Beyond c-structure and f-structure: On the argument-adjunct distinction in O'dam

Michael Everdell
The University of Texas at Austin

Paul B. Melchin
Carleton University

Ash Asudeh
University of Rochester/Carleton University

Daniel Siddiqi
Carleton University

Proceedings of the LFG'21 Conference

On-Line

Miriam Butt, Jamie Y. Findlay, Ida Toivonen (Editors)

2021

CSLI Publications

pages 125–145

http://csli-publications.stanford.edu/LFG/2021

Keywords: complement clauses, control constructions, relative clauses, LRFG, argumenthood, quantifiers, O'dam

Everdell, Michael, Melchin, Paul B., Asudeh, Ash, & Siddiqi, Daniel. 2021. Beyond c-structure and f-structure: On the argument-adjunct distinction in O'dam. In Butt, Miriam, Findlay, Jamie Y., & Toivonen, Ida (Eds.), *Proceedings of the LFG'21 Conference, On-Line*, 125–145. Stanford, CA: CSLI Publications.

Abstract

In this paper we examine the argumenthood properties of Controlled Complement Clauses and Non-Complement Subordinate Clauses in O'dam. We show that in O'dam only controlled COMPs are arguments, while other putative complement clauses are adjunct relative clauses that elaborate on a pronominal OBJ incorporated in the matrix verb. We use the L_RFG framework to capture both the argumenthood properties of the two types of clauses in O'dam as well as the patterns of object marking on the matrix verb by taking advantage of mismatches between c-structure (phrase structure and f-descriptions) and v-structure (the vocabulary items realizing this structure).

1 Introduction

In this paper we discuss the distinction between arguments and adjuncts in the Uto-Aztecan language O'dam. We focus on two types of subordinate clauses that previous literature has grouped together as complement clauses (Willett 1991, García Salido 2014). We call these two subordinate clause types Controlled Clausal Complements (CCC), shown in (1), and Non-Complement Subordinate Clauses (NCS), shown in (2).[1][2]

(1) T̈imu-ñi-ch [na=ñi-ch m̈ïï]$_{CCC}$
finish-1SG.SBJ-PFV SUB=1SG.SBJ-PFV run.SG.PFV
'I finished running.' (García Salido 2014: 283)

(2) Sap jup Ø-kaich-'am [na=Ø ba-tu-m-maki-a'
REP.UI IT 3SG.PO-say-3PL.SBJ SUB=3SG.SBJ CMP-DUR-MID-give-IRR
gu tumiñ]$_{NCS}$
DET money
'According to them, they said that money will be received.' (García Salido 2014: 281)

We will argue that only CCCs have the grammatical function COMP, while NCSs have the grammatical function ADJ. We will additionally argue that NCSs, as in (2), are headless relative clauses and that the object marking on the verb is an incorporated pronoun that takes the NCS as its referent.

[†]This project was in part funded by NSF-DDRIG BCS-1946625. The data here comes from our consultants Eli Soto Gurrola, Yamileth Gurrola, Wendy Gurrola, and Mauro Aguilar, who continue to help us understand the O'dam language. Thank you for the invaluable feedback from Gabriela García Salido, Luke Adamson, Kristin Denlinger, John Beavers, Stephen Wechsler, and the audiences of LFG21, WCCFL, NaCC, and the Syntax and Semantics Research Seminar at UT.

[1]García Salido (2014) terms CCCs Type 3 complement clauses and NCSs Type 1 complement clauses.

[2]Most of the glossing we use is taken from Leipzig abbreviations, here we show the abbreviations which do not have their standard Leipzig values: ∼ = reduplication ADVR = Adverbializer; EST = Stative; PO = primary object REP.UI = Reportative Unknown Information

This paper proceeds as follows: In §2 we overview basic background on the O'dam speaking community. Then in §3 we discuss previous work on the argument-adjunct distinction in O'dam and the preverbal quantifier test in §3.2. We then discuss the c-structural shape of O'dam subordinate clauses in §4 and the features of CCCs that distinguish them from other subordinate clauses in §4.1. In §4.2s we show that NCSs are distinct from CCCs in both their coreference on the matrix verb and their argumenthood properties. We propose that NCSs are not complements of their matrix verb, but that the verb selects for an OBJ with a referent associated with the NCS, which we back up with c-structural (in §4.2.1) and interpretational (in §4.2.2) properties of NCSs. In §5 we show that the LFG account leads to mismatches between argumenthood diagnostics, and thus must rely on stipulations of argumenthood. Finally, in §6 we show how the framework of Lexical-Realizational Functional Grammar (L_RFG) accounts for the distinction between clausal complements, in terms of object marking, while maintaining a principled definition of argumenthood.

2 The O'dam

O'dam (glottocode: sout2976) is a Uto-Aztecan language in the Tepiman subgroup, shown in Figure 1. O'dam is spoken primarily in the southern region of Durango and Nayarit, Mexico, in the part of the Sierra Madre known as the Gran Nayar. In Figure 2 we see Southern Tepehuan towns, with the O'dam speaking communities being those loosely centered around Santa María de Ocotán.

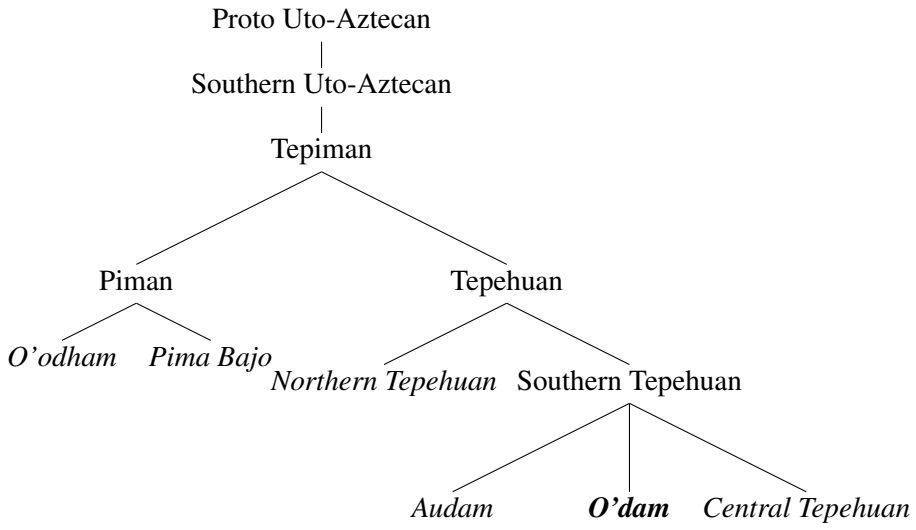


Figure 1: Uto-Aztecan family tree

Official censuses count O'dam as part of Southern Tepehuan, which includes O'dam's sister languages Audam (Southwestern Tepehuan) and Central Tepehuan. Southern Tepehuan has 36,543 speakers (INEGI 2015), of which O'dam is the

most widely spoken and the best studied of the three varieties. Currently children are learning O'dam as their L1, although increasing economic pressure is pushing O'dam speakers into communities where Spanish is more dominant; see García Salido and Everdell (2020). Geographically, the Southern Tepehuan languages are surrounded by other Southern Uto-Aztecan languages: Cora, Huichol and Mexicanero, although O'dam generally live in towns consisting of just O'dam or O'dam and mestizos.[3] The speakers we work with are fluent in Spanish and

