The Structure of Potawatomi Hybrid-Class Overabundance

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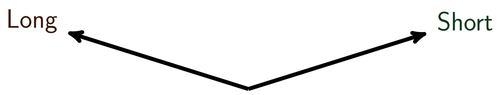
Guzman Naranjo and Bonami (2016) point out that one form that overabundance (Hockett, 1947; Thornton, 2011) can take is *hybrid-class overabundance*, where a lexeme belongs to a class that exhibits the union of the behaviors of two or more other classes. They suggest using multiple inheritance systems to model this. Yet, multiple-inheritance (Flickinger, Pollard, and Wasow, 1985; Evans and Gazdar, 1996), as used in a variety of morphological theories (Brown and Hippisley, 2012), can cause conflicts. Some theories have creative conflict mitigation strategies, hypothetically allowing them to model hybrid classes (Crysmann and Bonami, 2012) but similar issues remain with the data structure-centric approach. I show how a non-inheritance based relational approach using logical proofs (Lambek, 1997; McConville, 2006) can elegantly handle a complex system of overabundance in Potawatomi. The benefit of this system is better empirical coverage using a well-defined formalism.

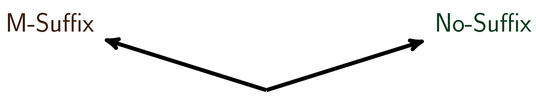
Hybrid Noun Classes in Potawatomi

A prefix indicating person in possession can take two forms (Hockett, 1947; Hockett, 1948; Lockwood, 2017).



nbiwabkom ‘my metal’
ndebiwabkom ‘my metal’

A suffix indicating possession is optional for some words.

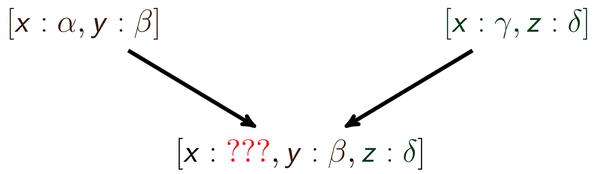


ndekobjegen ‘my string’
ndekobjegnem ‘my string’

There are non-overabundant classes that combine Long, Short, M-Suffix and No-Suffix attributes.

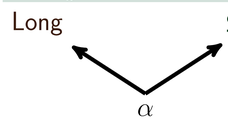
Multiple Inheritance

Orthogonal multiple inheritance systems are not designed for such data.



Classes without Inheritance

Designations for classes are ordered.



$\vdash \alpha \leq \textsf{Long}$
$\vdash \alpha \leq \textsf{Short}$

Lexemes are related to class designations using the function c.

$$\vdash c\,(\textsc{biwabekw}) = \alpha$$

Logical rules of inference allow one to prove the validity of forms for a class.

$$\frac{\langle stem, \textsc{lexeme}\rangle \quad c(\textsc{lexeme}) \leq \textsf{Short}}{\langle \textsf{n}stem, \textsc{lexeme}\rangle}\, n$$

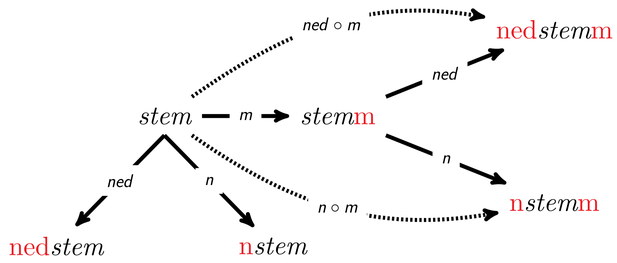
$$\frac{\langle stem, \textsc{lexeme}\rangle \quad c(\textsc{lexeme}) \leq \textsf{Long}}{\langle \textsf{ned}stem, \textsc{lexeme}\rangle}\, ned$$

Only one rule is needed for suffixes.

$$\frac{\langle stem, \textsc{lexeme}\rangle \quad c(\textsc{lexeme}) \leq \textsf{M-Suffix}}{\langle stem\textsf{m}, \textsc{lexeme}\rangle}\, m$$

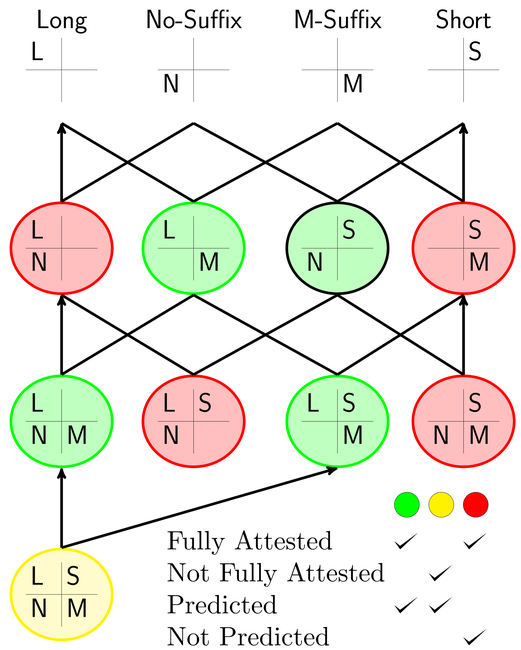
Paradigmatic Structure Space

Rules of inference describe the structure of the paradigm.



