec of IP position trigger third person agreement should be viewed as default agreement. The third person inflection on the verb with interrogative *qui* and *que* subjects then is similar to that with impersonal or weather subject *il* 'it'. Impersonal *il* 'it' and interrogative *qui* and *que* are identical in  $\emptyset$ -features, they only differ in that interrogative *qui* and *que* also carry semantic [ $\pm$ animate] features.<sup>11</sup>

We may conclude that French thus has an AgrC<sup>0</sup> *est-ce qui* with 0-valued  $\emptyset$ -features that can only agree with other 0-valued *wh*-elements, *in casu* interrogative *qui* 'who' and *que* 'what' originating in SpecIP position. The result of the analysis is that the interrogative animate *wh*-NP *qui* as well as the C<sup>0</sup> *est-ce qui* have totally 0-specified features, whereas C<sup>0</sup> *qui* can have [ $\alpha$ -pers,  $\alpha$ -gen,  $\alpha$ -num] features in Standard French and either [0 pers,  $\alpha$  gen,  $\alpha$  num] or [0 person, 0 gender, 0 number] features in the varieties of French described by Frei (1929).<sup>12</sup> Note that all variation is reduced to morphological differences, in conformity with Chomsky's (1992) minimalist program.

11. In fact, it should be stated more radically that the third person morpheme *il* 'he/it' is always underspecified as [0 person, 0 gender, 0 number]. The fact that *il* 'he/it' functions both as so-called impersonal or weather *il*, and as the third person masculine singular nominative pronoun is not just a result of homonymy: *il* 'he/it' is always underspecified, and the selectional properties associated with the argument of the verb ending up in Spec of IP position determine the personal ( $\pm$ animate) or impersonal status of *il*. Notice that an underspecified analysis of *il* 'he/it' explains why the morpheme *il* also shows up on the complementizer *qui*: *il* 'he/it' is the only morpheme in the subject clitic paradigm that is fully underspecified. As such, it is the only morpheme compatible with an underspecified complementizer. Under the view that subject clitics are heads in or related to AgrSubj (for example Roberge 1986), Kayne's (1976) and Rizzi's (1990) analysis of complementizer *qui* marking AgrSubj<sup>0</sup>-AgrC<sup>0</sup> agreement could be viewed as head movement of *il* 'he/it' to C<sup>0</sup>. *il* 'he/it' then is the only subject clitic to so move since its underspecified nature make it uniquely compatible with  $\alpha$ -specified AgrC<sup>0</sup>. Notice that this analysis would still require a change in the type of feature underspecification of subject clitic *il* from [0 person, 0 gender, 0 number] to [ $\alpha$  person,  $\alpha$  gender,  $\alpha$  number] of *il* 'he/it' in complementizer *qui*. This same problem arises with respect to the similarity of interrogative *qui* 'who' [0 person, 0 gender, 0 number], and complementizer *qui* which is either [ $\alpha$  person,  $\alpha$  gender,  $\alpha$  number] (Standard French), or a combination of 0- and  $\alpha$ -valued features in Nonstandard French. I will leave this problem for further research, noting that the analysis presented here at least allows for a descriptive explication of the similarities involved.

12. 0-specified features are presumably excluded from occurring in a declarative C<sup>0</sup>, since otherwise extraction out of an embedded sentence would be extremely limited: only interrogative *qui* and *que* would be able to move through the domain of C<sup>0</sup> on their way to the matrix clause. As a result, 0-featured AgrC<sup>0</sup> *est-ce qui* in French will only show up where *wh*-movement is local: in matrix and embedded interrogatives.

3.  $\alpha$ - and 0-features in syntax and phonology

Finally, the theoretical relevance of both types of syntactic underspecification should be discussed in the light of underspecification theory in phonology. In the history of generative grammar, syntactic feature theory has always been inspired by phonological feature theory. As was already mentioned in the introduction, the question arises whether this influence is accidental or not. If the feature systems of syntax and phonology are organized quite differently, the syntactic distinction between 0- and  $\alpha$ -features is not expected to turn up in phonology. If, on the contrary, the syntactic 0/ $\alpha$ -distinction does have a counterpart in phonology, it might reflect an organization of feature theory that would be shared by both syntax and phonology.