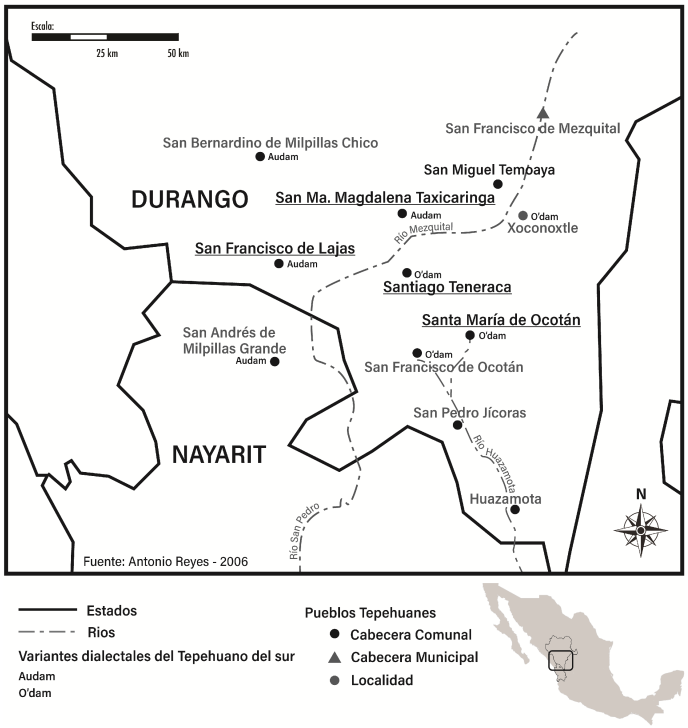


Figure 2: Map of Southern Tepehuan towns in Mexico (García Salido and Everdell 2020: 90)

O'dam and split their time between Durango City and their respective communities of Juktɨr (Santa María de Ocotán), Koba'ram (La Candelaria) and Suusbhaikam (Los Charcos).

3 Argumenthood in O'dam

3.1 Diagnosing argumenthood

The distinction between arguments and adjuncts in O'dam is not a clear one. Nominals lack case marking, the only element required for a clause is a verb, and verbal

[3] *Mestizo* is the majority ethnic group in Mexico, consisting of people who have mixed European and indigenous heritage. O'dam generally do not recognize *mestizos* as Indigenous.

dependents (arguments and adjuncts) can occur in any order following the verb, although typically no more than two XPs of any grammatical function appear in a given clause (Willett 1991, García Salido 2014, Everdell in progress).

Previous work on O'dam relies on two diagnostics for argumenthood (Willett 1991, Willett and Willett 2013, García Salido 2014). Subjects and primary objects are diagnosed based on their coreference with verbal affixes, shown in Tables 1 and 2. In (3) we see that the the 1SG subject suffix *-(i)ñ* and the 3PL primary object prefix *ja-* coreference the experiencer and stimulus of the seeing event. O'dam only permits a single object to be coreferenced on the verb, such non-coreferenced objects of ditransitives are called secondary objects. Because secondary objects lack any verbal coreference or obligatory exponent in the clause, previous work on O'dam has generally assumed their existence through entailment (e.g. 'give' entails a theme and recipient).[4]

To illustrate the difference between objects, the applicative in (3) licenses a beneficiary when combined with the verb *nɨɨya'* 'see', as in (3) (Everdell and García Salido 2021).[5] The primary object OBJ) is the 3SG stimulus, while we see in the gloss that the beneficiary is 1SG, making it the secondary object (OBJ_θ). However, the beneficiary lacks an exponent in the clause, it is optional, and in another discourse context could be any person-number combination. secondary objects optionally receive XP exponents along with primary objects, as in (4) where *gu tatoxkolh* '(the) pigs' is the primary object (OBJ) and *gu koi'* '(the) food' is the secondary object (OBJ_θ). secondary objects licensed by applicatives also often receive primary object status, as in (5a) where the *-dha* applicative combines with *ɨxcho'* 'hide' to license a person the patient is hidden from, compare (5b).

	Subject	Primary Object
1SG	*-(i)ñ*	*jiñ-*
2SG	*-(a)p*	*(ju)m-*
3SG	*-Ø*	*Ø-*
1PL	*-(i)ch*	*(ji)ch-*
2PL	*-(a)pim*	*jam-*
3PL	*-(a)m*	*ja-*

Table 1: Non-topic subject and primary object markers

	SG	PL
1	*(ji)ñ-*	*(ji)ch-*
2/3	*(ju)m-*	*(ju)m-*

Table 2: Middle primary object markers

[4]Recent work exploring these secondary objects has found them to pattern with primary objects and subjects in a number of ways, see Everdell (in progress).

[5]The tilde (∼) indicates reduplication, according to the Leipzig Glossing Rules.

(3) Añ gu=x bu∼pui-ch-ɨk ji na=**ñ**
1SG.SBJ DET=COP IT∼eye-CAUS-PNCT FOC SUB=1SG.SBJ
bha=**ja**-ni'ñ-dha' ma'n
DIR =3PL.PO-see-APPL one
'I only was looking at the ugly ones **for me**.' (García Salido 2014: 80)

(4) Añ tu-ja-maa gu ta∼toxkolh gu koi'
1SG.SBJ DUR-3PL.PO-give.PFV DET PL∼pig DET food
'As for me, I gave food to the pigs.' (García Salido 2014: 49)

(5) a. Ja-ɨxchoi-dha-'-iñ [gu biiñ]$_{\text{OBJ}_\theta}$ [gu=ñ
3PL.PO-hide-APPL-IRR-1SG.SBJ DET mezcal DET=1SG.POSS
jikkulh]$_{\text{OBJ}}$ na=pai'dhuk koxi-a'
uncle.PL SUB=when sleep-IRR
'I'm going to hide the mezcal from my uncle when he goes to sleep' (adapted from (Willett and Willett 2013: 73))

b. Ka-xi-Ø-ɨxcho-'-ap dhi kiis na=m
PERF-IMP-3SG.PO-hide-IRR-2SG.SBJ DEM cheese SUB=3PL.SBJ
cham jich-jugii'ñ-dha-' gu ja'tkam
NEG 1PL.PO-finish-APPL-IRR DET people
'Hide this cheese so the people don't finish ours! [Esconde el queso para que no se lo acabe la gente]' (Willett and Willett 2013: 73)

