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Variable rules meet Impoverishment theory: Patterns of agreement leveling in English varieties

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Abstract

This paper revives the sociolinguistic notion of 'variable rules' (Labov, 1969; Cedergren and Sankoff, 1974; Guy, 1991) as a specific and restricted mechanism within the theoretical framework of Distributed Morphology (Halle and Marantz, 1993; Embick and Noyer, 2007). We propose that intra-individual paradigm 'leveling' variation (or, variable syncretism), can be effectively modeled as resulting from post-syntactic feature deletion rules that apply variably. In other words, variable rules enact a structural change only probabilistically, rather than deterministically, when their structural description is met. By hypothesis, morphological 'Impoverishment' operations (Bonet, 1991; Halle, 1997; Noyer, 1998) are induced by the inherent and universal markedness of particular morphosyntactic features or their combination (Greenberg, 1966; Croft, 2003). We examine markedness-driven variable Impoverishment through case studies of three English varieties: *be*-leveling in Monmouthshire (Orton, 1962–1971) induced by marked [+author], *was*-leveling in Buckie (Adger and Smith, 2005; Adger, 2006) induced by marked [+participant], and *weren't*- and *ain't*-leveling on Smith Island (Wolfram and Schilling-Estes, 2003; Mittelstaedt, 2006) induced by marked [+negation].
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1. Introduction, scope, and structure

In this paper, we attempt to revive the notion of 'variable rules' from variationist sociolinguistics (e.g., Labov, 1969; Cedergren and Sankoff, 1974; Guy, 1991, among many others) as a specific and restricted mechanism within the theoretical framework of Distributed Morphology (DM; comprehensive presentations are found in Halle and Marantz, 1993; Embick and Noyer, 2007, among a large and growing body of literature). We propose that intra-individual paradigm 'leveling' variation (or, variable syncretism) results from the probabilistic application of post-syntactic feature-deleting 'Impoverishment' operations, which are already well established within DM (Bonet, 1991; Halle, 1997; Noyer, 1998; Harley, 2008). In other words, given the much-documented existence of individuals who variably produce, for instance, either *we* <u>*was*</u> *laughing at each other* or *we* <u>*were*</u> *laughing at each other*, we claim that Impoverishment rules may enact a structural change probabilistically, rather than only deterministically, when their

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structural description is met. In elaborating this proposal, we hope to provide plausible arguments that variable Impoverishment is among the mechanisms of intra-individual variation in morphosyntax (for additional or alternative mechanisms cf., Adger and Smith, 2005; Adger, 2006; Parrott, 2007; Embick, 2007b).

We furthermore wish to provide additional support for the hypothesis that morphological Impoverishment operations are induced by the inherent and universal markedness of particular morphosyntactic features or their combination (Greenberg, 1966; Croft, 2003). Much like a closely studied phenomenon in the phonology of English, whereby the consonants /t/ and /d/ are deleted by a variable rule in the marked post-consonantal word-final position, the cases of agreement syncretism examined below exemplify variable morphological rules, whereby the probabilistic application of Impoverishment is induced by marked morphosyntactic feature combinations. Thus, we hope that our proposal advanced below will contribute toward an internalist, mechanistic theory of morphosyntactic markedness.

Our paper focuses almost exclusively on cross-dialectal patterns of agreement syncretism in the English auxiliary and copular verb BE with pronominal subjects. We have several reasons for this narrow empirical scope. First, in its full range of potential inflectional distinctions, BE is the only English verb that has allomorphic variants for person and number in both tenses.

(1) BE [+past] (varieties without relevant leveling)

	Singular	Plural
1st	*I was*	*we were*
2nd	*you were*	*you were*
3rd	*she was*	*they were*

(2) BE [–past] (varieties without relevant leveling)

	Singular	Plural
1st	*I am*	*we are*
2nd	*you are*	*you are*
3rd	*she is*	*they are*

Second, all paradigms for BE show evidence of an 'elsewhere' form—that is, a phonological exponent that is shared among multiple heterogeneous 'cells' of the paradigm: consider the apparently disjunctive 2nd-person or plural forms in (1) and (2) above. Such undedicated default forms yield interesting patterns of syncretism when interacting with Impoverishment rules. Most important from a theoretical perspective is the ambiguous pattern of syncretisms found in the English BE paradigm, in which a 'vertical' syncretism among the plural cells intersects with a 'horizontal' syncretism among the 2nd-person cells. Arguably, this ambiguity allows different analyses of the features corresponding to each exponent for BE, as discussed in section 3.2.2 below, and is one way that intra-individual variation (i.e., within an I-language grammar) and inter-individual variation (i.e., between I-language grammars) can be related under our theoretical model.

Third, intra-individual variation is very common in the paradigms of BE across many English varieties, and this variation has been studied quite extensively in the sociolinguistic variationist literature. For some examples, see Tagliamonte (1998), Wolfram and Schilling-Estes (1998), Tagliamonte and Smith (2000), Anderwald (2002), Britain (2002), Schilling-Estes and Wolfram (2003), and Wolfram and Schilling-Estes (2003). Our case studies in section 3 below rely upon this important documentation of variation in English BE.

Finally, we limit our investigation to BE with pronominal subjects in order to abstract away from the so-called "Northern Subject Rule," a phenomenon whose first observation is attributed to Murray (1873) and which has since been widely documented in the sociolinguistic literature (most especially relevant for us are Smith, 2000; Adger and Smith, 2005; Adger, 2006). Briefly, agreement-leveling variation is sensitive to the distinction between pronominal and full DP subjects in many varieties of English. The canonical examples are observed in certain varieties of northern England and Scotland (but not only these), where leveling to singular agreement forms occurs with plural full-DP subjects (e.g., *Those boats is [% are] brand new*) but does not occur, or occurs less frequently, with plural pronominal subjects (e.g., *They are [* is] brand new*). Such facts indicate that different mechanisms may be responsible for agreement leveling variation with pronouns and full DPs. Adger and Smith (2005) analyze the Northern Subject Rule as arising from distinct lexical items for D, with one D allowing 'percolation' or copying of number features from its NP complement, and the other D2 having an invariant singular number feature regardless of

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the number feature on its NP complement. Another possible analysis might involve variable Impoverishment of number features on D, but prior to Agreement in the narrow syntax. We cannot evaluate these alternatives here (see section 3.2.1 for a few more details), but both involve differences in the phi features of full DPs. Therefore we restrict ourselves to pronominal subjects, whose number and person phi features are relatively clear as revealed by the form and semantics of the pronoun itself.

