

OJIBWE AGREEMENT IN A REPRESENTATIONAL, MORPHEME-BASED FRAMEWORK*

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1. The project

We are developing a theoretical framework that couples Lexical-Functional Grammar (LFG; Bresnan et al. 2016) with the realizational, morpheme-based approach to word-formation of Distributed Morphology (DM; Halle and Marantz 1993). The resulting framework, which we call Lexical-Realizational Functional Grammar (L_R FG), is particularly well-suited to modelling Canadian Indigenous languages, which are characterized by **polysynthesis** and **nonconfigurationality**. In this paper we summarize the framework, and demonstrate it with an analysis of the inflectional system of Ojibwe, a language showing these properties. Note that the intent of the paper is not to make new claims about Ojibwe, but instead to take existing descriptions (e.g., Jones 1977, Nichols 1980, Valentine 2001) and analyses (e.g., Oxford 2019) of the language and adapt them to the present formalism as a demonstration of the framework. The paper is structured as follows: Section 2 outlines the L_R FG framework, comparing and contrasting it to standard LFG and providing details on the exponence function. Section 3 provides a brief introduction to Ojibwe, and a background on relevant aspects of the language's morphosyntax. Section 4 provides a demonstration of our analysis, including a presentation and discussion of the templates used and specifications of the Vocabulary Items needed for animate agreement in Ojibwe, as well as the structure of a representative example sentence. Section 5 gives a brief conclusion.

2. The L_R FG framework

L_R FG is similar to standard LFG, with changes to the c-structure and its relationship with words/morphemes. The terminal nodes of c-structures are not words, but instead are f-descriptions (sets of f-structure equations and constraints). The c-structure is mapped to a v(ocabulary)-structure, a linearized structure in which vocabulary items (VIs) **expone** (i.e., realize) the features in the terminal nodes, via a correspondence function, v . Vocabulary structure is a morphophonological structure that maps to phonological form. In other

*We would like to thank the Carleton University Linguistics Reading Group, the University of Toronto Syntax Project, and the audiences at the MoMOT 2020 workshop in Kingston, the 2020 CLA virtual conference, and the LFG20 virtual conference for their helpful comments, as well as Bronwyn Bjorkman, Ron Kaplan, Tina Bögel, and Will Oxford for in-depth discussion of the theory and analysis we use. Remaining errors are our own. This research was supported by SSHRC Insight Grant 430-2018-00957 (Siddiqi).

words, v-structure precedes the phonological string in the Correspondence Architecture (see, e.g., Asudeh 2012: 53). Thus, the revised correspondence architecture for L_RFG is as shown in Figure 1.

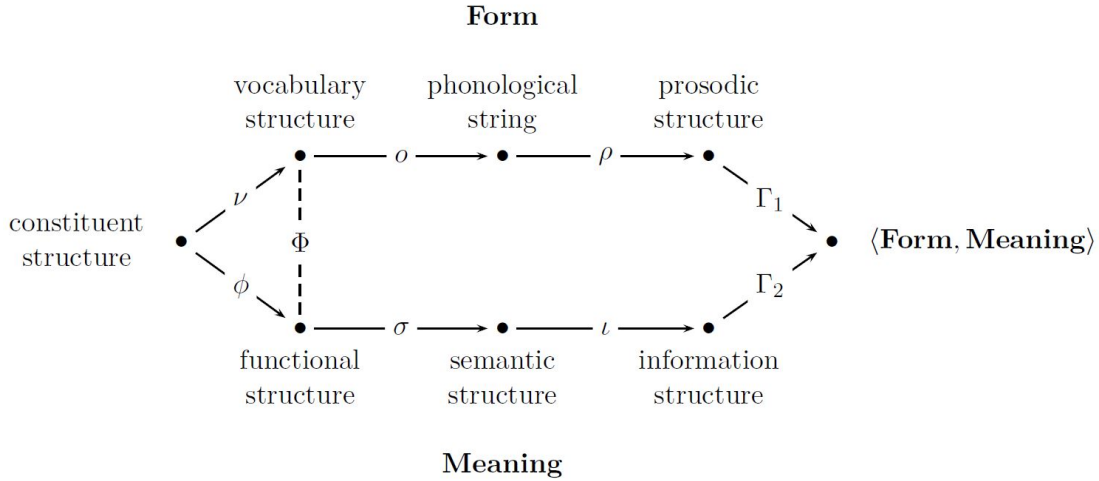


Figure 1. Correspondence architecture

Formally, v-structure is a list, each member of which is a feature structure defining morphophonological properties relevant to the linear placement and metrical properties of the item. This includes the phonemes/segments, as well as the metrical frame which determines syllable structure, affix/clitic status, and so on. Thus, the v-structure roughly corresponds to the p(honological)-form portion of a lexical entry in the metrical theory of Bögel (2015). In this paper, only the strings themselves are relevant, so we make some simplifying assumptions: (i) we represent the output of the exponence function, ν , simply as a string, not a full VI structure; (ii) we show alignment informally using the standard notational convention of adding a dash to the left or right of the string; (iii) we do not show the σ -mapping, but instead let the phonological forms stand in for the VI strings (i.e., we conflate the two for simplicity/presentational purposes).