Even though standard argumenthood tests fail for secondary objects, previous work has assumed that they are arguments. This assumption arises from the fact that they are entailed by the verb (e.g., Everdell and García Salido 2021). This characteristic has been shown to be a (somewhat mixed) indicator of argumenthood (Cappelen and Lepore 2005, Needham and Toivonen 2011, Barbu 2015, Barbu and Toivonen 2016a,b, Moura and Miliorini 2018). The factors determining primary and secondary objecthood are currently not well understood although in texts the primary object is most often the one with the highest animacy and number (García Salido 2014: 46ff). Everdell (2021) however finds that primary and secondary objects are symmetrical with respect to argumenthood tests other than verbal coreference, for example the preverbal quantifier test we use here. We treat primary objects as OBJ and secondary objects as OBJ$_\theta$. In §3.2 we return to the properties of preverbal quantifiers that make them a useful argumenthood test, before turning to CCCs and NCSs.

3.2 Preverbal quantifiers

Quantifiers in O'dam are a distributionally defined class of elements that immediately precede determiners in DPs, what we call the constituent position, or precede the verb, what we call the preverbal position. Although many O'dam quantifiers have quantifier semantics we have not checked whether all of them do and at issue

here is their f-structural properties and ability to associate with a discontinuous XP, not their s-structures or compositional meanings.

In the constituent position quantifiers quantify whatever XP they are a constituent with, as in (6). In this position the grammatical function of the XP in the larger clause is not relevant. In the preverbal position quantifiers act as an argumenthood diagnostic, they quantify arguments of the associated verb and not adjuncts. We see this in (7) where *ma'n* 'one/a'[6] can quantify the object *gu bhan* 'the/a coyote' but not the locative *mu pue'mlo* 'the town down there', which are systematically treated as adjuncts in O'dam, see also Everdell (2021, in progress) for further evidence of preverbal quantifiers as an argumenthood test.

(6) a. Ø-tii-ñi-ch [**ma'n** gu bhan]$_{DP}$ mu
3SG.PO-see.PFV-1SG.SBJ-PFV one DET coyote DIST.LOWER
pue'mlo
town
'I saw one/a coyote in that town'

b. Ø-tii-ñi-ch gu bhan [**ma'n** mu
3SG.PO-see.PFV-1SG.SBJ-PFV DET coyote one DIST.LOWER
pue'mlo]$_{Loc}$
town
'I saw the/a coyote in a town (down there)'

(7) **Ma'n** Ø-tii-ñi-ch [gu bhan]$_{Argument}$ [mu
one 3SG.PO-see.PFV-1SG.SBJ-PFV DET coyote DIST.LOWER
pue'mlo]$_{Adjunct}$
town
'I saw one/a coyote in that town'
*I saw the/a coyote in one/a town (down there)

In (8) we see the quantifier *bix* 'all' preceding the verb *niiya'* 'see' with a 1SG experiencer subject and a 3PL stimulus object. The subject is not quantifiable here because the 1SG subject is not compatible with the plural interpretation forced by *bix*. In (8a) we see that *bix* can quantify the OBJ of *niiya'* 'their teachers', but not the embedded possessor 'my friends' in (8b). Thus, we see that preverbal quantifiers in O'dam show DP island effects. We also see in (8c) that properties of the verb itself can be quantified in addition to more standard parts of the argument set of a verb's f-structure (i.e. the SUBJ and OBJ).

(8) **Bix** ja-nii'-iñ [gu ja-mamtuxi'ñ-dham [gu=ñ
all 3PL.PO-see-1SG.SBJ DET 3PL.POSS-teach-NMLZ DET=1SG.POSS
a'∼mi']$_{DPpossessor}$]$_{DPpossessum}$
PL∼friend

[6]Definiteness in O'dam is pragmatic (Willett 1991: 206-7) so *ma'n* can be interpreted as a true numeral or as an indefinite marker.

a. 'I see **all of the teachers** of my friends'

b. *I see the teachers of **all of my friends**

c. 'I see all of the teachers of my friends (e.g. if the teachers are trying to hide)'

The correlation between argumenthood and preverbal quantification suggests that quantification is mediated by f-structure, where grammatical functions and argumenthood are encoded, rather than at c-structure (see Al Khalaf 2019 and referenced therein). The functional equation for *bɨx* 'all' is given in (9). Here, AF is a variable over the argumental grammatical functions. The '*' notation indicates that the feature can be assigned to the current f-structure, including OBJ_θ in (26), or to any that can be reached via a path of AF functions, which will be discussed below. The f-structure feature QUANT, and values like ALL, are a simplifying substitute for an account in Glue Semantics (see, e.g., Dalrymple et al. 2019: chap. 8), which would involve the relevant portion of the path specification.

(9) $(\uparrow \text{AF}^* \text{ QUANT}) = \text{ALL}$

We have shown that quantifiers in the preverbal position quantify members of a verb's AF list and do not quantify those of the ADJ set. We have additionally shown that the verb itself is treated as a member of the set of Argument Functions by preverbal quantifiers. We now use this information to discuss the argumenthood properties of CCCs and NCSs in §4.

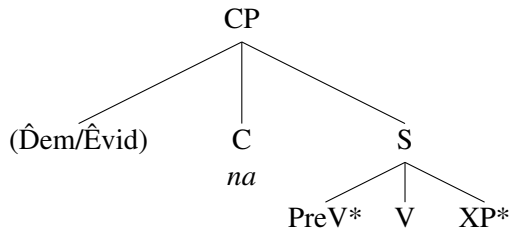
4 Subordinate clauses

The basic structure for all subordinate clauses in O'dam, complement or otherwise, involves projecting a CP over an S, which is a basic non-subordinate clause (Everdell and Melchin 2021, Everdell in progress).[7]

Within a basic clause, the V is the verb complex and can be understood as comprising the verbal word (Everdell in progress). The PreV is where preverbal quantifiers occur and consists of various scopally ordered non-projecting functional particles that roughly align with the clausal spine (Ramchand and Svenonius 2014) The only projecting heads attested in the PreV are topic XPs. The XP position following the V consists of all non-topic phrasal dependents of the verb regardless of grammatical function, see Everdell (in progress) for a fuller discussion of O'dam constituency.

[7]There are various subordinators (see García Salido 2014), however the general subordinator *na* is the only relevant one for our purposes.

(10)



While all subordinate clauses in O'dam share the same basic c-structural form, previous work grouped CCCs and NCSs as complement clauses because they are associated with special marking on the verb, which we discuss in §4.1 and §4.2. We will show that CCCs are true complement clauses, while NCSs are headless relative clauses with the ADJ grammatical function.

