

**ENGLISH NONSYLLABIC AUXILIARY CONTRACTIONS:
AN ANALYSIS IN LFG WITH LEXICAL SHARING**

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Abstract

English auxiliary contractions may reduce to varying degrees, sometimes becoming nonsyllabic, with only a consonant. Most nonsyllabic contractions exhibit behavior that suggests they are joined to the preceding form in the lexicon. Yet paradoxically they behave syntactically like a clitic group, formed from two distinct constituents. I conclude that these forms are *lexical clitics*. To model lexical clitics, I employ a mechanism called *lexical sharing*, allowing two or more atomic constituents to be instantiated by the same word. Combining lexical sharing with LFG provides a way to model functional constraints associated with nonsyllabic auxiliary contractions. I also show that lexical sharing provides an illuminating analysis of so-called second-word clitics, concluding that adding lexical sharing to LFG provides a useful component in the analysis of cliticization.

1 Introduction

This paper examines a problematic area of cliticization and considers how one might tackle it within the theory of Lexical-Functional Grammar (LFG). The issue revolves around a subset of English auxiliary contractions, specifically those which are most radically reduced, leaving only a consonant. These contractions do not form syllables unto themselves; therefore, I call them *nonsyllabic auxiliary contractions*. The behavior of some members of this class runs counter to the traditional thinking about clitics. Here I explain why these forms are challenging, and I offer an analysis that combines the tools traditionally made available in LFG with a mechanism that I call *lexical sharing* (Wescoat 2002). I go on to suggest that the incorporation of lexical sharing into an LFG proves useful for analyzing other types of clitic phenomena.

2 The traditional view of auxiliary contractions

English auxiliary contractions are routinely treated as clitics. Indeed, Zwicky and Pullum (1983) offer two auxiliary contractions, 's (*is* or *has*) and 've (*have*), as paradigmatic exemplars of clitics. More specifically, Zwicky treats English auxiliary contractions as members of the class of *simple clitics*, which comprises “cases where a free morpheme, when unaccented, may be phonologically subordinated to a neighboring word” (1977:5). For instance, 'll corresponds to the free form *will*, the contracted form arising only in places where the full form could have occurred:

- (1) a. I'll help.
- b. I **will** help.

The idea that auxiliary contractions are syntactically free yet phonologically bound is echoed in Di Sciullo and Williams's assumptions about the process by which such forms are derived:

The correct distribution for *I'll* is obviously arrived at in this way: *first*, independently determine the distribution of *I* and *will* according to syntax, and *then* weld the two together when they occur juxtaposed. Clearly, if this description is correct, then *I'll* is not a *syntactic atom* in any sense, because it is composed of syntactically accessible parts. So if *I'll* is a word at all, . . . it is a *phonological word*. (1987:107, emphasis added)

The term *syntactic atom* may be interpreted as referring to the smallest, indivisible units within the c(onstituent)-structure. Thus, we are told that *first* the syntax incorporates *I* and *will* into the c-structure as two autonomous syntactic atoms, *then*, in some postsyntactic readjustment, *I* and *will* are joined into *I'll*, which constitutes a word as far as the rules of phonology are concerned.

3 Lexicalist counteranalyses

Spencer (1991:383) notes that some auxiliary contractions seem to be incompatible with the traditional view of these forms as clitics. It has been recognized at least since the work of Sweet (1890:14–16) that auxiliary contractions may be reduced to varying degrees:¹

- (2) **aar** ‘are’: ə(r).
- æm** ‘am’: əm; m.
- hæd** ‘had’: həd; əd; d.
- hæv** ‘have’: həv; əv; v.
- hæz** ‘has’: həz; əz; z, s...
- iz** ‘is’: iz; z, s...
- wil** ‘will’: əl; l.
- wud** ‘would’: wəd; əd; d.

In the most extreme instances, all that remains is a single consonant that is realized as the final coda of the preceding word. As noted above, since these contractions do not form a syllable unto themselves, I call the single-consonant forms nonsyllabic auxiliary contractions. Spencer observes that this subclass of auxiliary contractions exhibits curious properties that make them more amenable to a lexicalist analysis.

3.1 Selection

One telling characteristic of nonsyllabic auxiliary contractions is their propensity to *select* pronouns and *wh*-words as the forms to which they attach:

- (3) a. **I’ll** help. [aɪl]
- b. **Ai’ll** help. [aɪ.l/*aɪl]²
- (4) a. **We’re** a big group. [wi:ɹ]
- b. The **Cree’re** a big group. [kɹi:ɹ/*kɹi:ɹ]
- (5) a. **They’ve** gone. [ðeɪv]
- b. They **may’ve** gone. [meɪ.əv/*meɪv]
- (6) a. **I’m** happy. [aɪm]
- b. **So am** I. [səʊ.m/*səʊm]
- (7) a. **How’ve** you been? [haʊv]
- b. The **Au’ve** been polled. [aʊ.əv/*aʊv]³

Note that ‘.’ symbolizes a syllable boundary and that the vertical line ‘|’ below a sonorant-consonant symbol indicates that the sound is being used vocally, as a syllable peak. With the nonpronoun, non-*wh*-words above, the nonsyllabic contractions are incompatible; instead, a less reduced contraction that contains its own syllable peak must be employed.

The property of selecting pronouns and *wh*-words is shared by some but not all nonsyllabic auxiliary contractions. Most notably, the nonsyllabic forms of ‘s (*is* or *has*) may attach to words of any category:

¹Sweet’s original transcriptions are retained in (2); ⟨aa⟩, ⟨i⟩, ⟨i̇⟩, and ⟨u⟩ correspond to ⟨a⟩, ⟨ɪ⟩, ⟨i̇⟩, and ⟨ʊ⟩ in the International Phonetic Alphabet.

²*Ai* is a Japanese given name.

³The Au are a people of Papua New Guinea.

