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The case of verbal agreement morphology**

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Do formal models constrain language description? The case of verbal agreement morphology¹

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1. INTRODUCTION

What is ‘agreement’ morphology and what function does it serve in language systems? The prevalent conception of ‘agreement’ is one of an asymmetrical syntactic relation between the two elements. One element, the CONTROLLER, triggers the realization of the other, the TARGET. This view has led to a number of well-documented issues in the modeling of ‘agreement’ relations. The domain of the controller-target relation between two syntactic elements can be difficult to define (Boeckx 2006, Corbett 2006), controllers can be underspecified for features ‘triggered’ on the targets (Barlow 1992, Frajzyngier 1985) and sometimes the features of target and controller fail to match entirely (Corbett 2006).

Despite these issues, ‘agreement’ has steadily gained prominence in formal models of grammar. The role of abstract functional heads such as AGR with the associated *phi* features in Minimalism is now central to the mediation of movement. Unification-based approaches often incorporate *phi*-type features to constrain unification. It will be argued here that the analytic issues discussed above are the result of the *a priori* assumption that agreement is an asymmetric syntactic relation, rather than being the result of limitations inherent in the formal models themselves. It is this assumption that leads to the oft arrived at conclusion that agreement morphology is redundant.

A small number of researchers (Barlow 1992, Frajzyngier 1985, Reid 1984) have rejected this view of agreement. Instead of accepting the claim that verbal agreement morphology is redundant, these analysts have posited functionality. Instead of viewing ‘agreement’ as an asymmetric syntactic relation, they view the morphology as independent coding means; *i.e.* the elements traditionally considered to be targets are in fact functionally independent of any controller. They are compatible with the controllers, not triggered by them.

Analyzing how ‘agreement’ relations are modeled, and considering how functions of morphology traditionally termed ‘agreement’ can be handled while rejecting the assumption that they are a symptom of asymmetric syntactic relations, brings to light two important gaps in formal models from the point of view of the descriptive grammarian. First, both derivational and unification-based formal models fail to make certain hearer oriented elements of an utterance explicit which opens the question as to whether or not they satisfy the criteria of ‘descriptive adequacy’. Secondly, such formal models do not provide a

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methodology for discovering and determining the scope of grammatical functions coded in particular languages. In spite of these issues, the insights provided by formal models are of increasing importance with the rise in deployment of tier-based annotation schemes.

2. TRADITIONAL APPROACHES TO AGREEMENT

Agreement is understood most broadly as the systematic variation of grammatical forms. In example (1) from Russian, the verbal suffix *-a* varies with the number and gender of the subject, *Tanja*.²

- (1) *Tanja* *sidel-a* *u* *okna*
 Tanya sat-F.SG by window
 ‘Tanya was sitting by the window.’
 (Corbett 2003: 53)

The nature of the relationship between the covarying elements is a matter of surprisingly little debate. The prevalent conception of agreement is that of an asymmetrical relation between the two elements. One element controls the realization of the other. In example (1) then, the controller *Tanja* triggered the realization of the target *-a* on the verb.

This view of agreement is by no means a recent innovation. Consider Bloomfield’s discussion of agreement (referred to here as CONGRUENCE).

Congruence is syntactically expressive because it is limited to words in certain relations with each other, - such as a subject and verb in English. When we say *I am; you, we, they are; he, she it is*, the form of the verb shows in the first case, for instance, that the verb has as its actor the speaker. To be sure, the congruence is not needed, for even without it, as in *I, you, he, she, it, they can (shall, will, did, gave, etc.)*, the position of the actor-word immediately before the verb expresses the relation between the words: our congruence of verb with person and number of actor is logically superfluous. (Bloomfield 1914: 180)

The seemingly redundant nature of agreement morphology which Bloomfield notes still influences many analyses of agreement. When Corbett asks, ‘What then is the role of [this] morphology?’, he answers, ‘Obviously to mark the agreement information on targets’ (Corbett 1988: 192). The assumption of this asymmetric controller-target relation between the congruent elements in a construction influences most current analyses of agreement phenomena. Because of this, the

² The abbreviations used in this paper are 1 = first person, 3 = third person, 4 = fourth person obviative, F = feminine, INTR = intransitive, M = masculine, PAST = past tense, PL = plural, PRS = present tense, SG = singular, TA = transitive animate stem

central concern of these analyses have been defining the syntactic domain of the congruent elements and defining the nature of the semantic features common to the corresponding elements rather than their function in the grammatical system.

