

Pima Causatives and Argument Structure ‘Saturation’¹

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1 Introduction

In this paper we investigate the relationship between argument structure and causative formation in Pima. We propose that a number of syntactic properties of causative constructions follow from the specification of lexical items or roots, such as the difference between synthetic and analytical causatives, the inchoative-causative alternation and causative constructions derived from nominal bases. Previous accounts of Tepiman, as well as of other Uto-Aztecan languages, claim that a number of distinct categories, besides intransitive and transitive verbs, can be causativized, namely, adjectives and nouns (Zepeda 1983 and Saxton 1982 for Papago; Dedrick and Casad 2000 for Yaqui; Launey 1979 for Nahuatl). In section 4, we suggest that the base of causative constructions always is a verb stem. In the cases of adjective and noun bases the syntactic operations of *merge* and *conflation* (Hale and Keyser 1998, 1993) take place and produce derived verbs from adjectives and noun roots. Causativization from nominal bases requires the abstract primitive predicates {BECOME} and {HAVE} as the complement of the causative morpheme *-c*.

¹During the *VI Encuentro de Lingüística en el Noroeste* in 2000, Avelino had the fortune to discuss a preliminary analysis of the data with Ken Hale. His influence and guidance in the paper is obvious, not as evident as the way in which Ken’s personality has influenced my professional life. We want to thank especially to Pam Munro for her continuous support and orientation. Also thanks to Ed Kennan, Robert Dixon, Marianne Mithun, Eric Jackson, Marcus Smith and Sahyang Kim for valuable comments and criticisms to earlier versions of this paper. As usual we assume the entire responsibility of the paper. The first author gratefully acknowledges the support of a CONACYT/UC-MEXUS fellowship.

The structure of the paper is as follows: In the first section of the paper we present the basic description of Pima causatives and its position within the typology of causative constructions. This characterization will serve as the empirical basis for the analysis proposed in the second section of the paper. We will suggest that the similarities between the typology of causative constructions across-languages and the Pima causatives are not simply accidental but they follow from the properties of the argument structure and its relation to the syntax.

2 Causative Formation in Pima

There are two major strategies in producing causative constructions in Pima: i. morphological (synthetic) and ii. periphrastic (analytic). Morphological causativization is indicated in Pima with the suffix *-c* (with the allomorph *-cud* in the Imperfective aspect) attached to a stem. Periphrastic causatives uses the lexical verb *cea* translated as 'to do' and 'to order' which takes the sentence referring to the caused event as complement.

2.1 Causatives from Intransitive Verbs

The sentences in (1)-(5) show a contrast between intransitive and 'causativized' pairs in Pima. The paradigm shows that Pima conforms to the characteristic typological properties of causation across-languages (Comrie 1976, Dixon and Aikhenvald 2000, Hooper and Thompson 1980, Talmy 1976): 1. The causative construction has one more NP argument than the causativized clause, which is marked as the sentential subject and corresponds to the notional CAUSER of the event. 2. The addition of this argument

produces that the original subject of the non causativized sentence, the CAUSEE, should redefine its syntactic function, surfacing as the object of the causative sentence. In these sentences the re-alignment of the subject of the causativized sentence is evident from inspection of the obligatory agreement properties of Pima: Subject agreement is marked in the AUX(iliary)², whereas object agreement is indicated in the verb.

	Imperfective		Perfective	
	Singular	Plural	Singular	Plural
1	'añ	'ac	'ant	'att
2	'ap	'am	'apt	'amt
3	'o	'o	'at	'at

Table 1. Subject agreement auxiliary system

Let us consider in detail the paradigm in (1)-(4). In (1)a the NP *mula* 'mule' is the subject of the sentence, in consequence it agrees with the AUX 'o corresponding to third person. In (1)b the NP object *mumula* 'mules' is a plural noun which agrees with the indefinite plural *ha*³, while the AUX agrees with the singular subject *hegai keli* 'the man'. Similarly, in (2)a the only argument of the verb agrees with the AUX corresponding to first person singular 'añ. In contrast, in (2)b the causee surfaces as *heñ*, the object marker for first person singular. Further examples are given in (3) and (5).

² The abbreviations used in this paper include: AUX=Auxiliar, PERF=Perfective, IMPERF=Imperfective, DET=Determiner, 1=First Person, 2= Second Person, 3=Third Person, PRON=Pronoun, CAUS =Causative, COMP.B=Complementizer B, IRR=IRREALIS, RED=Reduplicant, EXTR=Extrinsic deictic, INTEN=Intensifier, STAT=Stative, INDEF= Indefinite, PL=Plural, SG=Singular, FUT=Future. RSPEE=Reported Speech. OBJ=Object, SBJ=Subject, DO=Direct Object, IO=Indirect Object, PAST=Past, UA=Uto-Aztecán, INCEP=Inceptive. NEG=Negation. INDEF.HUM= Indefinite Human, PRF=Perfective (for glosses in Dedrick and Casad 2000), REFLX=Reflexive, COP=Copula, DES=Desiderative. The numbers of the examples come from Avelino *et al.* (2001).