I will discuss some indications from vowel harmony (the phonological counterpart of a agreement) that the latter conclusion is warranted. Tangale, a member of the Chado-Hamitic language group spoken in Nigeria, has nine vowel phonemes which can be represented in the following chart from Jungraithmayer (1971), as quoted by van der Hulst and van de Weijer (1993).

(18)

		front		back	
high		i		u	close/ATR
		ɪ		ʊ	open/RTR
mid		e		o	close/ATR
		ɛ		ɔ	open/RTR
low			a		open/RTR

(= van der Hulst and van de Weijer 1993: [1])

Jungraithmayer (1971) subdivides Tangale vowels into two subsets, the open set /i ʊ ɛ ɔ a/ and the closed set /ɪ u e o/, which are called harmonic sets. The open/close distinction was later argued to involve the feature [ATR] (advanced tongue root) (van der Hulst and van de Weijer 1993). Vowel harmony in Tangale is stem controlled: a stem with a closed vowel triggers the ATR variant of the vowel on all affixes, and a stem with an open vowel triggers the RTR (retracted tongue root) variants of the vowel on the same affixes. Vowels on stems are fixed, vowels on affixes act like chameleons (van der Hulst and van de Weijer 1993).

(19)

<i>ɲoldede</i>	'dog'
<i>seb-u</i>	'look-IMP'
<i>kɛn-o</i>	'enter-IMP'
<i>tug-o</i>	'pounding'
<i>wod-ɔ</i>	'farming'

(= van der Hulst and van de Weijer 1993: [2])

Importantly, the | a ATR vowel: t| neutralized (van nevertheless clas open set:

- (20) ?n kas-kɔ  
?a-nɔ  
war-o  
(= van de

When the neutral ATR or RTR vari vowel.

- (21) top-a  
top-a  
(= van de

Importantly, wher not agree with th suffix:

- (22) ped-na-n-  
peer-na-n-  
doh-na-g-  
dib-na-m-  
(= van der

The neutral vowel called an opaque v Van der Hulst ar are opaque: in the | are transparent. Th "transmission" of t on the line. Finnist

- (23)
- |  |           |
|--|-----------|
|  | non-round |
|  | i         |
|  | e         |
|  | ä         |
- (= van der Huls

Van der Hulst and example of a palatal

Importantly, the low vowel /a/ does not show a distinction between an RTR and a ATR vowel: there is no harmonic counterpart. The potential distinction is neutralized (van der Hulst and van de Weijer 1993: 2). The neutral vowel is nevertheless classified as RTR since it selects suffixes with vowels from the open set:

- (20) ?n kas-kɔ 'I have cut'  
 ?a-nɔ 'my belly'  
 war-o 'go-IMP'  
 (= van der Hulst and van de Weijer 1993: [3])

When the neutral vowel /a/ appears in affixes, it simply remains /a/, without an ATR or RTR variant, irrespectively of whether the stem has an ATR or an RTR vowel.

- (21) top-a 'start-NOM' peer-na 'compelled'  
 tɔp-a 'answer-NOM' ped-na 'untied'  
 (= van der Hulst and van de Weijer 1993: [4])

Importantly, when a suffix is added to a suffix with /a/, the added suffix does not agree with the stem vowel, but with the /a/ immediately preceding that suffix:

- (22) ped-na-n-gɔ 'untied me'  
 peer-na-n-gɔ 'compelled me'  
 dɔb-na-g-gɔ 'called you-PL'  
 dɪb-na-m-gɔ 'cooked for us'  
 (= van der Hulst and van de Weijer 1993: [6a])

The neutral vowel /a/ thus blocks the vowel harmony, and is correspondingly called an opaque vowel (van der Hulst and van de Weijer 1993).

Van der Hulst and van de Weijer (1993) point out that not all neutral vowels are opaque: in the Finnish vowel harmony system, there are neutral vowels that are transparent. These vowels are like consonants in that they do not block the "transmission" of the vowel harmony to the vowels of the affixes lower down on the line. Finnish has the following vowel system:

- (23)
- | front     |       | back      |       |      |
|-----------|-------|-----------|-------|------|
| non-round | round | non-round | round |      |
| i         | ū     |           | u     | high |
| e         | ō     |           | o     | mid  |
| ä         |       | a         |       | low  |

(= van der Hulst and van de Weijer 1993: [7])

Van der Hulst and van de Weijer (1993) define Finnish vowel harmony as an example of a palatal harmony system: vowels in a word are all front or all back.