The relationship between terminal nodes and VIs is many-to-one, using the mechanism of **Spanning** (Haugen and Siddiqi 2016, Merchant 2015, Ramchand 2008, Svenonius 2016); i.e. one VI may realize features of multiple terminal nodes. The exponence function ν maps from a pair of arguments to a VI, the exponence of the arguments. The first argument is a list of pre-terminal categories, typically of length 1, which are taken in the linear order they appear in the tree. The second argument is itself a function, Φ , which maps an f-description to the set of f-structures that satisfy the description; i.e. $\Phi(d \in D) = \{f \in F \mid f \models d\}$, where D is the set of valid f-descriptions and F is the set of f-structures.¹ In sum, ν maps **from** a pair whose first argument is a list of c-structure pre-terminal categories and whose second argument is a set of f-structures **to** a structured

¹We thank Ron Kaplan (p.c.) for discussion of this point. Any remaining errors are our own.

expression as described above. For a formal definition of the exponence function and additional discussion of the grammatical architecture of L_RFG , see Melchin et al. (2020).

3. Ojibwe: Background

Ojibwe and other Algonquian languages have long been of interest to linguists in the Ottawa area. Furthermore, Ojibwe exhibits many of the features that we hope to be able to model: **Nonconfigurationality** – word order is very free;² **polysynthesis** – complex verb morphology with extensive head-marking; a **direct-inverse-based agreement system** cross-referencing all core arguments; and **various morphological processes**, including verbal reflexives, noun incorporation, applicatives, various kinds of (anti)passives, and more, providing a rich testing ground for a theory of morphosyntax.

3.1 Dialects and data

Ojibwe can be classified either as a group of dialects or as a closely-related subfamily of languages in the Central Algonquian group. The data and analysis in this talk is meant to be widely applicable across the different varieties of Ojibwe, including Nishnaabemwin (such as Ottawa) and Anishinaabemowin dialects (such as Southwestern Ojibwe and Algonquin). The data are taken mainly from Nichols’s (1980) grammar of Southwestern Ojibwe, corroborated with the paradigms in Jones (1977) (Algonquin) and Valentine (2001) (Nishnaabemwin).

We include vowels that are omitted in the syncopated (Nishnaabemwin) dialects, and word final /n/, which is often dropped; we are essentially presenting the underlying forms of the morphemes and inflected verbs, though their pronunciation varies widely from one variety to the next. In cases where the inflectional morphemes themselves differ between dialects, we have done our best to present the more conservative forms, consulting the analysis of Proto-Algonquian in Oxford (2014). We made notes on instances of variation in Section 4.2.

3.2 Prominence and direction marking

The distribution of agreement affixes, and the choice of direct or inverse morphology, is based on arguments’ relative positions in a **prominence/person hierarchy**, which ranks arguments in terms of person, obviation and animacy. The hierarchy is characterized as

²When we say that Ojibwe is “nonconfigurational”, we do not intend to claim that word order is completely free. We are using the term in the LFG sense (Bresnan et al. 2016), meaning that word order and phrase structure are not used to distinguish grammatical functions like subject and object. Instead, word order is determined by a combination of factors, including obviation and information structure, i.e., determined by discourse and pragmatic factors more so than grammatical function; see Dahlstrom (2017) for extensive discussion and references.

follows (adapted from Valentine 2001: 268; abbreviations largely follow common Algonquianist practice):³

- (1) *Prominence Hierarchy*
- 2 2nd person
 - 1 1st person
 - 3 3rd person animate proximate
 - 3' 3rd person animate obviative
 - 0 3rd person inanimate

It should be noted that, while the ranking of 2 above 1 determines the insertion of the person prefix (at least on the view of Rhodes 1994, Rhodes and Valentine 2015, adopted here; see discussion below), there are other areas of the grammar where 1 appears to be ranked above 2, for instance when determining the insertion of certain agreement morphemes, and others where they appear to be equally ranked (see Section 4.1).

In transitive clauses, the relationship between the two arguments' relative ranking in the prominence hierarchy and their thematic roles is tracked by the **direct/inverse** morpheme, known traditionally as a Theme Sign (analyzed as Voice; e.g., Oxford 2014, 2019). When the agent is the higher-ranked argument and the patient is lower, the verb is marked as **direct**.⁴ When the patient is the higher-ranked argument and the agent is lower, the verb is marked as **inverse**.

The theoretical status of inversion in Ojibwe is still under debate. One question involves the relationship between inversion and the grammatical functions of subject and object. For some, the agent is always the subject and the patient is always the object (e.g., Valentine 2001, Dahlstrom 2014, Oxford 2019).