Our paper is structured as follows. In section 2, we review some essential empirical and theoretical background. Next, in section 3, we present three case studies analyzing leveling variation in paradigms of English BE. In each case, we argue that the markedness of a particular morphosyntactic feature induces variable application of phi-feature deleting Impoverishment rules, yielding the observed patterns of syncretism. Our first case comes from Monmouthshire, Wales (Orton, 1962–1971), 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 (Adger and Smith, 2005; Adger, 2006), 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 (e.g., Wolfram and Schilling-Estes, 2003; Mittelstaedt, 2006, among others), 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. Finally, in section 4, we conclude with discussion of several outstanding empirical and theoretical issues.

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. Mechanisms of intra- (and inter-) individual 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, most current theories lack mechanisms that can explain the existence of intra-individual variation (a.k.a. inherent variation, sociolinguistic variation, or Labovian variation), where variant forms appear probabilistically in the same morphosyntactic environment. Addressing the issue of mechanisms would seem to be a prerequisite for answering further questions about the relationship between intra-individual variation and other phenomena such as language change.

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

As a minimal set of desiderata, a mechanistic theory of intra-individual 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 our 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 probabilistically instead of deterministically when phi-feature deleting Impoverishment rules apply variably instead of categorically.

In developing a theory of morphosyntactic variation based on variable Impoverishment rules, we by no means intend to exclude other mechanisms of intra-individual variation. For the cases at hand, in which the presence of marked morphosyntactic features lead to use of a default exponent (in DM, an elsewhere Vocabulary item), Impoverishment rules turn out to provide a good model.

In dealing with variable syncretism, we attempt to follow the observation of Bresnan et al. (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.

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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, 2007a, who argues that only competing/multiple grammars can insulate the grammar from usage). Following Adger's (2007) clearly drawn distinction between cognitive modules of Grammar (G) and Usage (U), there is no rule within our model that makes reference to the social meaning of a variant. While U is clearly sensitive to social 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.

2.2. Variable rules in sociolinguistics

Variable rules have been proposed in the sociolinguistic variationist 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.[1] A clear example can be found in Guy (1991), who considers an English phonological deletion rule, 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:

(3) *-t, d* Deletion (Guy 1991: 8)
<variable, probability of application = p_a>
[*t, d*] → < Ø > / 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. The p_a of the rule is equal to 1.0 in the case of categorically applying, obligatory rules, and between 0 and 1.0 in the case of variable, 'optional' rules. p_a itself must be a dynamically varying number, perturbed at the point of usage by social, lexical, register, and a variety of other factors (Adger, 2007). While sociolinguistic studies often attempt to calculate the aggregate p_a of an entire community or subparts of it, calculating the p_a of a particular individual at a particular moment in time is not attempted in practice. As our goal is to understand the mechanisms of variation (or, optionality) in a single individual's internal grammar, an question of interest would be the factors (and their interaction) that yield p_a for each Impoverishment rule within particular individual grammars. In this paper, we adopt the theoretical construct of variable rules as probabilistically applying rules whose p_a may be determined by social factors, but we do not attempt to compute the actual p_a for each Impoverishment rule posited below, leaving this for other research. (See section 4.3 below for more discussion of these issues.)

2.3. On 'competing/multiple grammars'

Before proceeding, we offer a few remarks of comparison with what is probably the dominant alternative approach to intra-individual variation in morphosyntax, namely the notion of 'competing/multiple grammars' (e.g., Kroch, 1989, 1994, 2001; Henry, 1995, 2002; Embick, 2007a; Manzini and Savoia, 2007:12, among others). The basic proposal of competing-grammars theories is that a single individual possesses and utilizes two grammars (call them G_1 and G_2) that differ in that one of them contains a morphosyntactic rule that the other does not. Variation (or, optionality) arises because the choice between grammars is probabilistic. The difference between variable rules

[1] Fasold (1991), a review article on the history of variable rules as a theoretical tool, contains remarks on the ''quiet demise'' of variable rules due to the difficulty of analyzing generalized syntactic transformations, such as Move Alpha, as rules. Fasold arrives at a position of skepticism regarding the possibility of meshing quantitative analysis of sociolinguistic variables with the principles of theoretical linguistics. While the analysis of grammatical operations with probabilistic application may be more challenging in some cases than others, we do not see such difficulties as a reason to wholly abandon attempts at the integration of probabilistic intra-individual variation into formal linguistic theory.

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and competing grammars is that on a variable-rules approach, there is a single grammar with probabilistically applying rules, whereas in a competing-grammars approach, there is probabilistic choice between multiple grammars, each of which has no probabilistic choice within them.

At first blush, it seems straightforward to translate between these two approaches. For example, consider the variable-rules style Impoverishment rule in (4), which deletes all the phi-features on BE when [+auth] is among them, yielding variation between *I am* and *I be* (see section 3.1 below). This rule applies with probability of application p_a.

(4) Variable Phi Impoverishment rule (Monmouthshire English)
[φ] $(0 < p_a < 1)$ → [Ø] / [BE ±part +auth ±pl –past]

The same variable application could be expressed in a competing-grammars framework with a categorical version of (4).

(5) Multiple phi Impoverishment grammars (Monmouthshire English)
G_1: [φ] → [Ø]/ [BE ±part +auth ±pl –past]
G_2: has no such rule
Choice between G_1 and G_2: made with probability p_a

As (5) shows, there is apparent equivalence between saying that a rule applies with probability p_a in a single grammar and saying that there is a choice p_a between choosing a grammar in which the rule always applies and a grammar in which it never applies. The apparent difference between variable-rules theories and competing-grammars theories, then, would seem to reduce to mere ontological commitments: can there be one grammar with variability in it, or are there two non-variable grammars with a variable choice between them?

The apparent equivalence between these models quickly breaks down once we consider language varieties with more than one variable process For example, on Smith Island (analyzed in section 3.3), there are two variable Impoverishment rules, one affecting past-tense BE (yielding *weren't*-leveling), and another affecting all present-tense auxiliaries (yielding *ain't*-leveling and *don't*-leveling). On our approach, there are two probabilistically applying variable rules. However, in a competing-grammars theory, there are four competing grammars: one with the *weren't*-leveling rule and the *ain't*-leveling rule, one with the *weren't*-leveling rule only, one with the *ain't*-leveling rule only, and one with neither rule.

Competing grammars approaches, due to their insistence on having no variation within a grammar, are forced to create a new grammar for each variably applying process, with the result that n variable rules require 2^n competing grammars (and a choice mechanism between them) in order to model the phenomena. Since real grammatical systems in fact contain several variable processes, this leads to a potential combinatorial explosion. It is perhaps for this reason that competing grammars have never been embraced in phonology: phonological systems are known to contain many optional processes, which are ideally not modeled as the result of a single individual possessing 32 or more different phonologies.

