The Lexicon in Optimality Theory

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1. The Lexicon as the Source of Syntactic Variation

The view that the lexicon is the source of syntactic variation is widely accepted in various theoretical frameworks, and seems to be supported by movement paradoxes such as (1) found in spoken Standard English (Langendoen, 1970; Hudson, 1977; Dixon, 1982; Gazdar et al., 1982; Kim and Sag, 1996; Bresnan, in press a):

(1) **Standard English negative auxiliary inversion:**

a. *Aren't you/we/they going?* ∼ *You/we/they aren't going.*

b. *Isn't she/he going?* ∼ *She/he isn't going.*

c. *Aren't/*ain't/*amn't I going?* ∼ **I aren't going.*

In (2a,b) the inverted auxiliary in the interrogative sentence appears to have been moved from an underlying position following the subject—a position in which it overtly appears in the corresponding declarative sentence. In (1c) however, there is no such source for a moved form *aren't*. Lexicalist constraint-based theories such as Generalized Phrase Structure Grammar (GPSG, Gazdar et al., 1982), Head-Driven Phrase Structure Grammar (HPSG, Pollard and Sag, 1994; Kim and Sag, 1996), and Lexical-Functional Grammar (LFG, Kaplan and Bresnan, 1982), which generate the overt structures without movements, can simply postulate as an addition to the plural and second person *are*, a specific first person singular negative lexical form of *aren't* that can only be inserted into the inverted position:[1]

(2) $aren't_1$: $\begin{bmatrix} \text{NEG} & + \\ \ldots & \end{bmatrix}$ $aren't_2$: $\begin{bmatrix} \text{PERS} & 1 \\ \text{NUM} & \text{SG} \\ \text{NEG} & + \\ \text{INV} & + \end{bmatrix}$

[1]The square brackets in (2) employ attribute-value notation, in which $+feature$ is rendered $[feature\ +]$ (Johnson, 1988).

A similar approach can be adopted in a transformational framework which allows post-movement lexical feature checking, as does the Minimalist Program (MP, Chomsky, 1995). The features of *aren't*$_2$ in (2) could be checked against derived positions; the feature Inverted being a special feature which must be checked in C (the inverted position).

Yet such language-particular lexical feature specifications, whether they are implemented in frameworks with or without movement, are unsatisfying because they fail to relate the specified forms to the rest of the syntactic system. Why, for example, does *aren't* appear in the inverted position in (1) rather than *isn't*? Why does a movement paradox occur in Scots (3) but not in Hiberno-English (4)? These questions remain unanswered.

(3) Scots: *Amn't I going? *I amn't going.*

(4) Hiberno-English: *Amn't I going? I amn't going.*

2. The Lexicon as the Result of Syntactic Variation (Reranking)

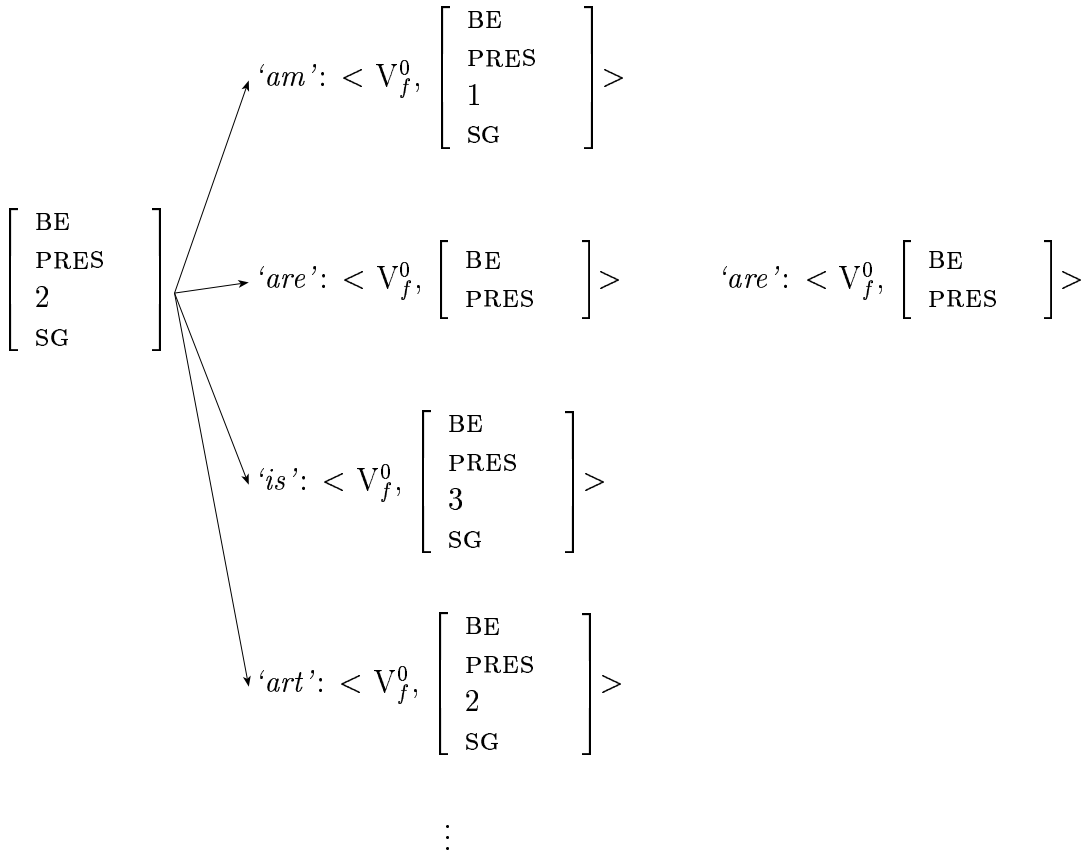
A very different conception of the lexicon is found in Optimality Theory (OT): the lexicon is not the source but the result of syntactic variation, via the reranking of violable universal constraints (Prince and Smolensky, 1993; Grimshaw, 1997a,b; Legendre, Smolensky, and Wilson, 1998; Grimshaw and Samek-Lodovici, 1998; Samek-Lodovici, 1996; Bresnan, in press a,b). As we will see, the lexical inventories of present tense *be* forms and their asymmetrical syntactic distribution can be derived from the reranking of general structural markedness and faithfulness constraints in OT.

