Abstract

The indigenous languages of North America have played a critical role in discussions of the universality of part-of-speech distinctions. In this paper, we show that Oneida does not include a *grammatical* distinction between nouns and verbs. Rather, Oneida inflecting lexical items are subject to two cross-cutting semantic classifications, one that concerns the sort of entities they describe, the other the sort of semantic relation they include in their content. Labels such as *noun* and *verb* can still be used for cross-linguistic comparison, as the semantic partition of lexical items corresponds to canonical nouns and verbs according to morphologists and some typologists. But the meta-grammatical status of these labels is quite distinct from the status of corresponding labels in Indo-European languages like English.

One of the goals of linguistics is to determine how similar or different languages of the world are. Broadly speaking, one can approach questions about universality versus diversity using two different strategies. The first strategy makes use of an *a priori* guideline. One version of this approach, let's call it *Methodological Universalism*, assumes that if one language has a feature, all languages have that feature, at least as the default hypothesis. This is the tack taken by, for example, Cinque & Rizzi (2008). The other strategy takes a more empirical approach to the issue and holds that positing a feature in a language cannot be based on the presence of that feature in other languages. We dub such an approach *Methodological Minimalism*. Features of an unfamiliar language, in this second approach, must be argued on the basis of positive evidence drawn from that language. This tack is typical of typological approaches to language description (see Haspelmath 2007 and the conclusions of Evans & Levinson 2009, among others). It is also the tack assumed in some work within HPSG, at least implicitly (see the CoreGram project and Müller 2015) and this is the approach we take in this paper. The particular issue we focus on is whether there is evidence for the inclusion of part-of-speech information in lexical entries of all languages. Part-of-speech information is, typically, justified by constraints on co-occurrence, either syntactic or morphological. For example, certain verbs must co-occur with PPs. Similarly, nouns may co-occur with different inflectional suffixes than verbs. There have been several attempts over the years to reduce such co-occurrences to semantic properties of the combining expressions (see, e.g., Langacker 1987), but such attempts have not proved convincing to most linguists, partly because the semantic distinctions involved are very subtle and not agreed upon by the majority of semanticists. As a result, most syntacticians would agree with Pollard & Sag (1987) that encoding the part of speech of the head of a verb's complements is necessary (see van Eynde to appear for an overview of treatments of parts of speech in HPSG and Chaves 2013 for a semantic analysis of English parts of speech within Sign-Based Construction Grammar that focuses on coordination and predicative structures).

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In previous work (Koenig & Michelson, 2014), we have argued that Oneida (Northern Iroquoian) contrasts with English and most languages in not providing evidence for *syntactic* part-of-speech information. Summarizing our argument, there is no evidence for syntactic selection or syntactic constraints on binding in Oneida; nor is there evidence for argument structure alternations. Consequently, there is no need to include either an ARG-ST or a VALENCE feature. And with the absence of these features the motivation for a HEAD feature disappears. In fact, we argue that the feature SYN is entirely unmotivated in Oneida and, in agreement with Methodological Minimalism, we suggest it is not part of the information included in signs.

The absence of *syntactic* part-of-speech information does not necessarily entail the total absence of part-of-speech information, though. Evans (2000b) shows that the syntax and morphology of a single language can include distinct parts of speech; the absence of syntactic part-of-speech information in Oneida does not mean there is no evidence for morphological parts of speech. Such a possibility is particularly pertinent for Oneida, since it is a polysynthetic language with a very rich inflectional system. In this paper, we argue that the grammar of Oneida does not include *morphological* part-of-speech distinctions either and that such information should be left out of lexical entries. We furthermore argue that Oneida inflectional constraints are sensitive to two orthogonal semantic classifications of lexical entries; simplifying somewhat, one pertains to the sort of individual described by the entry (which we model as distinct sorts of INDEX values), the other the sort of semantic relation used to describe those individuals (which we model as distinct sorts of KEY values; see Koenig & Davis 2006 for the use of the KEY attribute for argument structure and Koenig & Michelson to appear for its use in inflection).

1 Grammatical and meta-grammatical parts of speech

The indigenous languages of North America have played a critical role in discussions of typological questions, particularly questions pertaining to the universality of part-of-speech distinctions. Boas (1911, 441), when discussing Kwakiutl, a Wakashan language, states that "all stems seem to be neutral, neither noun nor verb". More recently, Sasse (1993) expresses doubts that Cayuga (a Northern Iroquoian language related to Oneida) distinguishes nouns and verbs (but see Sasse 2001 for a more nuanced view and Mithun 2000 for the opposite view). More recently, Chafe (2012) argues that Seneca (another Northern Iroquoian related to Oneida) does not include a class of adjectives, contra Baker's (2003) claim that Mohawk, again Northern Iroquoian, includes, like all languages according to Baker, a class of adjectives (see Michelson to appear for an overview of the issues surrounding parts of speech in Iroquoian).

Our claim that the grammar of Oneida has neither syntactic nor morphological parts of speech seems, at first glance, at odds with Mithun (2000), who argues for a noun/verb distinction in Iroquoian. It is not. This is because scholars do not distinguish between two uses of part-of-speech labels, grammatical uses and meta-

grammatical uses. Because scholars can use labels such as *noun* and *verb* in such radically different ways— compare the uses of the distinction between nouns and verbs in work as distinct as Cinque & Rizzi (2008), Croft (2001), and Dixon (2009)— comparison between languages is difficult and confusion likely. Grammatical part-of-speech labels are referenced in constraints that are part of a language's grammar. (1) provides two very informal sketches of constraints that reference nouns and verbs, respectively. The first constraint informally says that if the part of speech (of a lexical item) is *noun*, then certain argument structure properties are true of that lexical item; the second constraint informally says that if the part of speech is *verb*, certain inflectional properties are true of that lexical item. Both kinds of constraints justify distinguishing in the grammar of the language the HEAD values *noun* and *verb*, as the distinct labels help properly restrict their domain of application.

