

Variable Rules Meet Impoverishment Theory: Patterns of Auxiliary Leveling¹

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ABSTRACT

In this paper, we attempt to revive the mechanism of variable rules from sociolinguistics within the theoretical framework of Distributed Morphology. We argue that ‘leveling’ variation, or non-categorical paradigm syncretism, is well modeled as the variable application of post-syntactic phi-feature deleting Impoverishment operations. Certain morphosyntactic features and combinations are inherently marked, and that this markedness is what triggers Impoverishment rules in the morphology, resulting in variable syncretism. The empirical focus of the paper consists of three case studies, wherein we show that the markedness of a particular morphosyntactic feature causes variable Impoverishment rules to apply, yielding the observed patterns of syncretism. First, in Monmouthshire, Wales, the marked feature [+Author] is responsible for variable leveling to the plural form *be* in the 1st person, as in *I be (am) proud of myself*. Second, in Buckie, Scotland, the marked feature [+Participant] causes a split pattern of variable leveling to the singular form *was* in the 1st person, as in *We was (were) laughing at each other*, but not in the 3rd person, as in *They were (*was) laughing at each other*. Third, in Smith Island, Maryland, the marked feature [+Negation] results in variable leveling to the plural form *weren’t*, as in *She weren’t (wasn’t) scared*, as well as leveling to the form *ain’t* across the entire agreement paradigms of present tense *be* and *have*.

1. Introduction and Structure of the Paper

In this paper, we attempt to revive the mechanism of variable rules from sociolinguistics (Labov 1969, Cedergren and Sankoff 1974, Rousseau and Sankoff 1978, Sankoff 1978, Sankoff and Labov 1979, Guy 1991) within the theoretical framework of Distributed Morphology (Halle and Marantz 1993, Embick and Noyer 2007). Specifically, we argue that ‘leveling’ variation, or non-categorical paradigm syncretism, is well modeled as the variable application of post-syntactic

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phi-feature deleting Impoverishment operations. Following recent work on dialect micro-variation developed in Arregi and Nevins (2007), and with important parallels to the work of Bresnan, Deo, and Sharma (2007), among others, we claim that these Impoverishment operations are markedness driven. In other words, certain morphosyntactic features and feature combinations are inherently marked, and this triggers the application of phi-feature deletion rules in the morphology, resulting in syncretism—variably, in the cases of interest.

The main substance of our paper consists of three case studies analyzing the leveling variation in paradigms of English *be* in terms of variable application of morphological deletion rules. In each case, we show that the markedness of a particular morphosyntactic feature causes application of phi-feature deleting Impoverishment operations, yielding the observed patterns of syncretism. The first case comes from Monmouthshire, Wales, where the marked feature [+Author] is responsible for variable leveling to the plural form *be* in the 1st person, as in *I be (am) proud of myself*. The second case comes from Buckie, Scotland, where the marked feature [+Participant] causes a split pattern of variable leveling to the singular form *was* in the 1st person, as in *We was (were) laughing at each other*, but not in the 3rd person, as in *They were (*was) laughing at each other*. The third case comes from Smith Island, Maryland, where the marked feature [+Negation] results in variable leveling to the plural form *weren't*, as in *She weren't (wasn't) scared*, as well as leveling to the form *ain't* across the entire agreement paradigms of present tense *be* and *have*.

These case studies are presented in Section 3, which follows a background overview given in Section 2. Open questions for further inquiry are posed and discussed in Section 4.

2. Background Overview

This section provides a brief overview of the empirical and theoretical background required for our analyses of the case studies in Section 3.

2.1 English *be* with pronominal subjects

We limit our study to pronominal subjects, where the phi-features of the subjects are clear, and free of the influence of the “Northern Subject Rule” or variable percolation of features from N-to-D occurring with full noun-phrase subjects, as discussed in Börjars and Chapman (1998), Adger and Smith (2005), Adger (2006), Henry (1995) and Tortora et al. (this volume).

We also limit the study, to a large extent, to the copular/auxiliary verb *be*, as it is the only English verb that shows inflectional distinctions in the past tense. There are a few reasons for this empirical focus. First, *be* has allomorphic variants for person and number in both tenses:

(1) *Be* [+Past] (varieties without leveling)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I was</i>	<i>we were</i>
<u>2nd</u>	<i>you were</i>	<i>you² were</i>
<u>3rd</u>	<i>she was</i>	<i>they were</i>
<u>DP</u>	<i>a boat was</i>	<i>boats were</i>

(2) *Be* [-Past] (varieties without leveling)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I am</i>	<i>we are</i>
<u>2nd</u>	<i>you are</i>	<i>you are</i>
<u>3rd</u>	<i>she is</i>	<i>they are</i>
<u>DP</u>	<i>a boat is</i>	<i>boats are</i>

Second, paradigms for *be* show evidence of an Elsewhere form, as discussed further below. Third, inter- and intra-speaker variation (also called parametric and Labovian variation, respectively) in paradigms of *be* is both common in English varieties and relatively well studied in the sociolinguistic variationist literature. For examples, see among others Tagliamonte (1998), Wolfram and Schilling-Estes (1998), Tagliamonte and Smith (2000), Anderwald (2001), Schilling-Estes and Wolfram (2003), Wolfram and Schilling-Estes (2003), and Britain (2002). Our case studies, rely on this important documentation of variation in English *be*. Finally, and most importantly from our theoretical perspective, is the ambiguous pattern of syncretisms in the standard English paradigm, in which a ‘vertical’ syncretism among the plural forms intersects with a ‘horizontal’ syncretism among the 2nd person forms. Arguably this leads to different ‘ways of underspecifying,’ an idea developed by Adger (2006) and important in our discussion below.³

2.2 Morphosyntax of English *be*

In this article, we adopt a Distributed Morphology (DM) theoretical architecture, essentially following Embick and Noyer (2007) with some modifications. In this model, the output of the narrow syntactic computation is the input to the morphological component, where further operations apply during the computation to PF. Phonological exponents for functional morphemes are added post-syntactically—that is, DM is a ‘late insertion’ theory. However, departing

² Some English varieties have a distinct 2pl pronoun, for example *y'all*, *yous*, *yins*, and possibly *you guys*. Because these various pronoun forms are not evidently relevant to the matters under investigation here, only the homophonous 2pl form *you* appears henceforth.

³ At the time of writing, we have become aware of the algorithm for learning underspecified inflectional items developed in Pertsova (2007), which appears to provide a promising model of how the same inflectional system can result in varying underspecification analyses.

from Embick and Noyer's (2007) treatment of 'dissociated' morphology,⁴ we assume that semantically uninterpretable (notated as *u*) Person and Number phi (ϕ) features on the syntactic terminal morpheme of finite Tense ($T_{[\pm\text{Past}]}$) are present and valued by Agreement in the syntax (as in Pesetsky and Torrego to appear, among others). We adopt the following phi features for Person and Number (following Halle 1997, among others):

(3) Person phi features⁵

$[\pm\text{Participant}, \pm\text{Author}]$

(4) Number phi feature⁶

$[\pm\text{Plural}]$

Combining these three binary features yields the personal pronouns of English. Note that phi features are semantically interpretable on pronouns.

(5) Pronominal phi features of English

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I</i> = [+Part, +Auth, -Pl]	<i>we</i> = [+Part, +Auth, +Pl]
<u>2nd</u>	<i>you</i> = [+Part, -Auth, -Pl]	<i>you</i> = [+Part, -Auth, +Pl]
<u>3rd</u>	<i>she</i> = [-Part, -Auth, -Pl]	<i>they</i> = [-Part, -Auth, +Pl]

Functional morphemes are provided with phonological features in the post-syntactic morphological component by Vocabulary items (or entries), which contain a paired listing of phonological exponents and the morphosyntactic features that identify terminal morphemes for Vocabulary insertion. This operation must obey the Subset Principle (Halle 1997, among others):

(6) The Subset Principle for Vocabulary Insertion

The Subset Clause: A phonological exponent realizes a morpheme in the terminal string if the item matches all or a subset of the grammatical

⁴ McFadden (2004) develops an extensive theory of dissociated case, and Parrott (2007) adopts a dissociated morphology account of both case and agreement.

⁵ For arguments in favor of these particular features and not others, e.g. $[\pm\text{Addressee}]$ or $[\pm\text{Hearer}]$, see Nevins (2007b) and citations therein.

