

Two Kinds of Blocking*

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1 Introduction

This paper argues for the existence of two types of blocking, both of which can take place across linear positions in a word. One is disjunctive blocking, which is blocking by the Paninian principle of disjunctivity. By this principle, realization of a set of syntactic features by one affix blocks the insertion of a less specific affix to realize the same set of features. I will argue that disjunctive blocking necessarily makes reference to realization of syntactic features, counter to the predictions of Anderson (1986, 1992). The other type of blocking is what I will call nondisjunctive blocking. Certain theories, such as Anderson's (1992) A-Morphous Morphology, disallow nondisjunctive blocking across linear positions in a word. I will argue that certain instances of blocking cannot be explained either as disjunctive blocking or as nondisjunctive blocking within a single linear position, but require nondisjunctive blocking across linear positions.

What follows will assume the general framework of Distributed Morphology. Specifically, I will assume that syntactic operations are carried out on fully specified terminal nodes lacking phonological information. The derivation splits into two components, one proceeding towards the LF interface and one towards PF. In the PF component, various morphosyntactic operations take place which have no consequences at LF. These operations include, for example, insertion of agreement nodes and impoverishment rules deleting features from a node. Also in this component, vocabulary items bearing phonological features are inserted into the syntactic tree to realize the features of the terminal nodes. These items are underspecified, and compete for insertion into nodes of the appropriate category. The winners of the competition are the

* Thanks go to Stephen Anderson, Paul Hagstrom, Ken Hale, Morris Halle, Alec Marantz, Norvin Richards, and the Morph Beer crowd for helpful discussion of this work. The features used here are as follows: [1], [2] = first, second person; [PSE] = participant in the speech event (first or second person); [PL] = plural; [SG] = singular ([-SG, -PL] = dual); [OBJ] = object case (morphologically dative). This research has been supported by a NSF Research Training Grant (DIR 9113607) awarded to MIT, and by a SSHRC doctoral fellowship (752-93-2393).

most specific vocabulary items that match the features of the fully specified syntactic node. I will distinguish between syntactic positions, which are the terminal nodes of a syntactic tree, and templatic slots, which define the linear order of vocabulary items.

I will begin by discussing the properties of disjunctive blocking. It has been observed throughout the literature that the appearance of one vocabulary item can block the appearance of a less specific item. As Halle (1996) argues explicitly, following the approach of Noyer (1992), disjunctive blocking is purely an effect of vocabulary insertion, and occurs only between vocabulary items competing to realize the same set of syntactic features. However, different items realizing these features may show up in different templatic slots; for example, the vocabulary items competing for insertion into the same terminal node might include both prefixes and suffixes, which are inserted on different sides of the stem. Disjunctive blocking results from the fact that a particular set of features given by the syntax can be realized only once. This point is not noted by Anderson (1986, 1992), who thus makes incorrect predictions.

2 Disjunctive Blocking

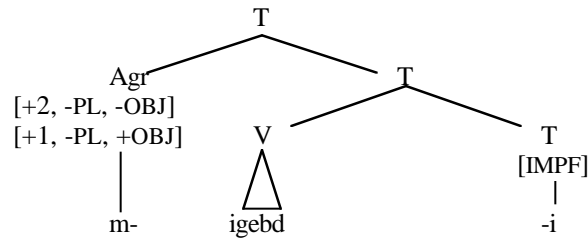
Disjunctive blocking results from the competition of underspecified vocabulary items to realize features of a fully specified morphosyntactic node. The most specific item consistent with the features of the node wins the competition. Less specific items are blocked from realizing the same features.

2.1 Blocking in the same position

An example of this type of blocking can be observed in the relation between certain personal prefixes in Georgian. The Georgian verb bears highly complex morphology, but we will focus here on the appearance of tense/aspect and agreement. A prefix and suffix agree with the person and number of first- and second-person arguments within the clause. The tense/aspect suffix also shows agreement with the person and/or number of an ergative or nominative argument within the clause. I will assume, following Nash (1995), that the verb in Georgian moves overtly to T. A simplified structure for the Georgian verb in T is given in (1). As will be illustrated below, both prefix and suffix vocabulary items compete to realize the phi-features of the subject and object, which are both present on the single Agr node.