- (10) I'i-da-kudh wui 'at heñ hi-m-c.
 drink-NOM-LOC to AUX.3-PERF 1SG.PRON go-DES-CAUS
'He made me go to a bar.'
- (11) M-a-t heñ cea m-an-t
 COMP.M-AUX.3-PERF 1SG.PRON make COMP.M-AUX.1SG-PERF
 o i'i-da-kudh wui hi.
 IRR drink-NOM-LOC to go
'He made me go to a bar.'

Thus, the hypothesis explaining the contrasts is that the sentential subject in morphological causatives contains the semantic properties of CONTROL (VOLITIONALITY is not necessarily entailed, but it seems to depend on the calculus of the *aktionsart* properties of the verb stem and the causative event together). Further, the caused subject lacks of control over the event. Thus, a sentence like () can only mean that Eric was used as a toy or as a player

- (12) Pam 'o cicvi-c heg Eric.
 Pam AUX.3.IMPERF play-CAUS DET Eric
'Pam is playing Eric' (Pam is using Eric as a toy.)

In contrast with the subject of periphrastic causatives where these features are attenuated or not present at all. Contrasts of this type entail very subtle semantic differences. Nonetheless, it is quite possible to have morphological causative constructions where the causer is an entity which may lack of the intensional control, as in sentences (13) and (14) below.

- (13) Tash 'a-t haagtok-cud heg gev.
 sun AUX.3-PERF melt-CAUS DET snow
'The sun is melting the snow.'
- (14) Heval 'a-t heepi-c heg hihidodh.
 wind AUX.3-PERF cold-CAUS DET food
'The wind cooled off the food.'

2.2 Causatives from Transitive Verbs

There are a number of properties that occur in causatives derived from transitive verbs. Similarly to intransitive verbs, the causer of the event is the subject of the entire construction as indicated by the AUX agreement. In turn, the subject of the embedded verb appears as a direct object in the final causative construction. Sentences below illustrate this pattern. In (15)a and (16)a the subjects are identified by the AUX agreement, second 'apt and third 'at persons, respectively. In the correspondent derived causatives (sentences b) the former subjects surface as the sentential object. Thus, in (15)b the former subject is indicated by the form *hem*. While in (16)b there is no marking for third person.

- (15) a. Mul 'ap-t heg 'uus.
 break AUX.2SG-PERF DET stick
'You broke the stick.'
- b. 'Aañi 'an-t 'am hem mul-c
 1SG.PRON AUX.1SG-PERF DEIC 2SG.OBJ break-CAUS
 heg 'uus.
 DET stick
'I made you break the stick.' (:135;2,4)
- (16) a. Gogs 'a-t heg mitol huhui.
 dog AUX.3-PERF DET cat chase
'The dog chased the cat.' (:41;1)
- b. Gogs huhui-da-c 'an-t heg mitol.
 dog chase-VB-CAUS AUX.1SG-PERF DET cat
'I made the dog chase the cat.' (:542;30)

The causative constructions derived from transitive verbs have the form of a double object construction. In principle, it seems that there is no formal mechanism for distinguishing the two DP objects when they are non-pronominal. However, it could be

2.3 Causatives from Ditransitives

A periphrastic causative construction is obligatory when the causative is derived from ditransitive verbs. This generalization entails that there can be no morphological causative for verbs that lexically contain two internal arguments, i.e. verbs with both, direct object and indirect object. Examples in (19) to (30) illustrate the contrast between the periphrastic and morphological strategies, where the latter produces ungrammatical sentences.

(19) Hioseg 'an-t am o hem maa
 flower AUX.1SG-PERF DEIC IRR 2SG.OBJ give
'I gave you a flower.'

(20) Virgil 'a-t am cea heg Sa t am o
 Virgil AUX.3-PERF DEIC make DET Sa PERF DEIC IRR
 maa heg Heriberto heg tash.
 give DET Heriberto DET watch
'Virgil made Sa give the watch to Heriberto.'

(21) *Virgil 'at 'am maac heg Sa heg Heriberto heg tash.
 intended: *'Virgil made Sa give the watch to Heriberto.'*

(22) Eric 'at 'am 'i vuushat heg 'o'ohana-kudh
 Eric AUX.3-PERF DEIC INCEP take.out DET write-INSTR
 vasha tamjedh.
 box inside
'Eric took the pen out of the box.'

(23) Pam 'a-t 'am cea heg Eric t 'ab o
 Pam AUX.3-PERF DEIC make DET Eric PERF DEIC IRR
 'i vuushat heg 'o'ohana-kudh vasha tamjedh.
 INCEP take.out DET write-INSTR box inside
'Pam made Eric take the pen out of the box.'