4.1 Controlled clausal complements

CCCs, shown in (11), are finite and fully saturated for their arguments, what Stiebels (2007) calls "inherent control." Previous work primarily diagnoses CCCs by the obligatory coreference marking and interpretation of the controller and controllee (Willett 1991, García Salido 2014). This is shown in (11), where the subject of *poderu'* 'be able to' controls the subject of *manteneru'* 'support' and both must be 3PL and be interpreted as consisting of the same set of individuals. While both subject and object controllers are attested, shown in Table 3,[8] we have only identified controlled subjects in O'dam. Nonetheless, our analysis here would apply the same to a CCC with a controlled object because the AF path would be the same; this is currently an unconfirmed prediction. We only find exhaustive control in the language; to our knowledge partial control constructions à la Landau (2000) do not exist.

(11) Na=**m**$_i$-gu' ba-poder [na=**m**$_{i/*j}$ jich-mantener-ka']$_{CCC}$
SUB=3PL.SBJ-ADVR CMP-can SUB=3PL.SBJ 1PL.PO-support-EST
ja'p sap jum-aa'
DIR REP.UI MID-think.PFV
'Because they could support us, he thought so.' (lit. Because they$_i$ could they$_{i/*j}$ support us, he thought so) (adapted from García Salido 2014: 283)

Verb	Meaning	Controller	Verb	Meaning	Controller
poderu'	'be able to'	Subject	*chia'*	'send/causative'	Object
tiimo'	'finish'	Subject			

Table 3: Attested control verbs in O'dam

We analyze control verbs as taking the CCC as a COMP argument. They also take another core argument, the controller, that must be coreferenced with the sub-

[8] Citation forms for verbs in O'dam are always given with the *-(a)'* irrealis suffix.

ject of the embedded clause; this is the direct object if the matrix verb has a thematic subject present, and subject otherwise. The control relationship is specified as in (12), for instances where the controller is the object, and (13) for subject controllers, adopted from Asudeh (2005).[9]

(12) $(\uparrow \text{OBJ})_\sigma = ((\uparrow \text{COMP SUBJ})_\sigma \text{ ANTECEDENT})$

(13) $(\uparrow \text{SUBJ})_\sigma = ((\uparrow \text{COMP SUBJ})_\sigma \text{ ANTECEDENT})$

When a quantifier sits in the preverbal position of a control verb, we find that it can quantify the arguments of both the control verb and the controlled verb. This is shown in (14) using the the analytical causative *chia'* 'send' and the quantifier *dɨlh* 'only' in the matrix preverbal position. In (14a) and (14b) we see that *dɨlh* can quantify the SUBJ and OBJ of *chia'*, where the OBJ is also the controller of the CCC subject. In (14c) we see that *dɨlh* can quantify the CCC clause as a whole, as we saw was possible for preverbal quantifiers in simple clauses in §3.2.

(14) Dɨlh jam-chia-mɨ-t na=pim bopooy-a' jix=io'm
only 2PL.PO-send-3PL.SBJ-PFV SUB=2PL.SBJ run.PL-IRR COP=very

a. '**Only they** told you.PL to run faster'
b. 'They told **only you all** (as opposed to anyone else) to run faster'
c. 'They told you all **to only run** faster (as opposed to do anything else faster)'

We also see in (15) that a non-controlled object of a CCC is quantifiable from the preverbal position of the control verb. Because quantifiers must be compatible with the elements they quantify (i.e. a quantifier with a plural interpretation cannot quantify a singular DP) the sentence in (15) would be ungrammatical if the non-controlled OBJ of the CCC was not available, because all other participants in the control construction are singular.

(15) Gok jiñ-chia-pi-ch na=ñ jup duñi-a' gu tacos
two 1SG.PO-send-2SG.SBJ-PFV SUB=1SG.SBJ IT do-IRR DET tacos
'You wanted me to make two tacos'

Since the arguments of the CCC are arguments of a COMP function, they fall within the scope of preverbal quantifiers as specified in (9) in §3.2. The f-structure for the object control construction in (15) is given in Figure 3, while the f-structure for the subject control construction seen above in (1) is given in Figure 4. Note that in this analysis verbs with an object controller are ditransitive. They pattern with other ditransitives in that they only show agreement with one of the objects/complements. See §5 for further discussion of ditransitives in O'dam.

We have shown that preverbal quantifiers can quantify through all argumenthood functions of their associated verb. For control constructions, treating CCCs

[9] If it turns out that O'dam does have controlled objects then there would be another set of equations equivalent to (12,13) but with the specification $((\uparrow \text{COMP OBJ})_\sigma \text{ ANTECEDENT})$.

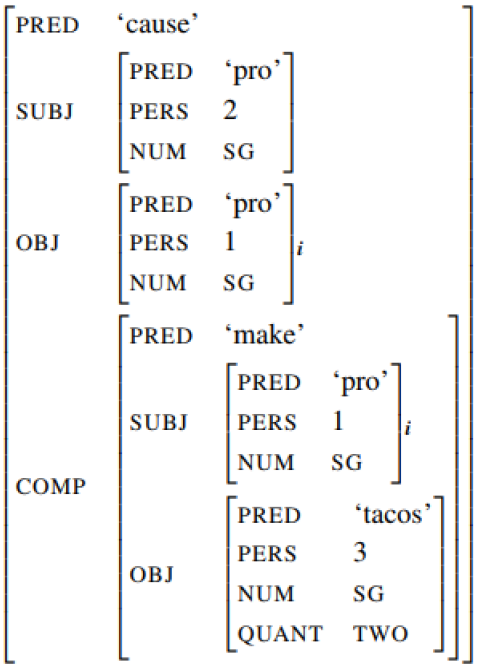


Figure 3: F-structure for CCC with object antecedent

as having the COMP function captures the ability for quantifiers in the preverbal position of a control verb to also quantify arguments of the controlled verb. We now move to §4.2 where we will see that same is not true of NCSs.

4.2 Non-complement subordinate clauses

NCSs are diagnosed by 3SG OBJ coreference on a transitive verb, as shown in (16).[10] A list of attested verbs that permit an NCS object is shown in Table 4

(16) Jix=bhai' jix=Ø-maat [na cham ji'xkat jugio-ka' gu
COP=good COP=3SG.PO-know SUB NEG never eat-EST DET
tu']$_{NCS}$
something
'Because it is good for him to know that he could not eat it.

Most verbs that select for NCSs also permit nominal objects that receive a DP exponent, as seen in (17), where the 3PL OBJ prefix is coreferenced with the DP 'the men who live in Teneraca', which is not an NCS. However, when the antecedent is an NCS the coreferring verbal object prefix is 3SG even when it has a plural referent, as seen in (18) where the quantifier *bix* 'all' enforces a plural interpretation of the referent of the NCS (i.e. the places where my family members live).