- (2) *GFs-as- θ -roles analysis*
- Direct:** subject is agent, object is patient
 - Inverse:** subject is patient, object is agent

This can be represented as in Figure 2, where the solid lines represent the correspondences in a direct form, and the dashed lines the correspondences in inverse. For others, the higher-ranked argument is always the subject and the lower-ranked argument is always the object (e.g., Rhodes 1994, 2010, Bruening 2005).

- (3) *GFs-as-prominence analysis*
- Direct:** subject is higher-ranked, object is lower-ranked
 - Inverse:** subject is lower-ranked, object is higher-ranked

³Contra Valentine (2001), we do not include the “unspecified actor” form in the prominence hierarchy; instead, we analyze these forms as instances of a short passive.

⁴Following common practice, we are using the term “agent” to refer to agent-like roles, including causes and many experiencers – i.e., the agent proto-role in the sense of Dowty (1991). Similarly, the term “patient” is used for the proto-role that includes patients, recipients, themes, and so on.

This is represented in Figure 3, where the solid lines represent the correspondences in a direct form, and the dashed lines the correspondences in inverse:⁵

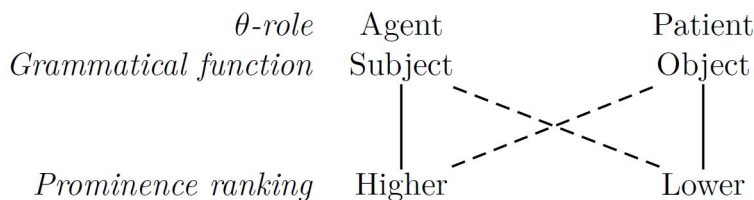


Figure 2. GFs-as- θ -roles analysis

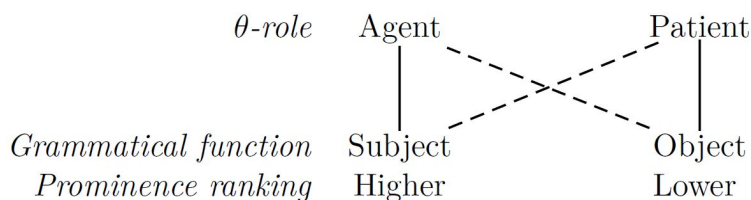


Figure 3. GFs-as-prominence analysis

We adopt the **GFs-as-prominence analysis**, where the grammatical functions are defined in terms of the prominence hierarchy.⁶ This allows us to treat direct/inverse marking as determining the mapping between f-structural objects (grammatical functions) and s-structural objects (thematic argument roles). It also means that the subject and object have more consistent (word-internal) c-structural positions, as with the clausal structure in configurational languages; the alternative would be to have specific positions for the higher- and lower-ranked arguments, which is more difficult to model. See Section 4.1 for a formalization of this analysis.

⁵These analyses are typically referred to as the *morphological* and *syntactic* accounts of inversion (respectively), reflecting the views of inverse marking as either altering syntactic configurations, and therefore grammatical function (GFs-as-prominence analysis), or as affecting only the morphological agreement marking but leaving the syntax unchanged (GFs-as- θ -roles analysis). However, in a non-derivational framework with no modular separation between syntax and morphology, this terminology is misleading and confusing, so we adopt the more descriptive terms used here.

⁶While it has been claimed that there is syntactic evidence for the GFs-as- θ -roles analysis (e.g., Dahlstrom 2014, Alsina and Vigo 2017, Oxford 2019), the evidence largely relies on judgements that vary between Algonquian languages, and even between dialects or individual speakers of Ojibwe, as pointed out by Rhodes (1994, 443). It is possible that languages differ as to which is the proper analysis, as is claimed by McGinnis (1999), Alsina and Vigo (2017).

4. Analysis

4.1 Templates

We make use of the LFG mechanism of **templates** (Dalrymple et al. 2004, Asudeh et al. 2013) to encode bundles of grammatical descriptions that get expressed in the language. The templates involved in our analysis can be divided into five groups: those encoding general constraints, those encoding the prominence hierarchy (person/gender), those encoding obviation and number, those encoding verb classes, and those encoding the mapping between grammatical function and argument structure (direction, argument suppression).

4.1.1 Constraints

Here we provide templates for constraints that determine the distribution of animacy, person, and alignment across grammatical functions and contexts. The first two constraints hold in all contexts. The first constraint, which we call the **Transitive Subject Constraint**, ensures that the subject of a clause with an object (either OBJ or OBJ_θ, i.e. PLUSO) must be animate; inanimate subjects are possible only in inanimate clauses (Rhodes 1990, 2010, Valentine 2001):

(4) *Transitive Subject Constraint*

@TSC := [(↑ SUBJ) & (↑ PLUSO)] ⇒ [(↑ SUBJ ANIM) = +]

This ensures that transitives with an inanimate ARG₁ are inverse, regardless of context (independent or conjunct).⁷ It correctly ensures that verbs with a secondary object (OBJ_θ) must have an animate subject (in Algonquianist terms, correctly predicts that there are AI+O verbs, but no II+O verbs).