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(1) Simplified verbal syntax of Georgian



‘You (sg) understood me.’

First, consider the disjunctive blocking relations among different prefixes competing for insertion into the Agr node. Some of these items are given in (2).

(2) Some Agr items in Georgian

[+1, +PL, +OBJ]	<—>	/gv-/
[+1, +OBJ]	<—>	/m-/
[+1]	<—>	/v-/

The features of these items stand in a subset relation. The principle of disjunctivity entails that the most specific item is inserted into a node bearing its features. Thus the highest-ranked item must be inserted in (3a), since it bears the most specified features consistent with the node; lower-ranked items are blocked by disjunctivity. The next highest item must be inserted in (3b), while the last can be inserted only when neither of the others is consistent with the features of the node, as in (3c).

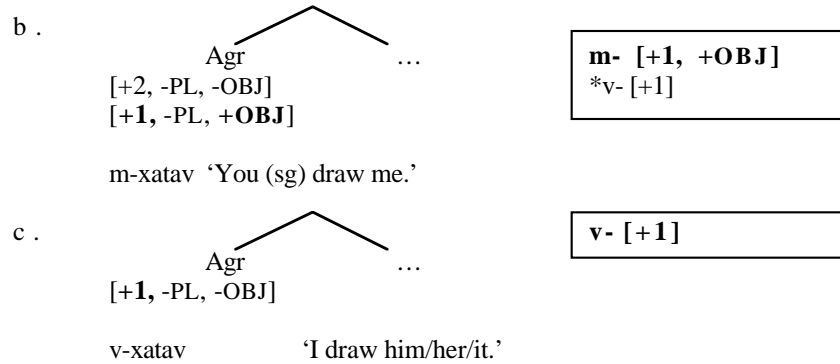
(3) Disjunctive blocking among Georgian prefixes

a.

gv- [+1, +PL, +OBJ]
***m-** [+1, +OBJ]
***v-** [+1]

gv-xatav ‘You (sg) draw us.’

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2.2 *Fission: Blocking across positions*

Following Noyer (1992), Halle (1996) argues that some disjunctive blocking across templatic slots also results from items competing for insertion. First, however, he argues that two items can realize features of the same syntactic node. To demonstrate this point, Halle takes an example from Hale’s (1973) discussion of Warlpiri. In (4) are listed the vocabulary items competing for insertion into the AgrS node, which is adjoined to the auxiliary in T.

(4) AgrS items in Warlpiri

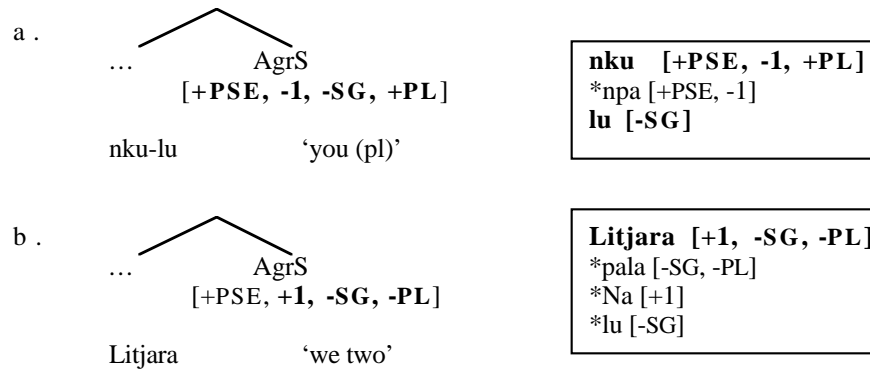
[-PSE, +1, -SG, +PL]	<—>	/Lipa/
[-PSE, +1, -SG]	<—>	/Li/
[+1, -SG, -PL]	<—>	/Litjara/
[+PSE, -1, +PL]	<—>	/nku/
[+PSE, -1]	<—>	/npa/
[-SG, -PL]	<—>	/pala/
[+1]	<—>	/Na/
[-SG]	<—>	/lu/