[10]NCSs in O'dam must be selected for by the verb and we have no verbs that select for a clausal subject.

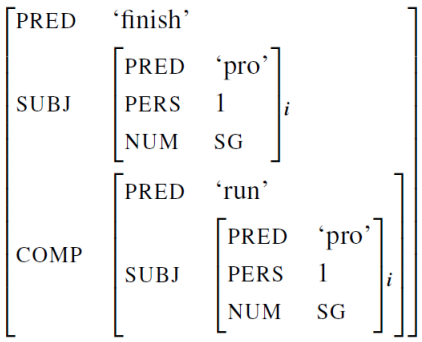


Figure 4: F-structure for CCC with subject antecedent

Verb	Gloss	Verb	Gloss
aa'	'want'	*maat*	'know'
choodo'n	'be afraid of'	*nɨiya'*	'see'
ɨibhi'ñ	'fear'	*taata'*	'feel'
ɨlhdha'	'believe'	*tɨtda'*	tell
kaaya'	'hear'	*tɨ'ñcho'*	'remember'
kaich	'say'		

Table 4: Attested verbs that permit NCS object

(17) Pɨx cham **ja-ñii'ñ-ap** [gu chi∼chio'ñ na=m kio
MIR NEG 3PL.PO-see-2SG.SBJ DET PL∼man SUB=3PL.SBJ live
mummu Chianarkam]$_{DP}$
DIST.LOWER Teneraca
'You have not ever seen the men who live in Teneraca'

(18) Añ joidham **tɨ-Ø-nɨi** [bix na=m pai' kio
1SG.SBJ enjoy DUR-3SG.PO-see all SUB=3PL.SBJ where live
gu=ñ pamil]$_{NCS}$
DET=1SG.POSS family
'I like all of the (various) places where my family lives'

When *maat* 'know' takes a NCS, as in (19), we see that the quantifier *bɨx* in the matrix preverbal position can quantify the NCS as a clause, in (19a), but not the dependents of the NCS, in (19b) and (19c) respectively.

(19) Bɨx jix=**Ø-**mat-iñ na=m jaroi' mɨi-'ñ
all COP=3SG.PO-know-1SG.SBJ SUB=3PL.SBJ someone burn-APPL
gu ku'a'
DET firewood

a. I know who.PL **completely burned the firewood** NCS
b. *I know who.PL burned **all of the firewood.** OBJECT

c. *I know **all of them** who burned the firewood. SUBJECT

In contrast, when *maat* 'know' takes a pronominal complement referring to an individual, as in (20), we see that it can quantify the ones who burned the firewood, in (20c), who are now the object of *maat*. However, in (20a) we see that now *bix* cannot quantify the BURN NCS like it could in (19a) when *maat* took an NCS object.

(20) Bɨx jix=**ja-**mat-iñ na=m jaroi' mɨi-'ñ gu
all COP=3PL.PO-know-1SG.SBJ SUB=3PL.SBJ someone burn-APPL DET
ku'a'
firewood

a. *I know who.PL **completely burned the firewood** NCS

b. *I know who.PL burned **all of the firewood.** OBJECT

c. I know **all of them** who burned the firewood. SUBJECT

We analyze these verbs as taking a function that is a pronominal OBJ that is coindexed with the NCS ADJ, rather than COMP as with CCCs. This OBJ is specified as being pronominal, and may be coreferenced with a CP realizing the clause. However, the CP appears in the f-structure with the grammatical function ADJ, rather than as an argument of the clause

The lack of preverbal quantification for arguments of the CP is now explained: The actual argument of the verb is a pronoun, referring to the NCS itself. However, the arguments of the NCS are only specified in f-structure (if at all) in an ADJ structure. Thus they fall outside the path specified by (↑ AF*) in our quantifier equation in (9).

The f-structure for (21) is shown in Figure 5.

(21) Bɨx **jix=Ø-mat-iñ** na=m jaroi' mɨi-'ñ
all COP=3SG.PO-know-1SG.SBJ SUB=3PL.SBJ someone burn-APPL
gu ku'a'
DET firewood

'I know who.PL completely burned the firewood' (Lit. I know that people completely burned the firewood)

In this section we have explained that giving the NCSs the ADJ grammatical function correctly captures the behavior of preverbal quantifiers. In §4.2.1 and §4.2.2 we will give evidence that verbs that previous work assumed selected for a NCS actually select for a pronominal OBJ with an clausal referent.

4.2.1 CP exponents of NCSs are headless relative clauses

When the referent of the NCS is not the eventuality, as in (22), we find that there is always a *wh*-word, in this case *pai'* 'where'.

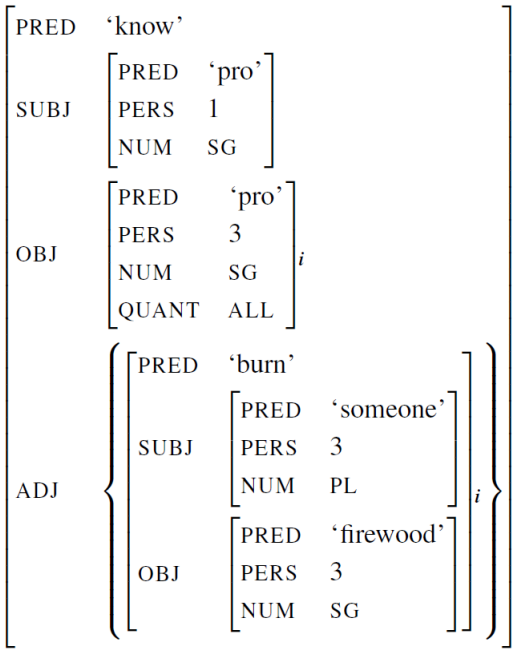


Figure 5: F-structure for NCS

(22) Añ joidham ti-Ø-nii [bix na=m **pai'** kio
1SG.SBJ enjoy DUR-3SG.PO-see all SUB=3PL.SBJ **where** live
gu=ñ pamil]$_{NCS}$
DET=1SG.POSS family
'I like all of the (various) places where my family lives'

We see in (23) that there is no *wh*-word in the NCS.

(23) Jix=bhai' jix=Ø-maat [na cham ji'xkat jugio-ka' gu
COP=good COP=3SG.PO-know SUB NEG never eat-EST DET
tu']$_{NCS}$
something
'Because it is good for him to know that he could not eat it.

García Salido (2021) finds such *wh*-words a diagnostic feature of headless relative clauses, which are always adjuncts, as in (24).