(1) Examples of *grammatical* POS constraints:
$[\ldots\textsc{head}\ \textit{noun}] \Rightarrow [\ldots\textsc{arg-st}\ \ldots]$
$[\ldots\textsc{head}\ \textit{verb}] \Rightarrow [\ldots\textsc{infl}\ \ldots]$

(2) illustrates a meta-grammatical use of part-of-speech labels. The first conjunct says that if a lexical item has a particular semantic content, its HEAD value is *verb*. The second says that a lexical item whose HEAD value is *verb* has such and such inflectional properties. Given the transitivity of the material conditional, the conjunction of constraints in (2) entails the constraint in (3) and the HEAD value of the lexical item can therefore be dispensed with. Nothing is gained by adding a part-of-speech label in the consequent of the first conjunct: it is an extraneous piece of information.

(2) *Meta-grammatical* morphological POS constraints:
$\left([\ldots\textsc{cont}\ \ldots] \Rightarrow [\ldots\textsc{head}\ \textit{verb}]\right) \wedge \left([\ldots\textsc{head}\ \textit{verb}] \Rightarrow [\ldots\textsc{infl}\ \ldots]\right)$

(3) $[\ldots\textsc{cont}\ \ldots] \Rightarrow [\textsc{infl}\ \ldots]$

Using the labels *noun* and *verb* can still be useful even if those labels are not part of any grammatical constraint, as long as it is understood that they are used as meta-grammatical labels employed for cross-linguistic comparison and that one makes clear that the grammatical categories these labels denote might have a different status in different languages. They are semantic categories in a language where they are referenced by constraints of the kind represented in (3); they are formal categories in a language where they are referenced by constraints of the kind represented in (1). To avoid confusion, we will use Quine's quasi-quotation symbols ⌜ and ⌝ (Quine, 1981, 35), e.g. ⌜noun⌝ and ⌜verb⌝, to refer to meta-grammatical labels. Our notion of meta-grammatical labels bears similarity to the notion of comparative concepts advocated by a number of typologists (Dryer 1997, Croft 2001, and Haspelmath 2010). But, our meta-grammatical labels are still labels for a language's categories, which is not true of comparative concepts. For example, Croft's *noun* and *verb* prototypes (Croft, 2001, 88–89) are not categories in any language's grammar (in fact, they are not categories in any clear sense of the term). Since what morphologists and syntacticians are often interested in is a comparison of certain grammatical

categories across languages (see Corbett 2008, 136–137 on how to establish correspondences between categories across grammars of distinct languages), it is useful to have identical meta-grammatical labels that cover these categories whatever their status (semantic or formal).

The main claim of our paper, then, is that putative part-of-speech labels in Oneida function like the *verb* label in (2). The labels can be dispensed with in the grammar of the language and be treated as meta-grammatical labels (i.e. as ⌜verb⌝ and ⌜noun⌝). We furthermore argue that two kinds of semantic properties are relevant for Oneida morphology: properties of indices (what kind of entity is described) and properties of the semantic relation that describes that entity, as shown informally in (4) and (5).

(4) [CONT [IND ...]]⇒ [INFL ...]

(5) [CONT [KEY ...]]⇒ [INFL ...]

2 Nouns and verbs in Iroquoian linguistics

It is traditional in Iroquoian linguistics to distinguish between particles (morphologically inactive lexical items) and inflecting nouns and verbs, which we will refer to, following the previous discussion, as ⌜noun⌝ and ⌜verb⌝. ⌜Nouns⌝ and ⌜verbs⌝ are lexical items that fit the templates in Table 1. The particulars of these two templates are not critical to our discussion (see Koenig & Michelson 2020 for arguments that support the layering of inflection implicit in both templates).

Word		
	Stem	
$Pro_{N/POSS}$	N_{Base}	NOUN-SUFFIX

Word			
		Stem	
(Prepro)	Pro_{V}	V_{Base}	ASPECT

Table 1: The layered inflection of Oneida ⌜nouns⌝ and ⌜verbs⌝

Importantly, for the discussion to follow, ⌜nouns⌝ take noun suffixes and particular sets of pronominal prefixes (labeled N and POSS in Table 1) and ⌜verbs⌝ take aspect suffixes, another set of pronominal prefixes (labeled V in Table 1) and, optionally, prepronominal prefixes (see Diaz et al. 2019 for a thorough description and analysis of Oneida prepronominal prefixes). The text in (6) illustrates these traditional parts of speech. Words in normal font in the partially segmented Oneida text are particles; those in bold are ⌜verbs⌝; those in italics are ⌜nouns⌝; finally, those in bold italics are kinship terms, a category we return to in Section 5.

(6) *né· kati? wí· thikʌ́ wʌ́hnisla·té·* *tshahyahtʌ·tí·*
né· kati? wí· thikʌ́ **w-ʌhnisl-ate-ʔ** **tsh-a-hy-ahtʌti-ʔ**
well then it's that 3Z/N.SG.A-day-exist-STV COIN-FACT-3M.DU.A-leave-PNC
aknulhá· *khále? lake?níha* *né· kwí· thikʌ́*
ak-nulhá· khále? ***lake-ʔniha*** né· kwí· thikʌ́
3FZ.SG>1SG-mother and 3M.SG>1SG-father so it's that

*yoʔkalásh*ʌ *kwí·* *ʌtsyakwatekhwu·ní·*
yo-aʔkalashʌ kwí· **ʌ-ts-yakw-ate-khw-uni-ʔ**
3Z/N.SG.P-evening[STV] FUT-REP-1EX.PL.A-SRF-food-make-PNC
osahé·taʔ kwí· *waʔknínaʔtsyiha·lʌ́·* *né· kwí·*
o-sheʔt-aʔ kwí· **waʔ-kni-naʔtsy-ihal-ʌʔ** né· kwí·
NPF-bean-NSF FACT-3FZ.DU.A-kettle-hang-PNC so it's
ʌtsyákwa-k-eʔ *n*ʌ *ʌtsyakwatekhu·ní·*
ʌ-ts-yakwa-k-eʔ nʌ **ʌ-ts-yakw-ate-khw-uni-ʔ**
FUT-REP-1EX.PL.A-eat-PNC when FUT-REP-1EX.PL.A-SRF-food-make-PNC
*yoʔkalásh*ʌ
yo-aʔkalashʌ
3Z/N.SG.P-evening[STV]

'Well anyway that day when my mother and my father went away, for our supper, the two of them boiled beans, that's what we would eat when we have our supper.' (Norma Kennedy, Worms in the Soup, recorded 2009)