The second constraint, which we call the **Participant Argument Constraint**, ensures that 1st and 2nd person (i.e., participant) pronominals are possible only as subjects and (direct/primary) objects; secondary objects and obliques must be 3rd person (Rhodes 1990, 2010, Valentine 2001):

(5) *Participant Argument Constraint*

@PAC := ¬(↑ PLUSR PERS PART)

We assume these two constraints are called by the c-structure rule introducing the root node CP, grouped together in the following template:

(6) @ROOT := @TSC
 @PAC

The last constraints, the **Prominence Constraints**, capture the different distributions of direct and inverse Voice heads in the independent and conjunct orders:

⁷This is already ruled out in independent contexts by (7), but not conjunct contexts with a participant ARG₁.

(7) *Independent Prominence Constraint*

@IPC :=

[(↑ SUBJ) & (↑ OBJ)] ⇒

{[(↑ SUBJ PERS PART) = + & (↑ OBJ PERS PART) = +] | [(↑ OBJ PERS) ⊆ (↑ SUBJ PERS)]}

(8) *Conjunct Prominence Constraint*

@CPC :=

[(↑ SUBJ) & (↑ OBJ)] ⇒

{[(↑ {SUBJ|OBJ} PERS PART) = +] | [(↑ OBJ PERS) ⊆ (↑ SUBJ PERS)]}

In independent forms, the subject always outranks the object (i.e., the object’s PERS features properly subsume those of the subject) unless both the subject and object are participants. In conjunct forms, the subject always outranks the object unless either the subject or object is a participant. We assume that these constraints are specified by the different versions of Agr(P) found in the independent and conjunct orders. The contrast between independent and conjunct order can be captured in templates, defined tentatively below in Table 3.

4.1.2 Prominence templates

Following Bejar and Rezac (2009), Oxford (2014), among others, we assume that the person and animacy features are decomposed into a number of privative features. Instead of the feature geometries used by the above authors, in our system the implicational relationships between the features are encoded in a set of nested templates, given in Table 1, providing a way to represent the prominence hierarchy without stipulating independent structures beyond those already provided by the LFG framework.

Contra Valentine (2001), we exclude unspecified actors from the prominence hierarchy, following the analysis of Rhodes (1991), Rhodes and Valentine (2015) in which the “unspecified actor” forms are analyzed as a kind of short passive (one of multiple passivization processes in the language, specifically the “Type I” passive of Rhodes 1991). This is because unspecified actors aren’t treated syntactically as a grammatical function; VTA forms with an unspecified actor are inflected as intransitives. The “theme signs” (Voice heads) indicating an unspecified actor are treated as passive Voice heads suppressing certain arguments, similar to the reflexive (but with a different kind of suppression – see Section 4.1.5).

4.1.3 Number and obviation templates

We use the templates in Table 2 to encode singular and plural number, and combinations of number, animacy, and obviation that are encoded in the verbal agreement system.

The template @AN-PLURAL is used only for 3rd person animate plurals (not for participants), capturing the distribution of the *-ag* morpheme (found both with independent verbs and as a nominal plural marker).

Table 1. Prominence hierarchy templates

<i>Template</i>	<i>Description</i>	<i>Explanation</i>
INCLUSIVE(<i>f</i>)	(<i>f</i> PERS SPEAK) = + (<i>f</i> PERS HEAR) = + @PARTICIPANT(<i>f</i>)	1st person inclusive
SPEAKER(<i>f</i>)	(<i>f</i> PERS SPEAK) = + @PARTICIPANT(<i>f</i>)	1st person
HEARER(<i>f</i>)	(<i>f</i> PERS HEAR) = + @PARTICIPANT(<i>f</i>)	2nd person
PARTICIPANT(<i>f</i>)	(<i>f</i> PERS PART) = + @PROXIMATE(<i>f</i>)	1 and/or 2
PROXIMATE(<i>f</i>)	(<i>f</i> PERS PROX) = + @ANIMATE(<i>f</i>)	3 and above
ANIMATE(<i>f</i>)	(<i>f</i> PERS ANIM) = + @ENTITY(<i>f</i>)	3' and above
ENTITY(<i>f</i>)	(<i>f</i> PERS ENTITY) = +	All persons (0 and above)