Our approach to Impoverishment rules in morphology (which are markedness-induced feature-deletion rules) models them as highly similar to deletion rules in phonology, and for that reason inter alia, we adopt the variable-rules approach to morphological deletion rules, rather than a multiple-grammars approach. There may be 'tricks' of optimization that allow a way around the apparent combinatorial explosion of multiple grammars (or we have missed some nuanced aspects of these models). Nevertheless, we would like to emphasize that the model of agreement-leveling variation we present in this paper, namely the variable application of Impoverishment rules, can be imported into a competing-grammars theory without changes to the structural descriptions, structural changes, and markedness-reducing motivations of the rules themselves; only the mechanism of probabilistic application would need to be different.

2.4. *Distributed Morphology and the morphosyntax of English* be

We adopt a 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

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post-syntactically—that is, DM is a 'late-insertion' theory. However, departing from Embick and Noyer's (2007) treatment of 'dissociated' morphology, we follow standard assumptions that semantically uninterpretable (notated as *u*) person and number phi (φ) features on the syntactic terminal morpheme of finite Tense (T = [φ ±past]) are present and valued by Agreement in the narrow syntax (as in Pesetsky and Torrego, 2007, among others). We adopt the following phi features for person and number (following Halle, 1997, among others):[2]

(6) Person phi features[2]
[±participant ±author]

(7) Number phi feature
[±plural]

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

(8) Pronominal phi features of English

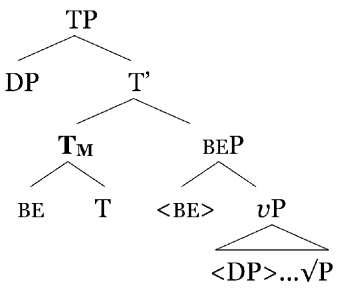
	Singular			Plural		
1st	*I*	=	[+part +auth –pl]	*we*	=	[+part +auth +pl]
2nd	*you*	=	[+part –auth –pl]	*you*	=	[+part –auth +pl]
3rd	*she*	=	[–part –auth –pl]	*they*	=	[–part –auth +pl]

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

(9) 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 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.

Syntactic head movement raises BE to adjoin with T[φ ±past], as shown below. For reasons of exposition, movement copies are indicated with ⟨angled bracket⟩ notation, and some internal structure is omitted in TP and *v*P. Though we employ a shorthand notation for BE below, we further decompose BE into its constituent syntactic and semantic features in section 3.3.4.

(10) Morphosyntax of auxiliary BE (adapted from Adger and Smith 2005)



(T = [φ ±past])

[2] For arguments in favor of these particular person features and not others, for example [±addressee] or [±hearer], see Nevins (2007b) and citations therein.

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Following Embick and Noyer (2001) and Embick (2007b), we assume that morphological rules and objects can contain and make reference to both hierarchical and linear structures. This 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^{0MAX} 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[φ ±past] are the terminal sub-words it contains. This is illustrated in bracket notation below, where the M-Word boundary is indicated with the notation $[_M$ ...].

(11) Maximal (M-) word (Embick 2007b) = X^{0MAX} (Chomsky 1995)
$\mathbf{T_M}$ = $[_M$ [BE] [φ ±past]]

Notice that the Vocabulary items above insert a single exponent for past-tense BE, not separate exponents for BE and T[+past]. Therefore, the features of the adjoined terminals $[_M$ [BE] T[φ+past]] 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.

(12) Post-syntactic morphological Fusion of BE and [φ ±past]
... $[_M$ [BE] [φ +past]] ...
↓
FUSION
↓
... $[_M$ BE φ +past] ...

(13) and (14) contain the Vocabulary items for past-tense and present-tense BE in English (of course, in those varieties lacking the kind of leveling variation discussed in section 3).

(13) Vocabulary for [BE φ +past]
[–pl] ⇔ /wʌz/
elsewhere ⇔ /wəɹ/

(14) Vocabulary for [BE φ –past]
[+auth –pl] ⇔ /æm/
[–pl] ⇔ /ɪz/
elsewhere ⇔ /aɹ/

Notice that according to the Vocabulary items in (13) and (14), the forms of BE with 2sg *you* should be past-tense *was* and present-tense *is*, contrary to fact in the relevant varieties. Indeed, it is a systematic fact of English verbal inflection that no morphological distinction for [±plural] is ever realized in the 2nd person. Evidently, the Vocabulary item for *were* does not carry a singular/plural distinction for speakers who allow *were* with either 2nd-person singular or plural subjects. Within a modular architecture of grammar, this failure of verbal inflection to signal a distinction between singular and plural subjects 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-auxiliary 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.

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), Bobaljik (2002), Harley (2008), and others, we model this information loss as the result of deletion rules

operating on morphosyntactic features. These are called Impoverishment rules because they enact the loss of 'rich' morphological distinctions that are otherwise expected.

In the English case at hand, the loss of any number distinction in the 2nd person results from an Impoverishment rule that applies categorically. This operation deletes number features in 2nd person environments, thus allowing the insertion of elsewhere exponents and correctly yielding *were* and *are* with 2sg *you*.

(15) Categorical [±pl] Impoverishment rule for English [φ ±past]
[±pl] → [Ø] / [+part –auth __]

The Impoverishment operation in (15) states that a number feature [±plural] on the terminal morpheme T is deleted whenever T has person phi features valued [+part, −auth], as exemplified in (16) below:

(16) Morphological Impoverishment of [±pl] on English T [φ ±past]
you [+part –auth –pl] ... T [+part –auth –pl] ...
↓
IMPOVERISHMENT
↓
you [+part –auth –pl] ... T [+part –auth Ø] ...

The result of (15) will be that the otherwise expected form *was* cannot be inserted into [BE φ ±past], 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 elsewhere (or, default) Vocabulary item *were* can be inserted, resulting in *you were*.

An important consequence of the interaction between the Subset Principle and Impoverishment theory is that Impoverishment will yield a terminal ineligible for its expected Vocabulary item and hence a less-specified, usually 'elsewhere,' item will be inserted.[3] It is thus expected that syncretism or 'leveling' cannot occur with a highly specified item, such as *am*. In other words, our theory predicts the impossibility of *am*-leveling in a dialect of English. We return to this prediction in section 4.2.

2.5. Impoverishment theory and morphosyntactic markedness

The concept of markedness originated in Prague-school phonology, and is especially attributed to Roman Jakobson and Nikolay Trubetzkoy (see Jakobson, 1990 for a collection of English-language translations, where Chapters 8 and 10 focus on markedness). Markedness can be characterized as the asymmetric grammatical treatment of one value of a binary feature. A canonical example of markedness in phonology is contrast neutralization, as in devoicing of final obstruents in Germanic, Slavic, Turkic, and other language families. Neutralization is always to the unmarked category, so that voiced [+voice] obstruents are marked in relation to voiceless [−voice] obstruents. For more on phonological markedness, see Greenberg, 1966:13–24; Chomsky and Halle (1968:Chapter 9) formalize markedness in a rule-based phonological theory; for more recent work implemented in an OT framework, see de Lacy (2006). Semantic markedness is discussed by Greenberg (1966:72–87) on kinship terms; more recently, Sauerland (2008, and references therein) discusses the semantic markedness of phi features.

