What's a Morpheme? The relationshop of the Dravidian Zero Negative and Typological Universals to a Cross-linguistic Implemented Grammar Engineering System*

Joshua Crowgey

Department of Linguistics, University of Washington
jcrowgey@u.washington.edu

Summary. In this poster, I draw attention to a putative typological universal, the "morphemic" realization of negation and a potential counterexample found in Old Kannada. I explore the relationship by casting the problem within the ontology provided by an implementation of the construction in a grammar from the LinGO Grammar Matrix.

Keywords: negation, typology, lexical rules, Grammar Matrix, morphology

1 Introduction

This paper discusses the notion of morphosyntactic primitives and their relation to surface syntax. I seek to reconcile Dryer's (2005) claim about the expression of sentential negation with the HPSG model of non-inflecting lexical rules.

Quoting Dryer directly:

> All of the ways of indicating negation involve negative morphemes. This contrasts, for example, with a variety of ways of signalling a polar question (Map 116A) that do not involve interrogative morphemes, such as changes in word order, intonation, and the complete absence of any signal that a sentence is a question. There are no known instances of languages in which negation is realized by a change in word order or by intonation, and all languages have negative morphemes.

But what counts as a negative morpheme? Dryer clarifies that word-ordering differences and intonational melodies do not. When Dryer claims that all the ways of indicating negation involve negative morphemes, do non-inflecting lexical rules count as morphemes? One curious phenomenon from South and Central Dravidian languages suggests that Dryer must allow such an abstract notion of a negative morpheme if his claim is to hold.

In certain older Dravidian languages, sentential negation is marked by the absence of the tense marker otherwise required on a finite verb (Master, 1946), as shown in (1) from Old Kannada (Miestamo, 2010). Finite negative verbs are underspecified with respect to tense. The tense markers are in complementary distribution with a negative marker, which is phonologically null. It is the absence of tense marking on a finite verb which indicates that negation is present.

(1) a. no:ḍ-uv-em
see-FUT-1SG
I will see.

b. no:ḍ-id-em
see-PST-1SG
I saw.

c. no:ḍ-∅-em
see-NEG-1SG
I do/did/will not see.

* Thanks to my advisor, Emily M. Bender, for pointing me to the fascinating study at the confluence of Formal Grammar, Linguistic Typology, and Implemented Syntax.

HPSG 2012 Conference/Ellipsis Workshop, July 18-21, 2012, Chungnam National University, Daejeon, Korea

Interestingly, Master (ibid.) suggests that an intonational marking of negation was indeed the case for Proto-Dravidian, ostensibly *contra* Dryer. He supports his claim by referring to (i) the use of interrogatives as "nominal negatives" (in the sense of Jespersen, 1924) and (ii) what he calls intonational marking of negatives in Myene [mye] (Wilson, 1847). In fact, as Pedersen (1993) points out, in discussing the Myene data, Master and Wilson are confounding grammatical tones with intonation (cf. Ladd, 2008). How do tonal morphemes fit into Dryer's claim about negation? The matter is revisited below.[1]

2 Non-inflecting lexical rules

Here, I take the framework of Copestake (2002) and the type hierarchy of the LinGO Grammar Matrix project (Bender, Flickinger, & Oepen, 2002; Bender et al., 2010) and present a representation of the Dravidian Negative data shown above. The system readily accommodates the construction in a rather mundane fashion. After, I reflect on what this tells us about Dryer's claim about negation.

A standard assumption in HPSG is the Lexical Integrity Hypothesis (Bresnan & Mchombo, 1995), that word-formation rules are distinct (and potentially of a different complexity class) than those which put words together into phrases. The problem of defining restrictions on morpheme co-occurrence in word-formation is called morphotactics. The current approach to morphotactics in the Grammar Matrix is described in Goodman & Bender (2010) (henceforth G & B).