The most specific item compatible with the features of the AgrS node is inserted first, blocking all less specific items from realizing the same features. However, if another item is consistent with the remaining features, it is inserted to the right of the higher-ranked node, as with the plural marker *lu* in (5a). It

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should be emphasized that although two items are inserted, they realize features of the same syntactic node; the fission of the single node into two items is brought about simply by the process of vocabulary insertion. On the other hand, if no items are consistent with the remaining features, only a single item is inserted, as in (5b). Thus, in blocking lower-ranked items with the same features from being inserted, *Litjara* is actually blocking the syntactic node from fissioning into two items, since the features remaining after its insertion (including [+PSE]) are not, by themselves, associated with any vocabulary item.

(5) Fission and competition in Warlpiri



A similar case arises in Georgian, where the insertion of a prefix can block the insertion of a less specified suffix. In this case, again, the prefix and suffix realize features of the same syntactic node, which fissions into two distinct vocabulary items only at the point of insertion. Unlike the AgrS items in Warlpiri, however, which are all of the same morphophonological type, the Agr items in Georgian include both prefixes and suffixes. (6) is an augmented list of items competing for the Agr node agreeing with first- and second-person arguments. The list now includes the plural suffix *-t*.

(6) Some Agr items in Georgian

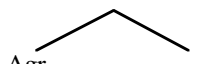
[+1, +PL, +OBJ]	<—>	/gv-/
[+1, +OBJ]	<—>	/m-/
[+1]	<—>	/v-/
[+PL]	<—>	/-t/

The most highly ranked item blocks each of the less specific items from realizing the same features, including not only the prefixes, as we have already

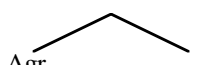
seen, but also the plural suffix *-t* (7a). An item without plural features fails to block *-t*, as shown in (7b).

(7) Fission and competition in Georgian

a.

	<p>gv- [+1, +PL, +OBJ] *m- [+1, +OBJ] *v- [+1] *-t [+PL]</p>
<p style="text-align: center;">Agr ...</p> <p style="text-align: center;">[+2, -PL, -OBJ] [+1, +PL, +OBJ]</p> <p>gv-xatav ‘You (sg) draw us.’</p>	

b.

	<p>v- [+1] -t [+PL]</p>
<p style="text-align: center;">Agr ...</p> <p style="text-align: center;">[+1, +PL, -OBJ]</p> <p>v-xatav-t ‘We draw him/her/it.’</p>	

2.3 Competition for realization

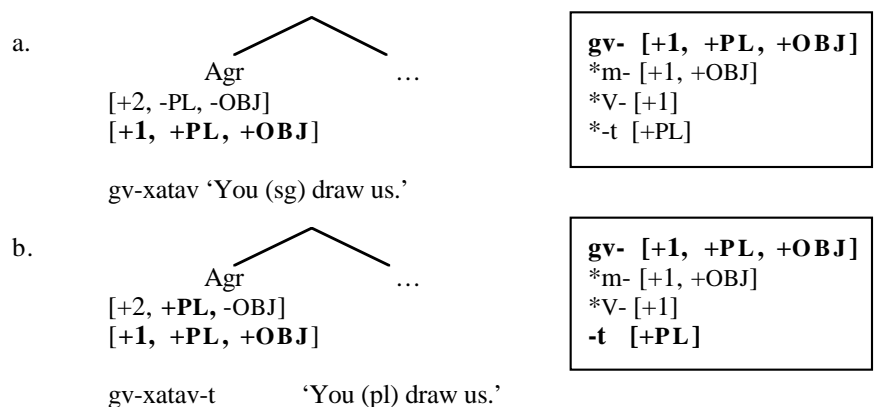
A crucial aspect of the foregoing discussion is the claim that disjunctive blocking results from competition for realization of the same features on a given morphosyntactic node. Once a vocabulary item has realized a feature, this feature is inaccessible to further realization. Anderson (1986, 1992) fails to take account of the importance of realization. For him, disjunctive blocking is simply a relation among rules inserting phonological information. Applying one rule in the environment of certain features does not prevent these features from serving as the environment of another rule. This claim is crucial for Anderson, since it follows from the lack of a distinction between constitutive and contextual features for insertion of phonological information.