Hybrid-Classes

The possible class space for this Potawatomi fragment.



The black outlined class corresponds to bound, *inalienably possessed* stems.

Paradigm Structure Simplified

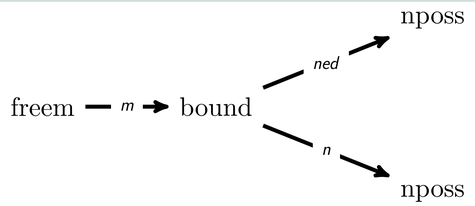
Three stem categories are delineated by class membership.

free	Occurs *with and without* m-suffix.
freem	Occurs *with* m-suffix.
bound	Occurs *without* m-suffix.

An order is defined over these categories.

$$\vdash \textsf{free} \leq \textsf{bound}$$
$$\vdash \textsf{free} \leq \textsf{freem}$$

One may think of this as similar to how numbered position classes are ordered $1 \leq 2 \leq 3$.



The category **nposs** is the category of a form with the correct combinations of suffixes and prefixes.

Proving Form Validity

Initial categorized stems are triples of category, a phonological string and a lexeme.

⟨bound, *os*, OS⟩ ‘father’
⟨free, *mowech*, MOWEJ⟩ ‘feces’

The rules are elaborated in comparison to those previously stated.

$$\frac{\langle mc, s, l\rangle \quad mc \leq \textsf{freem} \quad c(l) \leq \textsf{M-Suffix}}{\langle \textsf{bound}, s\textsf{m}, l\rangle}\, m'$$

$$\frac{\langle mc, s, l\rangle \quad mc \leq \textsf{bound} \quad c(l) \leq \textsf{Long}}{\langle \textsf{nposs}, \textsf{ned}s, l\rangle}\, ned'$$

$$\frac{\langle mc, s, l\rangle \quad mc \leq \textsf{bound} \quad c(l) \leq \textsf{Short}}{\langle \textsf{nposs}, \textsf{n}s, l\rangle}\, n'$$

The inference rule for m' will allow us to prove the validity of the suffixed form for MOWEJ but not OS.

$$\frac{\textsf{free} \leq \textsf{freem} \quad c(\textsc{mowej}) \leq \textsf{M-Suffix}}{\langle \textsf{bound}, \textsf{mowjem}, \textsc{mowej}\rangle^{[1]}}\, m'$$

Using this result, labeled [1], the proof is continued.

$$\frac{[1] \quad \textsf{bound} \leq \textsf{bound} \quad c(\textsc{mowej}) \leq \textsf{Long}}{\langle \textsf{nposs}, \textsf{ndemowjem}, \textsc{mowej}\rangle}\, ned'$$

Given that MOWEJ is categorized as **free** and $c(\textsc{mowej}) \leq \textsf{Short}$ we can also prove the following:

$$\frac{\textsf{free} \leq \textsf{bound} \quad c(\textsc{mowej}) \leq \textsf{Short}}{\langle \textsf{nposs}, \textsf{n}\textsc{mowech}, \textsc{mowej}\rangle}\, n'$$

Deriving Inalienable Possession

The class of ENESHENABÉ, is such that only a suffixed form with a long prefix occurs.

⟨freem, *neshnabé*, ENESHENABÉ⟩ ‘person’

Inalienably possessed stems can be derived from other nouns using *ij-*, ‘fellow’.

$$\frac{\langle mc, s, l\rangle \quad mc \leq \textsf{freem} \quad c(l) \leq \textsf{M-Suffix}}{\langle \textsf{bound}, \textsf{ij}s, ij(l)\rangle}\, ij$$

The function $ij(\textsc{lexeme})$ alters the identity of the lexeme such that:

$$\vdash c(ij(\textsc{lexeme})) \leq \textsf{Short}$$
$$\vdash c(ij(\textsc{lexeme})) \leq \textsf{No-Suffix}$$

Here is a proof of the derived form of ENESHENABÉ.

$$\frac{\textsf{freem} \leq \textsf{freem} \quad c(\textsc{eneshenabé}) \leq \textsf{M-Suffix}}{\langle \textsf{bound}, \textsf{ij}\textsc{neshnabé}, ij(\textsc{eneshenabé})\rangle}\, ij$$

It is no longer possible to prove a form for such a derived stem that takes an m-suffix and long prefix.

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