In this paper, our focus is on markedness in the domain of inflectional morphology, a central aspect of markedness for Greenberg (1966:25–55) and Croft (2003:95–99). Additional discussion can be found in Nevins (2007a) and in various contributions to Adger and Harbour (2008) and Bachrach and Nevins (2008). Morphosyntactic markedness involves what Croft (2003:95–97) refers to as "inflectional potential," or the empirical observation that there are fewer morphophonological distinctions in marked inflectional categories, cross-linguistically. Put more precisely, the number of morphological distinctions (Dn = number of phonologically distinct exponents) in an unmarked (uM) category is greater than or equal to the number of distinctions in a marked (M) category.[4] Of particular significance for

[3] See Müller (2006) for especially insightful discussion of elsewhere items in the context of transparadigmatic syncretism.

[4] Equivalently, it is not the case that the number of distinctions in the unmarked category is less than the number of distinctions in the marked category: $\neg$ [D_n (uM) < D_n (M)].

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Impoverishment theory in DM, we can state inflectional potential conversely in terms of syncretism: the number of morphological syncretisms (Sn = number of phonologically identical exponents) in a marked (M) category is greater than or equal to the number of syncretisms in an unmarked (uM) category.[5] For clarity, both formulations are provided below using logical notation:

(17) a. $D_n(uM) \geq D_n(M)$

b. $S_n(uM) \leq S_n(M)$

For all three phi features introduced in section 2.4 above ([±participant], [±author], and [±plural]), as well as for tense ([±past]), we claim that the positive value '+' is marked (following especially the practice of Greenberg, 1966, among others). In addition, we claim that negation is a marked environment, following Croft (2003) and Bresnan et al. (2007), along with many others. For convenience, we encode assertive polarity featurally as [±negation], where again, '+' is the marked value.

As Croft (2003:96) states, "If one is looking for the inflectional potential of values in a grammatical category, one must look at other categories orthogonal to the category in question and count morphological distinctions for each value." This can be illustrated in the paradigms of English BE. To establish the markedness of [+plural], consider the orthogonal categories of person and tense. There are indeed more person distinctions in the unmarked singular [–plural], in both tenses (3 forms *am*, *are*, *is* in BE[–past] and 2 forms *was*, *were* in BE[+past]), as opposed to total syncretism of person distinctions in the marked plural [+plural], in both tenses (1 form *are* in BE[–past] and 1 form *were* in BE[+past]). To establish the markedness of [+past], consider the orthogonal categories of person and number. Again, there are more person/number distinctions in the unmarked present tense [−past] (3 forms *am*, *are*, *is*) than past tense (2 forms *was*, *were*). In fact, these patterns of inflectional markedness hold throughout the verbal paradigms of English: HAVE (present 3sg *has*, elsewhere *have*, vs. past *had*), DO (present 3sg *does*, elsewhere *do*, vs. past *did*), and main verbs (present 3sg *-s*, elsewhere *-ø*, vs. past *-ed*).

As it turns out, morphosyntactic markedness is not an absolute, but rather a strong universal tendency. Indeed, our theory of markedness-induced Impoverishment, outlined below, advances the idea that the operation may apply variably in some instances. This would seem compatible with the idea (mentioned again in section 4.3 below) that markedness is not a categorical property of features (i.e., plus or minus marked) but perhaps a scalar property (i.e., more or less marked). In any case, the majority of inflectional paradigms, both within and across language varieties, conform to expected patterns of markedness.

A number of apparent exceptions to patterns of inflectional potential, illustrated above for English, can be found in certain verbal paradigms of French and other Romance varieties, as well as in certain case and verbal paradigms in Faroese and Icelandic.[6] A full explication of these evidently problematic cases is beyond the scope of this paper, though we do acknowledge their interest and relevance. But we do not think such cases are fatal either to the concept of markedness or to the predictive value of our markedness-driven variable Impoverishment theory. We suspect that upon closer inspection, most putative markedness anomalies will turn out to have another solution. The first of these is considering not only the 'textbook paradigm' but also the inclusion of reanalyzed elements as inflection. For example, cliticized subject pronouns in Romance varieties such as French can be analyzed as (re)introducing agreement distinctions into the paradigm, restoring the expected patterns of inflectional potential. Secondly, morphological markedness may have cross-cutting, transparadigmatic effects. In Faroese (Thráinsson et al., 2004), case paradigms in several feminine and neuter (but not masculine) noun classes have 2 distinct forms in the plural, but only 1 form in the singular. This unexpected pattern is caused by the dative plural form *-um*, which is the same form found in every case inflectional paradigm, across all noun classes and genders. So it would seem that the more marked categories in each dimension—non-masculine gender, dative case, and plural number—cause a transparadigmatic syncretism in Faroese. We anticipate that future research on morphosyntactic markedness will address these and other apparently exceptional cases.

[5] Equivalently, it is not the case that the number of syncretisms in the unmarked category is greater than the number of syncretisms in the marked category: $\neg$ [S_n (uM) > S_n (M)].

[6] Thanks to an anonymous reviewer and to Michael Schäfer (pers. comm.) for raising discussion of cases like these.

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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 or induced by a particular marked feature.

3.1. Be-*leveling in Monmouthshire: [+author] is marked*

Our first case comes from Monmouthshire (Mon.), a county in the southeast of Wales.[7] We compare the variable leveling pattern in Mon. with categorical syncretism in the counties of Devon (Dev.) and Wiltshire (Wil.), England. The data appear in the *Survey of English Dialects* (Orton, 1962–1971) and Ihalainen (1991). For the following present-tense paradigms, we have relied upon SED data reported by Bresnan et al. (2007).

3.1.1. *The pattern*

Both Dev. and Wil. have categorical leveling to the plural form *be* in the 1st person, as illustrated in (18) below.[8]

(18) Paradigm of Dev. and Wil. *be*-leveling

	Singular	Plural
1st	*I be*	*us be*
2nd	*thee art (Wil.: beest)*	NO DATA
3rd	*her is*	*they be*

Of interest for our Impoverishment analysis is the instantiation of this pattern as variable leveling to *be* (alternating with *am*) in Mon., as shown in (19) below.[9]

(19) Paradigm of Mon. *be*-leveling (variant with %)

	Singular	Plural
1st	*I be (% am)*	*us be*
2nd	*thee beest*	NO DATA
3rd	*her is*	*they be*

3.1.2. *Impoverishment analysis*

We propose the following Vocabulary for present-tense BE in Dev., Wil. and Mon.. 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.

(20) Vocabulary for [BE φ –past] in Dev., Wil., and Mon.