Table 2. Number and obviation templates

<i>Template</i>	<i>Description</i>	<i>Explanation</i>
PLURAL(<i>f</i>)	(<i>f</i> NUM) = PL	
SINGULAR(<i>f</i>)	(<i>f</i> NUM) = SG	
INAN-PLURAL(<i>f</i>)	@PLURAL(<i>f</i>) ¬(<i>f</i> PERS ANIM)	Inanimate plurals
AN-PLURAL(<i>f</i>)	@PLURAL(<i>f</i>) @ANIMATE(<i>f</i>) ¬(<i>f</i> PERS PART)	Animate 3rd person plurals
OBVIATIVE(<i>f</i>)	(<i>f</i> OBV) = + @ANIMATE(<i>f</i>) {@SINGULAR(<i>f</i>) @PLURAL(<i>f</i>)}	Animate obviatives Number is ambiguous

4.1.4 Verb class and order templates

Traditionally, Algonquianists group verb stems into four classes, depending on transitivity and the animacy of one argument: VAI (intransitive, animate subject), VII (intransitive, inanimate subject), VTA (transitive, animate object), and VTI (transitive, inanimate object). However, Piggott (1979, 1989) argues that VAI and VTI verb finals (i.e., *v* heads) should be conflated, and we follow him here, leaving us with three verb class templates. The templates for verbal order (independent vs. conjunct) given here are tentative, subject to revision to capture the subtleties of the distribution of the two orders. These templates are given in Table 3. The templates given for verbal order capture the generalization that the independent form is found in (most) root clauses, while the conjunct form is found

elsewhere.⁸

Table 3. Verb class and order templates

<i>Template</i>	<i>Description</i>	<i>Explanation</i>
VTA	(\uparrow_{σ} ARG ₁) (\uparrow_{σ} ARG ₂)	Two semantic arguments
VTI-VAI	(\uparrow_{σ} ARG ₁) @ANIMATE(\uparrow SUBJ) \neg (\uparrow OBJ PERS ANIM)	At least one semantic argument Subject is animate No animate object
VII	(\uparrow_{σ} ARG ₁) \neg (\uparrow SUBJ PERS ANIM)	At least one semantic argument Subject is inanimate
INDEP-ORDER(<i>f</i>)	@IPC \neg (GF <i>f</i>)	Indep. Prominence Constraint Cannot be embedded
CONJ-ORDER(<i>f</i>)	@CPC (GF <i>f</i>)	Conj. Prominence Constraint Must be embedded

4.1.5 Argument structure templates

The templates in Table 4 determine the mapping between grammatical functions (in the *f*-structure) and argument roles (in the *s*-structure). We adopt certain templates from the account of lexical mapping in Findlay (2016, 2020); their effects are summarized in the table. Note that @SHORT-PASSIVE, using the template definition from Findlay (2020), is used for a construction referred to in the Algonquianist tradition as the “unspecified actor” form (Valentine 2001); see Section 4.1.2 for discussion.

Table 4. Templates for argument mapping

<i>Template</i>	<i>Description</i>	<i>Explanation</i>
DIRECT	@MAP(SUBJ, ARG ₁) @MAP(OBJ, ARG ₂)	Subject \mapsto agent Object \mapsto patient
INVERSE	@MAP(SUBJ, ARG ₂) @MAP(OBJ, ARG ₁)	Subject \mapsto patient Object \mapsto agent
REFLEXIVE	@SUPPRESS(ARG ₂ , BIND(ARG ₁))	Patient reflexively bound
SHORT-PASSIVE	@SUPPRESS(ARG ₁ , CLOSE-OFF)	Agent existentially bound

⁸The actual situation is somewhat more complicated; the conjunct form is also found in main clauses in *wh*-questions, as well as in certain discourse contexts. The templates in Table 3 should be modified accordingly to account for this; however, distribution of the templates in *c*-structure rules and VIs should not be affected by this.

4.2 Vocabulary items

Here we list the agreement VIs present in forms involving animate subjects and (primary) objects (SUBJ and OBJ) in the independent order.

4.2.1 Voice heads

With the exception of the reflexive morpheme (which is traditionally called a verb final), these are traditionally referred to as “theme signs”. The main voice heads involved in this area of the agreement system are given in Figure 4. The form *-aa* is underspecified, showing up as a direct form when the object is 3rd-person animate, and a passive form when the subject is 3rd-person animate (though in the conjunct order, a different suffix, *-in*, plays this role). These two roles have in common that the grammatical function that maps to ARG₂ is animate (object in direct voice contexts, subject in the passive).

$$\begin{array}{l}
 \langle [\text{Voice}], \Phi \left\{ \begin{array}{l} @\text{DIRECT} \\ @\text{ADDRESSEE}(\uparrow \text{OBJ}) \end{array} \right\} \rangle \quad \xrightarrow{v} \quad -in \\
 \langle [\text{Voice}], \Phi \left\{ \begin{array}{l} @\text{DIRECT} \\ @\text{PARTICIPANT}(\uparrow \text{OBJ}) \end{array} \right\} \rangle \quad \xrightarrow{v} \quad -i \\
 \langle [\text{Voice}], \Phi \left\{ @\text{ANIMATE}((\uparrow_{\sigma} \text{ARG}_2)_{\sigma-1}) \right\} \rangle \quad \xrightarrow{v} \quad -aa \\
 \langle [\text{Voice}], \Phi \left\{ @\text{INVERSE} \right\} \rangle \quad \xrightarrow{v} \quad -igw \\
 \langle [\text{Voice}], \Phi \left\{ \begin{array}{l} @\text{SHORT-PASSIVE} \\ @\text{PARTICIPANT}(\uparrow \text{SUBJ}) \end{array} \right\} \rangle \quad \xrightarrow{v} \quad -igoo \\
 \langle [\text{Voice}], \Phi \left\{ @\text{REFLEXIVE} \right\} \rangle \quad \xrightarrow{v} \quad -idizo
 \end{array}$$