(24) *Pam at 'am 'i vuushatc heg Eric heg 'o'ohanakudh vasha tamjedh.
 intended: *'Pam made Eric take the pen out of the box.'*

- (25) Eric 'at 'am 'uupam cee heg 'o'ohana-kudh
Eric AUX.3.PERF DEIC inside put DET write-INSTR
'Eric put the pen back inside the box.'
- (26) Pam 'at 'am cea heg Eric t am
Pam AUX.3.PERF DEIC make DET Eric PERF DEIC
'uupam cee heg 'o'ohana-kudh.
inside put det write-INSTR
'Pam made Eric put the pen back inside the box.'
- (27) *Eric 'at 'am 'uupam ceec heg 'o'ohanakudh.
intended: *'Pam made Eric put the pen back inside the box.'*
- (28) Sa 'o heñ-'aagit heg ñooki.
Sa AUX.3.IMPERF 1SG.OBJ-tell DET word
'Sa told me a gossip.'
- (29) Virgil 'am cea heg Sa t 'am o hema
Virgil deic make det Sa perf deic irr one
heñ-'aagi heg ñooki.
1SG.OBJ-tell DET word
'Virgil made Sa tell me a gossip.'
- (30) *Virgil 'am heñ-'aagitc heg Sa hema heg ñooki.
intended: *'Virgil made Sa tell me a gossip.'*

Although the literature seldom reports such a patterns, similar cases to the Pima can be found in other languages. For instance, in Dulong/Rawang languages (LaPolla 2000) there is only two lexical ditransitive verbs, 'give' and 'tell'; in these verbs it is not possible to use the productive causative morpheme *dw-*, instead, the periphrastic causative *dwzvr* must be used. Likewise, in Songhai (Nilo-Saharan) a morphological causative of a ditransitive verb is ungrammatical, as shown in the example (31).

- (31) *Garba neere-ndi bari di Musa se Ali se.
Garba sells-CAUS horse the Musa IO Ali IO
"Garba made Mousa sell the horse to Ali." (Shopen & Konaré 1970:215)

In section 4.1 we will propose that the constraint against morphological causative derivation in ditransitive verbs follows from a syntactic principle of *argument structure saturation* which restricts the possibilities to expand the verb valency by morphological means according to the number of DP's encoded in the lexeme. The fact underlying this hypothesis is that, in general, languages do not encode more than three arguments in a single lexical verb. If more arguments are involved in an event, they will be encoded by different syntactic mechanisms (by prepositional phrases, oblique cases, periphrasis, and so on). Thus, when ditransitive verbs reach the limit of DP's in a clause, the causative derivation introducing an additional argument will induce syntactic rearrangements which would vary across languages (Dixon and Aikhenvald 2000). We will elaborate later on this proposal.

2.3.1 *-cud* introducing applicatives

Hale (2000) points out that in 'O'dham the morpheme *-cud* has an applicative function rather than a causative one. The phenomenon of marking two valency-increasing functions, namely causative and applicative with the same morpheme is not an unknown phenomenon across languages. Thus, some languages have been described as having a single morpheme which indicates that a clause has more DP's than those lexically specified in the verb. Therefore, additional DP's are encoded by the same morpheme regardless of the causative or applicative interpretation of the construction (Dixon and Aikhenvald 2000). A paradigmatic example comes from the Wolof suffix *-a/* which indicates an increasing in valency. The sentences below illustrate both structures, applicative in (33) and causative in (36).

- (32) Mungi dyang teere bi.
'He is reading the book.'

- (33) Mungi dyang-al eleew yi teere-em.
 PRES(3SG) read-APPL pupil the(PL) book-his
'He is reading the book to the pupils.'
- (34) Nga dem.
 AUX(2SG) go
'You went.'
- (35) Kan nga dem-al.
'Who did you go with?'
- (36) Di naa toog-al nenne bi.
'I will make the child sit down for you.' (Comrie 1985:316)

Likewise in a number of Pima sentences the glosses in English suggest that the argument introduced by the morpheme *-cud* is an indirect object, such that the suffix licenses an applicative argument. Further, note that the occurrence of the preposition and the suffix are incompatible as shown in (40).

- (37) Ñe'e 'añ.
 sing AUX.1SG
'I am singing'
- (38) Ñe'i 'añ Sa wi.
 sing- AUX.1SG Sa to
'I am singing to Sa.'
- (39) Ñe'i-cud 'añ heg Sa.
 sing-CAUS AUX.1SG DET Sa
'I am singing for Sa.'
- (40) *Ñe'i-cud 'añ Sa wi.
 intended: *'I am singing for Sa.'*

In section 4.2 we will propose an alternative analysis in which the morpheme *-cud* will be considered to have the same causative interpretation and therefore same structure.

In general, Pima causative constructions cannot be derived from the *s-adjective* forms.⁵ The evidence strongly indicates that the causative takes the adjective stem as the base of the derivation.⁶ The sentences below, (46) - (48), illustrate the adjective-causative contrast.