- (8) a. **Pat's** gone. [pæts]
 b. **So's** John. [souz]

The behavior of 'd (*had* or *would*) is similar in some dialects. On the one hand, Spencer reports the judgments in (9) and (10), which suggest that nonsyllabic 'd selects pronouns for some speakers:

- (9) a. **She'd** seen it. [ʃi:d]
 b. **Lee'd** seen it. [li:əd/*li:d]
 (10) a. **I'd** have seen it. [aɪd]
 b. **Bligh'd** have seen it. [blaɪ.əd/*blaɪd] (1991:383)

Yet in other dialects, including my own and that described by Zwicky (1970:331–332), even the b. sentences above are compatible with nonsyllabic 'd.⁴ Thus, the nonsyllabic contractions of 's, and for some speakers 'd, pattern more like the corresponding syllabic contractions and will not be relevant to this discussion. Henceforth, I use the term *restrictive* nonsyllabic auxiliary contractions to refer to the nonsyllabic forms of 'll (*will*), 'm (*am*), 're (*are*), and 've (*have*) (along with 'd in dialects like that described by Spencer); these forms share the crucial properties on which this argument is based.

The fact that they select pronouns or *wh*-words as the forms to which they attach is significant for determining the morphological status of restrictive nonsyllabic auxiliary contractions. Zwicky and Pullum provide some well-known criteria for distinguishing clitics and affixes. The latter term should be interpreted here as describing morphemes that attach to stems in the derivational or inflectional morphology. One of their criteria is given in (11):

(11) **Zwicky and Pullum's criterion A**

Clitics can exhibit a low degree of selection with respect to their hosts, while affixes exhibit a high degree of selection with respect to their stems. (1983:503)

By criterion A, restrictive nonsyllabic auxiliary contractions seem rather affix-like.

3.2 Morphophonological idiosyncrasies

Another curious property of nonsyllabic auxiliary contractions concerns morphophonological idiosyncrasies in the form of pronouns to which they attach. The literature reveals some degree of dialect variation in this area, but for me,⁵ the following generalizations hold: *I* [aɪ] may be pronounced [ɑ], but only in association with 'll (*will*), yielding *I'll* [ɑl]; moreover, *you* [ju:] may become [jɔ], but only when followed by 're (*are*), resulting in *you're* [jɔɪ]:⁶

- (12) *I'll* [aɪl/ɑl] *I'm* [am/*ɑm] *I've* [av/*ɑv]
you'll [ju:l/*jɔl] *you're* [ju:ɪ/jɔɪ] *you've* [ju:v/*jɔv]

This, by the way, is not a fast-speech phenomenon; *I'll* [ɑl] and *you're* [jɔɪ] may be heavily stressed and elongated.

Pronouns to which nonsyllabic auxiliary contractions attach undergo another process which is somewhat more regular. Zwicky (1970:330) describes this with a phonological rule called *Phonetic*

⁴Coincidentally, Bloch indirectly corroborates the existence of the latter sort of dialect; in discussing the phonology of "Midwestern English," he states "*pod* . . . is phonetically identical with *pa'd*" (1941:283–284).

⁵My thanks go to the students of Linguistics 121, Spring 2005, at the University of California, Davis, for discussing and corroborating these judgments.

⁶Sweet also reports this idiosyncratic pronunciation of *you're*, which he renders as "jɔə, jɔɪ" (1890:25).

Laxing, which causes vowels that are long and tense (i.e., with advanced tongue root, [+ATR]) to become short and lax (i.e., [-ATR]). For me, Phonetic Laxing is most clearly applicable when the following contraction consists of just a liquid, as in 'll (*will*) or 're (*are*); with other nonsyllabic auxiliary contractions the rule appears not to apply unless the pronoun is *you*:⁷

(13)	<i>we</i>	[wi:]	<i>we'll</i>	[wɪl]	<i>we're</i>	[wɪɹ]	<i>we've</i>	*[wɪv]	<i>we'd</i>	*[wɪd]		
	<i>you</i>	[ju:]	<i>you'll</i>	[jʊl]	<i>you're</i>	[jʊɹ]	<i>you've</i>	[jʊv]	<i>you'd</i>	[jʊd]		
	<i>he</i>	[hi:]	<i>he'll</i>	[hɪl]					<i>he'd</i>	*[hɪd]	<i>he's</i>	*[hɪz]
	<i>she</i>	[ʃi:]	<i>she'll</i>	[ʃɪl]					<i>she'd</i>	*[ʃɪd]	<i>she's</i>	*[ʃɪz]
	<i>they</i>	[ðeɪ]	<i>they'll</i>	[ðeɪl]	<i>they're</i>	[ðeɪɹ] ⁸	<i>they've</i>	*[ðeɪv]	<i>they'd</i>	*[ðeɪd]		

I find that all of the licit forms in (13) may be stressed and elongated; thus, Phonetic Laxing is not a fast-speech phenomenon. Significantly, this rule has a highly restricted range of application, operating only in vowel-final pronouns to which nonsyllabic auxiliary contractions are attached; witness *we'll* [wi:l/wɪl] vs. *wheel* [wi:l/*wɪl].⁹

Here another of Zwicky and Pullum's criteria for distinguishing clitics and affixes comes into play:

(14) **Zwicky and Pullum's criterion C**

Morphophonological idiosyncrasies are more characteristic of affixed words than of clitic groups. (1983:504)

In light of criterion C, since the above [ai/a] (*I*) and [ju:/jɔ] (*you*) allomorphies and the highly constrained rule of Phonetic Laxing are morphophonological idiosyncrasies triggered by the attachment of nonsyllabic auxiliary contractions, these forms are once again revealed to be affix-like.

3.3 A lexical source for restrictive nonsyllabic auxiliary contractions

In lexicalist theories, selection and morphophonological idiosyncrasies like those described above are lexical matters. One may therefore follow Spencer (1991:383) in assuming some version of (15):

(15) **Lexical source hypothesis**

The nonsyllabic contractions of *am*, *are*, *have*, and *will* (and for some speakers, *had* and *would*) are attached to pronouns and *wh*-words *in the lexicon*.