⁶ The choice between a feature system of $[\pm\text{Plural}]$ instead of $[\pm\text{Singular}]$ could be seen as a simple matter of notational equivalence. However, an argument in favor of $[\pm\text{Plural}]$ is suggested by the claim that markedness triggers Impoverishment. The leveling of person distinctions in the plural, i.e., vertical syncretism of plurals in English verbal paradigms, can be interpreted as evidence that plural is a marked environment. Formalizing plural featurally as $[\pm\text{Plural}]$ allows one to make the generalization, as for example in Section 2.3 below, that the marked value of binary features is 'plus' (+), thus including all phi features and negation. If plurality is encoded as $[\pm\text{Singular}]$, one is more generally required to stipulate which of the 'minus' (-) or plus value is marked for each feature.

features specified in the terminal morpheme. Insertion does not take place if the Vocabulary item contains features not present in the morpheme.

The Maximal Subset Clause: Where several Vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

(7) and (8) contain the Vocabulary items for past- and present-tense *be* in English (of course, in those varieties lacking the kind of leveling variation discussed in Section 3). For purposes of exposition, we employ a shorthand notation for *be* below. However, in Section 3.3.4, we further decompose *be* into its constituent syntactic and semantic features. Notice that according to these Vocabulary, the forms of *be* with 2sg *you* should be *was* and *is*, contrary to fact in relevant varieties. This is remedied immediately below with the introduction of Impoverishment rules, which delete number features in 2nd person environments and thus allow the insertion of Elsewhere exponents, correctly yielding *were* and *are* with 2sg *you*.

(7) Vocabulary for [*be* T_[+Past, φ]]

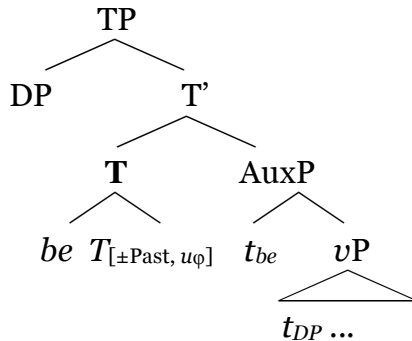
[-Pl]	↔	/wʌz/
<i>elsewhere</i>	↔	/wəɪ/

(8) Vocabulary for [*be* T_[-Past, φ]]

[+Auth, -Pl]	↔	/æm/
[-Pl]	↔	/ɪz/
<i>elsewhere</i>	↔	/aɪ/

Syntactic head movement raises *be* to adjoin with T_[±Past, uφ], as shown below; for reasons of exposition, movement is indicated with trace notation and internal structure is omitted in TP and vP.

(9) Syntax of auxiliary *be* (Adger and Smith 2005)



Following Embick and Noyer (2001) and Embick (to appear-b), we assume that morphological rules and objects can contain and make reference to both hierarchical and linear structures. Such information includes the constituency of complex heads that result from syntactic head movement and morphological operations such as lowering Merger. We adopt Embick and Noyer's definition of Maximum-Word (M-Word) as the highest terminal projection not dominated by any other terminal projection. This is the same definition given for H^{omax} in Chomsky (1995). In the case of English *be* above, the maximal projection of **T** in bold font is the M-word, while italicized *be* and $T_{[\pm\text{Past}, \varphi]}$ are the terminal sub-words it contains. This is illustrated in bracket notation below, where the M-Word boundary is indicated with the notation $[_M \dots]$.

$$(10) \ [_M \ [be] \ T_{[\pm\text{Past}, \varphi]} \]]$$

Notice that the Vocabulary items above insert a single exponent for past-tense *be*, not separate exponents for *be* and $T_{[\pm\text{Past}]}$. Therefore, the features of the adjoined terminals $[_M \ [be] \ T_{[\pm\text{Past}, \varphi]} \]]$ must be combined into a single terminal node by the morphological operation of Fusion. Fusion results in a single locus of vocabulary insertion. This operation, a mechanism of suppletion in DM theory, is illustrated in bracket notation below.

$$(11) \text{ Morphological Fusion of } be \text{ and } T_{[\pm\text{Past}, \varphi]}$$

$$\begin{array}{l} \dots[_M \ [be] \ T_{[\pm\text{Past}, \varphi]} \]]\dots \\ \text{FUSION} \rightarrow \\ \dots[_M \ be \ T_{[\pm\text{Past}, \varphi]} \]]\dots \end{array}$$

The Vocabulary items in (8) do not generate the correct result for 2sg. It is a systematic fact of English that no morphological distinction for $[\pm\text{Plural}]$ is ever realized in the 2nd person. This fact provides a chance to introduce an initial example of Impoverishment rules (Halle 1997).

Within a modular architecture of grammar, the failure of verbal inflection to signal a distinction between, for example, singular and plural subjects in the varieties of English under study, cannot be reflecting a process occurring in the semantics. Nor, arguably, is such a process located within the syntax—it would stretch the imagination to claim that verbs fail to Agree specifically with, say, 2nd-person subjects. In the varieties under study, loss of agreement distinctions does not correlate with changes in word order, such as subject-aux inversion. Therefore, this loss of morphological distinction must occur in a module distinct from semantic interpretation, after syntactic agreement (which occurs as usual), and before phonological computation.

Clearly, the Vocabulary item *were* does not carry a singular/plural distinction in its representation for speakers who allow *were* with either 2nd-person singular or plural subjects. By hypothesis, the featural representation of the singular/plural distinction is lost on the way to phonological realization—that is, during the post-

syntactic morphological computation to the PF interface. Following Bonet (1991), Noyer (1998), Harley (in press), Bobaljik (2002), and others, we model this information loss as the result of deletion rules that operating on morphosyntactic features. These rules are called Impoverishment because they enact the loss of otherwise expected morphological distinctions.

In the English case at hand, the loss of any number distinction in the second person is the result of an Impoverishment rule that applies categorically. This rule, given in (12) below, states that any Number features [\pm Plural] on the morphosyntactic terminal Tense (T) are deleted whenever T has Person phi features valued [+Part, -Auth]:

(12) Categorical [\pm Plural] Impoverishment rule, English varieties w/o leveling

$$T_{[\pm Pl]} \rightarrow T_{[\emptyset]} \quad / \quad T_{[+Part, -Auth]}$$

This Impoverishment operation causes the loss of any number features in the environment of 2nd person, or [+Part, -Auth], as exemplified in (13) below:

(13) Morphological Impoverishment of number on T, English

$$\begin{array}{l} \text{IMPOVERISHMENT} \rightarrow \text{you}_{[+Part, -Auth, -Pl]} \dots T_{[+Part, -Auth, -Pl]} \dots \\ \text{you}_{[+Part, -Auth, -Pl]} \dots T_{[+Part, -Auth]} \dots \end{array}$$

The result of (12) will be that a copular verb with a 2sg subject cannot insert the otherwise expected form *was*, because this terminal no longer bears the feature [-Plural], and hence is ineligible for exponence by *was* in accordance with the Subset Principle above. As a result, only the ‘default,’ or ‘Elsewhere’ item, *were* can be inserted, resulting in *You were*. Note that Adger (2006) adopts an alternative, which we discuss below, whereby there are two Vocabulary items for *were*, with a distinct one for 2sg (or perhaps 2nd person more generally). Indeed, we think this is a real possibility for some dialects and speakers.

Before proceeding, we would like to mention the important role played by Elsewhere items in Distributed Morphology and in realizational theories of morphology more generally. Müller (2006), working on a general model of inflectional syncretism, points out that the Icelandic nominal declension exhibits a good deal of transparadigmatic syncretism. He suggests that a very practical restriction on the mapping between morphosyntactic features and Vocabulary Items, both from a learnability point of view and from empirically attested patterns, comes from the existence of a maximally underspecified Elsewhere Marker. Müller suggests that the existence of Elsewhere Items places an upper bound of the lack of “paradigm economy” (i.e. on the number of distinct signal markers within a set of inflectionally related forms).

Müller musters important empirical and conceptual arguments for the existence of Elsewhere items, like English *were* above. An important consequence of the interaction of the Subset Principle and Impoverishment Theory is that Impoverishment will yield a terminal ineligible for its normal or expected Vocabulary item and hence a less-specified, often Elsewhere item will be inserted. It is thus expected that syncretism or “leveling” cannot occur with a highly specified item, such as *am*. In other words, the theory predicts the impossibility of *am*-leveling in a dialect of English. We return to this prediction in Section 4 below.

2.3 Impoverishment theory and morphosyntactic markedness

In this paper we specifically examine the role of markedness in triggering Impoverishment rules. Markedness can be formalized as the asymmetric grammatical treatment of one value of a binary feature (for discussion, see Nevins 2007a). It is our hope that, regardless of differences among models in how deletion is achieved, the marked features themselves will be recognized as crucial for determining the environments in which variable syncretism occurs.