There are two important aspects of the G & B approach to morphotactics that must be reviewed here. The first is the notion of the requires relation, which can hold between lexical rules. The second is the notion of zero-derivation.

G & B use the feature INFLECTED and the *luk* hierarchy to allow a lexical rule to require the presence of another. This sort of relationship is useful, for example, in modelling simple grammatical relations with multiple exponence in a single word. A straightforward example where this sort of relationship is necessary is in the modelling of the negation circumfix of Spoken Egyptian Arabic [arz] (Lucas & Lash, 2008) (2).

(2) ma-bəḥibb-^{i}š migiyy-u hina ktīr
NEG-like.IMPF.1SG-NEG coming-his here much
I don't like his coming here a lot. [arz]

The prefixal element *ma-* can be defined to take a verb as input (or daughter, in the Copestake (ibid.) framework) and to carry negative force. Via a requires relation, this lexical rule will also force the suffix lexical rule to occur. The result is two lexical rules which must co-occur and which contribute a single semantic relation.

G & B must also allow for zero affixation; a lexical rule which fills a position class may not contribute any phonological material. This is a straightforward way to model many inflectional paradigms.[2] A ready example showing the necessity of zero-affixes is given by certain irregular English [eng] plural forms, which stand in complementary distribution with the more productive *-s* plurals. (3).

(3)

singular	plural
cat	cats
	*cat
sheep	*sheeps
	sheep

G & B allow such restrictions by grouping lexical rules into position classes—lexical rules which are in the same position class cannot co-occur. Lexical rules, however, do not have to alter the phonological shape of their input. The standard HPSG approach to many erstwhile syntactic transformations[3] is to handle them as lexical generalizations, or non-inflecting lexical rules.

At this point, it is straightforward to create a representation of the Dravidian Zero Negative as a non-inflecting lexical rule which occurs in the same position class as the tense morphemes (4).

(4) a.
$$\begin{bmatrix} \textit{tense-and-neg-pc} & \\ \text{INFLECTED} & + \\ \text{DTR}|\text{INFLECTED} & \textit{na-or–} \end{bmatrix}$$

[1] It should be said that Master's explanation is not universally accepted. The alternative hypothesis is that Proto-Dravidian had the marker **-ā* as a suffix of negation. For more about the debate around the (pre-)history of this construction, see Pilot-Raichoor, 2010.

[2] The tradition of zero-affixation rules in linguistics stretches back as far as Pāṇini (cf. Diller, 1996).

[3] Valence and ARG-ST modifying operations, such as NP-dative shift, for example, cf Sag, Wasow, & Bender, 2003.

b. $\begin{bmatrix} \textit{neg-lex-rule} & \\ \text{ORTH} & \langle\rangle \\ \text{SEM} & \textit{neg}(\boxed{1}) \\ \text{DTR}|\text{SEM} & \boxed{1} \end{bmatrix}$

Given this representation, we return to the question of morphosyntactic primitives and how they relate to Dryer's claim about negation.

3 Discussion

We have seen that zero-affixation is common and accepted in linguistic tradition. This is the notion that a morphosyntactic primitive may not have any (positive) phonological exponence. I add "positive" here because representation of empty affixes in the implemented framework of G & B do indeed have phonological observable counterparts—they stand in complementary distribution with phonologically contentful affixes. Are these non-inflecting lexical rules "negative morphemes" in the sense of Dryer's claim?

In implemented systems like that of the Grammar Matrix (with G & B morphotactics), phonologically null affixes are not ontologically distinct from lexical rules which model other grammatical relations. Both are modelled as non-inflecting lexical rules. However, while we can point out that a subset of non-inflecting lexical rules (NP dative shift, et al.) are not traditionally associated with word formation and morphemes, we do not have any natural class distinction in our framework for dividing between these and the non-inflecting lexical rules which are associated with word-formation (and therefore perhaps more comfortably associated with the idea of "morphemic attachment").