In traditional theories of morphology, including Distributed Morphology, a distinction exists between the features constituting a morpheme and any contextual features that further specify the environment in which the morpheme occurs. In Distributed Morphology (see also Noyer 1992), constitutive features of a syntactic node are realized only once, while contextual features may be mentioned more than once. A-Morphous Morphology, however, does not involve vocabulary items, but rather rules inserting phonological information in the environment of certain syntactic features. For Anderson, *any* feature may act arbitrarily many times as the environment for insertion of phonological information; insertion leaves *all* features accessible for further insertion. However, as I will show, the empirical facts demand reference to realization of features, which makes them inaccessible to further realization.

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As we saw in Warlpiri and Georgian, realization of certain features on a node blocks further realization of the same features, but does not by itself block realization of the remaining features. To illustrate this point, we will examine the interaction between Georgian prefixes and suffixes in more detail. As shown in (7a), repeated as (8a), the prefix specified for plural, *gv-*, blocks the less specific *-t* when the two items are competing for realization of the same plural feature. However, (8b) shows that *gv-* does not block *-t* if another plural feature is present on Agr.

(8) Blocking and realization



Disjunctive blocking in A-morphous Morphology makes reference only to subset relations among the environments of rules. Thus, Anderson’s rule inserting *gv-* in the environment [+1, +PL, +OBJ] should always block the rule inserting *-t* in the environment [+PL]. However, the examples in (8) show that this account of disjunctive blocking does not capture the facts. Disjunctive blocking takes place only when these items are competing for realization of the same morphosyntactic features.

In general, disjunctive blocking obtains among vocabulary items competing for realization of the same features on a morphosyntactic node. Competing items may or may not occupy the same templatic slot. Disjunctive blocking crucially makes reference to realization of particular morphosyntactic features, not simply to interactions among rules or items.

3 Nondisjunctive Blocking

In addition to disjunctive blocking, there is also nondisjunctive blocking of vocabulary items. Several types of nondisjunctive blocking have been proposed (Noyer 1992, Halle and Marantz 1993, 1994, Bonet 1995, Halle 1996), of which I will focus on three. First, language-particular morphophonological constraints

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may restrict the position of vocabulary items within the word, for example allowing only one prefix to be inserted in any given word. Secondly, impoverishment rules can apply in the morphological component to remove syntactic features from a node before vocabulary insertion, resulting in the insertion of a less specific item. Finally, morphophonological deletion rules can delete vocabulary items after insertion. Anderson (1992) comes out against nondisjunctive blocking across positions; again, his approach make the wrong predictions.

3.1 Blocking by Position

One type of nondisjunctive blocking occurs among vocabulary items competing for insertion into the same templatic slot. It is possible that templatic blocking occurs whether or not the items in question are competing for insertion into the same morphosyntactic node. For example, the agentive *-er* and adverbial *-ly* suffixes on English adjectives compete for insertion into the same single suffix slot, though they do not necessarily realize the same node. At any rate, it is clear that templatic blocking does occur among items competing for insertion into the same syntactic node. This kind of blocking occurs throughout the Semitic languages (Noyer 1992, Halle 1996), and also occurs among certain personal prefixes in Georgian.