[+auth –pl]	⇔	/æm/	
[+part –auth]	⇔	/aɹt/	(Wil., Mon.: /bist/)
[–pl]	⇔	/ɪz/	
elsewhere	⇔	/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-individual variation to the same mechanism: when Impoverishment

[7] Bresnan et al. (2007:328ff) discuss data from Monmouthshire; their map (Fig. 1, p. 304) is restricted to English counties and thus does not include Welsh Monmouthshire.

[8] No data is reported for 2pl throughout the SED; we indicate this throughout by NO DATA in the relevant column.

[9] 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 et al. (2007:307 fn 7; 329, Fig. 20).

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applies categorically, the Dev./Wil. pattern results, and when Impoverishment applies variably, the Mon. pattern results.

(21) Phi Impoverishment rule (variable in Mon., categorical in Dev./Wil.)
[φ] (%)→ [Ø] / [BE ±part +auth ±pl –past]

This Impoverishment rule deletes the phi-features on BE 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: [+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 Smith (2000, 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*).

(22) 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.

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

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

As mentioned in section 1 above, 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.

(24) Multiple Ds (adapted from Adger and Smith 2005: 168)
a. D = $[_{DP}$ D[αpl] $[_{NP}$ N[αpl]]]
b. D2 = $[_{DP}$ D[-pl] $[_{NP}$ N[±pl]]]

While we provisionally accept Adger and Smith's analysis for the purposes of this paper, an alternative analysis is possible, under which a DP is 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 T in the narrow syntax.

The crucial point is that there is categorical non-variation with the 3rd-person plural pronoun, and variation with the 1st- and 2nd-person plural pronouns. These latter two, by hypothesis, share a marked feature: [+participant].

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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) proposal that there is, in fact, accidental homophony in Buckie—in 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 in (13–15) above for other English varieties, or the Vocabulary item for 2sg is highly specified, and *was* is the elsewhere form, as in (25) and (26) below for Buckie. We hypothesize that leveling is caused by Impoverishment operations, and 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*.[10]

(25) Vocabulary for [BE φ +past], Buckie

[+part –auth]	⇔	/wəɹ/
[+pl]	⇔	/wəɹ/
elsewhere	⇔	/wʌz/

By hypothesis, the positive value (+) of the feature [±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 do not find *was*-leveling with 3pl *they* [−part −auth +pl]. *Was*-leveling with plural DPs is due to a distinct mechanism, as above.

(26) Variable phi Impoverishment rule, Buckie

[φ] %→ [Ø] / [BE +part ±auth ±pl –past]

(27) Morphological Impoverishment of phi on [BE T], Buckie

we [+part +auth +pl] ... [BE +part +auth +pl +past] ...

↓

IMPOVERISHMENT

↓

we [+part +auth +pl] ... [BE Ø +past] ...

This rule is relativized to the past tense. Arguably, the past tense is a more marked environment to begin with, as all English verbs except the copula 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 4.1 below.

In summary, the analysis presented in (25) and (26) above results in Buckie's pattern of variable Impoverishment, yielding *we was* but not **they was.*

3.2.3. Discussion of Adger's (2006) combinatorial variability analysis

Adger (2006) adopts a feature co-occurrence restraint that prevents the feature [±author] from appearing in the same terminal with the feature [–participant]. Thus, differently from the system proposed in section 2 above, 3rd-person pronouns lack a [–author] feature in his theory.[11]

(28) Pronominal features of English (Adger, 2006)

	Singular			Plural		
1st	*I*	=	[+part +auth +sg]	*we*	=	[+part +auth –sg]
2nd	*you*	=	[+part –auth +sg]	*you*	=	[+part –auth –sg]
3rd	*she*	=	[–part +sg]	*they*	=	[–part –sg]

[10] See also Mittelstaedt and Parrott (2002), who proposed this analysis of *were*, without Impoverishment, for English varieties in general.
[11] Another difference is that Adger uses the number feature [±singular] while we use [±plural] in this article.

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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. (At the time of writing, we have become aware of an 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.) 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 in section 4.3 below). Notice that these Vocabulary items will not compete for insertion because they are all maximally underspecified, with only one morphosyntactic feature each.

(29) Adger's algorithmic Vocabulary for [BE φ +past], Buckie

[+sg]	⇔	/wʌz/$_1$
[–sg]	⇔	/wəɹ/$_1$
[+part]	⇔	/wʌz/$_2$
[–auth]	⇔	/wəɹ/$_2$
[+auth]	⇔	/wʌz/$_3$

Adger's account can thus derive the variable *was/were* pattern as a result of stochastic choice of non-competing Vocabulary items.[12] 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 section 4.2 below.

3.3. Weren't/ain't-*leveling on Smith Island: [+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 relatively 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 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.[13]

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

[12] See Parrott (2007:Chapter 6) for an independent argument that non-competing Vocabulary are among the mechanisms of intra-speaker variation in morphosyntax.

[13] We do not discuss Smith Island *was*-leveling in this paper. 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.

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

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

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.).

(32) 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.

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

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

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[14]. Two observations inform our analysis of this pattern. First, leveling occurs only with the reduced 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. In other words, *-n't* is not the result of mere phonological contraction, or 'simple cliticization' (Zwicky and Pullum, 1983), of *not*, but rather is morphosyntactically local to its host terminal T[±past] (more on this point below). Second, *were* is the elsewhere form of past-tense BE in Smith Island.

(34) Vocabulary for [BE φ +past], Smith Island
[–pl] ⇔ /wʌz/
elsewhere ⇔ /wəɹ/

Thus, we propose that a variable Impoverishment rule can delete the [±plural] feature entirely whenever [BE φ +past] occurs in the same morphosyntactic terminal complex as [+negation], as indicated using the 'maximal word' notation introduced above (M-word = [$_M$ . . .]).

(35) Variable [±plural] Impoverishment rule, Smith Island
[±pl] %→ [Ø] / [$_M$ [BE ±part ±auth __ +past] [+neg]]

In fact, as only [±plural] is otherwise distinguished, (35) could be generalized to Impoverishment of all phi features on [BE φ +past]:

(36) Alternate variable phi Impoverishment rule, Smith Island
[φ] %→ [Ø] / [$_M$ [BE __ +past] [+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

[14] *Weren't*-leveling is found in other communities in addition to Smith Island; for examples see Schilling-Estes and Wolfram (1994), Britain (2002), Schilling-Estes and Wolfram (2003), and Wolfram and Schilling-Estes (2003).

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analysis of *-n't*, pending further research. However, it is crucial that [+negation] occupy the same M-word as [BE φ +past] 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 induce Impoverishment. Again, we stress that [+negation] is a marked feature (see also Bresnan et al., 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* with *-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 reduced form of negation.

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

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

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

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

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*.