- (46) a. S-i'ov 'o heg ha'icu 'iibdag.
 STAT-sweet AUX.3.IMPERF DET something fruit
'The fruit is sweet.'
- b. i'ovi-c 'an-t heg ha'icu 'iibdag.
 sweet-CAUS AUX.1SG-PERF DET something fruit
'I sweetened the fruit.' (:233;14,16)
- c. *S-i'ovic 'ant heg ha'icu 'iibdag.
 intended: *S-i'ovic 'ant heg ha'icu 'iibdag.
- (47) a. S-gevk 'ap
 STAT-strong AUX.2SG.IMPERF
'You are strong.'
- b. 'añi 'an-t 'am 'im gevk-cud
 1SG.PRON AUX.1SG-PERF 2SG.OBJ ? strong-CAUS
'I am making you strong.' (:137;20)
- c. *'añi 'ant 'am 'im sgevk-cud.
 intended: *'I am making you strong.'*
- (48) a. Huñcui 'o s-moik.
 corn.dough AUX.3-IMPERF STAT-soft
'The corn dough is soft' (:138;23)
- b. Eric 'a-t moika-c heg huñcui.
 Eric AUX.3-PERF soft-CAUS DET corn dough
'Eric softened the corn dough.' (:305;18,19)
- c. *Eric 'at s-moikac heg huñcui.
 intended: *'Eric softened the corn dough.'*

⁵ See Jackson (2002) for a thorough analysis of the *s*-morpheme in Pima.

⁶ It should be noticed that the adjective ends in an elided or voiceless vowel while the causativized form has the vowel fully voiced. Later on in the paper it will be discussed that this subtle difference could be important for the syntactic analysis.

In Pima there is a reduced class of adjectives which are not marked with *s*-. Most of them belong to the classes DIMENSION and AGE.⁷

(49)

'uuk	'high'	}	DIMENSION
coadhk	'tall'		
ge'e	'big'		
'alya'asik	'small'		
shopol	'short'		
'aj(ij)	'narrow'		
vecic	'new'	}	AGE
hekiu	'old'		
gaaly	'young'		

Nevertheless, these adjectives present properties that parallels those of the *s*-adjectives with respect to causative formation. Consider the paradigms of *s*-marked adjectives like 'vegi' red, and non-*s*-marked adjectives like 'cevaj' long' below. The sentence in (51) shows the inchoative derivation of the adjective base in (50), where the change of state denoted by the verb is inherent. The example in (52) shows that in this type of sentences, as well as in the causative (54), the presence of *s*- is prohibited. Non-*s*-marked adjectives show a similar pattern. The sentence in (57) is the inchoative form derived from the bare adjective and the suffix *-da* attached to it. Similarly, the causative in (58) takes the inchoative form as the base of derivation, and accordingly, the change of state denoted by the verb it is caused by an external factor.

S-marked adjective paradigm

(50)

Hega'i	'iks	'o	ge	s-vegi.
det	cloth	AUX.3-IMPERF	FOC	STAT-red
<i>'The cloth is red.'</i>				

⁷ Thanks to Robert Dixon who pointed out the pattern in our own data.

(51) 'iida 'iks 'a-t vegi
 DET cloth AUX.3-PERF red
'The cloth became red.' (:265;18)

(52) *'iida 'iks 'at s-vegi
 intended: *'The cloth became red.'*

(53) Pi'a. Heg 'odh hegai keli m o ge
 NEG DET COP DET man COMP.M IRR be
 s-vegi kamish.
 STAT-red shirt
'No. He's the man in the red shirt.' (:380;19)

(54) M-añ vegi-omi-c 'iida 'iks
 COMP.M-AUX.1SG-IMPERF red-?-CAUS DET cloth
'I am coloring the cloth red.' (:265;19)

(55) *M-añ s-vegi-omi-c 'iida 'iks.
 intended: *'I am coloring the cloth red.'*

Non s-marked adjective paradigm

(56) cev(aj) 'long' (:265;13)

(57) Cev-da 'a-t 'iida vicna.
 long-VB AUX.3-PERF DET rope
'The rope is already long.' (:266;35)

(58) 'aañi 'an-t 'i cev-da-c
 1SG.PRON AUX.1SG-PERF INCEP long-VB-CAUS
 heg heñ shaaliv.
 DET 1SG.OBJ pants
'I am going to lengthen my pants.' (:267;37)

There is strong cross-linguistic evidence supporting the interpretation of the Pima inchoative-causative alternation. For example, Mithun (2000) describes in Yup'ik a suffix whose primary function is to mark inchoative but that can be also used with causative meaning "become or cause to become". In Tzes (Comrie 2000) there is a suffix *-r* deriving transitive (causatives) from intransitive (inchoatives). In this respect, the Pima data seems

3 Causative Formation and Argument Structure

3.1 Configuration of *-c*

We propose that the Pima morphological causative *-c* is a verbal head that selects for a VP complement⁹ as represented in the figure below.