Figure 4. Voice heads

4.2.2 Agr heads

This is the category traditionally referred to as “central agreement suffixes”. They are divided into two sets: one found in independent-order contexts, and one found in conjunct-order contexts. Here we analyze only the independent-order Agr heads, given in Figure 5.⁹

The distribution of the morpheme *-min* differs across dialects. In certain dialects, including some of the Nishnaabemwin dialects characterized by Valentine (2001) and the

⁹Many of the independent Agr forms have separate allomorphs that arise when (a) there is a PLUSO element present, but (b) there is no animate OBJ present, a phenomenon known as “n-registration” (Rhodes 1990). However, we do not address these forms here.

\langle [Agr _I],	Φ	$\left\{ \begin{array}{l} (\uparrow \text{MINUSR}) = \%GF \\ @\text{SPEAKER}(\%GF) \\ @\text{PLURAL}(\%GF) \\ \{(\uparrow \text{OBJ PERS PART}) \mid \neg(\uparrow \text{OBJ})\} \end{array} \right\}$	\rangle	\xrightarrow{v}	$-min$
\langle [Agr _I],	Φ	$\left\{ \begin{array}{l} (\uparrow \text{MINUSR}) = \%GF \\ @\text{PARTICIPANT}(\%GF) \\ @\text{PLURAL}(\%GF) \\ \{(\uparrow \text{OBJ PERS PART}) \mid \neg(\uparrow \text{OBJ})\} \end{array} \right\}$	\rangle	\xrightarrow{v}	$-m$
\langle [Agr _I],	Φ	$\left\{ \begin{array}{l} \neg(\uparrow \text{SUBJ PERS PART}) \\ \neg(\uparrow \text{PLUSO}) \end{array} \right\}$	\rangle	\xrightarrow{v}	$-w$
\langle [Agr _I],	Φ	$\left\{ \begin{array}{l} @\text{SPEAKER}(\uparrow \text{SUBJ}) \\ @\text{PLURAL}(\uparrow \text{SUBJ}) \end{array} \right\}$	\rangle	\xrightarrow{v}	$-naan$
\langle [Agr _I],	Φ	$\left\{ \begin{array}{l} @\text{PROXIMATE}(\uparrow \text{SUBJ}) \\ @\text{PLURAL}(\uparrow \text{SUBJ}) \end{array} \right\}$	\rangle	\xrightarrow{v}	$-waa$
\langle [Agr _I],	Φ	$\{ @\text{SHORT-PASSIVE} \}$	\rangle	\xrightarrow{v}	$-m$

Figure 5. Independent Agr heads

Southwestern Ojibwe dialect recorded in Nichols (1980), it is found in any form that does not have an animate OBJ; see Goddard (2007) for a diachronic analysis of these morphemes. The suffix $-w$ signals a 3rd-person animate argument in intransitive forms; in many cases it is absent due to phonological rules that delete glides word-finally and in certain consonant-adjacent contexts. The second suffix $-m$ is the unspecified-actor form found with intransitive predicates.

4.2.3 Agreement clitics

Ojibwe has two sets of agreement clitics that appear *only in independent-order contexts*: a set of proclitics that index the person of (usually) the subject (traditionally, “person prefixes”), and a set of enclitics that index number and obviation of third-person arguments (usually the object) in certain contexts (traditionally, “peripheral agreement”).

The person proclitics (category PersCl), given in Figure 6, are introduced in Spec-TP in a node annotated $(\uparrow \text{MINUSR}) = \downarrow$; it indexes the person of either SUBJ or OBJ, whichever is higher on the relevant prominence hierarchy (here using the feature HEAR rather than SPEAK for the highest point in the hierarchy, meaning 2nd person outranks 1st person). Note that the 3rd-person proclitic $o-$ does not appear in intransitive forms (forms with neither OBJ nor OBJ_θ, i.e., without PLUSO); there the Agr suffix $-w$ appears instead.

$$\begin{aligned}
\langle [\text{PersCl}], \Phi\{ @\text{HEARER}(\uparrow) \} \rangle & \xrightarrow{v} gi- \\
\langle [\text{PersCl}], \Phi\{ @\text{PARTICIPANT}(\uparrow) \} \rangle & \xrightarrow{v} ni- \\
\langle [\text{PersCl}], \Phi\left\{ \begin{array}{l} @\text{ANIMATE}(\uparrow) \\ ((\text{SUBJ } \uparrow) \text{ PLUSO}) \end{array} \right\} \rangle & \xrightarrow{v} o-
\end{aligned}$$