(24) Añ jix=io'm tu-jua [na **gu'** ap jix=io'm
1SG.SBJ COP=hard DUR-work.PFV SUB **why** 2SG.SBJ COP=hard
tu-jua]$_{headlessRC}$
DUR-work.PFV
''I worked hard because you worked hard.' (García Salido 2021: 70)

The syntactic shape of NCSs matches that of headless relative clauses when the referent is not an eventuality (i.e. they require a *wh*-word). This suggests that the

OBJ of the matrix verb is a pronominal that refers to the NCS, rather than the OBJ being the full clause itself, as with CCCs.

4.2.2 The 'personal' distinction

The difference in interpretation of verbs selecting for a typical DP object versus an object associated with NCS also suggests that for the latter, the NCS is treated as a relative clause of the elaborating on the OBJ of the matrix verb. In (25) we see two minimally contrastive sentences using the verb *maat* 'know'. Both sentences express that the speaker knows something about the multiple people who burned all of the firewood her friend had collected. In (25a) the object of *maat* 'know' is a 3PL pronoun refering to the individuals, which the headless relative clause modifies. This structure expresses that the speaker personally knows the people who burned the firewood. In (25b) the object of *maat* is a 3SG pronoun referring to the NCS, which the headless relative clause modifies. This structure expresses that the speaker did see who burned the firewood but does not know those people personally.

(25) a. Bix **jix=ja-mat-iñ** [na=m jaroi' mɨi-'ñ
all COP=3PL.PO-know-1SG.SBJ SUB=3PL.SBJ who burn-APPL
gu ku'a']$_{headlessRC}$
DET firewood
'I know who all burned the firewood' (Lit. I know all of them, who burned the firewood)

b. Bix **jix=Ø-mat-iñ** [na=m jaroi' mɨi-'ñ
all COP=3SG.PO-know-1SG.SBJ SUB=3PL.SBJ someone burn-APPL
gu ku'a']$_{headlessRC}$
DET firewood
'I know who.PL completely burned the firewood' (Lit. I know that people completely burned the firewood)

5 Interim summary: The LFG account

The analysis proposed so far accounts for which constituents can or can't receive preverbal quantification. Quantifiers assign a QUANT feature to any f-structure accessible via a path consisting only of argument functions. The arguments of a CCC are found in a COMP, so they can be quantified. The arguments of an NCS are in an ADJ and cannot be quantified.

However, the set of constituents that can be quantified is wider than the set diagnosed by verbal coreference. In ditransitives, only one object argument is coreferenced by verbal morphology, while both may be quantified, as shown in (26), where either the *recipient* or the *theme* may be quantified, while only the recipient is head-marked. We know that the OBJ in (26) is the recipient because

(26) is only acceptable with a 3PL recipient, coreferenced with *ja-*. If the recipient was the OBJ_θ, then it could be any person-number combination.

(26) Gok ja-maa-ñi-ch gu ti∼tbi-chuk
two 3PL.PO-give.PFV-1SG.SBJ-PFV DET PL∼play-POSSD
'I gave them two toys.'
'I gave toys to two (people).'

We thus have two mismatches between verbal coreference and preverbal quantification: OBJ_θ (non-coreferenced objects of a ditransitive) and properties of the event itself (often the scale). While this is a perfectly satisfactory syntactic analysis, it is incomplete, because it lacks a deeper explanation for the form of these grammatical functions. We turn to L_RFG to provide exactly that explanation.

6 An L_RFG analysis

Lexical-Realizational Functional Grammar (L_RFG) is a synthesis of Distributed Morphology (DM) as a theory of morphological realization and LFG as a theory of grammatical architecture (Melchin et al. 2020). As a descendant of LFG, it is a declarative, representational and constraint-based theory ideally suited to modelling nonconfigurationality, like in O'dam. As a descendant of DM, it provides a realizational, morpheme-based view of word-formation and is good at modelling complex morphological structures, including those found in highly agglutinative languages such as O'dam (Tallman et al. 2018). In L_RFG, as in DM, the terminal nodes of the c-structure are not words or morphemes (i.e., they contain no phonological material), but are instead bundles of features which are realized by Vocabulary Items (VIs) at v(ocabulary)-structure.

Our L_RFG account takes advantage of this distinction between c-structure and v-structure to account for the argumenthood mismatches. In L_RFG, features of all arguments are present in the c-structure nodes that map to the verb's f-structure. However, the VIs that realize these nodes are systematically specified only for certain grammatical functions. In this way, argumenthood and c-structure features are strictly correlated, while the features of the relevant nodes that get overt exponence are dependent on the VIs available to realize them.

We assume that features of all arguments, including both theme and recipient, are introduced by a node in the c-structure associated with the verb (i.e., in the V). A schematic L_RFG c-structure for the O'dam verb is shown in Figure 6.

In the c-structure of (26), the node hosting object agreement features, Agr_O, is specified for features of both the primary object (OBJ, the *recipient*) and the secondary object (OBJ_θ, the *theme*), as in (27).

(27) Agr_O' → … Agr_O …
 @ObjAgree

We use a template for object agreement (Dalrymple et al. 2004), where the optional material allows us to capture transitives and ditransitives in a single template:

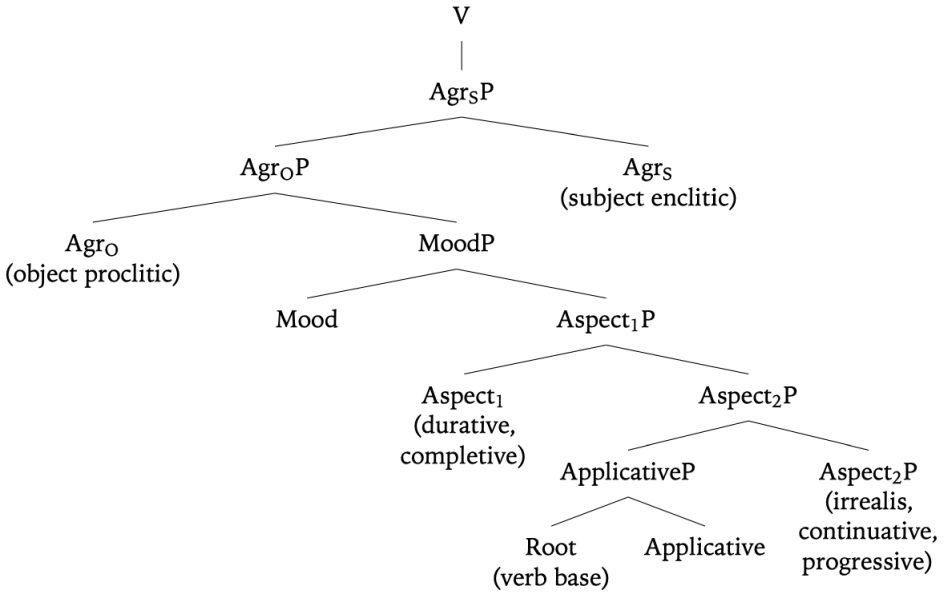


Figure 6: Schematic L_RFG c-structure for the O'dam verb

(28) ObjAgree:= $\begin{array}{l}(\uparrow \text{OBJ PERS}) = \{1|2|3\} \\ (\uparrow \text{OBJ NUM}) = \{\text{SG}|\text{PL}\} \\ \left(\begin{array}{l}(\uparrow \text{OBJ}_\theta \text{ PERS}) = \{1|2|3\} \\ (\uparrow \text{OBJ}_\theta \text{ NUM}) = \{\text{SG}|\text{PL}\}\end{array}\right)\end{array}$

However, the Vocabulary Items that realize Agr_O are only specified for features of one object, as in (29). The full list of subject and primary object markers is shown in Tables 1 and 2 in Section 4 above.