The particular OT framework assumed here is shown in (5) (Bresnan, in press b).[2]

[2] PRES may be regarded as an abbreviation for [TENSE PRES], [2] for [PERS 2], [SG] for [NUM SG], and [BE] for [PRED 'BE'] in the customary attribute-value notation of n. 1. (In LFG values of PRED such as 'BE' stand for an index to lexical semantics. Languages of course vary as to precisely which complexes of semantic primes they lexicalize, a topic beyond the scope of the present study. 'BE' stands for one such complex.) Alternatively, PRES etc. may be interpreted as monovalent (privative) features, which are represented uniquely by their values. The choice of feature interpretations is independent of the main issues addressed here.

(5) **OT Morphosyntactic Framework**:

(a) INPUT CANDIDATES OUTPUT



(b) GEN: INPUT→ CANDIDATES

(c) EVAL: CANDIDATES → OUTPUT

A generator GEN produces candidate structural analyses or realizations of the input, as indicated in (5b). Following Jakobson (1984) and Andrews (1990), we may assume that morphosyntactic candidates may have general (nonspecific or vague) meanings. Generality is represented by fewer feature specifications; so general forms express fewer featural distinctions.[3] The candidates are evaluated

[3]Output indeterminacy of this sort must not be confused with underspecification in the

according to a function EVAL, indicated in (5c). EVAL refers to a Constraint Set, consisting of a hierarchy of (largely) universal, violable constraints:

(6) **Evaluation of candidates:**
Given a language-particular strict dominance ranking of the Constraint Set, the optimal/most harmonic/least marked candidate (= the output for a given input) is one that best satisfies the top ranked constraint on which it differs from its competitors.

Two fundamental conditions hold of the OT framework. First, GEN must be universal. That is, the input and the candidate set are the same for all languages. Systematic differences between languages arise from different constraint rankings, which affect how the candidates are evaluated (Prince and Smolensky, 1993; Smolensky, 1996), and not from language-particular specifications of differences in input or lexical inventory. This condition is called 'richness of the base'. Secondly, to ensure learnability the input must be recoverable from the output and the output itself must contain the overt perceptible data (Tesar and Smolensky, 1996).

Richness of the base is captured in (5) by viewing the morphosyntactic input as arbitrary points in an abstract multidimensional space of dimensions of contrast, formally modelled by complex feature structures. Recoverability of the input from the overt perceptible output is ensured by a well-defined correspondence between feature structures and the types of overt forms of expression which may realize them. Both of these requirements are met by taking the morphosyntactic GEN to be a lexical-functional grammar, LFG (Bresnan, in press a; Kuhn, 1999).[4] In LFG feature structures (f-structures) represent morphosyntactic content in a language-independent format, while categorial structures (c-structures) represent overt forms of syntactic expression.

If both the input and the candidate set are universal, where is the lexicon? In this framework, systematic lexical properties, such as whether there are auxiliary verbs in the inventory of word classes or whether person and number distinctions are neutralized, are derived by constraint ranking. Unsystematic properties must be specified as language-particular properties. Given the constraint ranking for English, then, the lexicon of English is a sampling of the

phonological sense (Steriade, 1995). The latter involves the omission of features in underlying structures which are required at the overt level.

[4]Kuhn (1999) proves the decidability of the universal parsing problem for the present framework (OT-LFG), raised by Johnson (this volume).