Motivated by this hypothesis, some researchers have analyzed restrictive nonsyllabic auxiliary contractions not as clitics but as suffixes that attach to a stem to form affixed words. Sadler (1998) treats pairings of pronouns with nonsyllabic auxiliary contractions as *tense-marked pronouns* (D), as in (16a). Bender and Sag's (2001) HPSG analysis *incorporates* the pronoun into the auxiliary

⁷Plainly there is variability among speakers here; for instance, Zwicky (1970:330) indicates that Phonetic Laxing does not occur with 's (*is* or *has*), but he seems to accept it with other auxiliary contractions.

⁸Sweet's data also show the effect of Phonetic Laxing in this form; *they're* is rendered as "ðeɹ" (1890:25).

⁹Even more drastic reductions of the form of the pronouns are possible. When the nonsyllabic auxiliary consists of an obstruent, the pronoun may be realized with a central vowel, as in *she'd* [ʃɪd] or *they've* [ðeɪv]; however, it appears to me that these occur strictly in fast speech. When the auxiliary consists of a sonorant, it may be vocalized, in which case it takes over as the syllable peak of the pronoun-auxiliary unit, as in *you're* [jɹ] and *they'll* [ðɪ]. Interestingly, I find that the forms with vocalized sonorants can be stressed and elongated, though *he'll* [hɪ] may be an exception to this generalization. I will not consider these data further here, beyond noting that these phenomena provide yet more evidence of phonological processes that apply only in pronoun+auxiliary combinations.

(V), which in turn combines with a base-form VP to yield a saturated sentence requiring no subject NP, as in (16b):



4 Problems with affixed-word analyses

Approaches that treat the combination of a pronoun or *wh*-word with a restrictive nonsyllabic auxiliary contraction as an affixed word encounter difficulties when it comes to their predictions about the syntax.

First note that coordination fails to apply to the hypothesized affixed word, as seen in (17):

(17) ***You're** [jɔɪ] and **I'm** [am] helping.

Consider (17) in the light of another of Zwicky and Pullum's criteria, shown in (18):

(18) **Zwicky and Pullum's criterion E**

Syntactic rules can affect affixed words, but cannot affect clitic groups. (1983:504)

Since the rule of coordination cannot combine *you're* [jɔɪ] with *I'm* [am], by criterion E, these forms behave more like clitic groups than affixed words. Consider the reasoning underlying this conclusion. The affixed-word analyses sketched in (16) would predict that *you're* [jɔɪ] and *I'm* [am] are syntactic atoms, in the sense in which Di Sciullo and Williams (1987) employ this term, designating the smallest parts of a c-structure. As syntactic atoms, *you're* [jɔɪ] and *I'm* [am] would be constituents, so one is left to wonder why they would not undergo coordination. In contrast, clitic groups are assumed to comprise multiple syntactic atoms, which are phonologically bound. If *you're* [jɔɪ] and *I'm* [am] are each composed of a pronoun D and an auxiliary I, which would not together constitute a constituent, then there is every reason to expect coordination to fail in (17).

Another problem with the affixed-word analyses concerns I' coordination, as in (19):

(19) **I'll** [aɪl/aɪ] be there on Sunday and [_I am looking forward to seeing you]

Here the future tense of *I'll* [aɪl/aɪ] takes scope only over the left-hand conjunct. Moreover, the right-hand conjunct, headed by the tensed auxiliary *am*, needs a first-person, singular subject; this subject is in fact shared by both conjuncts. These observations are easily handled if one assumes that *I'll* [aɪl/aɪ] in (19) corresponds to a clitic group comprising two syntactic atoms, a first-person, singular D and a future-tense I. The D lies outside of the coordinate structure, taking scope over both conjuncts, while the I is inside of the left-hand conjunct, which corresponds, appropriately enough, to the perceived scope of the future tense. However, if *I'll* [aɪl/aɪ] were an affixed word, and thus a syntactic atom, one would have to choose between two equally unpalatable analyses. The left-hand conjunct would either contain the presumed syntactic atom *I'll* [aɪl/aɪ] or lack it. In the former case, the left-hand conjunct would be the whole clause *I'll be there on Sunday*; in the latter, it would be the phrase *be there on Sunday*, headed by uninflected *be*. Neither candidate

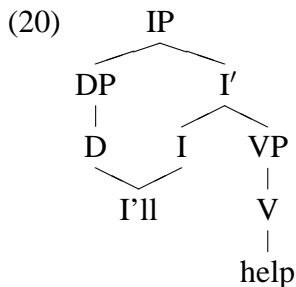
is plausible as the co-conjunct of an I' headed by the present-tense auxiliary *am*. Given these observations, *I'll* [aɪl/aɪ] once again seems more like a clitic group than an affixed word.

5 Toward lexical sharing

A paradox emerges here. By the lexical source hypothesis in (15), restrictive nonsyllabic auxiliary contractions are attached to pronouns and *wh*-words in the lexicon, as are affixes. Yet these pairings behave syntactically like clitic groups, and it is a widely held assumption that “All cliticization . . . follows syntax” (Zwicky & Pullum 1983:504). Thus, the conclusion seems so far to be that the derivation of restrictive nonsyllabic auxiliary contractions takes place in two parts of the grammar that lexicalist theories strive to keep scrupulously separate. To resolve this problem, one of the foregoing assumptions must be abandoned; I propose to explore the hypothesis that *not* all cliticization follows syntax. More specifically, I claim that restrictive nonsyllabic auxiliary contractions are instances of *lexical cliticization* of the sort advanced by Booij and Rubach (1987:36) to describe Polish preterite clitics. Moreover, I propose to treat lexical cliticization as an instance of a phenomenon that I call *lexical sharing* (Wescoat 2002), in which two or more syntactic atoms share a single word as their *lexical exponent*.