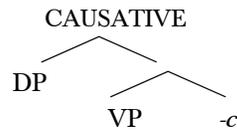


Figure 3. Morphological causative configuration

This simple structure will allow us to explain the Pima pattern and, by extension, a number of crosslinguistic generalizations. First, the DP Specifier of *-c* accounts for the characteristic 'valence increasing' property of causative constructions mentioned in the literature (Comrie 1976, 1985, Hooper and Thompson 1980, Shibatani 1976, Comrie and Polinsky 1993, Dixon and Aikhenvald 2000, among others). Second, if *-c* is considered to function as the verbal head of the matrix causative clause, the external argument of *-c*, will receive case in subsequent sentential derivations at higher levels of the structure, conceivable at the level of functional projections. Third, in previous sections it was illustrated how the DP subject of the embedded verb is marked with the prefix object agreement object in the causative sentence. Following standard proposals about case assignment (Chomsky 1981, Bittner and Hale 1996 and Ura 2001), we assume that object agreement is in harmony with the case marking of the DP from the head governing it, this

is, from the suffix *-c*.¹⁰ Moreover, it should be noted that the structure proposed for *-c* is similar to the structure projected by lexical verbs used in periphrastic causatives, *cea* 'to order' as represented in *Figure 4*. The main difference being the morphological status of both classes of elements, affix vs free form, respectively. The structural similarities between both structures further support the hypothesis that Pima *-c* is a verbal head.

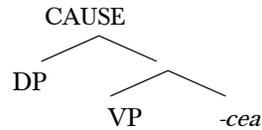


Figure 4. Lexical causative configuration

4 Argument Structure and Pima Causatives

4.1 Argument Structure and Verbal Causatives

The hypothesis about the configuration of Pima causatives allows us to explain the derivations described earlier for intransitive and transitive verbs in a straightforward manner: *-c* embeds a VP to the extent that it contains one or two internal arguments.¹¹ Consequently, the trees in *Figure 5* are the basic representation of sentences of the type (a) *Mo ha him-cud mumula hegai keli. 'The man drives the mules.'* and (b) *Gogs 'ant ki'ikac heg mitol. 'I made the dog bite the cat'.*

⁹ We use a simple label VP since we do not have evidence of the type of structure embedded by the causative i.e. whether a CP or a TP. However, this would be relevant for a further analysis about the differentiation between lexical and morphological causatives.

¹⁰ Causatives in Pima are thus different from ECM constructions in other well known languages, in which the verb of the matrix clause takes an infinitival TP complement with a subject in 'objective' case. It is an open question what could be the Pima equivalent to an infinitival clause. Provisionally, we conjecture that the Irrealis marker *o*, often found in the caused embedded sentence, does encode the temporal relations expressed in other languages by the infinitival (tenseless) clause.

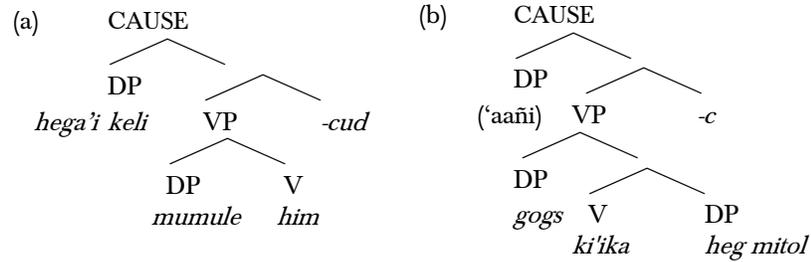


Figure 5. Causative structures of (a) intransitive and (b) transitive verbs

However, as described in section 2.3, systematically ditransitive verbs cannot undergo morphological causativization; instead they form causatives by using the analytic strategy.

For example, the sentence in (68) cannot have a verb form such as *maac* as a grammatical alternative.

(68)	Pam	a-t	'am	heñ	cea	t	am
	Pam	AUX.3-PERF	DEIC	1SG.OBJ	order	PERF	DEIC
	o	hem	maa	heg	'o'ohan.		
	IRR	2SG.OBJ	give	DET	book		
	<i>'Pam made me give you a book.'</i>						(:571;47)

The data presented strongly suggest that the distribution of the different causative strategies is related to the argument structure of the caused verbs.¹² That is to say, the distribution of the morphological and periphrastic causatives depends primarily on the argument structure properties of the VP complements that the causative heads select for. We will elaborate this hypothesis in the following sections.

¹¹ We do not include further sentential branching specifying, for instance, the position of AUX and aspectual markers.

¹² Furthermore, it seems causative formation applies the same to all intransitive verbs regardless of their internal structure (e.g. unacusatives and unergatives).

Early in the paper we claimed that *-c* has the property, similar in this respect to those of the lexical verb *cea*, of being verbal head that takes a VP as complement. The proposal made before should be refined. We suggest that in the case of the morphological causative the head is a 'light' verb (*vp*), while in the periphrastic causative the head is a regular lexical verb. An important piece of evidence supporting this approach comes from the distributional facts already observed about ditransitive verbs. We will follow some recent proposal to analyse the Pima double object constructions (Larson 1988, Hale and Keyser 1993, 1998, Chomsky 1995). Thus, the structure of a Pima sentence such as *M ant maa hegai 'o'ohan heg Shabnam 'I gave this book to Shabnam'*, is represented as in Figure 6. The lower verb in the structure corresponds to *maa* 'give', which takes the DP *heg 'o'ohan* 'the book' as a complement. This constituent [V-DP] merges with the DP in specifier position forming the VP. In a further operation, the lower V (*maa*) is conflated to a phonologically null element, the informally called 'light verb'.