For reasons of space, most of our discussion of Oneida inflection will focus on pronominal prefixes. We summarize here the distinctions of particular relevance to our discussion. All morphologically active lexical items in Oneida—lexical items that participate in derivational or inflectional morphological processes—i.e. ⌜nouns⌝ and ⌜verbs⌝, have a pronominal prefix. Pronominal prefixes reference up to two animate arguments; a default third singular feminine-zoic prefix is used when there is no animate argument (see Koenig & Michelson 2015b for details about pronominal prefixes in Oneida). There are three main paradigm classes of pronominal prefixes. The first class consist of portmanteau-like Transitive prefixes that reference two animate semantic arguments. The second and third class are Intransitive prefixes that reference a single animate semantic argument (or no argument at all, if the predicate associated with the meaning of a lexical item does not have animate arguments). The second class consists of Agent Intransitive prefixes; the third class consists of Patient Intransitive prefixes. The terms *Agent* and *Patient* are traditionally used as these two sets of prefixes often reference proto-agent and proto-patient arguments, respectively, in the sense of Dowty (1991). But, as Michelson (1991) shows, this is merely a strong tendency and, ultimately, the paradigm class ⌜nouns⌝ or ⌜verbs⌝ belong to cannot be predicted (with one salient exception we return to in Section 4.4).

3 Determining the ontological sorts of traditional nouns and verbs in Oneida

Our claim in this paper is that morphological part-of-speech distinctions in Oneida reduce to two orthogonal semantic classifications of inflecting lexical items. The traditional templates for ⌜noun⌝ or ⌜verb⌝ mostly pick up on the first semantic dimension of classification, namely what sort of entity is being described. To support this hypothesis, we combed through entries in Michelson & Doxtator (2002) to de-

termine the sort of entities they describe. First, we considered the ontological sorts of the entities described by ⌜verb⌝ entries. Given the number of such entries (2,777) and the fact that determining the ontological sorts of what they describe is rather straightforward, we sampled entries from the dictionary. Then, we determined the ontological sorts of *all* underived ⌜noun⌝ entries and all ⌜noun⌝ entries derived from ⌜verb⌝ entries in Michelson & Doxtator (2002)—approximatively 1,000 entries.

All ⌜verb⌝ entries in our sample describe events and states. Some denote what Maienborn (2005) calls *Kimian states*. Although Kimian states are not first order individuals in the universe of discourse for Maienborn, but rather abstract objects in the sense of Asher (1993), they share with eventualities (events or ordinary states) that they have a temporal dimension; or are time and world bound to use Maienborn's terminology. We will refer to the meaning of ⌜verbs⌝ as *time-conditioned descriptions*. Underived ⌜nouns⌝, on the other hand, describe a much wider variety of sorts of entities; critically, none have a temporal dimension. We will refer to the meanings of (underived) ⌜nouns⌝ as being *non-time-conditioned descriptions*. (7) characterizes informally the kinds of denotations of underived ⌜nouns⌝ together with some examples from Michelson & Doxtator (2002). The non-time-conditioned nature of these ⌜nouns⌝ is rather clear, we believe, except for time intervals, and emotions/traits. We reserve discussion of the latter until our description of derived nouns. As for names of time intervals, although they obviously have something to do with time, their denotation does not hold at a particular time nor is it exemplified at a particular time. It is in this sense that they constitute non-time-conditioned descriptions.

(7) ABSTRACT CONCEPTS *-yanlʌhsl-* 'law', *-kal-* 'value, worth'
ANIMALS *-skanutu-* 'deer', *-itsy-* 'fish'
BODY PARTS *-ʌʔnahs-* 'tongue', *-(w)yahutsh-* 'wing'
CLOTHING *-lisl-* 'pantleg, *-aʔkohs-* 'skirt'
COLOURS *-tsiʔnkwal-* 'yellow', *-luhy-* 'blue'
EMOTIONS OR TRAITS *-atlaʔsw-* 'luck', *-elyʌʔt-* 'intention, purpose'
FOOD *-lan-* corn soup, *-ʔwahlu-/-ʔwahl-* 'meat';
HOUSEHOLD ITEMS *-ks-* 'dish, plate, bowl', *-naʔtsy-* 'pail, pot, kettle'
SOCIAL RELATIONS *-hwatsil-* 'family', *-nahkw-* 'marriage'
NATURAL FORMATIONS *-nyatal-* 'lake', *-naw-* 'swamp'
PLANTS *-hnanaʔt-* 'potato', *-hneht-* 'evergreen, pine'
PEOPLE *-wil-* baby, *Kayʌʔkeha·kà·* 'Mohawk'
TIME INTERVALS *-ʌhnishl-* 'day, weather', *-ohsl-* 'year, winter'
LOCATIONS OF A SOCIAL NATURE *-nat-* 'town, village'
PLAY *-kal-* 'story';
SENSES *-ahuhs-* 'sense of hearing', *-asl-/-sl-* 'odor/smell'
TOOLS *-aʔshal-* 'knife, blade', *-nuwal-* 'needle, pin', *-alhyohkw-* 'sinker, ring, hoop'
WEATHER *-nyʌht-* 'snow', *-atshat-* 'fog, steam'

There are several different processes for deriving ⌜nouns⌝ from ⌜verbs⌝ in Oneida, as discussed in detail in Koenig & Michelson (2020). The two most relevant processes for our purposes are exemplified in (8) and (9).

(8) *yotshe?tʌ́·tuhe?*
yo-tshe?t-ʌ?tu-he?
3z/N.SG.P-jar-suspend-HAB
'pear'

(9) *owistóhsli?*
o-wisto-hsl-i?
3z/N.SG.P-be.cold-NMZR-NSF
'butter'

Most derived ⌜nouns⌝ follow the pattern illustrated in (8): the word is inflected entirely like a ⌜verb⌝, as shown by the fact that *yotshe?tʌ́·tuhe?* fits the template for ⌜verbs⌝ in Table 1, and only then the derivation of the ⌜noun⌝ takes place. But, despite the fact that *yotshe?tʌ́·tuhe?* inflects as is expected of a base that means 'suspend, be suspended', i.e. as is expected of a base that describes a state, its denotation is unexpectedly a fruit, i.e. the meaning of *yotshe?tʌ́·tuhe?* is a non-time-conditioned description. There is thus a mismatch between the sort of entities described by these derived ⌜nouns⌝ and the kind of inflectional prefixes and suffixes they have. Since in many cases there is also a mismatch between the compositional meaning of the word and its lexicalized non-time-conditioned meaning, we analyze these derived ⌜nouns⌝ as the output of a lexical rule (or construction) that maps an inflected ⌜verb⌝ to a morphologically inactive word and effects the requisite semantic shift. Since the bases of the derived ⌜nouns⌝ are inflected verbs whose meanings are of the expected sort and the derived ⌜nouns⌝ are not inflecting lexical items, these derived ⌜nouns⌝ are irrelevant to our claim about the correspondence between morphologically active ⌜nouns⌝ and ⌜verbs⌝ and ontological sorts.