There is a constraint in Georgian permitting only one Agr prefix per verb. As a result, only the highest-ranked prefix item is inserted, even if further prefixes are consistent with the remaining features of the Agr node. The full ranking of Agr items is given in (9). This list includes a new item, the second-person prefix *g-*, which realizes a set of features at least partially disjoint from those realized by any other Agr item. As a result, this item cannot participate in disjunctive blocking. I will assume that this item is ranked below its first-person counterpart in accordance with a universal or language-particular feature hierarchy (Noyer 1992, Harley 1994).

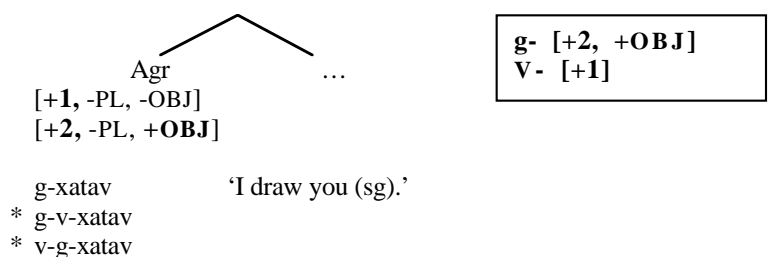
(9) Agr items in Georgian

[+1, +PL, +OBJ]	<—>	/gv-/
[+1, +OBJ]	<—>	/m-/
[+2, +OBJ]	<—>	/g-/
[+1]	<—>	/v-/
[+PL]	<—>	/-t/

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The Agr node bears the features of both subject and object first- and second-person arguments, so in some cases two prefix items are consistent with separate features of the Agr node. All else being equal, we would expect both items to be inserted, as with AgrS in Warlpiri (5a), or with prefix and suffix Agr in Georgian (7b). However, as we have said, there is only one templatic slot for an Agr prefix in Georgian. Thus, even when two prefixes are eligible for insertion, only the higher-ranked one is inserted, as in (10).

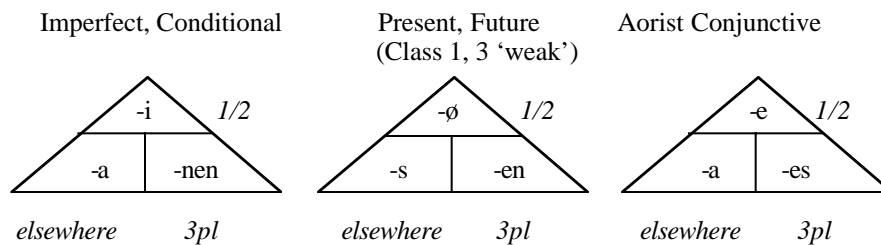
(10) Templatic blocking



3.2 *Blocking across positions*

Recall the structure from (1), in which the verb is adjoined to T. A tense/aspect suffix is inserted into T, appearing to the right of the verb. This suffix varies in form depending on the verb class, tense/aspect 'series,' and phi-features of the ergative/nominative argument. There are several sets of tense/aspect markers, some of which are shown below (from Aronson 1990). The top member of each set is the form inserted when the ergative/nominative argument is [+PSE] (first or second person); the bottom right-hand member is inserted when this argument is [-PSE, +PL] (third-person plural); and the bottom left-hand member is inserted elsewhere.

(11) Georgian tense/aspect markers



The plural suffix is inserted to the right of the tense/aspect suffixes, as shown in (12a-b). It so happens that the plural suffix *-t* is never inserted when

the verb bears the third-person plural forms of the tense/aspect suffix, even when another plural feature is eligible for realization, as in (12c).