- (24) *tyhmä – stä* 'stupid-ILL'  
*tuhma – sta* 'naughty-ILL'

(= van der Hulst and van de Weijer 1993: [9])

The vowels /i/ and /e/ have no back counterparts and are traditionally called neutral vowels. Importantly, the [front] feature of the neutral vowels /i/ and /e/ has no influence on vowel harmony:

- (25) a. *värttinä* 'spinning wheel'  
*värttinä – llä – ni – hän* 'with spinning wheel, as you know'  
 b. *tuoli – lla* 'on the chair'  
*palttina* 'linen cloth'  
*palttina – lla – ni – han* 'with linen cloth, as you know'

(= van der Hulst and van de Weijer 1993: [10–12])

Neutral vowels are therefore called transparent vowels (van der Hulst and van de Weijer 1993).

In essence, then, there are two types of neutral vowels intervening in a vowel harmony chain: some block the harmony (Tangale), others transmit the harmony (Finnish).

- (26) For X a feature participating in vowel harmony, and Y a neutral vowel:

a.	C	V	C	V	C	V	C	V	(Finnish)
		X		X		Y		X	
						'transparent'			
b.	C	V	C	V	C	V	C	V	(Tangale)
		X		X		Y		Z	
						'opaque'			

Now, abstracting away from the CV structure in (26), a similar pattern shows up in relative clauses in French. Recall that there is variation in French regarding the exact morphosyntactic features that can be transmitted to the embedded AgrSubj:

- (27) a. *C'est moi-1SG qui suis-1SG venu.*  
 'It is I who have come.'  
 b. *nous-1PL qui sommes-1PL là*  
 'we who are there'
- (28) a. *C'est moi-1SG qui est-3SG venu.*  
 'It is me who has come.'  
 b. *C'est nous-1PL qui sont-3PL venus.*  
 'It is us who have come.'

In (27), all [person, number, gender] features of the N heading the relative clause are transmitted to the relative clause, since AgrC<sup>0</sup> *qui* has  $\alpha$ -valued  $\phi$ -features

or is "transparent" the feature for  $\phi$  abstractly as follows

- (29) a. N  
 X $\phi$ <sub>pe</sub>

- b. N  
 X $\phi$ <sub>per</sub>

Both vowel harmony in common: both  $\epsilon$  the intervening element agreement. If it is  $\epsilon$  sufficiently alike  $i$  represent them. In binary feature systems of underspecification systems (Rennison 1985). In Government move to question theory noted in the introduction of functional heads (Bernstein 1991; Rizzi) much less work on attributes, namely v. unary system, the feature presentation rather than

Let us represent attributes and values attribute for a further on Attribute – Value  $\phi$ -features contains the Case node here. person, gender and number for resp [1st/2nd/3rd precise unary representation Value sets (AV sets) other. A sentence such

or is "transparent", in (28) only [gender, number] features are transmitted since the feature for person has a 0-value, or is "opaque". This can be represented abstractly as follows:

- (29) a. N (...) AgrC<sup>0</sup> (...) AgrSubj<sup>0</sup> (Standard French)  
 X<sub>person</sub> Y<sub>person</sub> X<sub>person</sub>  
 (α-person)  
 "transparent"
- b. N (...) AgrC<sup>0</sup> (...) AgrSubj<sup>0</sup> (Nonstandard French)  
 X<sub>person</sub> Y<sub>person</sub> Z<sub>person</sub>  
 (0-person) ("default" 3rd person)  
 "opaque"