2.1. Issues arising from the asymmetric syntactic relation assumption

Despite the intuitive appeal of the controller-target analysis of agreement, there are a number of well-documented issues that arise from this approach. The most commonly cited is the situation of an underspecified or missing controller. Pro-drop languages are common examples of missing controllers and this situation is often the basis of disagreement regarding the status of the morpheme as either an agreement morpheme or a pronominal affix. In example (2) from Arapaho (Algonquian), the suffix *-ét* agrees in person and number with the undergoer (the scout) and in person with the actor (the soldiers) although neither are instantiated as noun phrases in the clause. The morphology does not change when the noun phrases are present.

- (2) *né'-cih-yihoon-ét*
 then.PAST-to.here-go.to.TA-4/3.SG
 'They came after him (the soldiers came after the scout).'
 (Cowell & Moss 2005: 17)

In a study of 711 Arapaho independent clauses from four narratives, Cowell (2008: 400) found that 70 percent of the sentences had no NPs, and thus no controllers for the putative targets manifest on the verbs.

In examples (3a, b) from Uduk (Nilo-Saharan), the controllers are present, but are unspecified for number. The only coding of number in both (3a, b) comes from the target.

- (3) (a) *mi ya-di*
 goat go.SG-3SG.INTR
 '[A] goat went.'
- (b) *mi i-ni*
 goat go.PL-3PL.INTR
 'Goats went.'
 (Barlow 1992: 36)

Another common issue that arises from assuming a controller-target relation between agreement morphology and the NPs they index is feature mismatch between controllers and targets. In example (4) from Tamil, the verb agrees with the speech act participant status of the referent of the subject rather than with the lexical feature 'third person' one might expect a proper name to have, as with the English version of the utterance.

- (4) *Mohan* *peecur-eeen*
 Mohan (man's name) speak.PRS-1.SG
 'Mohan speaking.'
 (Corbett 2006: 161)

In feature mismatch examples, the agreement morphology is not semantically congruent with the NPs they putatively refer to and in fact clearly influence their interpretation.

In each of the above cases, agreement morphology clearly added to the interpretation of the clauses and should not be construed as redundant. The morphology in these cases should also not be construed as having been triggered by the syntactic controller. The morphology in the above examples is manipulated, in (2) and (3) to add information to the clause and in (4) to create a contrast with typical congruence which in turn forces an alternate interpretation of the clause. Examples such as these are common in the world's languages. However the *a priori* assumption that agreement is the result of an asymmetric syntactic relation remains largely unexamined.

3. AGREEMENT IN DERIVATIONAL AND UNIFICATION BASED MODELS

3.1. *Derivational approaches to agreement.*

In derivational approaches to modeling clause structures, each clause is derived from a single underlying form. While in early manifestations of this approach, that underlying clause was taken to be an active, indicative, transitive clause, current analyses take that underlying clause to be a structure built of abstract functional heads.

The representation of agreement in derivational approaches has undergone a long evolution. The utilization of *phi* features, which include agreement features, has continually gained prominence in the general modeling of syntactic derivations and is not simply limited to expressing agreement relations. The semantic features typically associated with agreement are associated with the subject's determiner phrase, the verb and with the abstract functional head of an agreement phrase. The distribution of agreement features both mediate and motivate movement along the syntactic tree as well as interacting with case assignment.

For derivation-based approaches to syntax, agreement is now central to the model. Because the underlying structures of clauses are modeled in part on the surface realization of asymmetric syntactic relations, positing other functions to agreement morphology can only be done 'in addition to' modeling said relations, rather than 'instead of' modeling said relations. It could be claimed that formal model is constraining the analysis, but only in so far as assumption is built into the framework.

A major drawback for this approach from the descriptive grammarian's perspective is the limitation of analysis to structural analysis. Because derivations are fed by fully inflected lexical items, this model doesn't concern itself with functions of agreement that aren't syntactic in nature (Baker 2008, Barlow 1992). For example, the subjects in examples (3a, b) are both *mi* 'goat'. Because of the division of labor between syntax and morphology, this model doesn't address semantic issues in agreement. Just as with English *committee*-type alternations, the lexical item *mi* would just have to be considered polysemous, with (3a) having a singular number feature and (3b) having a plural number feature to account for the alternation in agreement. The features are simply copied from controller to target. The possibility of agreement itself enriching the semantics of referents can't be accounted for in this kind of model.

3.2. Unification-based approaches to agreement.

Rather than deriving one structure from another, unification-based approaches model utterances by generating parallel syntactic structures and functional structures. As the unification progresses, the functional structures associated with terminal nodes on the syntactic tree are subsumed under the functional structures of dominating nodes. At the highest syntactic node, all functional structures are unified into a single functional structure.

Functional structures are sets of ATTRIBUTE-VALUE pairings: the attributes consisting of grammatical functions like SUBJECT and OBJECT, tense or agreement features, and the predication of semantic content; and the values consisting of semantic values for the attributes or nested sets of attributes. Agreement in such a model is typically represented as either a defining or constraining equation. Defining equations create the attribute-value pairing whereas constraining equations simply require that such a pairing be present after the unification of the minimal functional structure (Bresnan 2001, Dalrymple 2001).