(29) $\langle\, [\text{Agr}_\text{O}], \quad \Phi \left\{ \begin{array}{l}(\uparrow \text{PLUSO}) = \texttt{\%gf} \\ (\uparrow \texttt{\%gf PERS}) = 3 \\ (\uparrow \texttt{\%gf NUM}) = \text{PL}\end{array} \right\} \,\rangle \quad \Rightarrow \quad$ *ja-*

The label PLUSO is a variable over OBJ and OBJ_θ, as in Findlay (2016, 2020). The arbitrary local name `%gf` ensures that PERSON and NUMBER values are for the same argument. The choice of which of the two PLUSO arguments is expressed is due to a complex interaction between the available VIs and certain pragmatic factors (see for example García Salido 2014: 48ff). However, in either case there will be only one agreement morpheme available in the set of O'dam's VIs for the two object functions.[11]

[11] A reviewer raised the question of what advantage this analysis has over a traditional LFG analysis in which a single node in the c-structure can host either OBJ or OBJ_θ. However, this raises the question of how the features of both object arguments can be in the f-structure, if only one of them appears in a given c-structure. This analysis allows us to have the features of both arguments present in c-structure, and therefore in f-structure, while only one is ever realized overtly.

We assume that the QUANT features are assigned by the f-description, such as that in (9) for *bix* 'all', in the c-structure node of the preverbal quantifier, regardless of whether there is overt agreement on the verb. In other words, the assignment of QUANT features is not dependent on overt morphology, though both are determined by the grammatical function (and thus, the argumenthood) of the relevant participants. When there is no surface morphology, we take this as evidence that the O'dam Vocabulary lacks such an exponent. This is cross-linguistically typical with so-called "unmarked" or high-frequency feature combinations; see for example the work of Haspelmath, whose viewpoint is summarized in Haspelmath and Sims (2010: ch. 12).

In L_RFG, in cases like this where there is no VI that is dedicated to the expression of the relevant features, a linearly adjacent VI in the v-structure *spans* the unexpressed features. This allows the mapping between c-structure and v-structure to maximally satisfy the *MostInformative* constraint (Melchin et al. 2020: 273), which resolves the competition between forms by ensuring the v-structure realizes the largest subset of f-descriptions present in the c-structure using the smallest number of VIs. Thus, the relationship between terminal nodes and VIs is many-to-one in L_RFG, using the mechanism of Spanning (Haugen and Siddiqi 2016, Merchant 2015, Ramchand 2008, Svenonius 2016) that was developed for DM and similar models; that is, one VI may realize features of multiple terminal nodes.

For this reason, the framework is similar to the Lexical Sharing model proposed for LFG by Wescoat (2002, 2005, 2007), but maintains the complex internal structures of words as part of syntax. One difference between L_RFG and Lexical Sharing is the notion which L_RFG calls *Pac-Man Spanning* (Haugen and Siddiqi 2016, Melchin et al. 2020: 284). According to Pac-Man Spanning, VIs can span any number of adjacent preterminal nodes, as long as the spanning doesn't obscure a meaning (including semantic/conventionalized presuppositions) that could otherwise be realized via an overt exponent. This is the L_RFG alternative to so-called "null morphemes" in most morpheme-based realizational models: lacking any dedicated exponent of its own, functional material is absorbed into the expression of a neighboring terminal.

This spanning of unmarked feature combinations can be seen in the O'dam agreement system when the object has 3rd-person singular features. While this is marked as Ø in the list of agreement markers in Table 1, and in examples such as (21), we assume that the Agr_O node hosting the features in these contexts is actually realized by the VI for the neighboring verb root. That is, we assume there is no VI of category Agr_O that realizes 3rd-person singular features of PLUSO arguments, rather than assuming the existence of a dedicated null morpheme specified for these features. Therefore, in the examples above, the symbol Ø in glosses should be taken to indicate this kind of spanning, rather than the presence of a null morpheme.

In this analysis, there are thus two reasons for mismatches between verbal coreference and argumenthood (and therefore preverbal quantification, which is dependent on argumenthood), both made available by the L_RFG framework. The first occurs when there is a VI available to realize some, but not all, of the features

of the Agr_O terminal node. This occurs in ditransitives, where Agr_O has features of both OBJ and OBJ_θ, but the VIs realizing this category systematically only contain features of one PLUSO argument. Thus, the Agr_O VI realizes only a subset of the node's features. The second mismatch occurs when the object is 3rd-person singular, for which there is no Agr_O VI at all, in which case the node is realized by a neighboring node in an instance of Pac-Man Spanning.

7 Conclusion

Following Everdell's (2021) overview of O'dam argumenthood tests, we have shown that CCCs and NCSs pattern differently with regards to their argumenthood status, contra previous work that assumed they were both clausal complements. While CCCs as clausal complements of their control verb, NCSs pattern with adjuncts of their matrix verb, with the exception of the NCS as a whole. Combined with an analysis of CCCs as COMP and NCS as ADJ, this explains the differences in preverbal quantification of the arguments of the different types of clauses. Our analysis of the OBJ of an apparent NCS selecting verb as only having a pronominal OBJ with the NCS acting as a relative clause of that OBJ, explains the argumenthood status of that clause, as well as the varying shape of NCSs and the impersonal interpretation of verbs with an OBJ associated with an NCS. However, in LFG this account leaves unexplained the mismatches between preverbal quantification and the other main argumenthood diagnostic in O'dam, coreference by verbal affixes. In particular, a potential problem for standard LFG is that coreference only captures a subset of the arguments identified by preverbal quantification. These mismatches can be explained in L_RFG as mismatches between c-structure terminal nodes and their v-structure exponents, allowing arguments to be consistently present in c-structure.

References

Al Khalaf, Eman. 2019. Floating quantifiers are autonomous phrases: A movement analysis. *Glossa: a journal of general linguistics* 4(1): 89.