Both vowel harmony in (26) and the agreement in (29) have several properties in common: both are instances of a nonlocal feature dependency, in both cases, the intervening element does not change itself, despite blocking/transmitting the agreement. If it is granted that the phonological and syntactic feature systems are sufficiently alike in this respect, the question arises as to how to adequately represent them. In phonology, there has been a move away from the purely binary feature systems of the sixties towards binary feature systems making use of underspecification (Archangeli 1984) or even more restrictive unary feature systems (Rennison 1986; Anderson and Ewen 1987; Ewen and van der Hulst 1985). In Government and Binding syntax, there has not been a comparable move to question the representation of feature values, except for the references noted in the introduction. A lot of recent work has gone into the multiplication of functional heads for feature *attributes* such as person, gender, and number (Bernstein 1991; Ritter 1991; Picallo 1991), but to my knowledge there has been much less work on the representation of the values corresponding to those attributes, namely values such as <+>, <->, <0>, or <α>. Ideally, in a restrictive unary system, the feature values <+>, <0>, and <α> would follow from a representation rather than be stipulated within the system as feature values *per se*.

Let us represent agreement features as hierarchically structured pairs of attributes and values, where a value for a given attribute can in turn become the attribute for a further value. These terms are taken from Scobbie's (1991) work on Attribute – Value Phonology. In this way, the node representing the attribute φ-features contains the nodes [png] and Case as its values. We will not represent the Case node here. The node [png] is in turn the attribute for the three values person, gender and number. Person, gender and number then are the attributes for resp [1st/2nd/3rd person], [sg/pl], [fem/masc] (See the appendix for a more precise unary rendering of terminal feature values). In this way, Attribute – Value sets (AV sets) are obtained which are always partly embedded into each other. A sentence such as (30a) then has a feature representation as in (30b),

))

nd are traditionally called  
 : neutral vowels /i/ and /e/

wheel'  
 ming wheel, as you know'  
 air'  
 th'  
 n cloth, as you know'  
 93: [10–12])

els (van der Hulst and van

wels intervening in a vowel  
 others transmit the harmony

ony, and Y a neutral vowel:

V (Finnish)

X

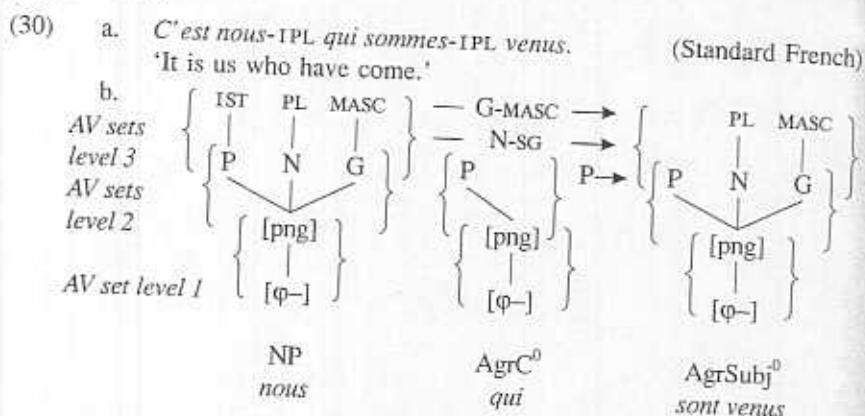
V (Tangale)

Z

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 ariation in French regarding  
 ansmitted to the embedded

N heading the relative clause  
*qui* has α-valued φ-features

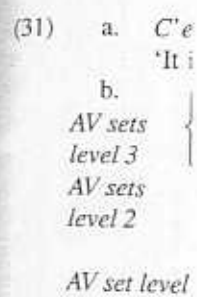
where I assume for ease of exposition that *nous* 'we' has [masc] features.<sup>13</sup> The brackets in the structure (30b) are meant to give a representation of the embedding of the various Attribute - Value sets, levels are given for mnemonic purposes only.



In this structure, I assume that AgrC<sup>0</sup> does have an attribute [person, gender, number], but that this attribute does not have a further Attribute - Value structure. As a result, it is transparent with respect to feature transmission: AgrC<sup>0</sup> then is completely "neutral" or "transparent" with respect to the transmission of agreement into the relative clause. The absence of a complete [attribute : value] set corresponds to the value  $\alpha$ .