Some derived ⌜nouns⌝ follow the pattern illustrated in (9). In these cases, derivation precedes inflection and there is a match between the ⌜nominal⌝ inflection and the sort of the derived ⌜nouns⌝: *owistóhsli?* is inflected as one would expect of a base that describes a non-time-conditioned entity. The denotation of all these derived ⌜nouns⌝ fit the categories listed in (7). Most of the Oneida nouns that denote emotions or traits are derived ⌜nouns⌝ including the entries in (10). We now turn to those difficult cases; what we say also applies to the corresponding non-derived ⌜nouns⌝s. To maintain that nouns denote non-time-conditioned descriptions in the face of such entries, we need to assume that these derived nouns describe a different sort of entity than their stative verb sources. Thus, we need to follow scholars who have argued that the denotation of nominalized predicates is different from that of the corresponding verbal predicates (Cocchiarella, 1978; Chierchia & Turner, 1988). More specifically, we assume with Francez & Koontz-Garboden (2015) that (derived or underived) ⌜nouns⌝ that denote emotions and traits denote an ordered set of degrees of the emotion or trait. In other words, $[\![happiness_N]\!]$ (i.e. the denotation of the nominalized base *-atsheyalʌhsl-*) is the set of all (ordered) degrees of happiness.

(10) a. *atshanunyáhsla?*
atshanuny-a-hsl-a?

3z/N.SG.A:get.happy-JN-NMZR-NSF
'happiness'

b. *atsheyalʌ́hsla?*
atsheyalʌ-hsl-a?
3z/N.SG.A:be.shy-NMZR-NSF
'shyness'

Given these assumptions, underived and derived ⌜nouns⌝ and ⌜verbs⌝ in Oneida can be said to constitute a strictly canonical association between inflectional class and ontological sorts: ⌜nouns⌝ encode non-time-conditioned descriptions and ⌜verbs⌝ time-conditioned descriptions. More generally, Oneida ⌜nouns⌝ and ⌜verbs⌝ constitute a strictly canonical association between (meta-)grammatical parts of speech and ontological sorts of the kind discussed in Spencer (2005) and Corbett (2012). Now, attempts to reduce part-of-speech labels to semantic distinctions are not new. But, whatever the merits of such analyses, they either rely on subtle and idiosyncratic semantic distinctions (Langacker, 1987) or it is unclear how they capture the similarity in semantic sort of derived event nominals and verbs (Chaves, 2013). What is remarkable about Oneida ⌜noun⌝ and ⌜verb⌝ categories is that they are canonical in a straightforward way and along traditional or relatively standard semantic lines. Interestingly, in our analysis the ontological correlate of ⌜verbs⌝ is more coherent than that of ⌜nouns⌝: ⌜verbs⌝ share a positive property, their denotation has a temporal dimension, whereas ⌜nouns⌝ are defined merely by the absence of that property, an observation that goes back to Aristotle's *On interpretation* ($16^{a}3$). We conjecture that this asymmetry is not specific to Oneida and that ⌜verbs⌝, across languages, are more ontologically coherent than ⌜nouns⌝. Be that as it may, the ontological canonicity of ⌜nouns⌝ and ⌜verbs⌝ entries in traditional Iroquoian linguistics means that these labels are, when applied to Oneida, meta-grammatical labels of classes of inflecting lexical entries that denote distinct sorts of entities.

4 Semantically restricted inflectional constraints

Having established the ontological sorts that are the correlates of the classification of lexical entries into the traditional Iroquoianist ⌜verb⌝ and ⌜noun⌝ categories, we turn to inflectional constraints that target semantically defined classes of entries and our HPSG treatment of those inflectional constraints. We begin with the structure of inflecting lexical entries in Oneida and the different kinds of inflectional constraints that are part of the morphology of Oneida.

4.1 Inflectional constraints in Oneida

(11) provides the basic structure of morphologically active or inflecting lexical items in Oneida.

(11)
$$\begin{bmatrix}
\textsc{phon} & \textit{list}(\textit{phoneme}) & \\
\textsc{cont} & \begin{bmatrix} \textsc{index} & \begin{bmatrix} \textsc{var} & \textit{var} \\ \textsc{phi} & \textit{index} \end{bmatrix} \\ \textsc{relations} & \textit{list}(\textit{rel}) \\ \textsc{key} & \textit{rel} \end{bmatrix} & \\
\textsc{infl} & \begin{bmatrix} \textsc{infl-feat} & \begin{bmatrix} \textsc{pro} & \begin{bmatrix} \textsc{affix-type} & \textit{A/P} \\ \textsc{agr} & \textit{list}(\textit{n-tc-index}) \end{bmatrix} \\ \textsc{npro} & \textit{npro-feat} \end{bmatrix} \\ \textsc{realization} & \begin{bmatrix} \textsc{mph} & \textit{set}(\textit{m-form}) \\ \textsc{ms} & \{\textit{pro}, \textit{stem}\} \cup \textit{set} \\ \textsc{rr} & \textit{realizational-rules} \end{bmatrix} \end{bmatrix} &
\end{bmatrix}$$