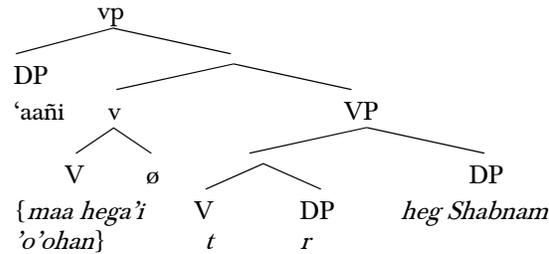


Figure 6. Representation of Pima double object construction

Based on the evidence that the morphological causative occurs only with intransitive and transitive verbs, we propose an analysis where *-c* can be analyzed as the head of the *vp*, so that the complement selected is a VP. In this approach a sentence such as (15)b *'aañi 'ant 'am hem mul-c heg 'uus* has a representation as in Figure 8.

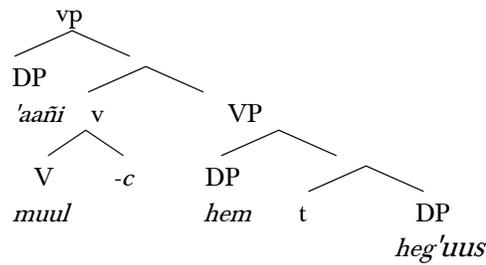


Figure 7. Causative structure derived from transitive verbs

Under this analysis the complementary distribution between lexical and morphological causatives according to the argument structure of the verb is explained straightforwardly: Causative affixation is accessible to the extent that there are argument positions available in the vp-VP complex, however, if the argument structure has already two internal arguments, the marking of causative is restricted to the periphrastic strategy.

The notion of argument structure 'saturation' that we are using here relates to the fact that languages do not encode more than three internal arguments in a single verb lexeme (Hale 2000, Levin 1993, Levin and Rappaport Hovav 1996). In our view this constraint may suggest that the linguistic encoding of the complexity of a given event in a single lexeme has limitations. If the constraint is confirmed as a universal tendency, it may indicate, lastly, a property of the human cognitive-linguistic capacities. In the present study, we formalize the constraint by claiming that the lexical projection cannot be extended arbitrarily, that is to say, the recursiveness of vp's should be restricted; if the count of internal lexical arguments is up to two, we conjecture that the natural limit may be only one vp. In this context, the Pima data offer empirical support to this hypothesis: Once that the argument structure is 'saturated' by two arguments, as in ditransitive verbs, the marking of causative should resort to the periphrastic strategy.

structure, neither specifier nor complement (Hale and Keyser 1993, 1998, Baker 2001). In fact, Pima has a *-t* morpheme (glossed simply as VERB) that derives verbs of ‘production’ when attached to noun bases. The examples below show the contrast with the causative formation introduced earlier. We propose that the structure of Figure 10 corresponds to these cases.

(73) V ’ant o goog kii-t.
 FUT AUX.1SG-PERF IRR two house-verb
 ‘I am going to make two houses.’

(74) Pam o kamish-t.
 Pam AUX.3-IMPERF shirt-VERB
 ‘Pam is making a shirt.’

(75) Heriberto ’at sap hoa-t.
 Heriberto aux.3sg-perf good basket-verb
 ‘Heriberto made a good basket.’

In consequence with this idea, we suggest that the structure of de-nominal causatives follows the same representation formulated earlier for verbs: the causative *-c* selects for a VP as complement. In the case of denominal constructions the verb is a transitive one, such that the noun is selected as the complement of the verb. Accordingly, the analysis of the denominal causatives entailed by *Figure 8* is wrong: *-c* cannot select directly for a DP complement. A revised representation of causative from noun bases is presented in below.

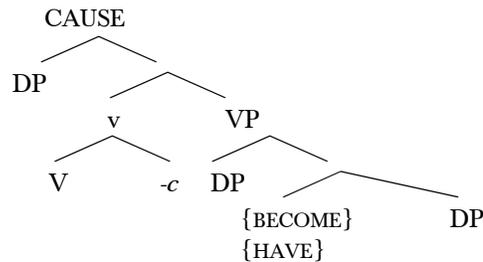


Figure 9. Representation of denominal causatives

The crucial difference between denominal causative constructions and causatives derived from verb bases is that in the former cases the head of the VP selected by *-c* is a phonologically null element which indeed has semantic content, namely {BECOME} or {HAVE}¹³. From this hypothesis it is possible to explain the contrast in meaning and unify the analysis for causativized verbs with that of denominal causatives. Let us illustrate the derivation of two sentences (a) *'E-ban-c 'a-t hegai keli* 'The man became coyote' and (b) *Pam 'o kamish-cud heg Eric*. 'Pam is making a shirt for Eric' in Figure 10 using the structure proposed before. In the example (a), the configuration correctly predicts that if the subject of the causative is correferential with the argument under the VP they would be marked with the reflexive.