Dryer's claim is that word-ordering and intonational melodies never mark sentential negation. By this claim, Dryer seems to suggest a partition of grammatical functions into those which can be marked by word-ordering and those which cannot. We have seen, however, that negation *is* marked by zero-affixation in the Dravidian construction under study here. Because zero-affixation is modelled as the same sort of process that changes word order patterns in HPSG, we are left with the question of whether the Dravidian zero negative presents a counterexample to Dryer's claim. The answer seems to reside in what counts as a morpheme. Does the NP dative shift rule add a phonologically null morpheme to the verb?

I do not come down on either side of this question presently, but merely point out that if Dryer includes phonologically empty morphemes in his claim that negation is always marked by a morpheme, then we must ask why we cannot expect negation via word-order or intonation. On the other hand, if a zero-affix is not a morpheme then the Dravidian negative (and its stability over 1000 years, cf. Pilot-Raichoor, 2010) does indeed present a counter example to Dryer.

References

Bender, E. M., Drellishak, S., Fokkens, A., Goodman, M. W., Mills, D. P., Poulson, L., & Saleem, S. (2010, July). Grammar prototyping and testing with the LinGO Grammar Matrix customization system. In *Proceedings of the acl 2010 system demonstrations* (pp. 1–6). Uppsala, Sweden: Association for Computational Linguistics. Retrieved from `http://www.aclweb.org/anthology/P10-4001`

Bender, E. M., Flickinger, D., & Oepen, S. (2002). The grammar matrix: An open-source starter-kit for the rapid development of cross-linguistically consistent broad-coverage precision grammars. In J. Carroll, N. Oostdijk, & R. Sutcliffe (Eds.), *Proceedings of the workshop on grammar engineering and evaluation at the 19th international conference on computational linguistics* (pp. 8–14). Taipei, Taiwan.

Bresnan, J., & Mchombo, S. (1995). The lexical integrity principle: Evidence from Bantu. *Natural Language & Linguistic Theory*, *13*(2), 181–254.

Copestake, A. (2002). *Implementing Typed Feature Structure Grammars. 2002*. CSLI Publications.

Diller, A. (1996, January). Linguistic zero in asia: from /panini/ to pro-drop. In *The fourth international symposium on language and linguistics* (p. 242-258). Thailand: Institute of Language and Culture for Rural Development, Mahidol University. Retrieved from `http://purl.org/sealang/diller1996linguistic.pdf`

Dryer, M. S. (2005). Negative morphemes. *The World Atlas of Language Structures*, 454–457.

Goodman, M., & Bender, E. (2010). *What's in a Word? Refining the Morphotactic Infrastructure in the Lingo Grammar Matrix Customization System.* (Presented at the Workshop on Morphology and Formal Grammar, Paris)

Jespersen, O. (1924). *The Philosophy of Grammar*. London: Allen and Unwin.

Ladd, D. (2008). *Intonational phonology* (Vol. 119). Cambridge Univ Pr.

Lucas, C., & Lash, E. (2008). Contact as catalyst: the case for coptic influence in the development of arabic negation. *Manuscript Cambridge University*.

Master, A. (1946). The zero negative in dravidian. *Transactions of the Philological Society*, *45*(1), 137–155.

Miestamo, M. (2010). Negatives without negators. *Rethinking Universals: How Rarities Affect Linguistic Theory*, *45*, 169.

Pederson, E. (1993). Zero Negation in South Dravidian. In *Cls 27, papers from the 27th regional meeting of the chicago linguistics society 1991. part two: Parasession on negation.*

Pilot-Raichoor, C. (2010). *The dravidian zero negative: Diachronic context of its morphogenesis and conceptualisation.* Berlin/New York: Mouton de Gruyter.

Sag, I., Wasow, T., & Bender, E. (2003). *Syntactic theory: A formal introduction*. Citeseer.

Wilson, J. (1847). *A grammar of the Mpongwe language: with vocabularies*. Snowden & Prall, printers.