Note that there is no SYN attribute, but that the inflectional information (the value of the attribute INFL) is rich. Inflectional information is divided into inflectional feature information (the value of INFL-FEAT) and realizational informationn (the value of REALIZATION). There are two sets of informational features, pronominal feature information (the value of PRO), which is information relevant to both ⌜nouns⌝ and ⌜verbs⌝, and non-pronominal information, which is the part of inflection where ⌜nouns⌝ and ⌜verbs⌝ differ (⌜nouns⌝ take ⌜nouns⌝ suffixes and ⌜verbs⌝ take aspect suffixes and, optionally, prepronominal suffixes). The AFFIX-TYPE attribute specifies whether a lexical item selects the Agent or Patient paradigm when it takes Intransitive prefixes (this selection is relevant even for semantically polyadic lexical items, since a polyadic lexical item with only one animate semantic argument takes Intransitive prefixes, see Koenig & Michelson 2015a and Koenig & Michelson 2015b for details). AGR lists the indices of (up to two) animate semantic arguments that are referenced by pronominal prefixes. We follow Crysmann & Bonami (2016) in the structure of realizational information; we will introduce features of REALIZATION as they become relevant for particular inflectional constraints. On the semantic content side, we distinguish an (extended) INDEX (Richter & Sailer, 2004, 134) and the semantic relations (RELS) contributed by a lexical item (there can be several, because, of, for example, possessed nouns and noun incorporation). The KEY relation is the member of RELS of relevance for pronominal prefix inflection (see Koenig & Davis 2006 for the notion of KEY and Koenig & Michelson to appear for its relevance to Oneida inflection). We model the difference between non-time-conditioned and time-conditioned descriptions we discussed in Section 3 by positing two subsorts of *extended-index*, *non-time-conditioned-index* and *time-conditioned-index* (abbreviated in AVMs as *non-tc-index* and *tc-index*, respectively). Lexical items whose index is of sort *non-time-conditioned-index* correspond to the class of lexical items referred to by the meta-grammatical label ⌜noun⌝ and those whose index is of sort *time-conditioned-index* correspond to the class of lexical items referred to by the meta-grammatical label ⌜verb⌝.

Before discussing inflectional constraints that target lexical items with a particular sort of INDEX or a particular sort of KEY, or both, we list the different kinds of inflectional constraints that must be distinguished in an inflectional system of Oneida's complexity. First, there are constraints that relate arguments of the KEY relation to AGR indices. One can think of these constraints as the equivalent of linking for head-

marking languages. Second, there are constraints on values of AFFIX-TYPE, i.e. constraints that ensure that lexical items are assigned to the correct Intransitive paradigm class (Agent vs. Patient). Third, there are constraints relating particular morphs (a member of the set of MPH (morphs)) to the PHON of the word; these constraints are the HPSG equivalent of morphophonological rules. Fourth, there are constraints relating PRO inflectional features to subsorts of the member of the MS set labeled *pro*. The morphosyntactic feature *pro* only includes the minimal lexical information that is "visible" to exponence rules. INDEX, KEY, and AFFIX-TYPE information, as we will see, condition the paradigm class of *pro*, but are not features that the exponence rules can "see" (see Corbett 2008, 134 on the notion of conditions on features): exponence rules for pronominal prefixes are only sensitive to the ϕ-features of animate arguments and paradigm class. Finally, the value of RR lists the realizational or exponence rules that license a particular word form, i.e. the rules that effect the many-to-many association between inflectional features and morphs (Crysmann & Bonami, 2016).

4.2 Examples of inflectional constraints sensitive to sorts of indices

In this section, we illustrate with two distinct kinds of inflectional constraints the claim that some inflectional constraints are sensitive to ontological sorts. The first set of constraints pertains to the value of the NPRO inflectional feature: lexical items that describe non-time-conditioned entities select different sorts of values for NPRO than lexical items that describe time-conditioned entities. Constraints (12) and (13) match the proper set of lexical items to the appropriate subsort of NPRO value. The type declarations in (14) and (15) (we use the symbol ≔ for type declarations) specify which non-pronominal inflectional features are appropriate for entries that describe time-conditioned and non-time-conditioned entities. Taken together, constraints (12)-(15) ensure that non-time-conditioned entries carry a noun-suffix feature and that time-conditioned entries carry prepronominal prefix features, aspect features, and are assigned to the class of active vs. stative entries, depending on whether they can occur in all three aspects or only the stative aspect (whether they are *v.a.* or *v.s.* entries in Michelson & Doxtator 2002).

(12) $\left[\textsc{content}\ \left[\textsc{index}\ \textit{tc-index}\right]\right] \Rightarrow \left[\textsc{infl}|\textsc{infl-feat}|\textsc{npro}\ \textit{tc-npro}\right]$

(13) $\left[\textsc{content}\ \left[\textsc{index}\ \textit{non-tc-index}\right]\right] \Rightarrow \left[\textsc{infl}|\textsc{infl-feat}|\textsc{npro}\ \textit{non-tc-npro}\right]$

(14) $\textit{tc-npro} \coloneqq \begin{bmatrix} \textsc{prepro} & \textit{prepro-feat} \\ \textsc{asp} & \textit{aspect} \\ \textsc{active} & \textit{boolean} \end{bmatrix}$

(15) $\textit{non-tc-npro} \coloneqq \left[\textsc{noun-suffix}\ \textit{nsuff}\right]$

The second example of an inflectional constraint restricted to lexical items that carry a particular sort of index is exemplified in the following excerpt from Michelson et al. (2016) (pronominal prefixes are in bold font). The prefix for the word 'blanket' *okʌ́haʔ* is *o-*; that for the word 'it is warm' *yoʔtalíhʌ* is *yo-*. The prefix for the ⌜noun⌝ 'blanket' lacks the word-initial glide that the prefix for the ⌜verb⌝ for being warm includes. This is a general pattern: all Patient prefixes (including Possessive Patient

prefixes) for ⌜nouns⌝ lack the word-initial glide of the corresponding ⌜verb⌝ prefix and some of the Agent and Transitive ⌜noun⌝ prefixes also lack the word-initial glide of the corresponding ⌜verb⌝ prefix.