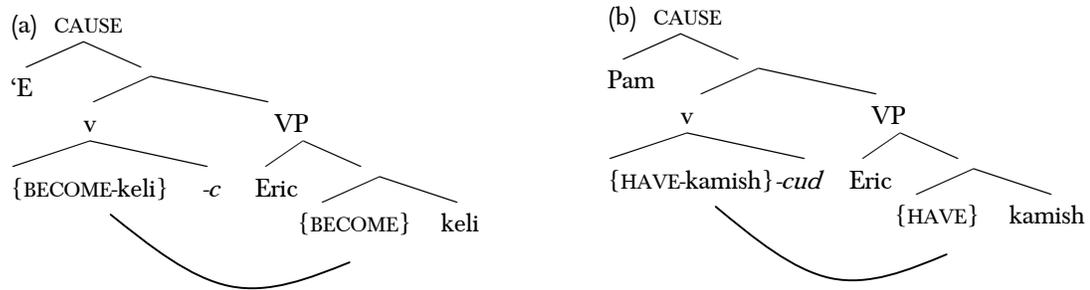


Figure 10. Representation denominal causative sentences
 (a) *'Eban-c 'a-t hegai keli*. 'The man became coyote' and (b) *Pam 'o kamish-cud heg Eric*.

4.2.1 Applicative interpretation is denominal causative

In 2.3.1 we described the case where suffixation of the causative morpheme seems to license applicative arguments. Let us consider the following contrast.

- (76) Ñe'e 'añ.
 sing AUX.1SG.IMPERF
 'I am singing.'

¹³ See Dowty (1979), Parsons (1990) and Bittner (1999) for independent arguments supporting {BECOME} and {HAVE} as primitive predicates.

- (77) Ñe'i-cud 'añ heg Sa.
 song-CAUS AUX.1SG.IMPERF DET Sa
'I am singing for Sa.'

The translation of the sentence in (77) gives the impression of a sentence with a benefactive argument. Nevertheless, we would like to consider here a different approach, that applicatives licenced by the causative morpheme are instances of denominal causative derivation. Let us consider the analysis of the examples given above. First, notice that the stem *ñe'e* in (77) is different from that in (78) as further demonstrated by the ungrammaticality of (79). Indeed, the contrast between (80) and (81) makes evident that *ñe'i* is a noun root ('song') and *ñe'e* is a verb root ('sing'). Only in the former a quantifier can take scope over the DP. The difference is further illustrated in (79) and (80).

- (78) Ñe'e 'añ.
 sing AUX.1SG.IMPERF
'I am singing.'

- (79) *Ñe'i 'añ.
 intended: *'I am singing.'*

- (80) Ñe'i 'an-t hema naato.
 song AUX.1SG-PERF one make
'I made a song.'

- (81) *Ñe'e 'an-t hema naato.
 sing AUX.1SG-PERF one make
 intended: *'I made a song.'*

- (82) Ñe'e 'añ Sa wi.
 sing AUX.1SG-IMPERF Sa to
'I am singing to Sa.'

- (83) *Ñe'i 'añ Sa wi.
 intended: *'I am singing to Sa.'*

Thus, our approach here is to analyze the sentence in (74) as a denominal causative. In this analysis the DP *ñe'í* 'song' and the verbal head *-cud* form a constituent via conflation as already discussed earlier, and the external argument is adjoined as customarily in sentences with double objects (cf. the examples of ditransitive verbs in section 2.3). The evidence suggests that this is a more parsimonious analysis than the one assigning an ambivalent function of the causative morpheme. In the latter approach it cannot be predicted when the sentence would have a causative or applicative interpretation. Furthermore, we would like to present as a strong piece of evidence the fact that the native transliteration of this sentence into English is closer to something like 'I am "singing" for Sa' or 'I am doing song for Sa'. Likewise, the native judgement disallows an interpretation such as 'I am making Sa sing'. Moreover, the causative derivation taken the verbal base is disallowed as illustrated in (81).

- (84) *Ñe'e-cud 'añ heg Sa.
 sing-CAUS AUX.1SG.IMPERF DET Sa
 intended: *'I am singing for Sa.'*

However there is an alternative analysis. Halle and La Verne (2000) have shown constructions in Hopi where the structure noun-VERBALIZER-CAUSATIVE is clearly seen in the surface. In the examples below the transitivizer *-toya* (cognate with the Pima *-t*) precedes the suffixation of the causative morpheme *-na*.

- (85) Um yan-wat kii-ta-ni.
 you this.way-WAT house-TOYA-FUT
 'You will build the house this way.'

- (86) Itaa-ti qa na'önani-qa ita-mu-y kii-toy-na.
 1pl-son neg lazy-comp 1-pl-acc house-toya-na
 'My son, who is not lazy, made a house for us.'

- (87) itaa-taha inu-gnam tts-ta.
 1pl-uncle 1sg-for shoe-TOYA
 'My uncle made shoes for me.'
- (88) Pu-t tiyooya-t katsin-na-'at pu-t tots-toy-na.
 3sg-ACC boy-ACC kachina-father-3sg 3sg-ACC shoes-TOYA-NA.
 'The godfather of the boy gave him shoes.'