For all three phi features introduced in Section 2.2 above, [\pm Participant], [\pm Author], and [\pm Plural], the positive value (+) is marked (see especially Greenberg 1966, who however did not use [\pm Participant]). In marked environments, we expect to see fewer inflectional distinctions being overtly manifested. As Croft (1990) states, “If one is looking for inflectional-behavioral evidence for the markedness patterns of values in a grammatical category, one must look at other categories orthogonal to the category in question and count morphological distinctions.” Thus, as 1st person and 2nd person are marked compared to 3rd, we expect to see a pattern of syncretism in the former group but not the latter. Similarly as plural is marked compared to singular, we expect to see a pattern of syncretism in the former group but not the latter.

In addition, we assume, following Croft (1990), Bresnan Deo and Sharma (2007), and others, that Negation is a marked environment. For convenience, we encode assertive polarity featurally as [\pm Negation], where again, ‘+’ is the marked value.

2.4 Mechanisms of intra- (and inter-) speaker variation

All theories of morphosyntax provide mechanisms to account for the familiar phenomenon of allomorphy, where variant forms appear deterministically in a certain morphosyntactic environment. However, current theories lack mechanisms that can explain the existence of intra-speaker variation (a.k.a. inherent variation, sociolinguistic variation, or Labovian variation), where variant forms appear probabilistically in the same environment. Addressing the issue of mechanisms would seem to be a prerequisite for answering further

questions about the relationship between intra-speaker variation and other phenomena such as language change.

Due to the longstanding gap between sociolinguistics and syntactic theory, this well-documented and evidently ubiquitous empirical phenomenon has gone largely without explanation in the Distributed Morphology (DM) theoretical framework (Halle and Marantz 1993, Embick and Noyer 2007), and other realizational theories of syncretism (e.g. Anderson 1992, Beard 1995, Wunderlich 1996, Stump 2001, Ackema and Neeleman 2004).

As a general set of desiderata, a mechanistic theory of variation should explain the following: a.) what kind of objects are the variant forms, b.) what kind of structure constitutes their environment, and c.) why do the forms appear variably instead of categorically. The theory should explain, in other words, how the mechanisms of variation differ from those of allomorphy.

In the current model, a.) the variant forms are different phonological exponents of underspecified Vocabulary items, b.) their environment consists of the phi-features and associated values of terminal nodes, and c.) the forms appear variably instead of categorically when phi-feature deleting Impoverishment rules apply variably instead of categorically in the morphological component.

In developing a theory of morphosyntactic variation based on variable Impoverishment rules, we by no means intend to exclude other mechanisms of variation. For the cases at hand, in which the presence of marked morphosyntactic features lead to use of a default exponent—an Elsewhere Vocabulary item—Impoverishment rules turn out to provide a very good model. In dealing with variable syncretism, we attempt to follow the observation of Bresnan, Deo, and Sharma (2007) that “Variation within a single grammar bears a close resemblance to variation across grammars.” In our model, the presence or absence of Impoverishment rules in different dialects of, for example, Basque can be related to variable application of these rules within a single speaker of Monmouthshire English.

We do not attempt any theory of the social significance of Labovian variation (e.g. Chambers 2002), which we regard as arising in the interaction of extra-linguistic performance systems and whatever variable mechanisms the grammar makes available. At this point, we would like to emphasize that our proposal for variable rules in morphology still allows us to maintain a “use-free” model of grammar (here we disagree with Embick to appear-a, who argues that only competing grammars can exclude usage). Following Adger’s (in press) clearly drawn distinction between cognitive modules of Grammar (G) and Usage (U), there is no rule within our model that makes reference to the frequency of a variant, or to the social meaning of a variant. While U is clearly sensitive to both of these factors, G is sensitive only to morphosyntactic features and structures built up from them. U itself does not construct morphosyntactic representations, but

simply conditions the probability of a variable rule being chosen to apply, or not, when the rule's structural description is met in G.

2.5 Variable rules in sociolinguistics

Variable rules have been proposed in the sociolinguistics literature in order to account for phenomena that resemble the normal input-output mapping processes modeled by rules with a structural description and a structural change, but which are not empirically observed to apply 100% of the time that their structural description is met.

A clear example can be found in the study by Guy (1991), who considers a phonological deletion rule in English, namely post-consonantal coronal stop deletion (e.g. *went* → *wen'*, *paint* → *pain'*, etc.) in terms of a derivational rule in the standard generative phonology tradition. Guy models post-consonantal *t/d*-deletion with a structural description and a structural change, but crucially includes the fact that the rule fires with a *variable probability of application*, denoted as p_a :

(14) *-t, d* Deletion (Guy 1991: 8)

<variable, probability of application = p_a >

$[t, d] \rightarrow \langle \emptyset \rangle / C_]$

Deletion rules in phonology are often understandable in terms of either paradigmatic or syntagmatic markedness; in the case of word-final cluster simplification, there is clearly a marked dimension to consonant clusters and word-final coda position, both of which are resolved by variable application of a deletion rule.⁷

3. Three Case Studies of Variable Impoverishment Rules

This section contains three case studies of leveling variation in agreement paradigms of *be* for several varieties of English. In each case, we argue that the observed patterns arise from a variable Impoverishment operation targeting a particular marked feature.

⁷ Fasold (1991) is a review article on the history of variable rules as a theoretical tool, which contains remarks on the “quiet demise” of variable rules due to the difficulty of viewing generalized syntactic transformations such as Move-Alpha as a rule, arriving at more general skepticism about the possibility of meshing quantitative analysis of sociolinguistic variables with the principles and elements of theoretical linguistics. While the integration of these certain types of grammatical operations with probabilistic application may be more formally challenging in some cases than others, but we do not see the existence of this type of difficulty as a reason to wholly abandon attempts at the unification of formal theory with probabilistic factors of intra-speaker variation.

3.1 *Be* leveling in Monmouthshire, Wales: [+Author] is marked

Our first case comes from Monmouthshire, a county in the southeast of Wales.⁸ We compare the variable leveling pattern in Monmouthshire with categorical syncretism in the counties of Devon and Wiltshire, England. The data appear in the *Survey of English Dialects* (SED, Orton 1962-1971) and Ihalainen (1991). For the following present-tense paradigms, we have relied upon SED data reported by Bresnan, Deo, and Sharma (2007).

3.1.1 *The pattern*

Both Devon and Wiltshire have categorical leveling to the plural form *be* in the first person, as illustrated in (15) below.

(15) Paradigm of Devon and Wiltshire (WS) *be* leveling (leveled forms **bold**)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I be</i>	<i>us be</i>
<u>2nd</u>	<i>thee art (WS: beest)</i>	NO DATA ⁹
<u>3rd</u>	<i>her is</i>	<i>they be</i>

Of interest for our Impoverishment analysis is the instantiation of this pattern as variable leveling to *be* (alternating with *am*) in Monmouthshire, as shown in (16) below.¹⁰

(16) Paradigm of Monmouthshire *be* leveling (variant with %)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I be (%am)</i>	<i>us be</i>
<u>2nd</u>	<i>thee beest</i>	NO DATA
<u>3rd</u>	<i>her is</i>	<i>they be</i>

3.1.2 *Impoverishment analysis*

We propose the following Vocabulary for present tense *be* in Devon, Wiltshire and Monmouthshire. Note that *be* is the Elsewhere item on this analysis: it is compatible with any phi-feature set that arrives from the syntax or subsequent Impoverishment operations, but will be blocked by more specific Vocabulary items when these are compatible.

⁸ Although Bresnan, Deo and Sharma (2007) discuss data from Monmouthshire (starting on page 328), their map of the English counties (Figure 1, page 304) does not include Welsh Monmouthshire.

⁹ No data is reported for 2pl in the SED.

¹⁰ In the SED, one individual from Monmouthshire and one from neighboring Gloucestershire had this pattern of variation, which we refer to as a Monmouthshire pattern following Bresnan, Deo, and Sharma (2007: 307 fn. 7; 329 Fig. 20).

(17) Vocabulary for [*be* T_[-Past, φ]], Devon, Wiltshire, and Monmouthshire (MS)

[+Auth, -Pl]	↔	/æm/
[+Part, -Auth]	↔	/aɪt/ (WS, MS: /bɪst/)
[-Pl]	↔	/ɪz/
<i>elsewhere</i>	↔	/bi/

The following Impoverishment rule will account for the observed patterns of leveling variation. In this case, the marked feature [+Author] triggers deletion of phi features in the 1st person, allowing the insertion of a default form, *be*. This analysis links inter- and intra-speaker variation to the same mechanism: when Impoverishment applies categorically, the Devon/Wiltshire pattern results, and when Impoverishment applies variably, the Monmouthshire pattern results.