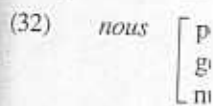
In the relative clauses of nonstandard French, relative *qui* does have an attribute for person, but no specific value associated with it. The presence of the attribute [person], or rather of the AV set [[png] : pers], now blocks transmission of the corresponding value of the head noun, triggering "default" third person agreement on V<sup>0</sup>-T<sup>0</sup>-AgrSubj<sup>0</sup> complex of the relative clause. This suggests that the relative AgrSubj<sup>0</sup> takes over the unspecified person attribute of *qui*. The 0-value of a feature then corresponds to an attribute without a feature specification: [attribute : ].

13. We represent the gender feature of *nous* 'we' here as [gender : masc] for ease of exposition. In fact, *nous* 'we' is always  $\alpha$ -specified for gender. This  $\alpha$ -specification can be defended in view of the fact that gender agreement with *nous* 'we' depends on extralinguistic context: referring to an all-female group, *Nous sommes contentes* 'We are happy-FEM:PL' shows feminine agreement, while a mixed group would trigger masculine (default) agreement (*Nous sommes contents* 'We are happy-MASC:PL'). Only  $\alpha$ -specification of the gender feature on *nous* 'we' can explain this "referential" agreement; 0-specification would trigger "default" or so-called masculine agreement in all cases.



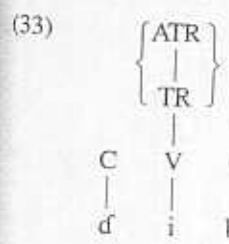
Since no AV sets this dialect of Fr transmitted down

Interrogative *qu* described as elem are projected, but value. The feature tive *qui* 'who' and



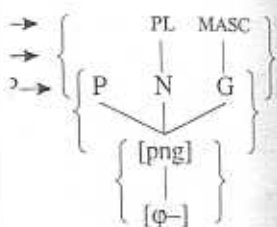
Note that the featur explain their morph elements are defin 'who' and *que* 'wh values (are always Attribute - Value French, [5]), or they and *que*) without va

The "opaque" aspe similar way. In (33), c



e' has [masc] features.<sup>13</sup>  
e a representation of the  
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(Standard French)



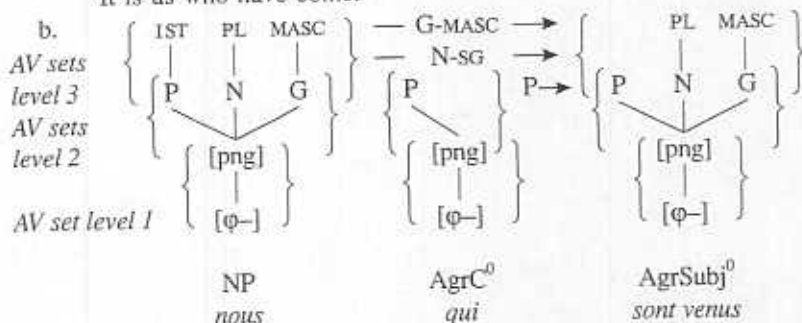
AgrSubj<sup>0</sup>  
sont venus

attribute [person, gender,  
urther Attribute - Value  
ature transmission: AgrC<sup>0</sup>  
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relative *qui* does have an  
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erson attribute of *qui*. The  
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: masc] for ease of exposition. In  
fication can be defended in view  
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happy-FEM:PL' shows feminine  
efault) agreement (*Nous sommes*  
: gender feature on *nous* 'we' can  
l trigger "default" or so-called

(31) a. *C'est nous-1SG qui sont-3SG venus.* (Nonstandard French)  
'It is us who have come.'



Since no AV sets for number and gender are present on the [png] attribute in this dialect of French, the AV sets for number and gender of *nous* 'us' are transmitted down to AgrSubj without encountering anything to block them.

Interrogative *qui* 'who' and *que* 'what', with so-called 0-features, can then be described as elements of which the [person], [number], and [gender] attributes are projected, but without being specified, that is, without receiving a specific value. The feature specification of *nous* 'we' then compares to that of interrogative *qui* 'who' and *que* 'what' in the following way:

(32) *nous* [person : IST  
gender : MASC  
number : PL]      *quelque* [person :  
gender :  
number : ]

Note that the feature values of interrogative *qui* 'who' and *que* 'what' now help explain their morphological similarity to the complementizers *qui* and *que*: both elements are definable in terms of 0- and α-valued features. Interrogative *qui* 'who' and *que* 'what' always have person, number and gender attributes without values (are always 0-specified), complementizer *qui* and *que* have either no Attribute - Value sets at all for person, number, gender features (Standard French, [5]), or they have certain attributes (in the same way as interrogative *qui* and *que*) without values (Nonstandard varieties of French, [6]-[7]).