5.1 How *not* to model lexical sharing

The capacity to associate one word with two syntactic atoms is something that must be carefully and precisely implemented in the theory of c-structure. In fact, the traditional model of c-structure is ill-equipped for the task. Consider the form *I'll* [aɪl/aɪ], which, as an instance of lexical sharing, would need to be associated with two syntactic atoms, a D and an I. The traditional way to represent the fact that a word *w* is associated with a syntactic atom of category X within the c-structure model is to have the tree include a terminal node labeled *w* immediately dominated by a preterminal node labeled X. Following this practice, one might propose a terminal node labeled *I'll* immediately dominated by one preterminal node labeled D and another labeled I:



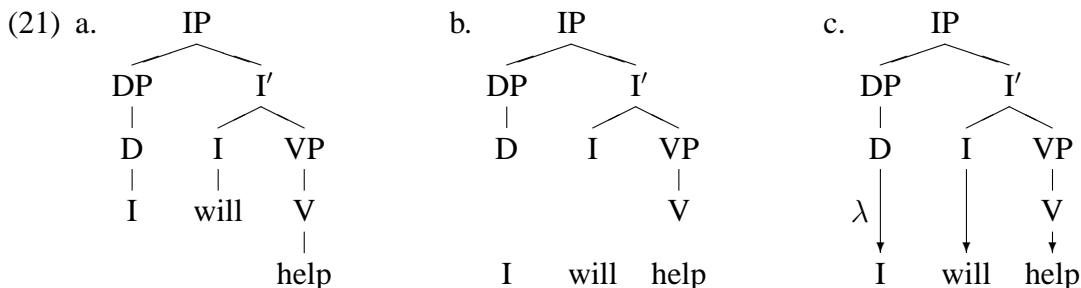
However, a structure like (20) is not a well-formed c-structure tree. In graph-theoretic terms, a c-structure is defined as a *directed tree*; such a structure has a *root* node from which every other node in the tree is reachable by *exactly one* directed path (Thulasiraman & Swamy 1992:106). There is a directed path from a ‘source’ node to a ‘goal’ node precisely when there is a sequence of nodes beginning with the source and ending with goal, such that each node other than the goal immediately dominates the next node in the sequence. In (20), IP is the only node from which there are directed paths leading to every other node; however, *I'll* may be reached from IP via two distinct paths, one going through DP and D, and another going through I' and I. Consequently, (20) is ill-formed, and some modification of the traditional c-structure model is required in order to allow for lexical sharing.

5.2 Freeing words from domination

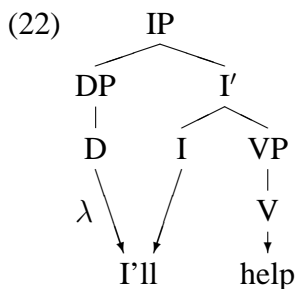
The single factor that prevents the traditional c-structure model from being able to represent lexical sharing is its dependence on immediate domination to convey the fact that a word corresponds to a syntactic atom of a particular category. To overcome this difficulty, I propose to remove words from the domination relation. To that end, I exploit LFG’s notion of a grammatical architecture based on “parallel structures flexibly related by correspondence mappings” (Bresnan 2001:43). Words will be removed from c-structure and set off in a structure of their own. The correspondence mapping that relates these two structures will thus be independent of the relation of domination that holds among nodes *within* c-structure. Consequently, the constraints on c-structure that undermined the first attempt at modeling lexical sharing will no longer be an issue.

The proposal may be visualized in three simple steps:

1. As a familiar conceptual starting point, begin with a traditional c-structure like (21a).
2. Sever the words from the tree, and arrange them in a separate, linearly ordered representation, called *l(lexical)-structure*, as in (21b). The terminal nodes of the new c-structure are the former preterminals. The new terminals represent syntactic atoms, which I henceforth describe as *atomic constituents*, to emphasize that these are elements of *constituent-structure* and formally on a par with complex constituents like those represented by DP, IP, I', etc.
3. Establish a correspondence mapping, λ , which relates each atomic constituent in c-structure to a word in l-structure, which one may call the atomic constituent’s lexical exponent. If a word w is the lexical exponent of an atomic constituent X, one may alternatively express that fact by saying that w *instantiates* X or by using functional notation: $\lambda(X) = w$. The correspondence mapping λ may be diagrammed with arrows, as in (21c).



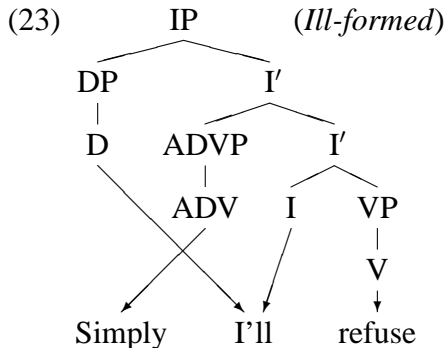
Since the correspondence mapping λ is distinct from domination, it is free to map D and I to distinct words, as in (21c), or to map them to *the same word*, as in (22):



In the latter case, multiple atomic constituents share a common lexical exponent, whence the name ‘lexical sharing.’

5.3 Homomorphic lexical integrity

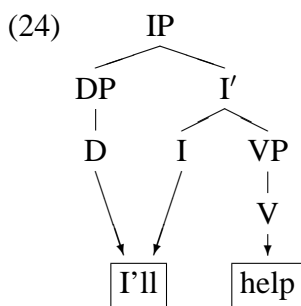
There is a very important constraint on the new correspondence mapping λ : It must be *order-preserving*. Notice that the terminals of the c-structure tree, which represent atomic constituents, are linearly ordered, as are the words in l-structure. For λ to be order-preserving, given two atomic constituents, X and Y, if X precedes Y, then $\lambda(Y)$ may not precede $\lambda(X)$. This condition may be easily appreciated in simple graphic terms: The arrows representing λ may *never* cross. Thus, for instance, the correspondence mapping between the c- and l-structures in (22) is *not* countenanced by the present theory:



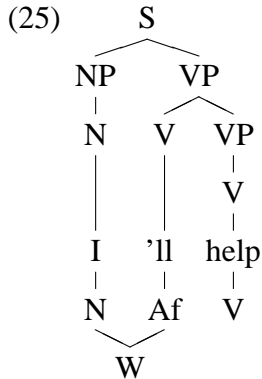
Given the requirement that λ be order-preserving, it follows that analyses framed within the lexical-sharing approach will have a property that I call *homomorphic lexical integrity*: Atomic constituents that share a lexical exponent will always be *adjacent*. The name of this property is derived from the fact that in the jargon of lattice theory, λ turns out to be a *homomorphism*. Notice, that in the illicit (23), D and I, which share *I'll*, are not next to each other in the linear ordering of atomic constituents; in contrast, in (22), which is allowed by the theory, the D and I that share *I'll* are side-by-side. The property described here constitutes a variant of Bresnan's (2001:92) notion of lexical integrity: Expressed in the terms of the present study, Bresnan's version would amount to saying that λ must be a one-to-one mapping, and therefore an *isomorphism*. This sort of isomorphic lexical integrity would of course render lexical sharing impossible; thus, I opt for the the homomorphic variety, which makes an interestingly strong statement about the integrity of words without undermining lexical sharing.