(18) Phi Impoverishment rule
(Variable in Monmouthshire, categorical in Devon/Wiltshire)

$$T_{[-Past, \phi]} \quad (\%) \rightarrow \quad T_{[-Past, \emptyset]} \quad / \quad T_{[+Auth]}$$

This Impoverishment rule deletes the phi-features on copulas when they contain a marked [+Author] feature. As a consequence, only the Elsewhere item *be* will be available as a phonological exponent of the resulting phi-feature matrix.

3.2 Was leveling in Buckie, Scotland: [+Participant] is marked

Buckie is a small and relatively isolated fishing village located in northeastern Scotland. Primary documentation of the Buckie dialect is found in Jennifer Smith's (2000) dissertation (see also Tagliamonte and Smith 2000 for comparison of leveling in Buckie and other dialects). In the discussion that follows, we rely on the descriptions of Buckie reported in Adger and Smith (2005) and Adger (2006).

3.2.1 The pattern

There is a “relatively rare variable/categorical split” (Adger and Smith 2005: 167) in the morphosyntactic environment for leveling in Buckie. Although leveled *was* occurs variably with full DP subjects (% *the boats was*), *was* is completely unattested with 3pl pronominal subjects (**they was*).¹¹

¹¹ We follow Adger and Smith (2005: 168-170) in treating 3sg leveling with full DP subjects as involving a different mechanism than leveling with pronominal subjects. According to Adger and Smith (2005: 170), leveling with DP subjects is made possible by “multiple lexical entries for D,” such that D has the same value for Number as its NP complement, and D2 is specified as singular regardless of the Number value of its NP complement.

(i) Multiple Ds (adapted from Adger and Smith 2005: 168)
D = [DP D_[α±Pl] [NP N_[α±Pl]]]
D2 = [DP D_[-Pl] [NP N_[α±Pl]]]

(19) Buckie *was* leveling, attested examples (Adger and Smith 2005: 156)

- a. Aye, I thought you *was* a scuba diver.
- b. We played on ‘at beach until we *was* tired [...].
- c. They *were* (**was*) still like partying hard.
- d. The mothers *was* roaring at ye comin’ in.

(20) Paradigm of Buckie *was* leveling (leveled forms **bold**, variants with %)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I was</i>	<i>we was (%were)</i>
<u>2nd</u>	<i>you was (%were)</i>	<i>you was (%were)</i>
<u>3rd</u>	<i>(s)he was</i>	<i>they were (*was)</i>
<u>DP</u>	<i>a boat was</i>	<i>boats was (%were)</i>

The crucial point is that there is categorical non-variation in 3rd person and variation in 1st and 2nd person. These, by hypothesis, share a marked feature: [+Participant].

3.2.2 Impoverishment analysis

To capture the leveling variation with pronouns, excluding 3pl *they*, we propose the following Impoverishment analysis. Our analysis relies on Adger’s (2006) idea that there is, in fact, accidental homophony in Buckie—in our DM terms, that there are two different Vocabulary items for *were*. Indeed, this idea reveals another source of variation: the ambiguous shape of the English paradigm, which allows for two possible analyses (by a linguist or a language learner). Either 2sg is Impoverished and *were* is the Elsewhere form, as above for other English varieties, or the Vocabulary item for 2sg is highly specified, and *was* is the Elsewhere form. We hypothesize that leveling is caused by Impoverishment operations, and this deletion of phi features on terminal morphemes always results in the insertion of a less-specified default exponent. Therefore, because Buckie levels to the form *was* and not *were*, we propose that the Vocabulary for past-tense *be* in Buckie contains two highly specified homophonous items for *were* and an Elsewhere item for *was*, as illustrated below.¹²

While we provisionally accept Adger and Smith’s analysis for the purposes of this paper, an alternative analysis is possible. Suppose there is (variable) Impoverishment of marked [+Plural] on D. As Impoverishment is a post-syntactic operation, this predicts that there could be Agreement with DP in the narrow syntax, followed by Impoverishment of D in the morphological component, yielding something like *this boats are*. Such a pattern is not attested to our knowledge. Suppose, therefore, that DP is a phase, whose spellout precedes DP-external syntactic operations. A DP can be spelled out to the morphological component and Impoverished at an earlier point in the derivation than when finite T is Merged to the structure, thereby prior to Agreement with DP in the narrow syntax, yielding the ultimate lack of number agreement on T.

¹² See also Mittelstaedt and Parrott (2002), who proposed this analysis of *were*, without Impoverishment, for English varieties in general.

(21) Vocabulary for [*be* T_[+Past, φ]], Buckie

[+Part, -Auth]	↔	/wəɪ/
[+Pl]	↔	/wəɪ/
<i>elsewhere</i>	↔	/wəz/

By hypothesis, the positive value (+) of the feature [\pm Participant] is marked. We propose a variable Impoverishment rule that deletes all of T's phi features (both Person and Number) when T has a [+Participant] feature. This allows variable insertion of the Elsewhere exponent *was*, the leveled form. This Impoverishment rule will not apply when T's Participant feature has a negative value (-), so we don't find *was* leveling with 3pl *they* [-Part, -Auth, +Pl]. *Was* leveling with plural DPs is due to a distinct mechanism, as mentioned in footnote (7) above.

(22) Variable Phi Impoverishment rule, Buckie

$$T_{[+Past, \phi]} \quad \% \rightarrow \quad T_{[+Past, \emptyset]} \quad / \quad T_{[+Part]}$$

(23) Morphological Impoverishment of phi on T, Buckie

$$\text{IMPOVERISHMENT} \rightarrow \begin{array}{l} we_{[+Part, +Auth, +Pl]} \dots [be \ T_{[+Past, +Part, +Auth, +Pl]}] \\ we_{[+Part, +Auth, +Pl]} \dots [be \ T_{[+Past]}] \end{array}$$

This rule is relativized to the past tense. Arguably, the past tense is a more marked environment to begin with. Indeed, all English verbs except the copula already show no inflectional distinctions there. Thus, we might predict an implicational generalization such that no dialect of English Impoverishes in the present tense but *not* in the past tense. We return to this prediction in Section 4 below.

3.2.3 Discussion of Adger's (2006) Combinatorial Variability analysis

Adger (2006) adopts a feature co-occurrence restraint that prevents the feature [\pm Author] from appearing in the same terminal with the feature [-Part]. Thus, differently from the system proposed in Section 2 above, 3rd person pronouns lack a [-Author] feature in his theory:

(24) Pronominal features of English (adapted from Adger 2006: 508)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I</i> = [+Sing, +Part, +Auth]	<i>we</i> = [-Sing, +Part, +Auth]
<u>2nd</u>	<i>you</i> = [+Sing, +Part, -Auth]	<i>you</i> = [-Sing, +Part, -Auth]
<u>3rd</u>	<i>she</i> = [+Sing, -Part]	<i>they</i> = [-Sing, -Part]

Adger (2006: 518) proposes a formal algorithm by means of which children acquire the mapping of syntactic and phonological features in lexical items,

reducing “optionality, synonymy, and the size of the lexicon.” The formalization of such an algorithm is an important step to understanding how speakers assemble feature combinations and map these to morphophonological forms in the process of acquisition. We furthermore agree with Adger (pers. comm.) that this or a similar algorithm can be used to assemble Vocabulary items. Thus, we have translated Adger’s (2006: 521) proposed lexical items into Vocabulary items for Buckie (homophonous exponents are subscripted for further reference directly below). Notice that these Vocabulary items will not compete for insertion because they are all maximally underspecified, with only one morphosyntactic feature each.

(25) Adger’s Algorithmic Vocabulary for [*be* T_[+Past, φ]], Buckie

[+Sing]	↔	/wΛZ/ ₁
[-Sing]	↔	/wəɪ/ ₁
[+Part]	↔	/wΛZ/ ₂
[-Auth]	↔	/wəɪ/ ₂
[+Auth]	↔	/wΛZ/ ₃

Adger’s account can thus derive the variable *was/were* pattern as a result of stochastic choice of non-competing Vocabulary items.¹³ Crucially, there is no Elsewhere item in this model, and so there are two important differences from the account we present above: first, the fact that the leveled **forms** are just the exponents already having the most heterogeneous distribution (e.g. *was*, being shared by 1sg and 3sg, bears no common person feature) and second, the fact that the leveling **environments** are characterized by markedness. By contrast, these two properties are immediate consequences of our proposed markedness-based Impoverishment account, which leads to ‘emergence of the least-specified’ as a source of leveling. Adger’s model could essentially generate variable leveling of a wide range of patterns input to the algorithm during acquisition. It is not clear that it could rule out, for example, *am* leveling among 1st and 2nd persons as a possible diachronic endpoint of change. Such a pattern of leveling is not predicted by our theory, since *am* is the most specified Vocabulary item and could not be inserted as a result of Impoverishment. We return to this prediction in the final section below.