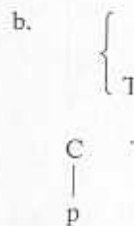
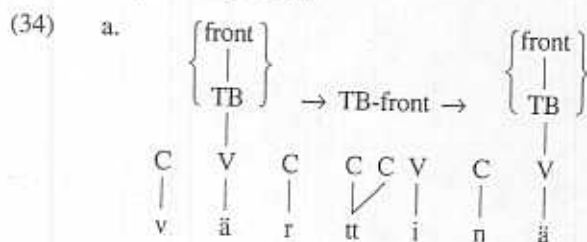
The "opaque" aspect of vowel harmony in Tangale can be represented in a perfectly similar way. In (33), only the feature set relevant to the harmony is represented:

(33) {ATR}      {TR} → TR → {TR}

C   V   C   C   V   C   C   V  
|   |   |   |   |   |   |   |  
d'   i   b-   n   a-   m-   g   u

The reason why /a/ is represented without a feature-value RTR for the attribute TR is the economy of a unary feature system: no reference to RTR (-ATR) is to be made if it is not necessary. Van der Hulst and van de Weijer (1993: 20) point out that vowel harmony systems such as Tangale have usually been described in terms of ATR-spreading. It therefore stands to reason that only this feature-value would be used, while the feature-value RTR is left underspecified, only to be "filled in" phonetically as a "neutral" or "default" tongue root position RTR. RTR is a phonetic, not a phonological property. "Default" 3rd person agreement in AgrSubj<sup>0</sup> arises in the same way in the syntax. The valueless [TR : ] also participates in the vowel harmony: this stems from the idea that the harmony/agreement system has no access to what is inside the Attribute - Value box: the harmony only sees the label TR on the box that is to be transmitted. Nothing essential hinges on this idea however. The segment structure condition that has traditionally been related to the neutralization, namely that the combination of the features [low] and [ATR] is impossible (van der Hulst and van de Weijer 1993), can here be restated by saying that the Attribute - Value set [height : low] prevents the attribute [TR] from projecting the feature [ATR].

Finally, "transparent" Finnish vowel harmony can be represented in the same way as its syntactic counterpart AgrC<sup>0</sup> *qui* in Standard French. Following van der Hulst and Smith (1986), I will assume that the feature [front] spreads in Finnish. The feature [back] (34b) is not represented as a feature-value. The underspecified value of the attribute [TB] (tongue body) will be "filled in" as [back] as a phonetic "default" procedure. For the vowels /i/ and /e/, this implies that the absence of the entire [TB] Attribute - Value set results in their being spelled out as "default" [front] vowels. The feature geometry of the vowels in (34) is of course not complete: only the features relevant to vowel harmony have been represented. The other elements determining the feature geometry of /i/ and /e/ (non-round, high/mid), which are not represented in (34), must be thought of as constraining the surface phonetic manifestation of vowels without a phonological [TB] attribute in such a way that /i/ and /e/ are "filled in" as the result of a phonetic process.

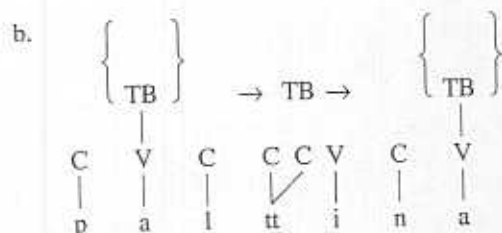


In Finnish then, the "hardwired" phonol /ö/, /ä/, or as a phonol that miss a [TB : fr [back] feature is re attribute without an

If this line of rea organization that mi this article, I have tr and <α>-values of distinction has long was made to argue systems can be repr reasons to assume i syntax and phonolog constitutes strong e language faculty, ba model, that would b

#### Appendix: The spec

One reviewer makes here, there are diffe morphosyntax. He ar or, as assumed here, more than two spee observation made is : it should be specific assigns binary featu phonological feature Secondly, the Attribi respect to the binary - Value set always i nesting AV sets. In th



In Finnish then, there are two ways in which [front] can be realized: either as a "hardwired" phonological feature that spreads via vowel harmony, yielding /ü/, /ö/, /ä/, or as a phonetic feature that shows up as a "default" value for vowels that miss a [TB : front] dimension altogether, yielding /i/ and /e/. The phonetic [back] feature is realized as a "default" value for vowels that have a [TB] attribute without an associated value: [TB : ].