5.4 The separation of syntax and morphology

Consider lexical sharing from the perspective of Lapointe's Generalized Lexical Hypothesis: "No syntactic rule can refer to elements of morphological structure" (1985:8). The crucial observation to make here is that the correspondence mapping λ maps atomic constituents to *unanalyzed words*:



Thus, under lexical sharing, the syntax is not privy to information about a word's internal composition. Contrast this with Autolexical Syntax (Sadock 1991: especially 52–53), which links X^0 -labeled nodes to *morphemes*, the latter being grouped into words in another tier of a multi-tiered model of grammar:

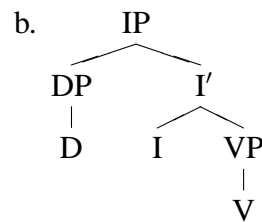


The fact that lexical sharing deals with words and not morphemes will prove advantageous in analyzing other clitic phenomena.

5.5 A rule formalism for lexical sharing

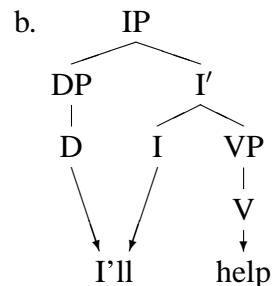
I provide a rule formalism for describing lexical sharing. To describe constituent structure, I use a normal, context-free phrase-structure grammar. Since these rules are concerned with c-structure, they contain only syntactic category symbols. The rules in (26a) admit the c-structure in (26b):

- (26) a. $IP \rightarrow DP I'$
 $I' \rightarrow I VP$
 $DP \rightarrow D$
 $VP \rightarrow V$



To determine l-structure and the correspondence mapping λ , I add *lexical-instantiation rules*, distinguished with a *leftward-pointing arrow*, as seen in (27a). The left-hand side of a lexical-instantiation rule is a word, and the right-hand side is a *sequence* of one or more syntactic categories. A lexical-instantiation rule of the form $w \leftarrow X_1 \cdots X_n$ allows the word w to appear in l-structure, provided λ maps n adjacent terminal nodes of the c-structure to w , and those terminal nodes are labeled, in order, X_1, \dots, X_n . Thus, the lexical-instantiation rules in (27a) associate the c-structure in (26b) with the l-structure *I'll help* via the correspondence mapping λ displayed in (27b):

- (27) a. $I'll \leftarrow D I$
 $help \leftarrow V$



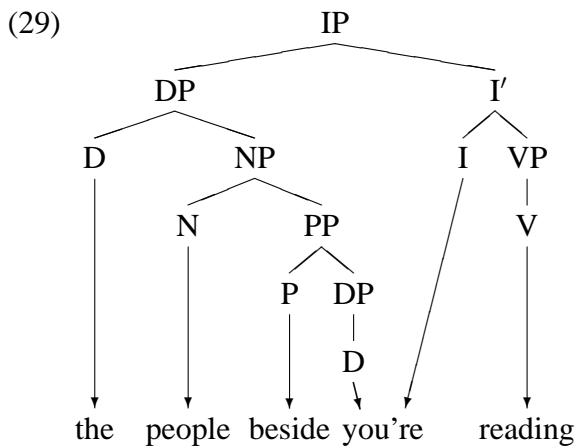
Thus, one may easily write lexical instantiation rules that implement the lexical-sharing analysis of nonsyllabic auxiliary contractions, as it has been described up to this point.

6 Incorporating lexical sharing into LFG

A further idiosyncrasy in the behavior of nonsyllabic auxiliary contractions becomes apparent in the following array of data:

- (28) a. **You're** reading. [ju:ɪ/jʊɪ/jɔɪ]
 b. The people beside **you're** reading. [ju:ɪ/*ju:ɪ/*jʊɪ/*jɔɪ]
 c. The people who helped **you're** kind. [ju:ɪ/*ju:ɪ/*jʊɪ/*jɔɪ]

When the auxiliary contraction is nonsyllabic, only (28a) is grammatical. However, if one gives *you're* [ju:ɪ/jʊɪ/jɔɪ] the lexical-instantiation rule *you're* ← D I, it ought to be possible to derive even the ill-formed sentences in (28), assigning (28b) the structure in in (29), for instance:



Some means is needed to constrain nonsyllabic auxiliary contractions to occur only in structures like (28a); a natural solution to this problem emerges if one combines lexical sharing with the over-arching grammatical theory of LFG.