Asudeh, Ash. 2005. Control and semantic resource sensitivity. *Journal of Linguistics* 41: 465–511.

Barbu, Roxana-Maria. 2015. Verbs and Participants: Nonlinguists' Intuitions. Master's thesis, Carleton University.

Barbu, Roxana-Maria, and Ida Toivonen. 2016a. Arguments and Adjuncts: at the Syntax-Semantics Interface. In Ellen Thompson, ed., *Proceedings of the Florida Linguistics Yearly Meeting (FLYM) 3*.

—. 2016b. Event participants and linguistic arguments. In A. Papafragou, D. Grodner, D. Mirman, and J.C. Trueswell, eds., *Proceedings of the 38th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.

Butt, Miriam, and Ida Toivonen, eds. 2020. *Proceedings of the LFG20 Conference*. Stanford, CA: CSLI Publications.

Cappelen, Herman, and Ernest Lepore. 2005. *Insensitive semantics: A defense of semantic minimalism and speech act pluralism*. Oxford: Blackwell Publishing.

Dalrymple, Mary, Ronald M. Kaplan, and Tracy Holloway King. 2004. Linguistic Generalizations over Descriptions. In Miriam Butt and Tracy Holloway King, eds., *Proceedings of the LFG04 Conference*, 199–208. Stanford, CA: CSLI Publications.

Dalrymple, Mary, John J. Lowe, and Louise Mycock. 2019. *The Oxford Reference Guide to Lexical Functional Grammar*. Oxford: Oxford University Press.

Everdell, Michael. 2021. From Whence Arise Arguments? Argumenthood in O'dam. Poster presented at the *2021 SSILA Annual Meeting*. University of California, Berkeley. January 7-10, 2021.

—. in progress. Argument Realization in O'dam. Ph.D. thesis, The University of Texas at Austin.

—. in progress. Constituency in O'dam. In Adam J.R. Tallman, Sandra Auderset, and Hiroto Uchihara, eds., *Constituency and Convergence in the Americas*. Language Science Press.

Everdell, Michael, and Gabriela García Salido. 2021. Los aplicativos en o'dam. Paper presented at *The 2021 Friends of Uto-Aztecan Conference/Taller de los amigos de las lenguas yutoaztecas (FUAC/TALY)*. The University of Texas at Austin, June 3-5.

Everdell, Michael, and Paul B. Melchin. 2021. On the argument-adjunct distinction: Evidence from O'dam preverbal quantifiers. Ms., The University of Texas at Austin.

Findlay, Jamie Y. 2016. Mapping theory without argument structure. *Journal of Language Modelling* 4(2): 293–338.

—. 2020. Lexical Mapping Theory and the anatomy of a lexical entry. In Butt and Toivonen 2020, 127–147.

García Salido, Gabriela. 2014. Clause Linkage in Southeastern Tepehuan, a Uto-Aztecan Language of Northern Mexico. Ph.D. thesis, The University of Texas, Austin.

—. 2021. Headless Relative Clauses in Southeastern Tepehuan (O'dam). In Ivano Caponigro, Harold Torrence, and Roberto Zavala Maldonado, eds., *Headless Relative Clauses in Mesoamerica*, 58–78. New York: Oxford University Press.

García Salido, Gabriela, and Michael Everdell. 2020. Southern Tepehuan (Durango and Narayit, Mexico) - Language Snapshot. *Language Documentation and Description* 19: 89–98.

Haspelmath, Martin, and Andrea D. Sims. 2010. *Understanding Morphology*. New York: Routledge, 2nd edn.

Haugen, Jason D., and Daniel Siddiqi. 2016. Towards a restricted realizational theory: Multimorphemic monolistemicity, portmanteaux, and post-linearization spanning. In *Morphological Metatheory*, 343–386. Amsterdam: John Benjamins.

INEGI. 2015. Instituto Nacional de Estadística y Geografía. http://www.inegi.org.mx/default.aspx.Mexico.

Landau, Idan. 2000. *Elements of control: Structure and meaning in infinitival constructions*, vol. 51. Springer Science & Business Media.

Melchin, Paul B., Ash Asudeh, and Dan Siddiqi. 2020. Ojibwe Agreement in Lexical-Realizational Functional Grammar. In Butt and Toivonen 2020, 268–288.

Merchant, Jason. 2015. How much context is enough? Two cases of span-conditioned stem allomorphy. *Linguistic Inquiry* 46(2): 273–303.

Moura, Heronides, and Rafaela Miliorini. 2018. Toward a comprehension of an intuition: criteria for distinguishing verbal arguments and adjuncts/Para compreender uma intuicao: criterios para distinguir argumentos de adjuntos verbais. *Alfa: Revista de Lingüística* 62(3): 575–594.

Needham, Stephanie, and Ida Toivonen. 2011. Derived arguments. In Miriam Butt and Tracy Holloway King, eds., *Proceedings of the LFG11 Conference*, 401–421. Stanford: CSLI.

Ramchand, Gillian. 2008. *Verb Meaning and the Lexicon*. Cambridge MA: MIT Press.

Ramchand, Gillian, and Peter Svenonius. 2014. Deriving the functional hierarchy. *Language sciences* 46: 152–174.

Stiebels, Barbara. 2007. Towards a typology of complement control. *ZAS papers in linguistics* 47(8).

Svenonius, Peter. 2016. Spans and words. In Daniel Siddiqi and Heidi Harley, eds., *Morphological Metatheory*, 201–222. John Benjamins.

Tallman, Adam J.R., Dennis Wylie, Eric Adell, Natalia Bermudez, Gladys Camacho, Patience Epps, Michael Everdell, Ambrocio Gutierrez, Cristian Juarez, and Anthony C. Woodbury. 2018. Constituency and the morphology-syntax divide in the languages of the Americas: towards a distributional typology. In *21st Annual Workshop on American Indigenous Languages*. University of California Santa Barbara.

Wescoat, Michael T. 2002. *On lexical sharing*. Stanford University.

—. 2005. English nonsyllabic auxiliary contractions: An analysis in LFG with lexical sharing. In Miriam Butt and Tracy Holloway King, eds., *Proceedings of the LFG05 Conference*, 468–486.

—. 2007. Preposition-determiner contractions: an analysis in optimality-theoretic lexical-functional grammar with lexical sharing. In Miriam Butt and Tracy Holloway King, eds., *Proceedings of the LFG07 Conference*, 439–459.

Willett, Elizabeth R., and Thomas L. Willett. 2013. *Diccionario Tepehuano de Santa María de Ocotán, Durango*. Mexico: Summer Institute of Linguistics.

Willett, Thomas L. 1991. *A reference grammar of Southeastern Tepehuan*. Dallas, TX: Summer Institute of Linguistics.