Another notable difference between these two models is that Adger’s appears, in principle, to be capable of predicting frequencies of variant usage. Because the Vocabulary in (25) are so underspecified, more than one exponent can be inserted at a given terminal. Adger’s acquisition algorithm yields twice as many items for *was* than *were* that are insertable when T has 1pl or 2sg phi features, but twice as many items for *were* than *was* that are insertable when T has 2pl phi

¹³ See Parrott (2007) for independent arguments that non-competing Vocabulary are among the mechanisms of intra-speaker variation in morphosyntax.

features. This is illustrated in (26) below. On the null hypothesis that each Vocabulary item has an equal probability of insertion (Adger in press), such a model predicts that leveled *was* will be used about twice as often as *were* with 1pl *we* and 2sg *you* than with 2pl *you*. And indeed, Adger (2006: 514) reports that across all the Buckie speakers in Smith's (2000) sample, leveled *was* occurred 67% of the time with 1pl *we*, 69% of the time with 2sg *you*, but only 10% of the time with 2pl *you*.

(26) Vocabulary Insertion (\leftarrow) of (25) in Buckie

<i>I</i> ... [<i>be</i> T _[+Sing, +Part, +Auth]]	\leftarrow	/wΛZ/ ₁ OR /wΛZ/ ₂ OR /wΛZ/ ₃
<i>You</i> ... [<i>be</i> T _[+Sing, +Part, -Auth]]	\leftarrow	/wəɪ/ ₂ OR /wΛZ/ ₁ OR /wΛZ/ ₂
(<i>S</i>) <i>he</i> ... [<i>be</i> T _[+Sing, -Part]]	\leftarrow	/wΛZ/ ₁
<i>We</i> ... [<i>be</i> T _[-Sing, +Part, +Auth]]	\leftarrow	/wəɪ/ ₁ OR /wΛZ/ ₂ OR /wΛZ/ ₃
<i>You</i> ... [<i>be</i> T _[-Sing, +Part, -Auth]]	\leftarrow	/wΛZ/ ₂ OR /wəɪ/ ₁ OR /wəɪ/ ₂
<i>They</i> ... [<i>be</i> T _[-Sing, -Part]]	\leftarrow	/wəɪ/ ₁

Our Impoverishment analysis of *was* leveling in Buckie, while certainly compatible with these (or any) empirically observed usage frequencies, does not predict the apparent 2:1 ratio of leveled *was* without additional stipulations. For instance, we might follow the original sociolinguistic approach to variable rules and attach application probabilities to a rule's structural description, where the sum gives an overall probability of application for the rule. The hypothetical Impoverishment rule for Buckie given in (27) has an input probability of application (Ip_a) equal to .33, and probabilities of application (p_a) equal to .33 when the phi features of T are [+Author] or [-Plural]. This yields probabilities to match the observed usage frequencies. The probability of Impoverishment with *we* (T_[+Part, +Auth, +Pl]) is equal to .66 [= ($Ip_a = .33$) + ($p_a = .33 / T_{[+Auth]}$)] and the probability of Impoverishment with *you_{SG}* (T_[+Part, -Auth, -Pl]) is also equal to .66 [= ($Ip_a = .33$) + ($p_a = .33 / T_{[-Pl]}$)], while the probability of Impoverishment with *you_{PL}* (T_[+Part, -Auth, +Pl]) is equal to .33 [= ($Ip_a = .33$)].

(27) Hypothetical Impoverishment rule w/ application probabilities

$$T_{[+Past, \phi]} \quad \% \rightarrow \quad T_{[+Past, \emptyset]} \quad / \quad T_{[+Part]} \\
\langle Ip_a = .33 \rangle \quad \quad \quad \langle p_a = .33 / T_{[+Auth]} \rangle \\
\quad \quad \quad \quad \quad \quad \quad \quad \langle p_a = .33 / T_{[-Pl]} \rangle$$

While such a move is formally possible, we are not yet convinced that it is necessary or desirable to capture usage frequencies over community-level dialects within a formal model of the individual's grammar. Further considerations make Adger's (2006) method for capturing usage frequencies look more fragile than at first glance. The algorithm yields twice as many *were* exponents for 2pl, but the observed frequency of leveled *was* is only 10% with plural *you*. This is much less than the predicted 33%. If an advantage of Adger's analysis is that it correctly predicts the observed 67% and 69% usage of leveled *was* with *we* and plural *you*, why isn't it a disadvantage that the analysis fails to predict the correct usage frequency with singular *you*? Furthermore, the numbers of attested *was* with plural *you* (N = 10) are extremely low compared to attestations with singular *you* (N = 161) and *we* (N = 368). These low numbers are undoubtedly due to the difficulty of eliciting 2pl pronouns during a sociolinguistic interview, but this lends itself to less confidence in the low ratio of leveled *was* with plural *you*. It seems quite plausible that the frequency of leveled *was* would increase if more 2pl tokens could be collected. If so, this could weaken the prediction of 33% leveled *was* with plural *you*. Finally, Hudson's (in press) response to Adger (2006) points out that the predicted 2:1 usage ratio is not observed for any one social group in Buckie, but is only detected when aggregating across all speakers. For example, Hudson observes that the middle-aged women in Smith's (2000) sample used leveled *was* less than 10% of the time with *we*. Again, if an advantage of Adger's analysis is that it correctly predicts usage frequencies over an entire population, why isn't it a disadvantage that the analysis fails to predict the correct usage frequencies when a population is stratified into socially significant categories?

While Hudson's conclusion is that social information must therefore be encoded in the grammar, we wonder whether models of grammar should attempt to predict usage frequencies at all. Notice that in order for our hypothetical Impoverishment rule in (27) to correctly capture such socially conditioned usage frequencies, it would be necessary to include social information in the rule itself, associated with application probabilities (e.g., $\langle p_a = -.9 / \text{speaker is a middle-aged female} \rangle$). We are reluctant to endorse such a radical "blurring of the boundaries between grammar and use," in Embick's (to appear-a) phrase. Therefore, we maintain a strictly modular view following Adger (in press): the valued application probabilities for variable Impoverishment rules are located in a usage module distinct from the grammar, where they can be freely influenced by myriad social, volitional, frequency and recency of use, and other language-external factors. We return to the question of modularity again in the final section of the paper.

3.3 *Weren't* and *ain't* leveling on Smith Island, MD: [+Negation] is marked

Smith Island, Maryland (really a small cluster of islands and marshy wetland areas) is located in the Chesapeake Bay on the East coast of the United States. This extremely isolated community is moribund for economic reasons, and erosion coupled with rising sea levels will make the islands uninhabitable in less than a century. Schilling-Estes (1997), Schilling-Estes and Wolfram (1999), Schilling-Estes and Wolfram (2003), and Wolfram and Schilling-Estes (2003) present extensive details on variation and change in progress on Smith Island. In what follows, we rely on data reported in Schilling-Estes (2000) and Mittelstaedt (2006).

3.3.1 *The weren't leveling pattern*

In both variationist studies of past-tense *be* carried out to date (Schilling-Estes 2000, Mittelstaedt 2006), leveling to the form *were* with 1sg and 3sg pronominal or DP subjects is completely unattested on Smith Island.¹⁴

- (28) a. * I were scared.
b. * She were scared.
c. * The boat were slower.

Both the full (*not*) and contracted (*-n't*) forms of negation are attested with past-tense *be* on Smith Island (example from Parrott 2007).

- (29) No it wasn't, I can assure you this John Dunne poem was not in any way shape or form meant as a threat.

However, leveling to the form *were* with the full form of negation is completely unattested on Smith Island.

- (30) a. * I were not scared.
b. * She were not scared.
c. * The boat were not slower.

On Smith Island, variable leveling to the form *weren't* is very well attested, and used at high levels by the whole population. *Weren't* leveling is attested with 1sg and 3sg pronominal and 3sg DP subjects (examples from Mittelstaedt 2006 and pers. comm.):

¹⁴ We do not discuss Smith Island *was*-leveling in this article. While *was* (and *-s*) leveling is well attested with DP subjects, Schilling-Estes (2000) reports only 5/68 tokens of *was*-leveling with pronominal subjects; Mittelstaedt (2006) found zero attestations of *was*-leveling with pronominal subjects. Whether this dialect has completely lost *was* leveling with pronominal subjects, or whether more data might reveal a pattern of variable leveling restricted to certain pronouns, are questions that will have to be addressed in future research on Smith Island.