Figure 6. Person proclitics

The number enclitics, given in Figure 7 appear on a node in the specifier of AgrP,¹⁰ which is annotated $\uparrow=\downarrow$; the @NUMCL template indicates which grammatical function's features are being specified, as defined in (9). These morphemes mark number/obviation of OBJ if there is an OBJ present; of OBJ_θ if there is an OBJ_θ but no OBJ; and of SUBJ if there is neither PLUSO function present. This is encoded in the @NUMCL template, defined as follows:

$$(9) \quad @\text{NUMCL}(\text{template}) := \left\{ \begin{array}{l} [(\uparrow \text{ OBJ}) \ \& \ @\text{template}(\uparrow \text{ OBJ})] \mid \\ [\neg(\uparrow \text{ OBJ}) \ \& \ @\text{template}(\uparrow \text{ OBJ}_\theta)] \mid \\ [\neg(\uparrow \text{ PLUSO}) \ \& \ @\text{template}(\uparrow \text{ SUBJ})] \end{array} \right\}$$

$$\begin{aligned}
\langle [\text{NumCl}], \Phi\{ @\text{NUMCL}(\text{AN-PLURAL}) \} \rangle & \xrightarrow{v} -ag \\
\langle [\text{NumCl}], \Phi\{ @\text{NUMCL}(\text{OBVIATIVE}) \} \rangle & \xrightarrow{v} -an
\end{aligned}$$

Figure 7. Number/obviation enclitics

4.3 Example structure

Figure 8 below provides the c-, f-, and v-structures for a representative example, (11), which is adapted from Nichols (1980: 292). (The s-structure is omitted for reasons of space.) The example consists of inflectional VIs taken from Section 4.2, as well as the root morpheme *waab* 'see', the v head (verb final) *-am* indicating the verb class @VAI, and the past tense prefix *gii-*. Note that, while we have included templates in the c-structure of the tree, as usual in LFG they are to be interpreted as the full bundle of features abbreviated by the template. Thus, while the description for the PersCl node in the example is written in the c-structure as (10-a), it should be understood as in (10-b):

¹⁰In a fuller exposition of Ojibwe verbal inflection, which includes negation and modality, this will be revised so that these enclitics appear in spec-ModP, as they follow the modal suffixes. However, since we are omitting modal suffixes in this analysis, we will leave them here for now.

- (10) a. @INCLUSIVE(↑)
 b. (↑ PERS SPEAK) = +
 (↑ PERS HEAR) = +
 (↑ PERS PART) = +
 (↑ PERS PROX) = +
 (↑ PERS ANIM) = +
 (↑ PERS ENT) = +

5. Conclusions

The analysis of Ojibwe inflection given here is a part of a project to provide a larger, more complete analysis that includes inflection for inanimate arguments, OBJ_{θ} , and inflectional affixes found in the conjunct order. While the results of the larger study have not yet been published, the analyses involved are along the same lines as those given here. The fact that the complex agreement morphology of a polysynthetic language like Ojibwe can be succinctly and (we believe) insightfully accounted for in an L_RFG formalism lends credence to the overall project of developing a theoretical framework well suited to capturing the properties of Canadian Indigenous languages that elude elegant analysis in more mainstream frameworks.