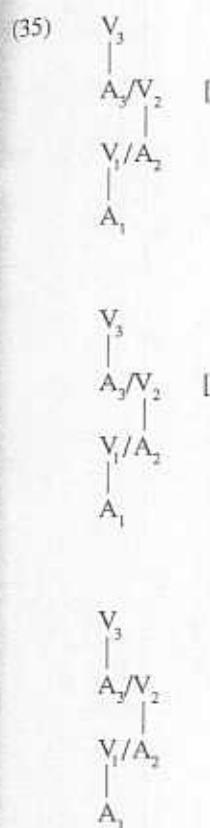
If this line of reasoning is correct, there is evidence of a system of feature organization that might be common to the morphosyntax and the phonology. In this article, I have tried to show that a descriptive difference between <+>, <0> and <∅>-values of features is necessary in morphosyntax, and that a similar distinction has long been made for phonological harmony systems. An attempt was made to argue that both the phonological and morphosyntactic harmony systems can be represented in the same way. Therefore, there seem to be good reasons to assume that the basic elements of feature theory are common to syntax and phonology. Such a common ground for the organization of features constitutes strong evidence for a separate module of feature theory in the language faculty, based on something like Scobbie's (1991) Attribute - Value model, that would be accessible to both syntax and phonology.

#### Appendix: The specification of features

One reviewer makes the interesting observation that despite the system proposed here, there are differences in the organization of features in phonology and morphosyntax. He argues that phonological features are either maximally binary or, as assumed here, unary, while syntactic features are not binary but can have more than two specifications, as is the case for the [person] feature. The observation made is an important one, and needs some qualification. First of all, it should be specified that classical (say *Sound Pattern of English*) phonology assigns binary features, but that is has been proposed in the literature that a phonological feature such as [height] needs to have three feature-values. Secondly, the Attribute - Value system used here does not take position with respect to the binary or multiple specification of features: note that one Attribute - Value set always is the Value of another Attribute - Value set: this creates nesting AV sets. In the system proposed here, the nesting of AV sets is assumed

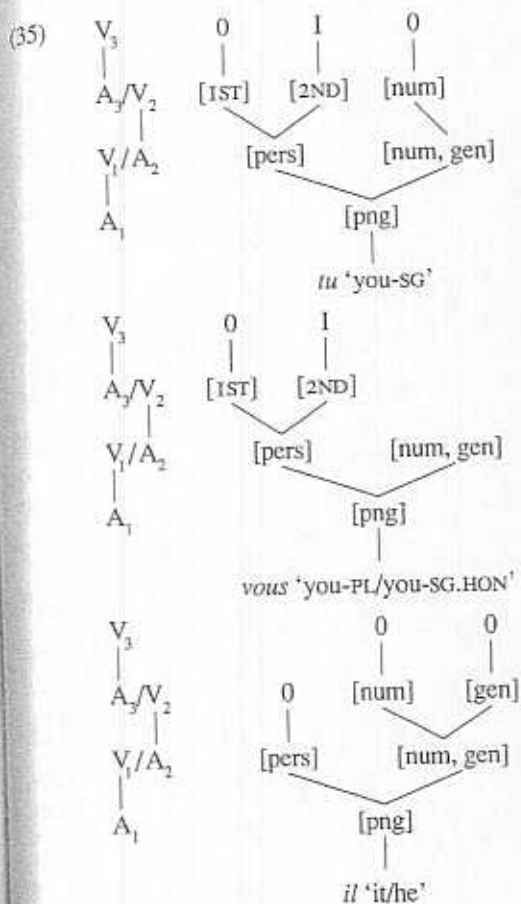
to be multiple for ease of exposition, as for the [person, number, gender] features in (30b), where [png] ends up having three branches. Nothing hinges on this, however. In a more complete representation, there are even a number of arguments to split [png] in a binary way, distinguishing person on the one hand, and [gender, number] on the other. The separate branch [gender, number] then divides up further in gender and number. The reason for this would be that in a number of languages, if agreement has gender, it also involves number, but not necessarily person (cf. past participle agreement in Romance). The maximal branching of nesting Attribute – Value sets therefore can, and maybe should, be argued to be binary.