- (31) a. I weren't able to answer.
 b. I weren't very old.
 c. She weren't that close to you.
 d. He weren't expecting a boat.
 e. The man weren't there every day.
 f. Ma weren't doing no laughing.

The phenomenon of *weren't* leveling is found in various communities in addition to Smith Island; see for example Schilling-Estes and Wolfram (1994), Britain (2002), Schilling-Estes and Wolfram (2003), and Wolfram and Schilling-Estes (2003).

3.3.2 Impoverishment analysis of weren't leveling

To summarize the pattern discussed above, 1sg and 3sg pronouns variably allow the expected form *wasn't* or the leveled form *weren't* on Smith Island. Two observations inform our analysis of this pattern. First, leveling occurs only with the contacted form of negation *-n't*, and never with the full form *not*. This is the result of a locally determined morphological process in the environment of negation; *-n't* is not merely the result of phonological 'contraction' of *not* (Zwicky and Pullum 1983), but is morphosyntactically local to its host terminal $T_{[+Past]}$. Second, *were* is the Elsewhere form of past-tense *be* in Smith Island:

(32) Vocabulary for [*be* $T_{[+Past, \phi]}$], Smith Island

[-Pl]	\Leftrightarrow	/wʌz/
<i>elsewhere</i>	\Leftrightarrow	/wəɪ/

Thus, we propose that a variable Impoverishment rule can delete the [\pm Plural] feature entirely whenever [*be* $T_{[+Past, \phi]}$] occurs in the same morphosyntactic terminal complex as [$+$ Negation], as indicated using the 'maximal word' notation (M-word = [$_M \dots$]) of Embick (to appear-b).

(33) Variable [\pm Plural] Impoverishment rule, Smith Island

$$T_{[+Past, \pm Pl]} \quad \% \rightarrow \quad T_{[+Past, \emptyset]} \quad / \quad [_M __ +Neg]$$

In fact, as only [\pm Plural] is otherwise distinguished, (32) could be generalized to Impoverishment of all phi features on $T_{[+Past]}$:

(34) Alternate variable Phi Impoverishment rule, Smith Island

$$T_{[+Past, \phi]} \quad \% \rightarrow \quad T_{[+Past, \emptyset]} \quad / \quad [_M __ Neg]$$

While adopting fairly standard accounts of negation (e.g., Zanuttini 1997) and head movement in the narrow syntax (e.g., Roberts 2001), we would like to remain somewhat agnostic regarding the precise morphosyntactic analysis of –

n't, pending further research. However, it is crucial that [+Negation] occupy the same M-word as [*be* T_[+Past, φ]] in order to trigger Impoverishment in the morphological component. M-word locality constitutes an important structural constraint on this morphosyntactic operation, and furthermore restricts the range of environments where an 'overload' of marked features can cause Impoverishment. Again, we stress that [+Negation] is a marked feature (here, we agree with Bresnan, Deo and Sharma 2007). In our model, the presence of [+Negation] within the same M-word causes variable Impoverishment deletion of phi features in past-tense *be*, yielding the Elsewhere form *were(-n't)*.

3.3.3 The ain't leveling pattern

In addition to *weren't* leveling, on Smith Island present-tense *be* and *have* level variably to the form *ain't* in all values of person and number. As in every other dialect of English that we are aware of, there is no independently occurring form *ai* for present-tense *be* or *have* without the contracted form of negation.

(35) *Ain't* = *be+n't* (attested, Mittelstaedt pers. comm., 2006)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I ain't gonna have nothing</i>	<i>we ain't sure he's Buck's</i>
<u>2nd</u>	<i>you ain't gonna cook nothing</i>	NO DATA
<u>3rd</u>	<i>he ain't gonna do it</i> <i>she ain't very good</i>	<i>they ain't pretty</i>

(36) *Ain't* = *have+n't* (attested, Mittelstaedt pers. comm., 2006)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I ain't been to DC</i>	NO TOKENS (<i>Cf. we haven't lost a lot a people</i>)
<u>2nd</u>	<i>you ain't really accomplished nothing</i>	NO DATA
<u>3rd</u>	<i>he ain't been home</i> <i>she ain't been critiqued much</i>	NO TOKENS (<i>Cf. they haven't come up with a answer</i>)

Furthermore, the leveled form *ain't* appears where present-tense *do* is ambiguous with *have* as a finite auxiliary hosting negation with the participial verb of possession *got*.

(37) *Ain't* = *have+n't (do+n't)* (attested, Mittelstaedt pers. comm., 2006)

	<u>Singular</u>	<u>Plural</u>
<u>1st</u>	<i>I ain't got no Sprite</i>	<i>we ain't really got any fields</i>
<u>2nd</u>	<i>you ain't got a thong, do you?</i>	NO DATA
<u>3rd</u>	<i>he ain't even got a</i> <i>make sure she ain't got no water in</i>	NO DATA

On Smith Island, there is no *ain't* leveling with any other instances of *do+n't*, and thus we take this *ain't* to be an exponent of underlying *have+n't* rather than underlying *do+n't*, despite the tag question “*do you?*” in the 2sg example given in (37). Even without *ain't*, the tag question is always with *do* and never with *have* in U.S. English varieties, and (38d) is presumably unattested in any English variety.

- (38) a. % You haven't got a thong, do you? (U.S. varieties)
 b. % You haven't got a thong, have you? (British varieties)
 c. % You don't got a thong, do you? (U.S. varieties)
 d. * You don't got a thong, have you?

3.3.4 Impoverishment analysis of *ain't* leveling

Before attempting an Impoverishment analysis of *ain't* leveling on Smith Island, we acknowledge that there is a very large literature on contracted negation and *ain't* in English dialects to which we cannot do full justice here. For examples, see among others Hazen (1996), Tagliamonte and Smith (2002), and Anderwald (2002, 2003, 2004). This oft-pilloried form has a long history. Walker (2005: 4) provides the following as the first attestation of contracted negation in English, from 1652.

- (39) *But **mayn't** I Bar points, being the Challenged?*
(John Tatham, The Scotch Figgaries, or a Knot of Knaves IV, i, Oxford English Dictionary, 1989)

The modern form *ain't* apparently developed from the contractions of “*are + not*, *have + not*, and *am + not*,” as attested below (Walker 2005: 4).

- (40) a. ***Han't** she tole you, and ha'not I told you...*
(The Sparagus Garden IV.v; Brome, 1635)
 b. *wee'l play heads or tails, who goes first, that's fair now, **e'nt** it?*
(The Mock-Tempest IV.ii; Duffett, 1674)

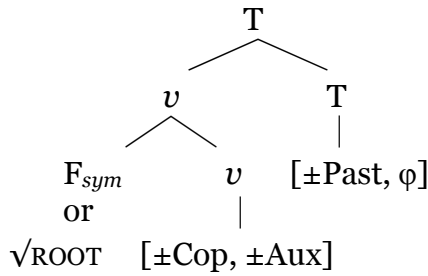
Turning to our own account of *ain't* leveling on Smith Island, the following observations are crucial. First, the existence of *ain't* leveling is still more evidence that the feature [+Negation] is marked, and can trigger (variable) Impoverishment deletion of phi features within its M-word.¹⁵ However, unlike with *weren't* leveling above, *ai* is not obviously an Elsewhere form of *be* or *have*, and never occurs independently of *-n't*. Finally, the form *ain't* doesn't just level across the person and number paradigms of *be* and *have*: rather, it seems that the form *ain't* levels across the distinction between *be* and *have*.

¹⁵ Indeed, we would like to thank Christina Tortora (pers. comm.) for reminding us that all the cases of leveling with *-n't* involve the plural forms of *be/have*, both synchronically (in the case of *weren't*) and perhaps historically (in the case of *ain't*). This may support our analysis, since this fact might have to be treated as a coincidence on a non-Impoverishment account, whereas in the present model these plural forms are the Elsewhere exponents.

Taken together, these observations about *ain't* require an analysis that includes details about the morphosyntax of verbal auxiliaries, and addresses questions about locally-determined allomorphy (Bobaljik 2000, Adger, Béjar and Harbour 2003). Specifically, *ain't* leveling raises the question of whether *ain't* is a ‘monomorphemic’ or ‘suppletive’ form, a kind of allomorph of negation, an allomorph of T, or a portmanteau.