(12) Nondisjunctive blocking across positions

- a.
- | | |
|---|---|
| | g- [+2, +OBJ]
-t [+PL] |
| g-igebd-i-t 'I understood you (pl).' | |
- b.
- | | |
|--|---|
| | g- [+2, +OBJ]
-t [+PL] |
| g-igebd-a-t 'S/he understood you (pl).' | |
- c.
- | | |
|--|---|
| | g- [+2, +OBJ]
-t [+PL] |
| g-igebd-nen 'They understood you (pl).' * g-igebd-nen-t | |

Anderson's (1986, 1992) account of this effect places the phonological insertion of what we have called the Agr suffix in the same rule block as the insertion of the tense/aspect suffixes. His account is based on the exceptional instance of the Present/Future forms, in which one suffix, the third-person plural, blocks the plural suffix, as we have noted; another suffix, the [+PART] form, is null, as shown in (11); and an extra rule deletes the remaining suffix before the plural *-t*. These factors conspire to prevent any overt tense/aspect suffix from co-occurring with the plural *-t* in the Present/Future series. Thus, the Present/Future forms themselves are consistent with Anderson's conflation of the plural *-t* with tense/aspect morphology.

In most cases, however, such as that shown in (12), Anderson's analysis makes the wrong predictions. By his view, only one rule may apply from a given rule block, but in (12a-b) both the tense/aspect suffix and the plural suffix appear. It is only in the environment of the third-person plural suffix that the plural Agr suffix cannot appear. Two slots are available in (12a-b), but something—namely, the third-person plural form of the tense/aspect suffix—blocks the plural suffix from being inserted into its slot in (12c).

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The Georgian facts make it clear that nondisjunctive blocking can occur across positions. This kind of blocking is caused neither by competition to realize certain syntactic features, nor by the competition to occupy a certain templatic slot. The interaction between this type of blocking and competition for insertion sheds further light on the blocking mechanism, as we will now observe.

3.3 *Blocking by Deletion*

Two alternative mechanisms for blocking across positions are impoverishment rules and morphophonological deletion rules. Impoverishment rules (Halle and Marantz 1993, Bonet 1995) remove syntactic features from a node before vocabulary insertion, blocking the insertion of a highly specified item, and causing a lower-ranked ‘default’ to be inserted. Morphophonological deletion rules remove vocabulary items after insertion. I will show evidence indicating that nondisjunctive blocking of the Georgian *-t* suffix across positions is the result of deletion rules rather than impoverishment.

Following Noyer (1992), I have claimed that fission takes place as a result of vocabulary insertion. Under this view, fission is no more than the realization of a single syntactic node in two or more templatic slots. Impoverishment rules, by definition, remove syntactic features from a node before vocabulary insertion. Thus it follows that impoverishment rules precede fission.

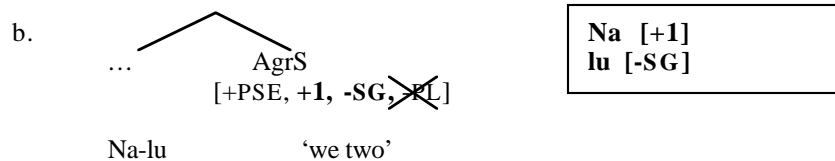
An illustration of this fact is given by Halle (1996), again based on the analysis of Warlpiri by Hale (1973). Hale notes that the morphological distinction between dual and plural agreement collapses when neither the subject nor the object is singular. Halle captures this loss of a distinction with an impoverishment rule deleting [-PL] when both AgrS and AgrO are [-SG]. This rule gives rise to insertion of less specified vocabulary items, such that the Agr node may fission into two items. For example, the highly specified item in (13a) is blocked in the environment of [-SG] AgrO, leaving the two less specific items in (13b) to realize features of the impoverished node.

(13) Sensitivity of fission to impoverishment

a.