6.1 Nonsyllabic auxiliary contractions and discourse functions

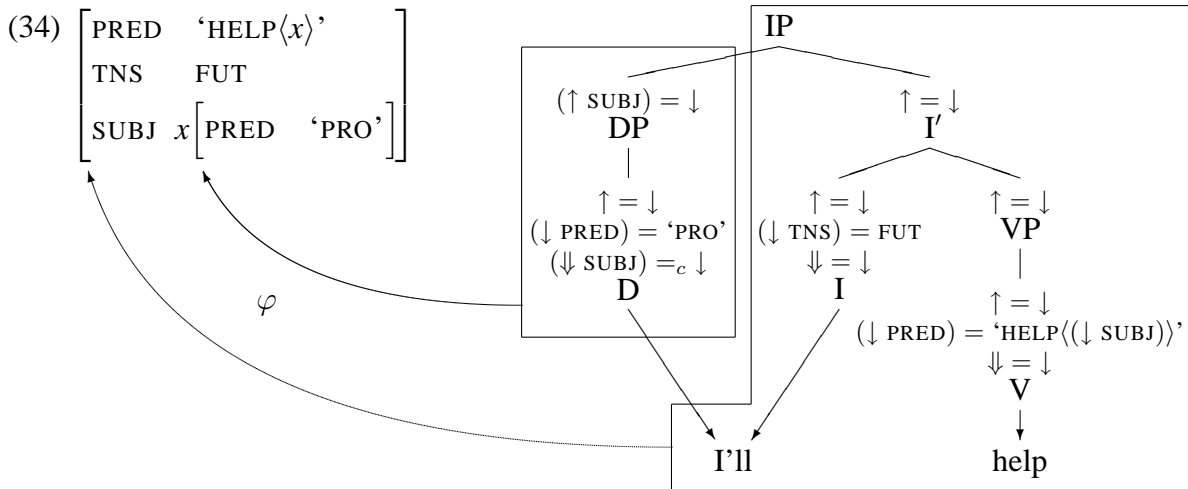
Faced with data like (28), Zwicky offers the following comment, framed in terms of his rule of *Auxiliary Reduction*:

The correct generalization is that Auxiliary Reduction applies to *will*, *have*, *am*, and *are* only after one of a small set of pronominal forms. . . , and then only when these NPs are immediately dominated by S. It may be significant that this S is always the one to which the auxiliary belongs (where a node X is said to *belong to* an S if that S is the lowest S dominating X). (1970:332)

Here S and NP may be interpreted as IP and DP, and one may readily infer that the DP in question is the *specifier* of the IP, i.e. [_{IP} DP. . .]. LFG proposes universal principles for associating grammatical functions with elements of c-structure, including this one, which is relevant to *functional categories* like IP: “Specifiers of functional categories are the grammaticalized *discourse functions*” (Bresnan 2001:102, emphasis added). The discourse functions recognized within LFG are *topic*, *focus*, and *subject*. Assume that in (28), *you're* [ju:ɪ/jʊɪ/jɔɪ] instantiates a D and an I; then

- (33) $IP \rightarrow DP \quad I'$
 $(\uparrow \text{SUBJ}) = \downarrow \quad \uparrow = \downarrow$
 $I' \rightarrow I \quad VP$
 $\uparrow = \downarrow \quad \uparrow = \downarrow$
 $DP \rightarrow D$
 $\uparrow = \downarrow$
 $VP \rightarrow V$
 $\uparrow = \downarrow$

The rules in (32) and (33) then give rise to the c-, l-, and f-structures in (34):



Three points should be emphasized in connection with (34). First, the terminal nodes of the c-structure, D, I, and V, receive annotations both from the lexical-instantiation rules in (32) and from the phrase-structure rules in (33). The second matter concerns the correspondence mapping φ from c- and l-structure to f-structure; φ maps DP and D to the smaller f-structure labeled x , and all other elements of c- and l-structure to the larger f-structure. In particular, the annotation $\downarrow = \downarrow$ on I is responsible for equating the f-structures of I' and I; the $\downarrow = \downarrow$ on V similarly equates the f-structures of $help$ and V. The final point concerns the annotation $(\downarrow \text{SUBJ}) =_c \downarrow$ on D; the use of $'=_c'$ indicates that this is a *constraining equation*. Once the f-structure in (34) is created by the various *defining equations* expressed with $'=,'$ the constraining equation $(\downarrow \text{SUBJ}) =_c \downarrow$ checks that the f-structure associated with D is the SUBJ of the f-structure associated with I' , which also happens to be the f-structure for I.

One may now see how the functional identification hypothesis from (31) is implemented by the lexical-instantiation rule for I' [a1/a1] in (35):

- (35) $I' [a1/a1] \leftarrow D \quad I$ [repeated from (32)]
 $(\downarrow \text{PRED}) = \text{'PRO'}$ $(\downarrow \text{TNS}) = \text{FUT}$
 $(\downarrow \text{SUBJ}) =_c \downarrow \quad \downarrow = \downarrow$

Though associated with different atomic constituents, the annotations $(\downarrow \text{SUBJ}) =_c \downarrow$ and $\downarrow = \downarrow$ interact through the \downarrow metavariable, which refers to the f-structure of the shared lexical exponent I' . Together, these annotations ensure that the f-structure for D must turn out to bear the discourse function SUBJ with respect to the f-structure for I, just as required by (31). Similar comments hold for examples in which a restrictive nonsyllabic auxiliary contraction is lexically cliticized to a *wh*-word, as in (30). There, a minimally different lexical-instantiation rule along the lines of (36)

might be employed:

$$(36) \textit{how've} [\textit{haʊv}] \leftarrow \textit{ADV} \quad \textit{C}$$

$$\begin{array}{ll} (\downarrow \textit{PRED}) = \textit{'HOW'} & (\downarrow \textit{TNS}) = \textit{PRES} \\ (\downarrow \textit{FOCUS}) =_c \downarrow & (\downarrow \textit{ASP}) = \textit{PERF} \\ & \downarrow = \downarrow \end{array}$$

6.3 More on coordination

There is yet another interesting idiosyncrasy associated with restrictive nonsyllabic auxiliary contractions. They do not attach to coordinated hosts:

$$(37) \textit{She and I'll help.} [\textit{aɪ.l}/\textit{*aɪl}/\textit{*aɪ}]$$

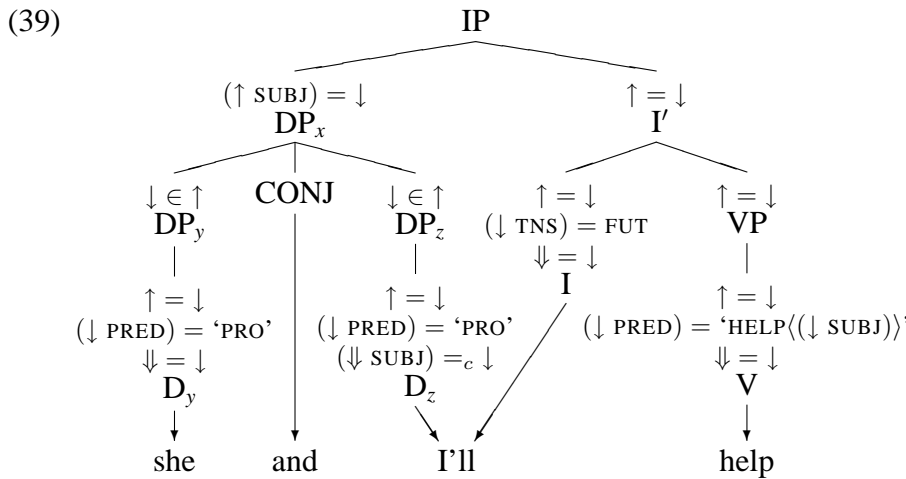
Felicitously, an explanation for this behavior is already at hand, thanks to the foregoing LFG implementation of the functional identification hypothesis. The analysis offered here closely parallels that presented by Sadler (1998), though the underlying technical details differ.