Modeling agreement via constraining equations essentially admits that the morphology is redundant, at least in terms of the information that such morphology can add to the clause. However, a unification-based approach allows for the possibility that controllers might be unspecified for a feature and that a target could enrich the functional structure of the controller. For example, the Uduk sentences (3a, b) would have *mi* as unspecified for number in the functional structure, and the target would be stated as a defining equation rather a constraining equation.

Derivational and unification-based approaches both offer ways of making explicit the location of agreement features in the syntax and describing the shared features in a controller-target relationship. By virtue of the unification of shared features, rather than the copying of shared features, a unification-based approach has an advantage over a derivational approach in being able to account for the possibility of targets enriching the semantics of the clause. However there are still a number of agreement phenomena that cannot be accounted for by the merging of agreement features in a functional structure. For example, in Welsh, agreement is not based on the resolution of the features of the conjunct, but is dependent on

the linear order of the coordinated items, with the verb agreeing with the first element of the conjunct. The relevance of the linear order is problematic for an account of agreement relying on the functional structure. In Hindi-Urdu verbs can display default agreement. Rather than agreeing with one or the other arguments in the clause, the verbs display masculine agreement when both arguments are marked for case (Falk 2006). Again, unification can't easily account for default agreement scenarios.

While the assumption that agreement is an asymmetric syntactic relation is built into derivational models, unification-based approaches at least in principle don't require agreement to be presented as such. However, analysts using the formalism still perpetuate the assumption and the resulting view that 'true' agreement is essentially redundant.

4. ALTERNATIVES TO 'ASYMMETRIC SYNTACTIC RELATIONS'

This assumption is ingrained so deeply that it goes almost entirely unquestioned. It is taken as axiomatic. But the fact remains that agreement *per se* is not a function of any sort. It is simply a relation, a 'compatibility' as Matthews (2007) put it. Without an analysis that provides a function for the phenomena, any analysis then implicitly accepts the redundancy attributed by Bloomfield.

A few researchers (Barlow 1992, Frajzyngier 1985, Reid 1984) have posited functionality to agreement phenomena while explicitly rejecting the asymmetric syntactic relation assumption.

4.1. English agreement coding the number of entities in focus

Instead of regarding *committee* agreement patterns as an interesting aberration of prototypical agreement function, or an indication of polysemy for words such as *committee*, Reid (1984, 1991) takes these as the best examples for understanding the functions of the morphemes. In Reid's analysis, the nominal and verbal *-s* suffix alternations code related, but independent domains. The nominal *-s* codes 'multiple entities' while the nominal *-∅* codes a single entity. The verbal *-s* codes a 'single entity in focus' and the verbal *-∅* codes 'multiple entities in focus'. These are meant to be understood as construal patterns rather than referential indices, thus they can be manipulated independently of each other to construct distinct message types.

Despite the strong intuition that disagreement is disallowed with regard to verb and subject in English, Reid presents many examples from media sources that are perfectly acceptable contradictions of the rule. There are many examples such as (5) which contain singular subjects but plural verbs.

- (5) *There are cases where a couple are happy in many respects but one or both partners are sexually dissatisfied.*
(Reid 1984: 108)

And examples such as (6) which have a plural subject but a singular verb.

- (6) *Two drops deodorizes anything in your house.*
(Reid 1984: 109)

Reid discusses the problem of productivity with the ‘number in focus’ hypothesis. An example such as (7) is a bizarre and uninterpretable sentence. This would generally be taken as a clear illustration of ungrammaticality.

- (7) *The boys walks through the field.*
(Reid 1984: 241)

However Reid argues that the sentence simply ‘doesn’t provide sufficient information for the hearer to invent a plausible communicative intent that would have motivated any speaker construct that particular sequence of linguistic signs’ (Reid 1991: 242). This argument is similar to the one Chomsky famously made regarding the autonomy of syntax with the example ‘*Colorless green ideas sleep furiously*’ (Chomsky 1957: 15). While a sentence can be illogical and semantically vacuous, that is not the same as being ungrammatical. Reid’s position is that the large number of tokens of all four combinatorial possibilities of the entity-focus number system in the corpus he collected suggests that speakers do exploit the functional possibilities of the coding means, but only in combination with referents that can be construed as one or the other number-focus combination given the discourse context.

4.2. *English agreement maintaining functional transparency*

Frajzyngier & Shay (1995, 2003) also reject the asymmetric syntactic relation assumption. Instead, agreement is seen as an illusion which results from the compatibility of functional coding across a clause, not the effect of some elements triggering other formal elements.