(systematic) inventory (Smolensky, 1996), with which unsystematic properties such as language-particular form-meaning correspondences are associated. In (5a) the orthographic labels in single quotes (*'am', 'are',* etc.) represent the pronunciations of various auxiliaries, which are English-particular lexical associations.

The morphosyntactic inventories of English auxiliaries can be derived from the relative ranking of the two types of constraints shown in (7)—constraints on faithfulness to the input ('FAITH') and constraints on the structural markedness or wellformedness of forms ('STRUCT') (Prince and Smolensky, 1993; Smolensky, 1996).

(7) Constraints:
FAITH: $\text{FAITH}^{\text{P \& N}}$
STRUCT: *PL, *SG and *2, *1, *3

'$\text{FAITH}^{\text{P \& N}}$' is violated by any candidate which fails to match the input in both person and number.[5] STRUCT constraints *2, *1, *3 are respectively violated by candidates specified for second, first, and third person values. Different faithfulness constraints may be instantiated for various morphosyntactically defined domains (Urbanczyk, 1995; Benua, 1995). In Standard English the three present-tense verbal paradigms (*be*, modal verbs, and other verbs) are thus represented by three different $\text{FAITH}^{\text{P \& N}}$ constraints, of which we will be concerned here only with faithfulness in the domain of the copula (*be*), $\text{FAITH}^{\text{P \& N}}_{be}$.

If all of the structural markedness constraints dominate the faithfulness constraints in the constraint hierarchy, as in (8), then by (6) candidates which violate them will be less optimal than those which do not. ('$c_1 \gg c_2$' means that constraint c_1 outranks constraint c_2 in the constraint hierarchy. The ranking relations of constraints separated by commas are not specified here.)

(8) $\text{*PL,*SG,*2,*1,*3} \gg \text{FAITH}^{\text{P \& N}}_{be}$

Hence, it will be worse for candidates to express number and person contrasts than it will be for them to fail to faithfully preserve the input content. The

[5] As in Bresnan (in press b), faithfulness in fusional morphology is assumed to respect *sets* of values, such as person and number combined in $\text{FAITH}^{\text{P \& N}}$. This property in turn may be derived from finer-grained morphological constraints such as 'FUSE-PERS-NUM', which morphemes will satisfy by marking person if and only if they mark number.

result will be complete neutralization of person-number contrasts. While most English dialects preserve some contrasts in the present tense of *be*, there are non-Standard English dialects spoken in the West and East Midlands (Cheshire, Edwards, and Whittle, 1993: 80) in which complete neutralization has occurred in the past tense, as shown in (9):

(9) West and East Midlands (Cheshire, Edwards, and Whittle, 1993: 80):

	sg	pl
1	were	were
2	were	were
3	were	were

I were singing. So were John. Mary weren't singing.

Suppose now that the structural markedness constraints are ranked with respect to the faithfulness constraints as in (10).

(10) $*\text{PL},*2 \gg \text{FAITH}_{be}^{\text{P}\,\&\,\text{N}} \gg *\text{SG},*1,*3$

Standard English:

	sg	pl
1	am	are
2	are	are
3	is	are

The ranking of the markedness constraints for second person and plural above the faithfulness constraint means that violations of the former are worse than violations of the latter. Thus it is worse to express these features than to be unfaithful to the input by failing to preserve them. Hence a general form unmarked for second person or plural number will be preferred over candidates specifically marked for these features. On the other hand, the ranking of faithfulness above the other markedness constraints means that it is worse to fail to express the input features of singular number and first or third person than to bear the complexity penality against marking them. The end result of these rankings will be that specific forms for first or third person singular will be optimal when they match the input, as we see in (11), and the general unmarked form will be optimal elsewhere, as we see in (12).

In these tableaux the constraints are ordered from left to right according to their relative ranking. Violations of constraints are indicated by a *, and the ! denotes a fatal violation, rendering a candidate nonoptimal. The optimal

candidate(s) are designated by ☞. Constraint evaluations which have no effect in determining the outcome are shaded gray. Thus the marks incurred in (11) by *'am'*, which violates *1 and *SG by bearing the features 1 and SG, are nevertheless overridden by the fatal marks incurred by its unfaithful competitor candidates and have no role here in determining the outcome:

(11) input: [BE PRES 1 SG]

	*PL,*2	FAITH$^{\text{P \& N}}_{be}$	*SG,*1,*3
☞ 'am': [BE PRES 1 SG]			**
'is': [BE PRES 3 SG]		*!	**
'are': [BE PRES]		*!	
'art': [BE PRES 2 SG]	*!	*	*

Similarly, in (12), the perfect faithfulness of second person singular *art* to the input is overridden by its high markedness, and of the remaining unfaithful forms, the least marked candidate wins:

(12) input: [BE PRES 2 SG]

	*PL,*2	FAITH$^{\text{P \& N}}_{be}$	*SG,*1,*3
'am': [BE PRES 1 SG]		*	*!*
'is': [BE PRES 3 SG]		*	*!*
☞ 'are': [BE PRES]		*	
'art': [BE PRES 2 SG]	*!		*

By the logic of this theory if the markedness constraint against first person in (12) were promoted above faithfulness, *are* would be generalized to first singular. This possibility is realized in the Southern and East Midland dialects, where both *I are* and *Are I?* are heard (Orton et al., 1962–71), as shown in (13):

(13) *PL,*2,*1 $\gg$ FAITH$^{\text{P \& N}}_{be}$ $\gg$ *SG,*3

Southern and East Midland Counties (Orton et al., 1962–71)

	sg	pl
1	are	are
2	are	are
3	is	are

I are. Are I?

Conversely, if the markedness constraint against second person were to be demoted below faithfulness, the second person form would now become optimal, as in the older Somerset dialects studied by Ihalainen (1991: 107–8):

(14) $*\textsc{pl},*1 \gg \textsc{Faith}^{\textsc{p}}_{be}{}^{\&\ \textsc{n}} \gg *\textsc{sg},*2,*3$

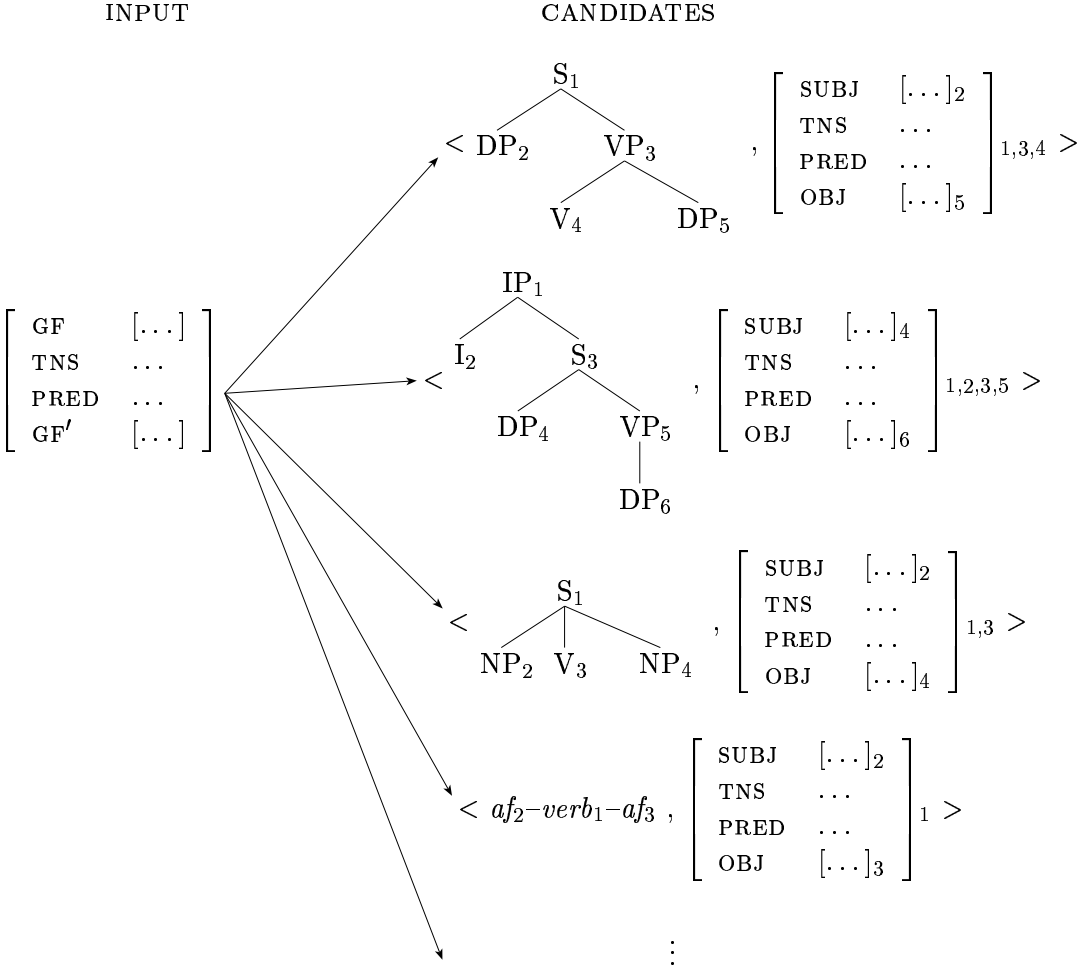
Somerset (Ihalainen 1991: 107–8):

	sg	pl
1	be	be
2	art	be
3	is	be

Note that the orthography and pronunciation of the general form here (*be*) differs from that of the previous dialects (*are*), but this difference in form-meaning correspondences is an unsystematic language-particular property, from the point of view of our constraint ranking.