To model the coordinate structure in (37), one might follow Dalrymple and Kaplan (2000) in employing an annotated phrase-structure rule not unlike (38):¹²

$$(38) \textit{DP} \rightarrow \textit{DP} \textit{ CONJ } \textit{DP}$$

$$\downarrow \in \uparrow \quad \downarrow \in \uparrow$$

With this rule, one may construct the c- and l-structures in (39):



Using the defining equations in (39), one may build the f-structure in (40):

$$(40) \left[\begin{array}{ll} \textit{PRED} & \textit{'HELP}\langle x \rangle' \\ \textit{TNS} & \textit{FUT} \\ \textit{SUBJ} & x \left\{ \begin{array}{l} y \left[\textit{PRED} \textit{'PRO'} \right] \\ z \left[\textit{PRED} \textit{'PRO'} \right] \end{array} \right\} \end{array} \right]$$

The elements of (40) labeled *x*, *y*, and *z* are the f-structure correlates of the c-structure nodes bearing the same labels as subscripts in (39). Now consider the constraining equation $(\downarrow \textit{SUBJ}) =_c \downarrow$ on

¹²Dalrymple and Kaplan's (2000) analysis of coordination introduces several nuances which I ignore here, since they have no effect on the present argument. See Dalrymple and Kaplan's article for more details.

D_z ; it requires that z be the SUBJ of the f-structure corresponding to $I'll$, which turns out to be the unlabeled f-structure in (40). Of course, the SUBJ of the unlabeled f-structure is x rather than z , so the constraining equation is not satisfied, the f-structure is deemed *inconsistent*, and the string in (37) is consequently ruled out.

7 Beyond nonsyllabic auxiliary contractions

I have focused on restrictive nonsyllabic auxiliary contractions because such forms seem to *require* a lexical-sharing analysis. However, nonrestrictive auxiliary contractions, whether syllabic or nonsyllabic, are no less *compatible* with lexical sharing. The foregoing discussion leads to conclusions of the following sort: There is a lexical process that attaches nonsyllabic $'ll$ [I] (*will*) to a host, yielding a lexical-sharing structure; the host must be a pronoun or *wh*-word, the attachment of $'ll$ [I] triggers morphophonological idiosyncrasies, and functional restrictions are involved. If one accepts that such conclusions are necessary, then it probably makes sense to analyze other auxiliary contractions with statements along these lines: There is a lexical process that attaches $'s$ [z/s/əz] (*is* or *has*) to a host, yielding a lexical-sharing structure; the host may be anything, the attachment of $'s$ [z/s/əz] triggers no morphophonological idiosyncrasies, and no functional restrictions are involved. The lack of morphophonological and functional intricacies in no way undermines a lexical-sharing analysis.

Beyond auxiliary contractions, lexical sharing is useful as a tool for treating various other clitic phenomena. In general, simple clitics, in Zwicky's (1977) terminology, may be candidates for such an analysis. Recall that simple clitics are characterized as unstressed versions of free words which become phonologically dependent on a neighbor; by positing a single word that instantiates a sequence of adjacent atomic constituents, lexical sharing accords well with this sort of phenomenon, as suggested by the foregoing analysis of English auxiliary contractions. In contrast to simple clitics, Zwicky also posits *special clitics*, which include forms with a special syntax that situates them in places where one would not expect to find corresponding non-clitics. This is illustrated by Romance clitic pronouns, as in these French examples:

- (41) a. Je **lui** prêterai un livre.
 I to.him will.lend a book
 'I will lend a book to him.'
- b. Je prêterai un livre à **Jean**.
 to
 'I will lend a book to Jean.'

Clitic phenomena of this sort are not compatible with a lexical-sharing analysis, since nonadjacent parts of c-structure seem to be involved; rather, an approach that posits distinct c-structures that map to similar f-structures, as proposed by Grimshaw (1982), is more appropriate for capturing the relationship between the sentences in (41). Zwicky posits a third class of clitic phenomena, containing what he calls *bound words*; these are forms that are "semantically associated with an entire constituent while being phonologically attached to one word of this constituent" (1977:6). Lexical sharing provides an interesting approach to members of this class, such as English possessive $'s$, which I discuss elsewhere (Wescoat 2002:30–36). Among Zwicky's bound words is a subtype that particularly illustrates the utility of lexical sharing, with its strict separation of syntax and morphology. The forms in question are known as *second-word clitics*.