(39) *Ain't* = HAVE+*n't* (DO+*n't*) (attested, Mittelstaedt pers. comm., 2006)

	Singular	Plural
1st	*I **ain't** got no Sprite*	*we **ain't** really got any fields*
2nd	*you **ain't** got a thong, do you?*	NO DATA
3rd	*he **ain't** even got a…* *she **ain't** got no water…*	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 (39). Even without *ain't*, the tag question is always with DO and never with HAVE in U.S. English varieties, and (40d) is presumably unattested in any English variety.

(40) 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?

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3.3.4. Impoverishment analysis of ain't-leveling

We begin by providing some background on *ain't*. There is a very large literature on reduced negation and *ain't* in English dialects (see among others Hazen (1996), Tagliamonte and Smith (2002), and Anderwald (2002a,b, 2003, 2004). This oft-pilloried form has a long history; Walker (2005:4) provides the following as the first attestation of reduced negation in English, from 1652.

(41) 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* developed from the contractions of "*are* + *not*, *have* + *not*, and *am* + *not*," as attested below (Walker, 2005:4).

(42) 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 *ain't*-leveling on Smith Island, the following observations are pertinent. First, 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* also levels across the auxiliary distinction between BE and HAVE. In other words, *ain't* not only syncretizes distinctions of person and number, but also distinctions between verbal auxiliary types,[15] all within the inflectional category of negation. The existence of *ain't*-leveling is evidence that negation is morphosyntactically marked according to the diagnostic of inflectional potential.[16] In our model, this means the marked feature [+negation] can trigger (variable) Impoverishment deletion of phi features within its M-word.[17]

Second, however marked negation may be, **ai* or * *ai not* is conspicuously unattested in any English variety: *ain't* syncretism only occurs with *-n't*. We conclude from this that only *-n't* (and not *not*) is morphologically 'local' enough to induce syncretisms in person, number, auxiliary type, or tense. As above, this would appear to be still more evidence for Zwicky and Pullum's (1983) claim that English *-n't* is an 'inflectional affix' like past-tense *–ed* and not a 'simple clitic' like the reduced auxiliaries -'*s* and -'*ve*. Note that the latter induce no syncretisms or any other morphological changes to their host, as Zwicky and Pullum point out.

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. We turn to a fuller discussion of these.

We assume that all auxiliaries consist of a verbal categorizing head, in the DM sense (see, e.g., Marantz, 1997, 2001), indicated here as little *v*. This functional head can be adjoined to a Root that contains both semantic and phonological features, yielding main verbs and perhaps also certain modals (e.g., *should*, etc.). The categorizing head *v* can also adjoin to a head (or maybe multiple heads, indicated here as F_{sym}) containing syntactico-semantic features. These features F_{sym} determine each auxiliary's unique semantics, tense/aspect properties, and argument structure, about which we have little further to say here. Our claim is that *v* consists of two binary morphosyntactic features: [±copula ±auxiliary].

The morphology of English auxiliaries refers to 2 binary-valued features,[18] which in our model as laid out below can be deleted by Impoverishment in the post-syntactic morphological component. It would be technically possible

[15] *Ain't* even syncretizes distinctions of tense in African-American English DO (Parrott, 2008).

[16] As well as by Croft's (2003) 'structural coding' (Greenberg, 1966).

[17] 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.

[18] The morphology of English makes 3 distinctions among the auxiliaries, not 4 as would be logically possible using 2 binary-valued features. This may be explained in the same way that 2 binary-valued person features yield 3 and not 4 distinctions in person. That is, the feature-value [+copula] might entail the feature-value [+auxiliary]; the feature-value combination *[+copula –auxiliary] would be ruled out because no verbal element can be a copula but not an auxiliary.

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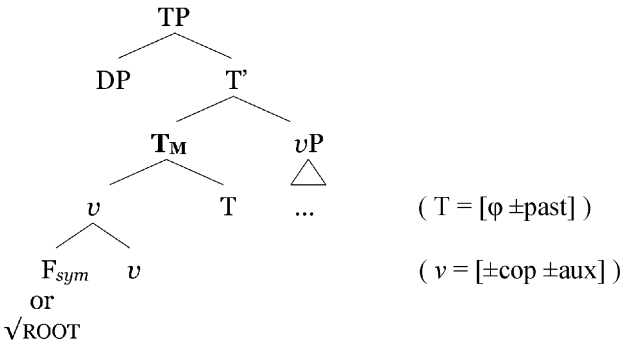
and empirically adequate to represent these features with an abstract notation, say [±X ±Y]. However, under the general DM framework, morphology is interpretive: its job is to provide exponence to syntactic features and structures. Therefore [±copula ±auxiliary] are features introduced in the pre-syntactic lexical array, computed by the syntax, further modified and finally interpreted by the morphology. We presume that [±copula ±auxiliary] are bundled into the *v* terminal. These features of *v* have the syntactic function of selecting particular complements of *v*. For example, English BE takes small clause, gerundival, and adjectival complements; on our analysis, BE's features *v*[+copula, +auxiliary] select functional heads, such as *f-SC*, n^{-ing}, and *a*, during the narrow syntax.

(43) Morphosyntax of verbal auxiliaries, modals, or main verbs



The operation of morphological Fusion (see section 2.4 above) applies to *v* and $F_{sym}/\sqrt{\text{ROOT}}$. Main verbs have the features [−cop −aux] and are adjoined with T[φ ±past] through morphological lowering/Merger. This allows the insertion of a distinct Vocabulary item at the terminal for T[φ ±past] (e.g., the exponent *-d*).

(44) Morphosyntactic terminal features of main verbs and [φ ±past]

$[_M\ [\sqrt{\text{ROOT}}\ [\text{–cop –aux}]\ ]\ [\varphi\ \pm\text{past}]\ ]$

The verbal auxiliaries have suppletive Vocabulary, as we saw above. Therefore, *v*[±copula ±auxiliary] must undergo Fusion with T[φ ±past], yielding the following morphosyntactic terminals:

(45) Morphosyntactic terminal features of BE, HAVE, DO after Fusion

a.	BE	(auxiliary or copula)	=	$[_M\ \varphi\ \pm\text{past}\ +\text{cop}\ +\text{aux}\ F_{sym\text{-BE}}]$
b.	HAVE	(auxiliary)	=	$[_M\ \varphi\ \pm\text{past}\ -\text{cop}\ +\text{aux}\ F_{sym\text{-HAVE}}]$
c.	DO	(light verb)	=	$[_M\ \varphi\ \pm\text{past}\ -\text{cop}\ -\text{aux}\ F_{sym\text{-DO}}]$
d.	DO	(DO support for affixal T)	=	$[_M\ \varphi\ \pm\text{past}\ -\text{cop}\ -\text{aux}]$

Fusion allows the insertion of single Vocabulary items for auxiliaries. The Vocabulary for auxiliaries is repeated here from above, with featural detail added. Recall that a 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*.

