Implementing a Syntax-Morphology Interface for Athabaskan

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Overview

- *Introduction/goals*
- *Terminological distinctions*
- *Reject two possible interfaces*
- *Proposed interface design: run-time and development*
- *Conclusions*

... Illustrated with examples from Slave (Rice 1989)

Introduction: Montage

- *Suite of tools to assist in the documentation of underdescribed languages* (Bender et al 2004)
- *Focus on grammar (especially morphology and morphosyntax)*
- *Integrate with other initiatives building tools for transcribed texts and lexicons (e.g., ELAN, FIELD, AGTK)*

Some terminology

- *Morphophonology:*
  - *Morphotactics (e.g., position classes)*
  - *Morph.-conditioned phonological rules*
  - *General phonological rules*
  - *Mapping to abstract morphemes*
- *Morphosyntax:*
  - *Syntactic-semantic representations built from analysis of strings of abstract morphemes*

Introduction: Montage

- *Overarching goal: Allow the "ordinary working linguist" to make use of sophisticated grammar engineering tools without being grammar engineers themselves*
- *This talk: the Montage model for morphological analysis, and the morphology-syntax interface*

Possible interfaces

- *Morphophonology in morphosyntax*
- *Morphosyntax in morphophonology*
- *Independent morphophonology and morphosyntax*

Morphophonology in Morphosyntax

- *Morphosyntactic rules associated with morphophonological effects*
- *Standard in HPSG, perhaps most thoroughly worked out in Orgun 1996*
- *Assumed in current version of the LKB (Copestake 2002)*

Morphosyntax in Morphophonology

- *Interpret abstract morphemes as actual feature bundles*
- *Output of morphophonology is a lexical edge which can be used directly by the morphosyntactic parser*
- *Doesn't generalize to morphosyntactically complicated cases*

Morphophonology in Morphosyntax

- *Hard to reuse morphophonological work in morphosyntax*
- *Hard to push all morphophonology into one efficient machine*
- *Particularly awkward for strictly phonological effects*

Slave Morphological Causatives

hedenétį	hedné**h**tį
's/he fell asleep'	*'s/he put him/her to sleep'*

(Rice 1989:454)

- Syntactically and semantically, the causative form cannot be produced merely by adding features to the intransitive form.

Epenthesis in Slave

- *An epenthetic "peg element" is inserted before verb stems if they would not otherwise be preceded by some syllable in their word (Rice 1989:133)*
- **he**hjį *'I sing' vs.* nejį *'you sing'*

Theoretical conclusion

- *A computational system should allow morphophonology and morphosyntax to be modeled as independent, articulated systems*
- *The point of interface is the abstract morpheme*

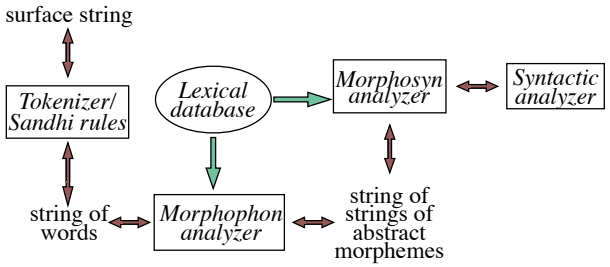
Independent Morphophonology and Morphosyntax

- *Morphophonology: maps surface forms to strings of abstract morphemes*
- *Morphosyntax: maps strings of abstract morphemes to syntactic/semantic information (feature structures)*

Development interface

- *Spell each underlying stem only once*
- *Define default morphotactic/syntactic pairings*
- *Allow multiple continuation classes for the same word sense and vice versa*

Runtime Interface

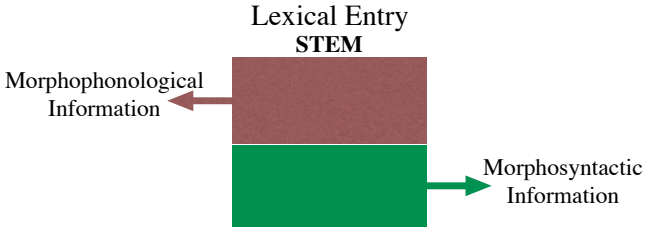


cf. Kaplan et al 2004, Siegel and Bender 2002

Slave Verb Classifiers

- *Verb classes based on the "classifiers" a verb theme contains* (Rice 1989:439–470)
  - *Ø-classifier,* **Ø**-ʔáh *'eat, chew'*
  - *h-classifier,* **h**-t'ó *'suck'*
  - *d-classifier,* **d**-shin *'sing'*
  - *l-classifier,* ná-**l**-séh *'hunt'*

Bipartite lexical database design



Build on Copestake et al 2004, FIELD

One morphosyntactic entry::many morphophonological entries

- *"Each classifier has a basic function, although they must be considered as part of the verb theme since this semantic content is not always clear."* (Rice 1989:453)
- *In some cases, verbs can alternate in their choice of classifier, with no non-morphophonological consequences* (Rice 1989:449–50)

One morphophonological entry::many morphosyntactic entries

- *Homophony within the same morphological class*
- *Multiple valence patterns, not predicted by a productive valence alternation*

Correlated morphophonological and morphosyntactic choices

- tę *'ice' (as a noun),* -tę*'freeze' (as a verb)* *(Rice 1989:161)*
- ká**tę**diįtse *'s/he broke through the ice'(incorporated noun)* *(Rice 1989:653)*
- *These stems will be associated with multiple morphophonological and morphosyntactic classes*
- *Handle correlation explicitly or implicitly*

Conclusions

- *Morphology and syntax are best treated as independent of one another*
- *Point of interface is abstract morphemes*
- *Two interfaces are required: run time and development*
- *Morphologically exuberant languages like Athabaskan are informative*

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ELAN: EUDICO Linguistic Annotator. http://www.mpi.nl/tools/elan.html
FIELD: Field Input Environment for Linguistic Data. http://emeld.org/tools/fieldinput.cfm
Grammar Matrix: Precision Grammar Starter Kit. http://www.delph-in.net/matrix/
LKB: LKB Grammar Development Environment. http://www.delph-in.net/lkb/
QLDB: Querying Linguistic Datbases. http://www.ldc.upenn.edu/Projects/QLDB/
XFST: Xerox Finite State Transducer. http://www.fsmbook.com/

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