We assume that all verbal auxiliaries consist of a category head little *v* adjoined either to a Root (perhaps in the case of modals like *should*, etc.) or to certain syntactico-semantic features F_{sym} that determine each auxiliary’s unique semantics, argument structure, and complement selection properties. Little *v* consists of two features: $[\pm\text{Copula}, \pm\text{Auxiliary}]$. We claim that the feature-value $[\text{+Copula}]$ entails the feature-value $[\text{+Auxiliary}]$. In other words, the feature-value combination $*[\text{+Copula}, \text{-Auxiliary}]$ is ruled out because no verbal element can be a copula but not an auxiliary.

(41) Morphosyntax of verbal auxiliaries



The operation of morphological Fusion (see above) applies to *v* and $F_{sym}/\sqrt{\text{ROOT}}$. Main verbs have the features $v_{[-\text{Cop}, -\text{Aux}]}$ and are adjoined with $T_{[\pm\text{Past}, \phi]}$ through morphological lowering Merger (Embick and Noyer 2001). This allows the insertion of a distinct Vocabulary item at the terminal for $T_{[\pm\text{Past}, \phi]}$ (e.g., the exponent *-d*).

(42) Morphosyntactic terminal features of main verbs + $T_{[\pm\text{Past}, \phi]}$

$$[{}_M [\sqrt{\text{ROOT}}, v_{[-\text{Cop}, -\text{Aux}]}] T_{[\pm\text{Past}, \phi]}]$$

The verbal auxiliaries have suppletive Vocabulary, as we saw above. Therefore, $v_{[\pm\text{Cop}, \pm\text{Aux}]}$ must undergo Fusion with $T_{[\pm\text{Past}, \phi]}$, yielding the following morphosyntactic terminals:

(43) Morphosyntactic terminal features of *be*, *have*, *do*

<i>be</i>	=	$[T_{[\pm\text{Past}, \phi]}, v_{[\text{+Cop}, \text{+Aux}]}, F_{sym-be}]$	(auxiliary or copula)
<i>have</i>	=	$[T_{[\pm\text{Past}, \phi]}, v_{[-\text{Cop}, \text{+Aux}]}, F_{sym-have}]$	(auxiliary)
<i>do</i>	=	$[T_{[\pm\text{Past}, \phi]}, v_{[-\text{Cop}, -\text{Aux}]}, F_{sym-do}]$	(light verb)
<i>do</i>	=	$[T_{[\pm\text{Past}, \phi]}, v_{[-\text{Cop}, -\text{Aux}]}]$	(<i>do</i> support for $T_{[\pm\text{Past}]}$)

This allows the insertion of single Vocabulary items for auxiliaries. The Vocabulary for auxiliaries is repeated here from above, with featural detail added. Recall that the categorical Impoverishment rule for 2sg is in effect on Smith Island, ensuring that the Elsewhere forms *were* and *are* are correctly inserted with the pronoun *you*.

(44) Categorical [-Plural] Impoverishment rule, Smith Island

$$T_{[-Pl]} \rightarrow T_{[\emptyset]} / T_{[+Part, -Auth]}$$

(45) Vocabulary for [*be*_[+Cop, +Aux], *T*_[+Past, ϕ]], Smith Island

$$\begin{array}{ll} [-Pl] & \Leftrightarrow /w\Lambda z/ \\ elsewhere & \Leftrightarrow /w\text{ə}\mathfrak{x}/ \end{array}$$

(46) Vocabulary for [*be*_[+Cop, +Aux], *T*_[-Past, ϕ]], Smith Island

$$\begin{array}{ll} [+Auth, -Pl] & \Leftrightarrow /æm/ \\ [-Pl] & \Leftrightarrow /ɪz/ \\ elsewhere & \Leftrightarrow /aɪ/ \end{array}$$

(47) Vocabulary for [*have*_[-Cop, +Aux] *T*_[-Past, ϕ]], Smith Island

$$\begin{array}{ll} [-Part, -Pl] & \Leftrightarrow /hæz/ \\ elsewhere & \Leftrightarrow /hæv/ \end{array}$$

(48) Vocabulary for [*do*_[-Aux] *T*_[-Past, ϕ]], Smith Island

$$\begin{array}{ll} [-Part, -Pl] & \Leftrightarrow /d\Lambda z/ \\ elsewhere & \Leftrightarrow /du/ \end{array}$$

[+Negation] can be adjoined to *T*_[Past:±], either through syntactic head movement or morphological Merger (as in Parrott 2007), forming a complex terminal M-word. In this context, the exponent of [+Negation] is *-n't*, while elsewhere the exponent is *not*. In other words, the ‘contracted’ form of English *not* is really a contextual allomorph of Negation.

(49) Vocabulary for English [+Negation] (Parrott 2007)

$$\begin{array}{ll} [+Neg] & \Leftrightarrow /nt/ \quad / \quad [M \ T_{[Past:\pm]} \ ___] \\ elsewhere & \Leftrightarrow /nat/ \end{array}$$

As above, parallel to past tense *weren't*-leveling in (33), we claim that a variable Impoverishment rule deletes ϕ features of *T*_[+Past] when it is in the same M-word as marked [+Negation]. The claim that Negation is marked and triggers

Impoverishment receives further support in the work of Tubau (in progress), who applies an Impoverishment-based analysis to variation in negative concord.

However, for Smith Island *ain't* leveling, we propose an even more drastic Impoverishment rule caused by the M-word-internal environment of marked Negation. This rule deletes not only phi features, but also the [\pm Cop] feature of $T_{[-Past]}$.

(50) Variable [\pm Copula] and Phi Impoverishment rule, Smith Island

$$T_{[-Past, \phi, \pm Cop, \pm Aux]} \quad \% \rightarrow \quad T_{[-Past, \emptyset, \emptyset, \pm Aux]} \quad / \quad [M \text{ ___ } +Neg]$$

On this theory, *be* and *have* are distinguished from each other by their [\pm Copula] feature, and they are distinguished from *do* by their [+Auxiliary] feature. Impoverishment of [\pm Copula] and phi features, here again triggered by M-word locality with the marked feature [+Negation] (i.e., *-n't*) neutralizes the distinction between *be* and *have* but retains the distinction between *be/have* (+Auxiliary) and *do* (-Auxiliary).

(51) Features of [-Past] *be*, *have*, *do* after Impoverishment rule (50)

<i>be</i>	$[M \ T_{[-Past, \phi, +Cop, +Aux]}]$	IMPOV. \rightarrow	$[M \ T_{[-Past, +Aux]}]$
<i>have</i>	$[M \ T_{[-Past, \phi, -Cop, +Aux]}]$	IMPOV. \rightarrow	$[M \ T_{[-Past, +Aux]}]$
<i>do</i>	$[M \ T_{[-Past, \phi, -Cop, -Aux]}]$	IMPOV. \rightarrow	$[M \ T_{[-Past, -Aux]}]$

The Vocabulary for *do* in (48) above contain only the feature [-Auxiliary] and no [\pm Copula] feature, so exponents for *do* can still be inserted after Impoverishment rule (50) applies. However, since the phi features of *do* are also deleted by (50), only the Elsewhere exponent *do* can be inserted. The exponent *-n't* is inserted as normally. The result of variable Impoverishment rule (50) is *don't* leveling in 3rd person, as attested on Smith Island (Mittelstaedt pers. comm., Mittelstaedt 2006).¹⁶

- (52) a. *he don't care where he's at*
 b. *she don't have the kids*

The Vocabulary for *be* and *have* in (46-47) above contain [+Copula] and [-Copula] features respectively. Thus, after Impoverishment of [\pm Copula], no exponents of *be* or *have* can be inserted at all. According to the subset principle, repeated from above, “Insertion does not take place if the Vocabulary item contains features not present in the morpheme.” The only exponent to insert into the now severely Impoverished terminal morphemes for *be* and *have* $[M \ T_{[-Past, +Aux]}]$ are within the Vocabulary for $T_{[-Past]}$, which is where one finds *ain't*.

¹⁶ We provisionally treat the vowel change [u] \rightarrow [o] in *do* \rightarrow *don't* as the result of a phonological readjustment rule. Our theory does not provide an obvious explanation for the change from *will* \rightarrow *won't*. Many such questions about English *-n't* (raised especially in Zwicky and Pullum 1983) remain unaddressed in this paper for reasons of scope.