(16) *né· s né· thikʌ́ kítkit ostó·sliʔ ya·wét né·*
né· s né· thikʌ́ kítkit **o**-stoʔsl-iʔ ya·wét né·
it's that that chicken 3Z/N.SG.P-feather-NSF like it's
yakotunyá·tu okʌ́haʔ. Ó·ts,
yako-at-uny-a-ʔt-u **o**-kʌh-aʔ ó·ts
3FI.P-SRF-make-JN-CAUS-STV 3Z/N.SG.P-blanket-NSF Gee
yoʔtalíhʌ s kwí· né· thi·kʌ́.
yo-aʔtalihʌ s kwí· né· thikʌ́
3Z/N.SG.P-be.warm[STV] it's that
'she made kind of like a blanket out of chicken feathers. Gee it was warm.'
(P. Cornelius, 307)

Since the lack of glides only applies generally to Patient prefixes, we provide in (17) the inflectional constraint for Patient prefixes for ⌜nouns⌝. (17) says that the phonology of ⌜nouns⌝ that take Patient prefix morphs that start with a glide does not include the glide. (The statement of the constraint assumes the templatic approach to prefixal inflection discussed in Diaz et al. 2019 according to which pronominal prefixes occur in position 7 in the template and stems in position 8.)

(17)
$$\begin{bmatrix} \textsc{cont} & \left[\textsc{index}\ \textit{non-tc-index}\right] \\ \textsc{infl} & \begin{bmatrix} \textsc{infl-feat} & \left[\textsc{pro}\ \left[\textsc{affix-type}\ P\right]\right] \\ \textsc{realization} & \left[\textsc{mph}\ \left\{\begin{bmatrix}\textsc{ph} & \langle \textit{glide}\rangle \oplus \boxed{1} \\ \textsc{pc} & 7\end{bmatrix}, \left[\textsc{pc}\ 8\right]\right\} \cup \textit{eset}\right] \end{bmatrix} \end{bmatrix}$$
$$\Rightarrow \left[\textsc{phon}\ \boxed{1} \oplus \textit{list}\right]$$

Note that this constraint (and related constraints for Agent and Transitive pronominal prefixes) relates the exponent of the relevant prefixes to the overall phonology of the word, i.e. we treat the absence of glide as a morphophonological fact. We have two reasons for this analytical choice. First, the constraint applies across cells in a paradigm and across paradigms. It is not confined to certain exponents or paradigms and does not therefore constitute an alternative realizational rule. Second, the constraint is not entirely regular (as we alluded to, it does not apply to all cells that would otherwise start in a glide within the Agent or Transitive paradigms) and cannot thus be treated as a strictly phonological rule (leaving aside the fact that it only applies to lexical items that describe non-time-conditioned entities, an unlikely restriction for a phonological rule).

4.3 An example of inflectional constraints restricted to certain semantic relations

Michelson (1991) and Koenig & Michelson (2015a) argue that the assignment of lexical entries to the Agent or Patient Intransitive paradigm class cannot in general be

predicted from their meaning. But, as Michelson et al. (2016) discuss, there is a semantically defined class of entries where Agent or Patient paradigm class assignment is predictable: entries that include a possession relation in their semantic content. In this case, Agent/Patient class membership is predictable from the (in)alienability of the relation: the entry is assigned to the Agent class if the possession relation is inalienable, the Patient class if the relation is alienable, as shown in (18) and (19) for possessed ⌜nouns⌝ and (20) and (21) for ⌜verbs⌝ that incorporate possessed ⌜nouns⌝, respectively (see Koenig & Michelson to appear for details). The fact that these constraints apply to a word that describe one's nose (18) or to a word that describes a state of one's eyes being big (20) shows that these constraints apply irrespective of the lexical entry's INDEX sort, as long as the entry's semantic content includes a possession relation.

(18) *laónhwale?*
lao-nhwal-e?
3M.SG.POSS-fur-NSF
'his fur'

(19) *la?nyú·ke*
la-?nyu-?ke
3M.SG.A-nose-LOC
'his nose'

(20) *Kʌh né· na?teyeká·lahse?.*
kʌh né· n-a?te-**ye**-kahl-a-?se?
this, yea assertion PART-DL-**3FI.A**-eye-size.of-STV.PL
'Her eyes were THIS big.' (Verland Cornelius, *Ghosts, flirts and scary beings*, recorded 2007)

(21) *yah te?wé·ne? tsi? nihotinúhsahse? tsi? nú·*
yah te?we·ne? tsi? ni-**hoti**-nuhs-a-?se? tsi? nú·
it's incredible how PART-3**M.DP.P**-house-size.of-STV.PL where
*ni**hati**nákle? kʌ́·*
ni-**hati**-nakle-? kʌ́·,
PART-3M.PL.A-reside-STV y'know
'it's incredible how big their houses were where they lived,' (Mercy Doxtator, *Why dogs don't talk*, recorded 1998)

(22) and (23) model these two predictable assignments of paradigm class.

(22) [CONTENT [KEY *alien-poss-rel*]] ⇒ [...PRO [AFFIX-TYPE *P*]]

(23) [CONTENT [KEY *inalien-poss-rel*]] ⇒ [...PRO [AFFIX-TYPE *A*]]

4.4 Examples of a sort and semantic relation restricted inflectional property

Finally, we discuss inflectional constraints that target lexical items on the basis both of the sort of entity they describe and the kind of semantic relations included in their semantic content. The basic descriptive fact of the first case of this kind is that pronominal prefixes on alienably possessed nouns are a subtype of Patient prefixes, as exemplified in Table 2. Let's compare the column P(V) that lists a subset of pronominal prefixes for ⌜verbs⌝ that belong to the Patient paradigm class and the column P(poss) that lists a subset of pronominal prefixes for possessed ⌜nouns⌝.

	C-stems		
	A	P(V)	P(poss)
…	…	…	…
3M.SG	la-	lo-	lao-
3M.DU	ni-	loti-	laoti-
3M.PL	lati-	loti-	laoti-
3FZ.SG	ka-	yo-	**ao-**
3FZ.DU	kni-	yoti-	**aoti-**
…	…	…	…

Table 2: A subset of Agent, Patient and Possessive Patient prefixes for Consonant stems

As is easily seen, the P(poss) exponents for third person masculine indices are simply the P(V) exponents with an *a* before the *o* (only P(V) exponents that have an *o* after the initial consonant/glide differ from P(poss) exponents). The same pattern is true of third feminine-zoic exponents aside from the additional difference that, as expected of lexical items that belong to the Patient paradigm and describe non-time-conditioned entities, the initial glide is missing as per constraint (17).

We model Possessive Patient prefixes as forming a distinct paradigm from ordinary Patient prefixes. Figure 1 provides part of the hierarchy of pronominal morphosyntactic features (the *pro* member of MS).