Finally, we observe that the overall structure of this framework for morphosyntax (5) applies as well to larger syntactic structures (Bresnan, in press a; Choi, 1999; Kuhn, 1999; Lee, 1999; Sells, 1998; Asudeh, 1999):

(15) **OT-LFG Syntactic Framework**

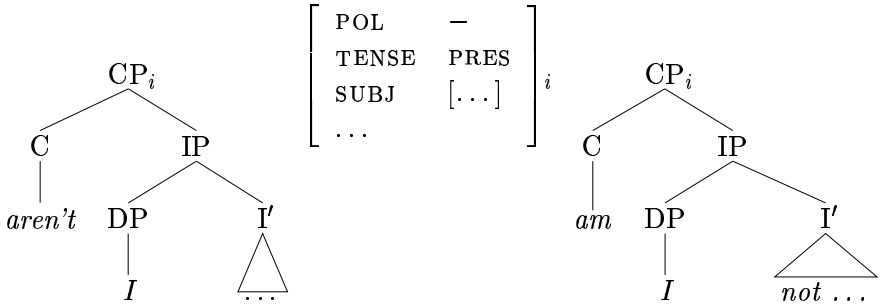


The inputs are again f-structures (with undifferentiated argument function types GF, GF′), and the candidates are again pairs of expressions and their corresponding f-structures, but this time at the level of sentence structure (as in LFG and similar syntactic frameworks).[6] In such a framework, words and phrases may be close competitors in the candidate set, expressing essentially the same content, as informally illustrated in (16). Here the synthetic word

[6]Expressions of syntax are actually composite, consisting of c-structures and their lexical instantiations. Hence, the candidates are more accurately thought of as quadruples of lexical strings, trees, feature structures and their correspondence functions.

aren't and the analytic phrase *am ... not* specify exactly the same f-structure content, consisting of negative clausal polarity [POL −], present tense [TENSE PRES)], subject person and number attributes (not shown), and the like:

(16) Words compete with phrases:



It is precisely this kind of competition that explains that 'anti-movement' paradox in negative auxiliary inversion in colloquial Standard English (1) and Scots English (3), as we will see.

3. Negative Auxiliary Inversion

Let us now address the problem of dialectal variation in inventories of negative auxiliary structures. We limit ourselves to forms used for sentential negation in basic sentences—*standard negation* as defined by Payne (1985). Crosslinguistically, standard negation is overwhelmingly a verbal category (Payne 1985): it occurs as an invariant negative adverb, clitic, or particle associated with VPs and verbs in various clausal positions, as a negative verbal inflection, or as a negative verb root which negates its complement. We set aside discussion of constituent negation here for reasons of space (see Bresnan, in press b).

In what follows 'V' denotes the normal main verb position in English, 'I' is the VP-external position for finite auxiliary verbs and modals in English, and 'C' is the position of the inverted (pre-subject) auxiliary verb. All of these categories denote word class positions, not empty categories representing abstract features or bound morphemes. As in other constraint-based, output-oriented syntactic approaches, the present framework for GEN assumes no derivational operations such as syntactic movements (Bresnan, in press a,b, forthcoming). Auxiliaries and modal verbs share common categorical features of I and C, which allows them to be base generated in either position (King, 1995).

Let us assume that the polarity of clauses in standard negation is represented in the input, and again take partially indeterminate f-structures as

our formal model of the input. The output—a syntactic structure and its specific interpretation—will again be formally represented by a corresponding c-structure/f-structure pair.

The inventories of negative auxiliary structures can be derived from the relative ranking of faithfulness and markedness constraints, shown in (17) and (18).

(17) FAITH^{NEG}: Sentence scope negation in the input should be preserved in the output.

By definition, all forms of standard negation can express sentence scope negation.[7] As with the markedness constraints on person values (7), STRUCT constraints penalize the structural complexity associated with the expression of negation:

(18) STRUCT:

(i) Avoid an analytic negator associated with verb phrases or verbs in various positions (VP, V, I, C):
*NEG-VP, *NEG-V, *NEG-I, *NEG-C.

(ii) Avoid negative inflections of verbs (auxiliaries and modals, or lexical verbs):
*NINFL-AUX, *NINFL-V.

(iii) Avoid negative lexical verb roots: *NEG-VROOT.

The relative ranking of these markedness and faithfulness constraints determines the inventory of negative structures for expressing standard negation. For example, if all of the structural markedness constraints for negation are ranked above the faithfulness constraint FAITH^{NEG}, the markedness of negative expressions will be worse than the failure to express negation. The resulting grammar would define a hypothetical language severely limited in its expressibility by the absence of specialized expressions for negation. Demotion of one or another markedness constraint below faithfulness will admit the corresponding marked form into the inventory (Bresnan, in press b).