Thus, the analogy with Pima would suggest a structure such as [noun-t-cud] where the verbalizer *-t* is assimilated with the palatal consonant of the causative morpheme. However, as Hale has pointed out the structure entailed by the morpheme *-t* lacks of a specifier internal to the verbal projection, "therefore, it is no position for the DP argument which is necessary in the derived transitive." (2000:165). This problem is not present in our proposal, if an abstract verbal head is allowed.

4.3 Argument structure and De-Adjectival Causatives

In principle, it is desirable to extend the analysis developed so far to the cases of de-adjectival causatives illustrated earlier in section 2.4. Before of addressing these issues it is convenient to summarize the relevant empirical facts described before: 1. De-adjectival causatives are formed from intransitive bases (inchoatives). and 2. Causative structures cannot co-occur with with predicate adjectives marked by *s-*.

With respect to the last point, our account of Pima is similar to the description presented by Hale (2000) for 'O'odham deriving inchoatives from adjectives as the examples in (89) below.

- | | | | |
|------|------------------|-------------------|-------|
| (89) | <u>Adjective</u> | <u>Inchoative</u> | |
| | swegĩ | wegi | 'red' |
| | ge'(ej) | ge'eda | 'big' |

In Hale's analysis the inchoative derivation is accomplished by suffixation of an element "whose effect is to fully vocalize the underlying final vowel of the root, and the basic predicative theme" (Hale 2000:155). The effect of demoraization (Hill and Zepeda 1992) explains why in the adjective root the final vowel is often devoiced, but in the inchoative it is always fully voiced.

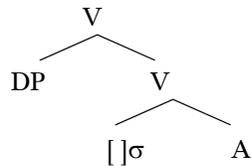


Figure 11. 'O'otham inchoative derivation (Halle, 2000)

The structure proposed by Hale implies that the adjective will be later incorporated into the verb stem (assumed by Hale to be a suffix), yielding the inchoative derivation. This approach seems to account also for the Pima data. So for instance, predicate adjectives often show the final devoiced form *svegi* [svəgi] 'red' or even a completely omitted vowel as in *smoik* [smoik] 'soft' which surfaces in the inchoative form *vegi* [vəgi] 'redden' and *moika* [moika] 'soften', respectively. Indeed, we have been able to confirm Hale's claim in our Pima data. Thus, in (90) the final vowel is voiceless. In contrasts with the inchoative form (91) where a voiceless vowel is unacceptable.

(90) i'ida iks 'o s-vegi [svəgi] ~ *[svəgi]
 'The cloth is red.'

(91) i'ida iks 'at vegi. [vəgi] ~ *[vəgi]
 'The cloth became red'

We follow Hale (2000) and Hale and Keyser (nd) in analyzing Pima deadjectives as an instance of incorporation. Further, we propose that this analysis is compatible with the general hypothesis of causatives presented here. Similarly, as in verbs and denominal causatives, in deadjectival causatives, *-c* takes as complement a VP which in turn has been derived from the synthesis of an adjectival stem and a verbal head. Let us examine the sentences below. Our data suggest that the causative derivation of adjectives indeed should be licensed by a verbalizer head as shown by the ungrammaticality of (94). The representation of a sentence such as (93) is similar to that in Figure 11 with the difference that here, the verbalizer suffix *-da* is the verbal head. Once that the incorporation of the adjective to the *-da* as taken place, the causative formation can apply as ordinary.

(92) 'i'ida vicna 'o cevaj.
 DET rope aux long
'The rope is long.'

(93) 'i'ida vicna 'a-t cev-da.
 DET rope AUX.3-PERF long-VB
'The rope got long.'

(94) *'i'ida vicna 'a-t cevaj.
 DET rope AUX.3-PERF long
 intended: *'The rope got long.'*

(95) Juuki 'at cev-da-c heg vicna
 rain AUX.3SG-PERF long-VB-CAUS DET rope
'The rain made the rope get long' ~ The rope got long with the rain.'

Finally, it seems that the plausibility of this hypothesis is supported by the robust typological evidence showing that in the inchoative-causative derivation, the inchoatives are predominantly derived from adjectives (Haspelmath 1993:94).¹⁴

¹⁴ In his extense discussion of the inchoative-causative alternation Haspelmath gives similar examples from German: *stark* 'strong', *sich verstärken* 'become strong'; *voll* 'full' *sich füllen* 'fill (intr.)', and Russian: *vysokij*

5 Conclusions

Causative constructions in Pima show a direct relationship with the argument structure of verbs. We have shown that the difference between synthetic and analytical causatives is rooted in the lexical specification of arguments, such that transitive and intransitive verbs are aligned with morphological causatives, while ditransitive verbs correlate with periphrastic causativization. Causative formation in Pima offers support for a representation of verbal argument structure where *-c* is the head of a vp that selects for a VP complement. In contrast, the periphrastic causative *cea* is used exclusively with ditransitive verbs since the argument structure of the vp-VP complex is already saturated. We offered evidence demonstrating that causativization from nominal bases requires the primitive predicates {BECOME} and {HAVE} as the complement of *-c*. Ken Hale thought us that in the broader research agenda it is indispensable to conciliate three factors: a rigorous formal account, an in depth description of individual languages and a strong typological evidence. The three of them are necessary and complementary.

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