Frajzyngier & Shay argue that the function of agreement (and any other morphology) must be established on a language by language basis. Their analysis of English agreement focuses on a gap in the English verbal paradigms. In every tense and aspect, English has some verb specific morphology (e.g. *-ed* for past tense, modal or auxiliary verbs in progressive aspect or non-indicative modalities). There is one gap and that is in the simple present. It is also in the simple present that English verbs display agreement. Why is this the case? Frajzyngier & Shay argue that agreement maintains the visibility of the verb as a reference point in an utterance. This reference point is argued to be necessary as English relies on linear order to code grammatical relations. To know the relation of a noun phrase to a verb, one must be able to identify the verb. This is meant to explain why verbal agreement was retained when the rest of the case and agreement system collapsed in old English.

The purpose of this section is not to advocate these particular alternative analyses of English agreement phenomena, but simply to demonstrate that

alternatives to the asymmetric syntactic relation analysis can be made and to now consider whether formal models can handle these alternative analyses, or if they constrain the linguistic analysis.

5. GRAMMATICAL FUNCTION AND FORMAL MODELS

When confronted with the apparent redundancy of agreement in English, why wasn't this taken as evidence of some other functionality by Bloomfield and most other linguists who have considered the question? The answer lies in part on a gap in methodological development in linguistics.

This gap has its roots in the structuralist preoccupation with distributional analysis of form independent of function. This view of grammatical function is summed up by Hockett (1958: 138) when he writes 'the semantic system is a peripheral part of the design of language. Peripheral because it relates the central subsystem of grammar... to an aspect of the non-speech world'. The essential divorce of meaning from form in grammatical theory was continued in the work of Chomsky during the development of derivational models of grammar. Despite the many claims that Chomsky was instrumental in bringing meaning into the analysis of syntax through transformations, at the outset he was quite clear about his position on the role of meaning in grammatical theory. 'Investigations of such [semantically motivated] proposals, however, invariably seems to lead to the conclusion that only a purely formal basis can provide a firm and productive foundation for the construction of grammatical theory' (Chomsky 1957: 100).

While theoreticians working in other frameworks may appear to be concerned with meaning, this meaning is often not restricted to that of a grammatical nature. Instead meaning is conceived of psychologically and fundamentally experiential in nature (cf. Croft & Cruse 2004, Gumperz & Levinson 1996). The notion that grammatical function is universal is often maintained even when a universal grammar is rejected. For example, Bresnan proposes 'variability' as Principle I of Lexical-Functional Grammar, where constituent structures will vary across languages; yet maintains in Principle II that functional structure is largely invariant (Bresnan 2001: 44-45).

For a researcher attempting the description of an undocumented language who wishes to entertain language-specific hypotheses regarding grammatical function, there is a methodological gap. By restricting the meaning relevant to grammatical description to that of grammatical function, Frajzyngier attempts to develop a methodology for determining the kinds of meaning a particular grammar has subsumed rather than mapping the distributional patterns of coding to a set of universal or cognitively motivated categories. This view remains open to the possibility that languages will code distinct functional domains and the functions should be established on a language by language basis. Principles such as the avoidance of tautology and contradiction in grammatical encoding would suggest that the analysis of any morphology as redundant should be unlikely.

Can formal models handle the alternative analyses of agreement presented earlier? In the case of Reid, the answer is yes. A unification-based approach can model the verbal agreement function posited by Reid by declaring the function as an attribute-value pair. The modeling itself is trivial although adding a new function is problematic from a theoretical perspective which holds to the underlying universality of grammatical functions. The case of Frajzyngier's analysis is more problematic. The modeling of linear order in both types of formal model is simple enough. This is represented in the syntactic tree. But where is the function of coding lexical category to be represented? Lexical categories are coded implicitly on syntactic trees, they cannot be represented as being potentially ambiguous. This brings to light the second issue with formal models from the descriptive perspective.

Formal models tend to neglect coding means whose function is to signal structural attributes of clauses. These are handled implicitly in the tree structures, but not explicitly. These models present utterances from a production-side perspective and so often don't make explicit cues intended to help the hearer parse an utterance. For example in Chichewa (Bantu), tone is retracted in the subjunctive when the element that follows the verb is not part of the verb phrase (Bresnan & Mchombo 1987). The effect of the tone retraction is implicitly modeled on the syntactic tree, but nowhere is the functionality of the tone retraction coded. Similarly, if the transparency of the lexical category of verb is maintained in English by agreement, this function will only be modeled implicitly in either derivational or unification-based models.

In conclusion, it would appear that the assumptions brought to the analysis do more to constrain the description than do the formal models used to make the description explicit. While many descriptive linguists eschew the use of formal models, the current rise in computational methods for archiving and analyzing field data means that many researchers will be implicitly using formal models in the form of hierarchically dependent tier structures in their time-aligned annotations. Similar questions about the function of values in the annotation line need to be addressed.

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