[7]However, only forms associated with constituent phrases can express constitent negation of that phrase. Hence, both NEG-VP and NEG-I can express sentence negation, but only NEG-VP can express VP constituent negation (Bresnan, in press b).

English dialects have several different forms of negation, each of which can be used to express sentential negation under certain circumstances. In Hawick Scots (Brown, 1991), the negative clitic *nae* is preferred in unstressed negation of declarative sentences. The contradiction in (19a) shows that *nae* has wide scope over the first clause, while the absence of contradiction in (19b) shows that *no* has narrow scope (constituent) negation:[8]

(19) a. ? *She couldnae have told him, but she did.*
('It was impossible for her to have told him, but she did tell him.')

b. *She could no have told him, but she did.*
('It was possible for her not to have told him, but she did tell him.')

In questions, however, *nae* cannot be used, and *no* can be used for wide-scope negation:

(20) a. * *Isnae he coming?* (Hawick Scots—Brown 1991: 80)

b. * *Couldnae he work?*

c. * *Could he nae work?*

d. *Could he no work?*

Finally, the contracted form *-n't* may be used for sentence negation in interrogatives, but not in declaratives, as we already saw in (3):

(21) a. *Couldn't he work?*

b. * *He couldn't work.*

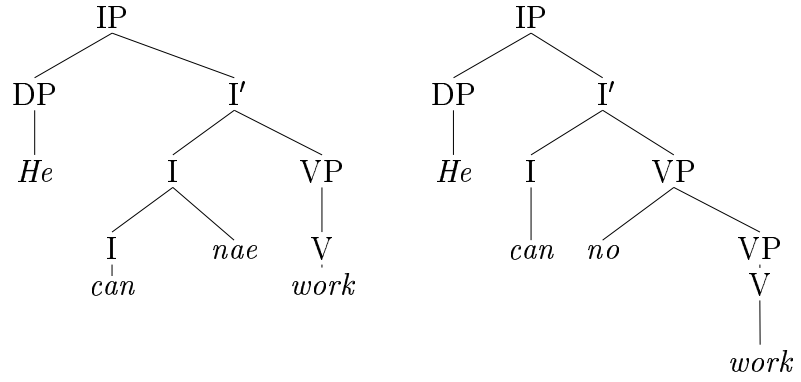
We can explain these facts very straightforwardly in the following way. As shown in (22), the clitic *nae* adjoins to a finite auxiliary or modal in declaratives (in the 'I' position), while *no* adjoins to the VP:[9]

[8]The form *no* also allows a negative stressed wide scope reading (Brown, 1991: 83; Bresnan, in press c).

[9]We represent *nae* as adjoined to I for simplicity and clarity, but there are various other ways of associating a NEG-I form with I which could have the same effects within the present framework of assumptions.

***nae, no* in Hawick Scots** (Brown, 1991):

(22)



In other words, the clitic *nae* is the Scots pronunciation of NEG-I, while *no* is the Scots pronunciation of NEG-VP. The contracted form *-n't* is a morphological suffix to individual finite auxiliaries or modal verbs, as in Standard English (Zwicky and Pullum, 1983). It is thus an instance of NINFL-AUX. The following constraint ranking admits just these three forms into the inventory of standard negation expressions:[10]

(23) Scots:
$\ldots$, *NEG-C $\gg$ FAITH$^{\text{NEG}}$ $\gg$ *NEG-VP, *NINFL-AUX $\gg$ *NEG-I

The relative ranking of these constraints explains the distribution of the various forms of negation. The lowest ranked constraint *NEG-I applies to the least-marked form, *nae*, which is optimal in basic (unstressed) declaratives (19). The highest ranked constraint shown, *NEG-C, being ranked above the faithfulness constraint, eliminates analytic negators in the inverted auxiliary position (C) from the inventory of negation structures altogether. This accounts for (20a,b). The ranking of the remaining markedness constraints makes the forms *-n't* (NINFL-AUX) and *no* (NEG-VP) available in the inventory, but they are optimal for sentence negation only where the less marked analytic negator *nae* is unavailable. (This is so because these forms violate higher-ranking markedness constraints and therefore to minimize violations these forms must be avoided wherever possible.) This explains their appearance in the negative auxiliary

[10] '$\ldots$' includes all of the remaining markedness constraints in (18): *NEG-V, *NINFL-V, *NEG-VROOT. These are omitted in (23) for perspicuity.

inversions (20), (21) and their exclusion from the declarative (19).[11] The logic of this analysis is summarized in the following tables (adapted from Bresnan, in press c):[12]

(24) Scots:

		*NEG-C	FAITHNEG	*NEG-VP, *NINFL-AUX	*NEG-I
	input: ¬(POSS(work(he)))				
	he couldn't work			*!	
☞	*he couldnae work*				*
	he could no work			*!	
	input: Q(¬(POSS(work(he))))				
☞	*couldn't he work?*			*	
	couldnae he work?	*!			
☞	*could he no work?*			*	

On this account what explains the movement paradox of (3), repeated here—

(25) Scots:
*Amn't I going? *I amn't going.*
**Amnae I going? I amnae going.*

—is the relative markedness of the negative auxiliary inflection *-n't*, compared to the syntactic I negator *nae*. There is independent evidence for such a difference in markedness. The form *nae* is native to Scots, but the auxiliary suffix *-n't* is a Standard English form having restricted use in Scots both socially and lexically. According to Miller (1993), the contracted form *-n't* is preferred

[11] The additional constraints which require auxiliary inversion in questions and its absence in declaratives are discussed in Grimshaw (1997) and Bresnan (in press a).

[12] The input is succinctly shown here as a logical formula representing the wide scope of sentential negation rather than as an f-structure. The two constraints separated by commmas are treated as floating constraints having variable ranking values (Boersma, 1997; Asudeh, 1999). At evaluation these two constraints may be ranked in either order, allowing for variability in the occurrence of the two expressions of negation they mark.

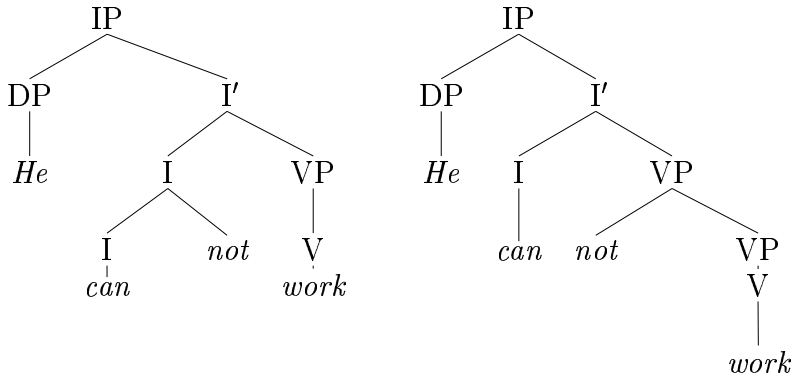
by educated speakers of Scots in formal contexts. In Scots it is also lexically restricted compared to *nae*, as shown in (26) from Brown's (1991: 93) study:

(26) *cannae, mustnae, willnae, couldnae, ...*
**can't, *mustn't, *won't, couldn't, ...*

The relative markedness of this form is captured in the constraint ranking in (24).

How does Standard English differ from Scots on this theory? Where Scots pronounces NEG-I (*nae*) differently from NEG-VP (*no*), English pronounces both as *not*:

(27)



The ambiguity of *not* in English has been noted by various researchers (Payne, 1985). In Standard English only *not* adjoined to VP can express VP scope in the absence of focus operators, as we see in (28b) and can be separated by adverbs from the modal, as we see in (29c), while only *not* adjoined to I can express sentence scope in declaratives, as we see in (27a), and can form an orthographic word with the modal *can*, as we see in (29a):

(28) a. *He [could not] have been working.* $\text{NEG}(\text{PRT})_I$

b. *He could [not have been working].* $\text{NEG}(\text{PRT})_{VP}$

(29) a. *He cannot have been working.* $\neg(\text{POSS}(\text{work}(\text{he})))$

b. *He can (just/simply) not have been working.* $\text{POSS}(\neg(\text{work}(\text{he})))$

Where the Scots NINFL-AUX *-n't* is a relatively marked form, the same form in Standard English is among the least marked expressions of sentence negation, an alternative to NEG-I in declaratives—

(30) a. *He can't have been working.* ¬(POSS(work(he)))

b. *He cannot have been working.* ¬(POSS(work(he)))

c. *He can not have been working.* POSS(¬work(he))

—and strongly preferred to NEG-VP in interrogatives. In spoken Standard English examples like (31c) sound very formal (they are termed "stilted and unnatural" by Palmer and Blandford (1969: 293)). The more natural expression of wide-scope negation in interrogatives is *-n't* (31a):

(31) a. *Can't he have been working?* Q(¬(POSS(work(he))))

b. *Can he not have been working?* Q(POSS(¬(work(he))))

c. % *Can he not have been working?* Q(¬(POSS(work(he))))

All of these differences follow from the constraint ranking shown in (32), in which *NINFL-AUX is ranked below *NEG-VP, in contrast to the Scots ranking (23):[13]

(32) Standard English:
..., *NEG-C ≫ FAITH^{NEG} ≫ *NEG-VP ≫
*NEG-I, *NINFL-AUX

The consequences of this ranking are summarized in (33):

(33) Spoken Standard English:

		*NEG-C	FAITH^{NEG}	*NEG-VP	*NEG-I, *NINFL-AUX
	input: ¬(POSS(work(he)))				
☞	*he can't have been working*				*
☞	*he cannot have been working*				*
	he can not have been working			*!	
	input: Q(¬(POSS(work(he))))				
☞	*can't he have been working?*				*
	cannot he have been working?	*!			
	can he not have been working?			*!	