One of the usual examples of a second-word clitic is the Latin *-que* ‘and.’ The place of *-que* in a coordinate structure is not in between conjuncts, but rather attached to the end of the final conjunct’s first word:

- (42) a. [NP boni pueri] [NP pulchrae**que** puellae]
good boys pretty-and girls
 ‘good boys and pretty girls’
 b. *boni pueri**que** pulchrae puellae (Sadock 1991:63)

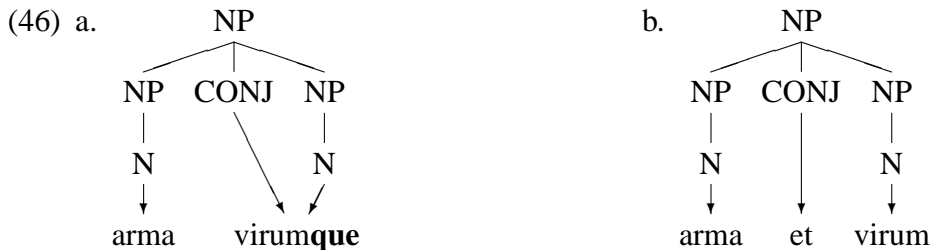
The term ‘second-word clitic’ arises from the assumption that *-que*, though phonologically bound, is a word unto itself, which occurs second-in-line within the conjunct. However, *-que* arguably forms a word with its host, since the rules of accent placement apply to the host and *-que* as a single unit:

- (43) a. vírum
 ‘the man (ACC)’
 b. virúm**que**
 ‘and the man’ (Zwicky 1977:30)

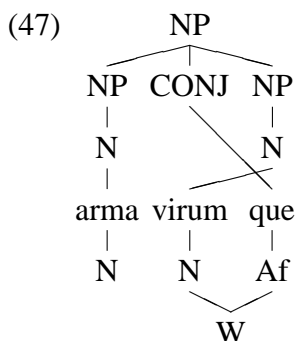
If one assumes a lexical-sharing treatment in which *virumque* instantiates two atomic constituents, a CONJ followed by an N, as specified by (44), one might give (45) the analysis in (46a), which shares the c-structure of (46b), formed with the free conjunction *et* ‘and’:

(44) *virumque* ← CONJ N

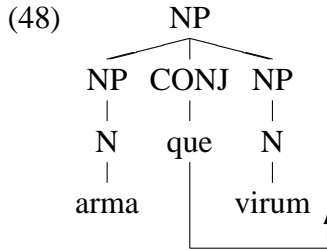
- (45) arma virum**que**
arms man-and
 ‘arms and the man’



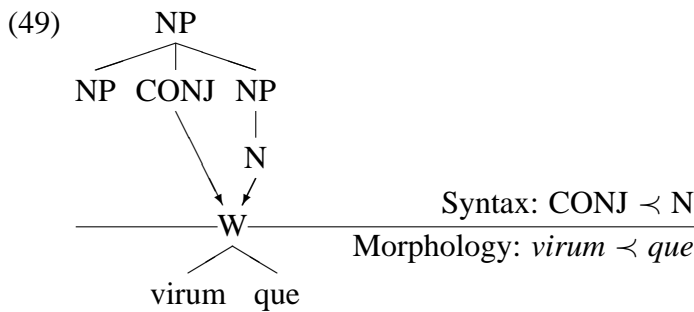
The lexical-sharing analysis of *-que* compares favorably with other approaches. Using the multi-tiered model of Autolexical Syntax, Sadock (1991:63–64) proposes a structure in which the association lines between the syntactic tier and the morphological tier are crossed, as in (47).



In order to capture the fact that *-que* is in ‘second’ position and not third, fourth, etc., Sadock proposes a theory of morphosyntactic mismatches in order to limit the degree of crossover between tiers. Halpern (1995) suggests including a procedure called *Prosodic Inversion* in the mapping from the syntax to prosodic structure; this would move the clitic to the opposite side of its host:



However, to ensure that the clitic is in ‘second’ position, Halpern stipulates that *Prosodic Inversion* allows movement over just one phonological word (1995:63). Whereas the foregoing theories require special measures to prevent *-que* from being placed too far to the right, the same effect follows without stipulation from the lexical-sharing analysis. The only word in the final conjunct that is able to act as host for *-que* is the leftmost one; this allows CONJ and the atomic constituent to its immediate right to share the word bearing *-que* as their lexical exponent, and if this state of affairs does not obtain, a violation of homomorphic lexical integrity will result. Recall that the correspondence mapping λ relates atomic constituents to unanalyzed words; thus, the role of the syntax in situating *-que* is strictly limited to placing it somewhere inside of the first word of the conjunct. Beyond that, the position of *-que* within the word is independently determined by the morphology; since *-que* is a suffix, it will occur at the word’s right edge. This distribution of labor between the syntax and the semantics is schematized in (49):



In this manner, *-que* winds up at the right edge of the first word of the final conjunct, and this accounts for the perception that *-que* is in ‘second-word’ position. Thus, lexical sharing acquits itself rather well in the analysis of so-called second-word clitics.

Elsewhere I offer some suggestions about how lexical sharing might fit into a more comprehensive theory of clitics (Wescoat 2002:57–64). Essentially, exploiting the sort of capabilities illustrated in the discussion of Latin *-que*, I propose lexical sharing as a candidate to take over the role played by *Prosodic Inversion* within the overarching theory devised by Halpern (1995).

8 Conclusion

In sum, lexical sharing affords an analysis that successfully captures the characteristics of restrictive nonsyllabic auxiliary contractions as lexical clitics. Moreover, it shows promise for explaining other cliticization phenomena, such as the pseudo-movement of ‘second-word’ clitics. I hasten to

point out, however, that lexical sharing is not limited in its application to the analysis of clitics. For instance, in addition to the topics mentioned in the foregoing discussion, I have employed lexical sharing in the treatment of English pronominal determiners (e.g. *These are good*), Romance preposition+determiner compounds (e.g. French *au*), and Hindi noun incorporation (Wescoat 2002). Lexical sharing has also been applied to Korean copular constructions by Kim et al. (2004) and by Kim and Sells (2005). Lexical sharing affords analyses of these phenomena in a tractable and straightforward formalism. For a grammar composed of phrase-structure rules and lexical-instantiation rules of the sort outlined here, the problem of recognizing whether or not a string is generated by the grammar may be solved in time proportional to the cube of the string's length (Wescoat 2002). This compares quite favorably with many of the mechanisms employed in modern theories of grammar, so by the objective measure of computability, lexical sharing is a relatively simple grammatical tool. Moreover, lexical sharing integrates nicely with LFG, in a manner that allows one to express the functional constraints at work in restrictive nonsyllabic auxiliary contractions without sacrificing the clarity of the rule formalism. The availability of such simple analyses suggests that lexical sharing may prove to be a useful component in the LFG explanation of cliticization.

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