References

- Alsina, Alex and Eugenio M. Vigo. 2017. Fixing LFG to account for direct-inverse agreement: The case of Plains Cree. In *Proceedings of the lfg'17 conference*, ed. Miriam Butt and Tracy Holloway King. Stanford, CA: CSLI Publications, 24–44.
- Asudeh, Ash. 2012. *The logic of pronominal resumption*. Oxford: Oxford University Press.
- Asudeh, Ash, Mary Dalrymple, and Ida Toivonen. 2013. Constructions with lexical integrity. *Journal of Language Modelling* 1: 1–54.
- Bejar, Susana and Milan Rezac. 2009. Cyclic agree. *Linguistic Inquiry* 40: 35–73.
- Bögel, Tina. 2015. *The syntax-prosody interface in Lexical Functional Grammar*. Ph.D. thesis, University of Konstanz.
- Bresnan, Joan, Ash Asudeh, Ida Toivonen, and Stephen Wechsler. 2016. *Lexical-functional syntax*. Chichester, UK: Wiley-Blackwell.
- Bruening, Benjamin. 2005. The Algonquian inverse is syntactic: Binding in Passamaquoddy. Ms., University of Delaware.
- Dahlstrom, Amy. 2014. *Plains Cree morphosyntax*. Abdington-on-Thames: Routledge.
- Dahlstrom, Amy. 2017. Seeking consensus on the fundamentals of Algonquian word order. In *Papers of the forty-fifth algonquian conference*, ed. Monica Macaulay. Albany, NY: SUNY Press, 1–13.
- Dalrymple, Mary, Ronald M. Kaplan, and Tracy Holloway King. 2004. Linguistic generalizations over descriptions. In *Proceedings of the lfg04 conference*, ed. Miriam Butt and Tracy Holloway King. Stanford, CA: CSLI Publications, 199–208.
- Dowty, David R. 1991. Thematic proto-roles and argument selection. *Language* (67): 547–619.
- Findlay, Jamie Y. 2016. Mapping theory without argument structure. *Journal of Language Modelling* 4(2): 293–338.
- Findlay, Jamie Y. 2020. Lexical Mapping Theory and the anatomy of a lexical entry. Paper presented at the LFG20 virtual conference.
- Goddard, Ives. 2007. Reconstruction and history of the independent indicative. In *Papers of the thirty-eighth algonquian conference*, ed. H. C. Wolfart. Winnipeg, MB: Papers of the Algonquian Conference, 207–271.
- Halle, Morris and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from building 20*, ed. Samuel Jay Keyser and Ken Hale. Cambridge, MA: MIT Press, 111–176.
- Haugen, Jason D. and Daniel Siddiqi. 2016. Towards a restricted realizational theory: Multimorphemic monolistemicity, portmanteaux, and post-linearization spanning. In *Morphological metatheory*. Amsterdam: John Benjamins, 343–386.
- Jones, David. 1977. *A basic Algonquin grammar for teachers of the language at Maniwaki, Quebec*. Maniwaki: River Desert Band Council.
- McGinnis, Martha. 1999. Is there syntactic inversion in Ojibwa? *MIT Occasional Papers in Linguistics* 17: 101–118. Papers from the Workshop on Structure & Constituency in North American Languages.
- Melchin, Paul B., Ash Asudeh, and Dan Siddiqi. 2020. Ojibwe agreement in Lexical-Realizational Functional Grammar. Paper presented at the LFG20 virtual conference, June 24, 2020.
- Merchant, Jason. 2015. How much context is enough? two cases of span-conditioned stem allomorphy. *Linguistic Inquiry* 46(2): 273–303.

- Nichols, John David. 1980. *Ojibwe morphology*. Ph.D. thesis, Harvard University, Cambridge, MA.
- Oxford, Will. 2014. *Microparameters of agreement: A diachronic perspective on Algonquian verb inflection*. Ph.D. thesis, University of Toronto, Toronto.
- Oxford, Will. 2019. Inverse marking and Multiple Agree in Algonquin. *Natural Language and Linguistic Theory* 37(3): 955–996.
- Piggott, Glyne L. 1979. Verb classification in Ojibwa. *Montreal Working Papers in Linguistics* 12: 149–186.
- Piggott, Glyne L. 1989. Argument structure and the morphology of the Ojibwa verb. In *Theoretical perspectives on native american languages*, ed. Donna B. Gerds and Karin Michelson. Albany, NY: SUNY Press, 176–208.
- Ramchand, Gillian Catriona. 2008. *Verb meaning and the lexicon: A first phase syntax*. Cambridge: Cambridge University Press.
- Rhodes, Richard A. 1990. Ojibwa secondary objects. In *Grammatical relations: A cross theoretical perspective*, ed. Katarzyna Dziwirek, Patrick Farrell, and Errapel Mejías-Bikandi. Palo Alto, CA: CSLI Stanford, 401–414.
- Rhodes, Richard A. 1991. On the passive in Ojibwa. In *Papers of the twenty-second Algonquian conference*, ed. William Cowan. Ottawa: Carleton University, 307–319.
- Rhodes, Richard A. 1994. Agency, inversion, and thematic alignment in Ojibwe. In *Proceedings of the 20th annual meeting of the berkeley linguistics society*, ed. Susanne Gahl, Andy Dolbey, and Christopher Johnson. 431–446.
- Rhodes, Richard A. 2010. Relative root complement: a unique grammatical relation in Algonquian syntax. In *Rara & rarissima: Collecting and interpreting unusual characteristics of human languages*, ed. Jan Wohlgemuth and Michael Cysouw. Berlin: Mouton de Gruyter, 305–324.
- Rhodes, Richard A. and J. Randolph Valentine. 2015. Transitivity in ojibwe. In *Valency classes in the world's languages : Case studies from new guinea, australia, and the americas, and theoretical outlook*, ed. Andrej Malchukov and Bernard Comrie. Berlin: Mouton de Gruyter, 1205–1264.
- Svenonius, Peter. 2016. Spans and words. In *Morphological metatheory*, ed. Daniel Siddiqi and Heidi Harley. Amsterdam: John Benjamins, 201–222.
- Valentine, J. Randolph. 2001. *Nishnaabemwin reference grammar*. Toronto: University of Toronto Press.