[13] The ranking may differ, of course, in more formal varieties of Standard English.

The present theory explains why it is in Scots that *-n't* appears only where *nae* cannot appear, and why there is a contrast in the scope of NEG-VP in Scots and Standard English. It can also easily explain the movement-paradox contrast between Scots and Hiberno-English noted in (3) and (4): Scots rejects the use of *-n't* in declaratives, while Hiberno-English allows it. The solution is simply that Hiberno-English has the same constraint ranking as Standard English (32). This is a quite plausible approach because in Hiberno-English, unlike Scots, both the NEG-I and NINFL-AUX forms of negation are shared with Standard English.

Despite its similarity to Hiberno-English, Standard English differs conspicuously in one respect: it lacks a negative inflected form for first person singular present tense *be* (1): **I amn't; *Amn't I?* Various explanations for this lexical gap have been proposed; Dixon (1982), for example, proposes avoidance of the phonologically marked *mn* sequence. Here we will simply assume a high-ranking constraint **amn't* which penalizes this candidate, for whatever reason. (In Bresnan (in press b), lexical gaps are analyzed by means of a universal constraint LEX against unpronouncible candidates, which penalizes those candidates idiosyncratically associated with no pronunciation in a language-particular lexicon.)

If no other changes are made to the constraint ranking for Standard English: the consequences of eliminating this candidate are that syntactic constructions with *am . . . not* replace the missing first person singular negative inflected form of *be* in both declaratives and interrogatives expressing sentential negation:

(34) Possible effect of a lexical gap (I):

	**amn't*	*NEG-C	FAITH^{NEG}	*NEG-VP	*NEG-I, *NINFL-AUX
(declarative input)					
I amn't working	*!				*
☞ *I [am not] working*					*
I am [not working]				*!	
(interrogative input)					
Amn't I working?	*!				*
Am not I working?		*!			
☞ *Am I [not working]?*				*	

Though some speakers may avoid the lexical gap in this way, it is much more common (certainly in informal spoken Standard American English) to use *Aren't I . . . ?*, the apparent "first person" *aren't* of (1), (2). What is happening is that faithfulness to person and number is sacrificed in order to avoid the very marked use of NEG-VP with wide scope. For these speakers, *NEG-VP dominates $\text{FAITH}^{\text{P}}_{be}\&\,^{\text{N}}$ in the constraint hierarchy, as shown in (35):

(35) *NEG-VP $\gg$ $\text{FAITH}^{\text{P}}_{be}\&\,^{\text{N}}$ and $\text{FAITH}^{\text{P}}_{be}\&\,^{\text{N}}\gg$ *NEG-I, *NINFL-AUX

With all other constraint rankings the same as before, this means that it is a worse violation to use VP negation (for wide-scope input) than to violate faithfulness to number and person. The main result is shown in (36):

(36) Possible effect of a lexical gap (II):

		*amn't	*NEG-C	FAITH^{NEG}	*NEG-VP	FAITH$^{P}_{be}\&\,^{N}$	*NEG-I, *NINFL-AUX
	(declarative input)						
	I amn't working	*!					*
	I aren't working					*!	*
☞	*I [am not] working*						*
	I am [not working]				*!		
	(interrogative input)						
	Amn't I working?	*!					*
☞	*Aren't I working?*					*	*
	Am not I working?		*!				
	Am I [not working]?				*!		

The reason that *aren't* is the optimal form here is that the constraints against more faithful analytic expressions of negation such as **Am not I?, *Am I not?*—namely *NEG-C and *NEG-VP—outrank faithfulness to person and number ($\text{FAITH}^{\text{P}}_{be}\&\,^{\text{N}}$). According to our analysis of person/number neutralization in Section 2, *are* is the most general form in the present tense paradigm of *be*. Hence, when faithfulness to the input is overridden, *are* will emerge as the least marked form, generalizing further into the paradigm (see Bresnan, in press b).

In conclusion, we see that the movement paradoxes in (1) and (3) are not matters of brute lexical stipulation, but can be derived from more general properties of the grammatical systems of these English dialects: the unmarkedness of *are* in the Standard English paradigm for present *be*, the relative markedness of Standard *-n't* in Scots compared to the non-Standard native form *nae*, and the competition between morphological and syntactic forms of negation across dialects, which follows from the feature-logic based theory of GEN for morphosyntax provided by OT-LFG (Bresnan in press a,b).

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