(46) Categorical [±pl] Impoverishment rule, Smith Island

[±pl] → [Ø] / [+part –auth __]

(47) Vocabulary for English BE = [φ +cop +aux –past]

[+auth –pl]	⇔	/æm/
[–pl]	⇔	/ɪz/
elsewhere	⇔	/aɹ/

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(48) Vocabulary for English BE = [φ +cop +aux +past]
[–pl] ⇔ /wʌz/
elsewhere ⇔ /wəɹ/

(49) Vocabulary for English HAVE = [φ –cop +aux –past]
[–part –pl] ⇔ /hæz/
elsewhere ⇔ /hæv/

(50) Vocabulary for English DO = [φ –aux –past]
[–part –pl] ⇔ /dʌz/
elsewhere ⇔ /du/

As above, let us suppose that *-n't* results from the head adjunction of the syntactic terminals [+negation] and T[φ ±past], forming a complex terminal M-word. Whether this adjunction happens by syntactic head movement or by post-syntactic morphological Merger (Parrott, 2007) is immaterial to the analysis; either way T and [+negation] become part of the same M-word in the morphological component. Let us further suppose that *-n't* is an contextual allomorph of negation when [+negation] is part of the same M-word as finite T[φ ±past], and *not* is the elsewhere exponent of negation.[19]

(51) Vocabulary for English [+negation] (Parrott 2007)
[+neg] ⇔ /nt/ / [$_M$ [±past] [__]]
elsewhere ⇔ /nat/

As above, parallel to past-tense *weren't*-leveling in (35–36), we claim that a variable Impoverishment rule deletes phi features of T[±past] when it is in the same M-word as marked [+negation].[20] However, for Smith Island *ain't*-leveling, we propose an even more drastic Impoverishment rule that deletes not only phi features, but also the [±copula] feature of T[–past]:

(52) Variable [±cop] and phi Impoverishment rule, Smith Island
[φ ±cop] %→ [Ø Ø] / [$_M$ [__ __ ±aux –past] [+neg]]

On our theory, BE and HAVE are distinguished from each other by their [±copula] feature, and they are distinguished from DO by their [+auxiliary] feature. Impoverishment of [±copula] and phi features, here again induced by M-word locality with the marked feature [+negation] (i.e., *-n't*), neutralizes the distinction between BE (+copula) and HAVE (–copula) but retains the distinction between BE/HAVE (+auxiliary) and DO (–auxiliary).

(53) Features of BE, HAVE, DO [–past] terminals after Impoverishment
a. BE = [$_M$ φ +cop +aux –past] → [$_M$ +aux –past]
b. HAVE = [$_M$ φ –cop +aux –past] → [$_M$ +aux –past]
c. DO = [$_M$ φ –cop –aux –past] → [$_M$ –aux –past]

The Vocabulary for DO in (50) above contain only the feature [–auxiliary] and no [±copula] feature, so exponents for DO can still be inserted after Impoverishment rule (52) applies. However, since the phi features of DO are also deleted by (52), only the elsewhere exponent *do* can be inserted. The exponent *-n't* is inserted as normally. The result of variable Impoverishment rule (52) is *don't*-leveling in 3rd person, as attested on Smith Island (Mittelstaedt pers. comm., Mittelstaedt, 2006).[21]

[19] See also Flagg (2002, 2003), who independently arrives at the conclusion that English *-n't* and *not* are allomorphs of the same morphosyntactic terminal [+negation], but under a different syntactic analysis of negation.

[20] The claim that negation is marked and triggers Impoverishment receives further support in the work of Tubau (2008), who applies an Impoverishment-based analysis to variation in negative concord.

[21] We provisionally treat the vowel change [u] → [o] in *do* → *don't* as the result of a phonological readjustment rule. Our theory does not provide an obvious explanation for the change from *will* → *won't*.

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

The Vocabulary for BE and HAVE in (47–49) above contain [+copula] and [–copula] features respectively. Thus, after Impoverishment of [±copula], no exponents of BE or HAVE can be inserted at all. Recall that according to the subset principle, repeated from above, "Insertion does not take place if the Vocabulary item contains features not present in the morpheme." So where are the exponents that can be inserted into the now severely Impoverished terminal morphemes for BE and HAVE [–past +auxiliary]? In other words, where is the Vocabulary for *ain't*?

There are three possible analyses we would like to consider. First, it could be that the exponent *ai* is a contextual allomorph of T[–past] when M-word internal with [+negation] (*-n't*, which is inserted normally). The Vocabulary item for *ai* is more highly specified than Ø, with contextual features rather than substantive features for T[–past].

(55) Hypothetical *ain't* Vocabulary for T [φ –past], Smith Island

[–part –pl –past]	⇔	/z/		
[–past]	⇔	/ei/	/	[$_M$ __ +neg]
elsewhere	⇔	Ø		

An objection might be that the solution is counterintuitive, because no exponent *ai* is ever found independently, only as part of *ain't*. That is, *ain't* seems like one 'word,' whereas *isn't* seems like two 'words': this distinction is even reflected in the folk-linguistic explanation for the stigmatization of *ain't*: "*ain't* ain't a word." Along these lines, 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 φ +past] terminals. On our Impoverishment analysis, we maintain that *weren't*-leveling involves two Vocabulary items, elsewhere *were* and the negative allomorph *-n't*. However, we could still analyze *ain't* as a single exponent by hypothesizing a lone [+negation] feature in the substantive features of a Vocabulary item for T [–past].

(56) Hypothetical *ain't* Vocabulary for T [φ –past], Smith Island

[–pl –part]	⇔	/z/
[+neg]	⇔	/eint/
elsewhere	⇔	Ø

Similarly, a third solution might be to analyze *ain't* as a highly specified allomorph of negation, rather than an allomorph of T [φ –past]:

(57) Hypothetical English *ain't* Vocabulary for [+neg]

[+neg –past]	⇔	/eint/		
[+neg]	⇔	/nt/	/	[$_M$ [±past φ] __]
elsewhere	⇔	/nat/		

Both of these latter two analyses require 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]. Certainly such application of Fusion will have to occur 'late' in the morphological derivation (Kandybowicz, 2007), after iterated searches for and insertions of other Vocabulary items (Parrott, 2007). From this perspective, Fusion can be viewed as a kind of 'repair' operation, which applies in order to allow the insertion of single Vocabulary items, as in cases of suppletion.

(58) Morphological Fusion of English T [–past, –aux] and [+neg]

...[$_M$ [–aux –past] [+neg]]...
↓
FUSION
↓
...[$_M$ –aux –past +neg]...

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Both analyses reflect the intuition that *ain't* is a 'word' in a way that *isn't* is not. The exponent *ain't* is inserted by a single Vocabulary item into a single severely Impoverished and Fused terminal [−past +auxiliary +negation], while the exponents *is* and *-n't* are inserted by different Vocabulary items into distinct (but Mergered) terminals.