A further issue, and a more crucial one for the binary nature of features, concerns the value of the terminal nodes in the Attribute – Value system advocated here. Only the terminal nodes are required to have a unary value. Once more, the representations in the main text are reductionist and non-unary for purposes of exposition. However, in a more constrained system, a feature like number only has two representations as an AV set: plural is represented as [number : plural], and singular, the “default” value, can always be represented as a 0-feature [number :  $\emptyset$ ]. Similarly, feminine gender, being marked, should be represented as [gender : feminine], and masculine, the default value, should be represented as a zero-valued Attribute [gender :  $\emptyset$ ]. This last representation for masculine does not show up in the representations in (30)–(32) in order to make the case for “transmission” of features as clearly as possible. As for person features, it seems at first sight that they involve multiple specification: 1st, 2nd, 3rd. However, it has been argued that third person functions as “non person” in various languages (Benveniste 1966). In Yorùbá, third person is less marked morphologically (Déchaine 1992). Hale (1973) argues that while 1st person in Walbiri should be described with the features set [+I, –II] and 2nd person with [–I, +II], 3rd person is [–I, –II], another way of representing “nonperson”. Similarly, in Romance, third person functions as “default” person for agreement with impersonal (= nonreferential) subjects. These observations clearly make a case for distinguishing third person as a 0-valued AV set [person :  $\emptyset$ ], while 1st and 2nd person could be viewed as constituting their own AV sets binarily branching off the person Attribute. In order to clarify this point, I represent the second person pronouns *tu* ‘you-SG’ and *vous* ‘you-PL/HON:SG’, as well as third person *il* ‘it/he’ in French as follows:<sup>14</sup>



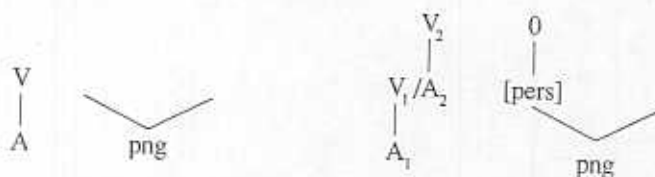
In the representation gender translates the ‘transparent’  $\alpha$ -value of the referent, triggers the referent, triggers the content(e) ‘you are’ captures its interpretation second person plus these features open “default” value (cf. representations in ( “transparent” (Non

14. The indexing of A – V sets is intended to show more clearly the “nesting” of AV sets: an Attribute with index  $n$  contains as its value  $n$  an Attribute – Value set with index  $n + 1$ .



In the representation for *tu* 'you-SG', the complete absence of the AV set for gender translates the idea that gender for second person *tu* 'you' must have a 'transparent'  $\alpha$ -value, since it can be both masculine and feminine depending on the referent, triggering the corresponding agreement where necessary (*Tu es content(e)* 'you are happy'). The representation for second person *vous* 'you' captures its interpretation as either an honorific second person singular, or a second person plural: the "transparent"  $\alpha$ -value for gender and number leaves these features open. The 0-marking of features for *il* 'it/he' represents its "default" value (cf. note 10). With this in mind, it is useful to again recall the representations in (30)–(31), which are either entirely (Standard French) or partly "transparent" (Nonstandard French) for features whose AV set is left unspecified.

(36)



“transparent” *qui* in  
Standard French (= [30])

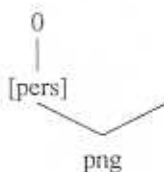
“person-blocking” *qui* in  
Nonstandard French (= [31])

It may be that the feature representation I have adopted here is too rich. It should nevertheless be viewed as an attempt to provide an explicit formalization of feature blocking and transmission in both phonology and morphosyntax.

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