There are two possible analyses of the phonological string *ain't*. First, it could be that the exponent *ai* is a contextual allomorph of $T_{[-Past]}$ when M-word internal with [+Negation]. On this analysis, the [+Negation] terminal realizes its *-n't* exponent independently:

(53) Hypothetical Vocabulary I for $T_{[-Past]}$, Smith Island

[-Pl, -Part]	\Leftrightarrow	/z/		
<i>else</i>	\Leftrightarrow	/ei/	/	$[_M \text{ ___ Neg}]$
<i>else</i>	\Leftrightarrow	\emptyset		

The Vocabulary item for *ai* item is more highly specified than \emptyset —with contextual features rather than substantive features for $T_{[-Past]}$. An objection might be that it is counterintuitive to analyze *ai* in *ain't* as an independent morpheme, because *ai* never appears by itself. For example, Parrott (2007, following Mittelstaedt and Parrott 2002), proposes a suppletion analysis of Smith Island *weren't* leveling, where the entire form *weren't* is inserted by a single non-competing Vocabulary item after late morphological Fusion (Kandybowicz 2007) of the [+Negation] and [*be* $T_{[+Past]}$] terminals.

On this Impoverishment analysis, we maintain that *weren't* leveling involves two Vocabulary items, Elsewhere *were* and the negative allomorph *n't*. However, we can still analyze *ain't* as a single, portmanteau exponent, by hypothesizing a [+Negation] feature in the substantive features of a Vocabulary item for $T_{[-Past]}$.

(54) Hypothetical Vocabulary II for $T_{[-Past]}$, Smith Island

[-Pl, -Part]	\Leftrightarrow	/z/
[+Neg]	\Leftrightarrow	/eint/
<i>else</i>	\Leftrightarrow	\emptyset

This analysis requires morphological Fusion of the tense and negation terminals. Fusion creates a single locus of Vocabulary Insertion for the exponent *ain't*, and additionally prevents the independent insertion of *-n't* in [+Negation].¹⁷

(55) Morphological Fusion of $T_{[-Past, \pm Aux]}$ and [+Negation]

	... $[_M T_{[-Past, \pm Aux]} [+Neg]]$...
FUSION \rightarrow	... $[_M T_{[-Past, \pm Aux], +Neg}]$...

On this analysis, then, /eint/ is a single exponent Vocabulary item inserted at the severely Impoverished terminal $[_M T_{[-Past, +Aux], +Neg}]$. Again, we stress our point that the marked feature [+Negation] causes variable Impoverishment of not only

¹⁷ Certainly this application of Fusion will have to occur late in the morphological derivation (Kandybowicz 2007), after iterated searches and insertions of other Vocabulary items (Parrott 2007).

T's phi features, but of the [\pm Copula] feature, leaving only a [+Auxiliary] feature that *be* and *have* share, but that distinguishes these from *do* with [-Auxiliary].

4. Future Directions for Variable Impoverishment Research

To conclude, we would like to pose a few outstanding questions, which we leave for further inquiry. These questions are both empirical and theoretical in nature.

4.1 Markedness of the past tense and Impoverishment

Past tense is generally regarded as being more marked than present tense. As a result, given the overall markedness-based Impoverishment approach to leveling proposed in this paper, we predicted above that a past/present implicational generalization should hold if Impoverishment is triggered by markedness. That is, no dialect of English should show a pattern of leveling in the present tense but not in the past tense. In the SED past-tense patterns that we have inspected in comparison to the present-tense forms reported in Bresnan et al. (2007), this prediction appears to be fairly well supported. For Devon, Wiltshire,¹⁸ Yorkshire, Somerset, Berkshire, Kent, Hampshire, and Sussex counties, leveling is reported in both present- and past-tense paradigms. For Cornwall county, no leveling is reported in the present tense, but there is leveling in the past-tense paradigm, consistent with the implicational generalization. Finally, "standard" English leveling to present-tense *are* in the 2sg is reported for Northumberland, Norfolk, and Suffolk counties, but no past-tense data is given for the 2nd person. It is reasonable to assume the same pattern occurs (i.e., *you were*), so that this does not constitute counter-evidence to the implicational generalization. Importantly, there is no dialect with leveling in the present tense in Bresnan et al. (2007) that does not have leveling in the past tense. If the past is marked with respect to the present, and marked environments trigger Impoverishment, this implicational pattern is predicted. More research will be required to determine whether every dialect with variable leveling in the present-tense paradigm also has it in the past-tense paradigm in order to verify this suggestive preliminary empirical generalization.

4.2 *Am* leveling

The model developed above states that (variable) paradigm leveling is the direct result of Impoverishment rules, caused by marked features, that delete distinctive phi and other features, and that the result of this deletion is a wider distribution of Elsewhere exponents. A straightforward prediction of our model is thus that no English dialect should have *am*-leveling, because *am* is not an Elsewhere form.

¹⁸ Unfortunately, we have not been able to attain access the SED's past-tense data for Monmouthshire or Gloucestershire counties.

While there are no robust reports of *am*-leveling across a present-tense paradigm, Ihalainen (1991) reports the existence of an unstressed phonologically weak ‘*m*’ form of the copula used with plural pronominal subjects in East Somerset dialects. The evidence does not, however, determine that ‘*m*’ comes from the copular *am*, rather than being a reduced form of the 3rd person plural pronominal *them*; the latter possibility is certainly a likely interpretation. An additional possible source of evidence for *am* leveling can be found in entries in the SED, such as those for Surrey, which list “are/am” as variant forms for *we*. Importantly, we have not found any instances of categorical *am*-leveling in the plural. As variable Impoverishment theory as formulated here is simply the variably applicable version of an ordinary categorical rule, we might expect to find dialects with categorical *am*-leveling, but none have been found as of yet. Given the wide range of *is*-leveling, *are*-leveling, and *be*-leveling patterns, we take the rarity of *am*-leveling to reflect confirmation of the underlying intuition of our analysis that insertion of highly specified forms cannot be fed by Impoverishment operations.

4.3 Frequency fitting

We have formulated variable rules above as ordinary deletion rules with a structural description and a structural change but simply with a variable probability of application. We have not, however, provided numbers to match the actual probabilities. In ‘bridging the gap’ between formal morphosyntactic theory and the empirical richness of sociolinguistic variation, the question of whether a mechanistic theory of intra-speaker variation should specifically build in devices for capturing the frequency of variants remains important and open to further debate. As discussed above, one apparent benefit of Adger’s (2006) Combinatorial Variability theory is that it can model frequency in the proportion of variants. In the original versions of variable rule theory by Labov, Sankoff, Guy, and others, variable rules could have a certain specified probability of application p_a . This could also be implemented our theory, simply by stipulating that a given variable Impoverishment rule has a probability of application p_a , as in the hypothetical rule in (27). As stated, we remain unconvinced that this is indeed the case, in part because we are concerned that this method of capturing frequencies would simply have a *post hoc* flavor, as the following quotation from Guy can be interpreted.

The practice in the field is usually to find out what values are obtained from an empirical study and then ‘explain’ the values post-hoc. Used in this way, the mechanics of a variable rule analysis become a discovery device, or a kind of summary statistic. But to use this device to test a hypothesis, or to pursue an explanation of the phenomena observed, requires something else in addition to the variable rule mechanisms, namely, a model or theory of the elements and the events of language. (Guy 1991: 6)

It should be said that Guy (1991) derives the relative frequencies of application of intra-morphemic versus heteromorphemic *t/d* deletion in an extremely insightful way, by employing the theoretical tools of Lexical Phonology, in which each rule has the possibility to apply on each cycle, thereby predicting that a rule which could have variably applied on two cycles will have a square of the probability of a rule that can only apply on one cycle. Guy's (1991) probabilities thus directly tie the variable application for each morphological unit to language-internal facts about their linguistic structure.

An approach within this spirit may eventually be possible in accounting for fine-grained frequency effects in our model, by attempting to connect the probability of a variable rule's application with the degree of markedness of the features that trigger Impoverishment. We might speculate that markedness is not a binary property (\pm Marked), but rather a gradient quality of a feature, and that, for example [+Author] might be more marked with respect to [-Author] than [+Participant] is with respect to [-Participant]. However, we concur with Adger (2006: 506), who concedes that on any mechanistic theory of variation, "probabilities can be perturbed at the point of use by factors such as recency effects and metalinguistic judgments on the form." In other words, we must always leave open the possibility that language-external social and volitional factors can change variant frequencies in actual usage.

4.4 Cross-linguistic and cross-morphological validation

To conclude, we have examined the variable leveling found only in the English copula system, modeling it in terms of markedness within a post-syntactic treatment of morphology. Further confirmation of this approach should ideally come from the generality of the applicability of this analysis to empirical data on variable leveling phenomena in other languages and in domains outside of copula systems, such as case morphology and DP-internal concord.

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