3.3.5. Summary

Because the patterns of the preceding section were rather involved, we summarize them here. On Smith Island, there are two patterns of auxiliary-leveling variation, both induced exclusively by the *-n't* form of negation. First, there is leveling to the form *weren't* with 1sg and 3sg pronouns; second, there is leveling to the form *ain't* with pronouns of all persons and numbers, affecting both BE and HAVE but not DO. We analyze *weren't*-leveling as the variable Impoverishment deletion of phi features on T[+past] when it is part of the same M-word as negation. We analyze *ain't*-leveling as the variable Impoverishment of both the phi features and the [±copula] feature on T[−past], leaving only a [+auxiliary] feature that BE and HAVE share, but that distinguishes these from DO with [−auxiliary]. Again, we stress our point that in both cases, the marked feature [+negation] induces variable Impoverishment under M-word locality.

4. Outlook and directions for variable impoverishment

In concluding, we will discuss a few consequences and outstanding questions that relate to the analysis developed above: the predictions of a markedness-based account for implicational relations between auxiliary leveling in the past vs. present tense; the (im)possibility of leveling to *am* given the need for elsewhere exponents as the result of Impoverishment; and the question of exact matching of observed usage frequencies in a theoretical model.

4.1. Markedness of the past tense and Impoverishment

Past tense is generally regarded as being more marked than present tense (see section 2.5). 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: no dialect of English should show a pattern of leveling in the present tense but not in the past tense.

The prediction appears to hold for Smith Island, where *ain't*-leveling in the present tense is accompanied by *weren't*-leveling in the past tense. Furthermore, this prediction appears to be well supported in the SED past-tense patterns that we have inspected in comparison to the present-tense forms reported in Bresnan et al. (2007). For Devon, Wiltshire,[22] 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. This implicational pattern is predicted by the current approach.

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 preliminary empirical generalization.

4.2. Lack of am-leveling

The model developed above states that (variable) paradigm leveling is the direct result of Impoverishment rules, which are induced by marked features and delete distinctive phi and other features; 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.

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

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

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reduced form of the 3rd person plural pronominal *them;* the latter possibility is certainly a likely interpretation. One can envision a diachronic scenario in which resumptive pronouns become reduced and grammaticalized as copulas, e.g., *The kids, them hungry* → *The kids, 'em hungry* → *The kids'm hungry*. There is no evidence that this 3pl copula form comes from *am* instead of *them*. 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*. We suspect this may be related to the 1sg object form found in British dialects, as in *Give us a kiss*, and a neutralization of singular/plural distinctions in the 1st person, leading to Vocabulary Items such as *am* ⇔ [+author].

Importantly, we have not found any instances of categorical *am*-leveling throughout the plural present-tense of BE. 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 that insertion of highly specified forms cannot be fed by Impoverishment operations on our analysis.

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-individual variation should specifically build in devices for capturing the frequency of variants remains important and open to further debate. As discussed directly below, one apparent benefit of Adger's (2006) Combinatorial Variability theory is that it can model frequency in the proportion of variants. Similarly, in the original versions of variable rule theory by Labov, Sankoff, Guy, and others, variable rules have a certain specified probability of application p_a.

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 (±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.

A notable difference between Adger's Combinatorial Variability model and our own variable Impoverishment model is that the former predicts frequencies of variant usage, as follows. Because the Adger Vocabulary given in (29) above is severely underspecified, more than one exponent can be inserted at a given terminal. Adger's acquisition algorithm yields twice as many items for *was* than for *were* that are insertable when T has 1pl or 2sg phi features (yielding a prediction for *we was* and *you was* 2/3 of the time). This is illustrated in (59) below. On the null hypothesis that each Vocabulary item has an equal probability of insertion (Adger, 2007), 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*. 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*.

(59) Insertion (indicated by '←') of Vocabulary for [BE +past], Buckie

I	… [BE +part +auth +sg +past]	←	/wʌz/$_1$
		OR	/wʌz/$_2$
		OR	/wʌz/$_3$
You	… [BE +part –auth +sg +past]	←	/wəɪ/$_2$
		OR	/wʌz/$_1$
		OR	/wʌz/$_2$
(S)he	… [BE –part +sg +past]	←	/wʌz/$_1$

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We	...	[BE +part +auth –sg +past]	←	/wəɹ/$_1$
			OR	/wʌz/$_2$
			OR	/wʌz/$_3$
You	...	[BE +part –auth –sg +past]	←	/wʌz/$_2$
			OR	/wəɹ/$_1$
			OR	/wəɹ/$_2$
They	...	[BE –part –sg +past]	←	/wəɹ /$_1$

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. 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 (61) has an input probability of application $\langle Ip_a \rangle$ equal to .33, and probabilities of application $\langle p_a \rangle$ 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* [+part, +auth, +pl] is equal to .66 ($\langle Ip_a = .33 \rangle + \langle p_a = .33/[+\text{auth}] \rangle$) and the probability of Impoverishment with singular *you* [+part, −auth, −pl] is also equal to .66 ($\langle Ip_a = .33 \rangle + \langle p_a = .33/[-\text{pl}] \rangle$).

(61) Hypothetical Impoverishment rule w/ application probabilities

[φ]	%→ [Ø]	/	[BE +part ±auth ±pl –past]
	<Ip_a = .33>		<p_a = .33 / T[+auth]>
			<p_a = .33 / T[–pl]>

While such a move is formally possible, it is an open question whether it is necessary or desirable to capture usage frequencies over community-level dialects within a formal model of the individual's grammar. Some further considerations make Adger's (2006) method for capturing exact usage frequencies look more fragile than at first glance. For example, 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%. 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*; conversely, it is 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. Finally, Hudson's (2007) 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, it is an advantage of Adger's analysis is that it correctly predicts usage frequencies over an entire population; again, conversely, it is 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 are unsure whether models of grammar should explicitly attempt to predict exact usage frequencies at all. Notice that in order for our hypothetical Impoverishment rule in (61) to correctly capture such detailed socially conditioned usage frequencies a la Hudson, it would be necessary to include social information in the rule itself, associated with application probabilities (e.g., $\langle p_a = -.9/\textit{speaker is a middle-aged female} \rangle$). We are reluctant to endorse such a "blurring of the boundaries between grammar and use," in Embick's (2007a) phrase. We maintain a strictly modular view following Adger (2007): 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.

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4.4. Cross-linguistic and cross-morphological validation

We have examined variable agreement leveling only in the English auxiliary system, modeling it in terms of markedness within a post-syntactic treatment of morphology. Further confirmation of this approach should ideally come from the general applicability of the analysis to empirical data on variable leveling phenomena in typologically diverse languages, and in domains outside of auxiliary systems, such as variable case morphology and variable DP-internal concord (e.g., Bonet et al., 2009 on Catalan). The validity of the approach will stand on its ability to model variable leveling as the result of post-syntactic Impoverishment rules leading to insertion of less-specified Vocabulary items.

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