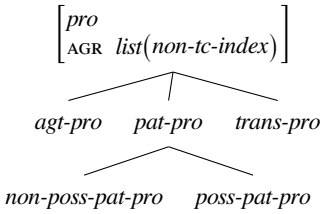

Figure 1: A part of the hierarchy of the *pro* morphosyntactic feature

Each subsort of *pro* indexes a set of exponents that belong to a different paradigm. Agent prefixes are those morphs that expound an *agt-pro* and Patient prefixes are those morphs that expound a *pat-pro*. Both of these subsorts inherit the AGR attribute. Thus, two different prefixes can expound the same list of indices. (24) and (25)

are two realizational rules that expound an ordinary Patient and Possessive Patient third singular feminine-zoic index, respectively. The different subsorts of *pro*, the morphosyntactic feature that is being realized, are sufficient to ensure the presence of different exponents, *yo-* or *yao-*. Note that the exponent for the third singular feminine-zoic index is *yao-*, although words that make use of this rule will actually always start with *ao*, as per the morphophonological constraint in (17).

(24)
$$\begin{bmatrix} \text{MUD} & \left\{ \begin{bmatrix} \textit{non-poss-pat-pro} \\ \text{AGR} & \left\langle \begin{bmatrix} \text{PHI} & \begin{bmatrix} \text{PERS} & \textit{3} \\ \text{GEND} & \textit{fem-zoic} \\ \text{NUMBER} & \textit{sg} \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix} \right\} \\ \text{MPH} & \left\{ \begin{bmatrix} \text{PH} & \langle \text{yo} \rangle \\ \text{PC} & 7 \end{bmatrix} \right\} \end{bmatrix}$$

(25)
$$\begin{bmatrix} \text{MUD} & \left\{ \begin{bmatrix} \textit{poss-pat-pro} \\ \text{AGR} & \left\langle \begin{bmatrix} \text{PHI} & \begin{bmatrix} \text{PERS} & \textit{3} \\ \text{GEND} & \textit{fem-zoic} \\ \text{NUMBER} & \textit{sg} \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix} \right\} \\ \text{MPH} & \left\{ \begin{bmatrix} \text{PH} & \langle \text{yao} \rangle \\ \text{PC} & 7 \end{bmatrix} \right\} \end{bmatrix}$$

For rules such as (24) and (25) to hold of the right set of lexical items, we need to ensure that only lexical items that bear a morphosyntactic pronominal prefix feature that is of sort *non-poss-pat-pro* or *poss-pat-pro* instantiate these realizational rules. This is what constraints (26) and (27) do. Constraint (26) ensures that lexical items that belong to the Patient paradigm bear a morphosyntactic feature that is expounded with a Patient prefix. Constraint (27) ensures that alienably possessed ⌜nouns⌝ bear a morphosyntactic feature that is expounded with a Possessive Patient prefix.

(26)
$$\begin{bmatrix} \text{INFL}|\text{INFL-FEAT}|\text{PRO} & \begin{bmatrix} \text{AFFIX-TYPE} & \textit{P} \\ \text{AGR} & \langle \textit{non-tc-index} \rangle \end{bmatrix} \end{bmatrix}$$
$$\Rightarrow \begin{bmatrix} \text{INFL}|\text{REALIZATION}|\text{MS} & \{\textit{pat-pro}\} \cup \textit{set} \end{bmatrix}$$

(27)
$$\begin{bmatrix} \text{SEM} & \begin{bmatrix} \text{INDEX} & \textit{non-tc-index} \\ \text{KEY} & \textit{alien-poss-rel} \end{bmatrix} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{INFL}|\ldots|\text{MS} & \{\textit{poss-pat-pro}\} \cup \textit{set} \end{bmatrix}$$

Incorporated possessed nouns provide another example of the orthogonality of the two semantic classifications to which Oneida inflectional constraints are sensitive, INDEX values and KEY relations. As examples (20) and (21) above show, possessed nouns can be incorporated into stative verbs (see Koenig & Michelson to appear for discussion). The semantic content of the resulting ⌜verb⌝ includes three semantic relations. Consider the verb form *nihotinúhsahse?* 'their houses were big': it includes the state description glossed as 'big', the denotation of the incorporated noun (*-nuhs-* 'house'), and the relation of possession. As Koenig & Michelson (to appear) show, it is the possessor argument of the possession relation that is referenced by the pronominal prefix (a fact that Koenig & Michelson call *Possession Dominance*): it is the possession relation that is the KEY relation, i.e. the relation that matters for linking purposes. *Possession Dominance*, which is sensitive to the semantic content of the lexical item,

is provided in (28). (Keep in mind that RELS lists all the relations included in a lexical entry's semantic content; in the context of noun incorporation, there will be two such relations, three when a possessive noun is incorporated.)

(28) $[\text{CONTENT } [\text{RELS } \boxed{2}]] \wedge \text{member}(\boxed{1}\textit{poss-rel},\boxed{2}) \Rightarrow [\text{CONTENT } [\text{KEY } \boxed{1}]]$

Now, because the possession relation, as per (28), is the entry's KEY, assignment of the lexical entry to the Agent/Patient paradigm classes is governed by the possession relation's (in)alienability, as per (22) and (23). In other words, the same constraints apply to possessed ⌜nouns⌝ that are not incorporated and those that are incorporated when it comes to which semantic argument is marked (the possessor) and the entry's paradigm class assignment. But, when a possessed ⌜noun⌝ is incorporated, the sort of the INDEX of the ⌜verb⌝ does not change: the resulting stem still describes a state (of being big in (21)). In other words, the word's INDEX is still of sort *time-conditioned-index*. As a result, NPRO inflection is determined by the *time-conditioned-index* of the verb: the result of the combination of the two bases includes aspect suffixes and, optionally, prepronominal prefixes (e.g., the partitive *ni-* in (21)) and, were there no prepronominal prefix, the relevant prefixes would include the pronominal prefix's exponent's initial glide. Possessed noun incorporation illustrates the complex interplay of INDEX and KEY properties in the inflectional morphology of Oneida.