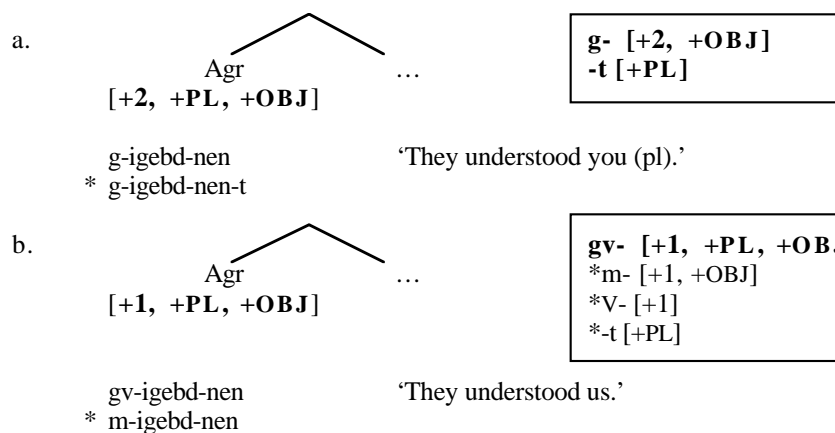
Litjara [+1, -SG, -PL] *pala [-SG, -PL] *Na [+1] *lu [-SG]
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If impoverishment rules precede vocabulary insertion and fission, they should not be sensitive to distinctions introduced by these processes. An impoverishment rule should apply to a node regardless of whether the node is realized by a single item or more, and also regardless of whether it realized by a prefix or a suffix. However, the third-person plural tense/aspect suffix only blocks the [+pl] Agr feature from being realized by a suffix, not by a prefix. (14a) is the case of blocking of plural *-t*. If an impoverishment rule blocked the insertion of this item by deleting the plural feature from the Agr node, it would also block the insertion of the first-person plural object prefix *gv-*. However, *gv-* is not blocked in this environment, as (14b) shows.

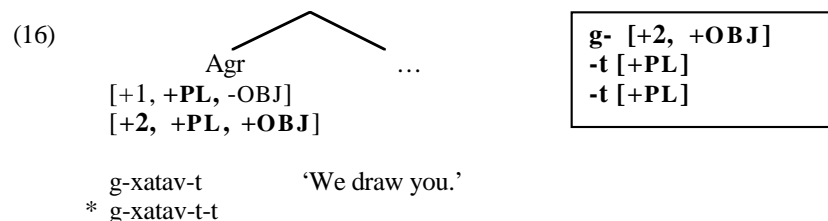
(14) Sensitivity of deletion to vocabulary items



We are forced to conclude that the rule blocking plural *-t* in the environment of third-person plural tense/aspect suffix is sensitive to the operation of vocabulary insertion, which creates a principled distinction between the deleted feature, which is realized by a suffix, and the preserved feature, which is realized by a prefix. Let us propose, then, that this blocking results from the application of a morphophonological deletion rule, as in (15).

(15) $-t \rightarrow \emptyset / \dots +pl] \text{ ___}$

This rule also accounts for the absence of a second plural *-t*, even when two plural features are eligible for realization, as in (16). By this account, both *-t* suffixes actually are inserted, but rule (15) deletes the second one.



As we have seen, Anderson’s (1986, 1992) attempt to do away with nondisjunctive blocking across positions fails to capture the correct generalizations. This type of blocking appears to exist in Georgian. By observing the interaction of rule (15) with the fission of a syntactic node into two vocabulary items, we found that the instance of blocking discussed is sensitive to fission. Given a view in which fission is the result of vocabulary insertion, this case of nondisjunctive blocking must follow vocabulary insertion.

4 Conclusions

In the foregoing discussion, I have given evidence for two kinds of blocking, disjunctive and nondisjunctive. Moreover, I have argued that effects of both kinds of blocking can be observed across linear positions.

Disjunctive blocking obtains among items competing for realization of the same morphosyntactic features on a node. These items may occupy the same templatic slot, or else their insertion may fission the node into separate linear positions. A more specific item consistent with the features of the node blocks a less specific item from realizing those same features. However, as we observed, realization of one set of features does not by itself block a vocabulary item from realizing a separate set of features.

Nondisjunctive blocking occurs under several different conditions. For example, this kind of blocking occurs between items competing for a single templatic slot. Nondisjunctive blocking also occurs across syntactic and linear positions, by deletion of morphological information before or after vocabulary insertion in a particular context.

The account given here provides insight into certain difficulties inherent in Anderson’s A-Morphous model of morphology, and suggests an alternative approach which makes the correct generalizations.

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