5 Against a mixed category analysis of kinship terms

The preceding section detailed some Oneida inflectional constraints. Some constraints target lexical items on the basis of the kind of entities they describe, some target lexical items on the basis of the kind of semantic relations that are part of the entry's semantic content (the relation of (in-)alienable possession in the case of paradigm class assignment) and some target lexical items on the basis of both the kind of entities being described as well as the semantic relations that are part of their semantic content (non-time-conditioned indices and relation of possession in the case of Possessive Patient prefixes). In this section, we show that our claim that Oneida inflectional constraints are sensitive to two orthogonal semantic classifications allows for a reanalysis of the properties of kinship terms discussed in Koenig & Michelson (2010). We mentioned kinship terms in the context of excerpt (6). In that excerpt, *aknulhá·* 'my mother' was an example of kinship term. As Koenig & Michelson (2010) discuss, kinship terms in Oneida have some inflectional properties of ⌜nouns⌝ (kinship terms do not have aspect suffixes, some pronominal prefixes are glideless) and some inflectional properties of ⌜verbs⌝ (reflexive prefixes are possible, (most) kinship terms have transitive prefixes).

Koenig & Michelson (2010) analyze kinship terms as a mixed category à la Malouf (2000): Oneida inflecting lexical items are divided into two sorts of parts of speech, *nominal* and *verbal*, with *noun* and *kinship* being of sort *nominal* and *verb* and *kinship* being of sort *verbal*. Kinship terms thus share some properties with both nouns and verbs in their analysis, hence their dual status. But Koenig & Michelson

must stipulate which nominal and which verbal properties kinship terms have: since these properties are stipulated of the sorts *nominal* and *verbal*, any other partition of these properties is in principle possible. But, of course, it is not. *Nominal* lexical items cannot have aspect suffixes, because their index is of the wrong sort: if a lexical item does not describe a time-conditioned entity, aspect is not a possible semantic property and aspect suffixes are inappropriate. Our new approach to parts of speech *explains* the behavior of kinship terms: kinship terms have all the properties that befits the fact that they describe non-time-conditioned entities and the fact that the semantic relation that is part of their semantic content is a dyadic relation. In other words, kinship terms describe non-time-conditioned entities (one member of the kin relation), so they have the inflectional properties appropriate for entries with an index of sort *non-time-conditioned-index* and their KEY relation is a kinship relation, so they have the inflectional properties of polyadic relations.

6 Does Oneida have a morphological noun/verb distinction?

In this paper, we examined the question that is the title of this section. What we have suggested is that this is the wrong question to ask, because what is meant by the labels *noun* and *verb* is ambiguous. This ambiguity explains why we can agree with the evidence and its interpretation laid out in Mithun (2000) and still maintain that there is no morphological distinction between nouns and verbs in Oneida (just as we argued that there is no syntactic distinction between nouns and verbs in Oneida in Koenig & Michelson 2014). *The grammar* of Oneida does not include a noun vs. verb distinction because its inflectional system is only sensitive to classifications of lexical items along two orthogonal *semantic* dimensions, the sorts of INDEX and KEY relation their semantic content includes. But the absence of any grammatical constraint that references the part-of-speech labels *noun* and *verb* does not mean the labels have no linguistic use when it comes to comparing Oneida to other languages. Oneida inflectional constraints partition lexical items along a dimension typical of canonical nouns and verbs of the kind discussed in Spencer (2005) and Corbett (2012). Oneida can, thus, be profitably compared to other languages in terms of a *meta-grammatical* distinction between ⌜nouns⌝ and ⌜verbs⌝, bypassing the issue of the status of those categories within the grammar of Oneida. Such a comparison shows that Oneida inflection targets lexical categories that are canonical ⌜nouns⌝ and ⌜verbs⌝ and that they are canonical because inflectional potential follows ontological sort. The derivation of ⌜noun⌝ bases from ⌜verb⌝ bases changes the ontological sort of the bases and the inflectional potential of the derived bases is correspondingly altered. The derivation of ⌜noun⌝ words from ⌜verb⌝ words, on the other hand, derives morphologically inactive words from fully inflected ⌜verbs⌝ (whose inflection reflects their ontological sorts) and the issue of inflectional potential is moot. Discussions about universals of parts of speech or limits of variation often miss the possible distinct status of categories used in language descriptions (but, see the contrast between descriptive and

analytic uses of the term *syllable* in Hyman 2011, 58), a distinction of some importance to discussions of universality or linguistic diversity. After all, discussions of the purported universality of the distinction between nouns and verbs or of how children learn to assign lexical items to these universal syntactic categories (Pinker, 1984, 40) are moot if the status of the partition is not kept constant.

Let us end this paper with a discussion of what the status of morphological part-of-speech information in Oneida tells us about what makes the language rather unique. On the one hand, Oneida morphological parts of speech conform to some semantic canon linguists rarely expect to be instantiated in languages of the world. On the other hand, the inflectional reflexes of this canonicity are uniquely complex because of the amount and different kinds of information speakers must attend to to properly inflect ⌜nouns⌝ and ⌜verbs⌝. Now, it is not unusual for the morphological referencing or syntactic realization of semantic arguments to be sensitive to the distinction between monadic and polyadic predicates, the grammar of possession to be different from the grammar of other semantic relation, or for kinship terms to behave differently from other kinds of relations (see Evans 2000a). In other words, it is quite frequent for the grammar of a language to distinguish different kinds of semantic relations when it comes to referencing semantic arguments morphologically or realizing semantic arguments syntactically. Nor is it unusual for the morphology of a language to be sensitive to ontological sorts. After all, the very notion of canonical (Spencer, 2005) or prototypical (Croft, 2001) parts of speech depends on distinguishing among ontological sorts. But what is unusual is for both dimensions of classification to simultaneously condition the same inflectional slot, namely pronominal prefixes. This is what is most remarkable about Oneida's morphological parts of speech: the proper referencing of semantic arguments via pronominal prefixes requires juggling at the same time ontological sorts and properties of the KEY semantic relation. This need to attend to two orthogonal semantic classification only compounds the formal complexity of pronominal prefixes exponence rules discussed in Koenig & Michelson (2015b) and makes Oneida's inflectional morphology rather unique. To borrow the bricolage metaphor discussed in Koenig & Michelson (to appear), the tools required to properly inflect Oneida words are nothing special, but the fact that these tools must be used concomitantly is.

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