

The Morphological Typology of Change of State Event Encoding

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Words denoting non-causative and causative change of state (COS) predicates often are morphologically related to words denoting the related state predicates, though the relationship sometimes differs for different types of states. For the state of ‘brokenness’, for example, in English the word denoting the state in (1c) is derived from the words denoting the change of state. In contrast, the word denoting the state of ‘looseness’ in (2c) is morphologically basic, with the words denoting the changes of state being derived from it.

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|-----|----|-------------------------|---------------------------------------|
| (1) | a. | The cup broke | (non-causative change of state) |
| | b. | Sandy broke the cup | (causative change of state) |
| | c. | The cup is broken | (state predicate is deverbal) |
| (2) | a. | The knot loosened | (non-causative change of state) |
| | b. | Sandy loosened the knot | (causative change of state) |
| | c. | The knot is loose | (state predicate is simple adjective) |

This paper reports on preliminary research aimed at clarifying the morphological and lexical semantic relationship between states such as those highlighted above and their causative and non-causative COS counterparts.

The morphological typology of words denoting non-causative (e.g. (1a), (2a)) and causative (e.g. (1b), (2b)) COS predicates has been relatively well studied (Nedjalkov 1969; Nedjalkov and Silnitsky 1973; Haspelmath 1993), with one important finding being that for certain types of COS events, languages tend to have morphologically simple words denoting the causative predicates, morphologically deriving the corresponding word denoting the non-causative COS predicate. For other types of events, the opposite direction of derivation is favored. This pattern of behavior is observed in Tongan (Polynesian), as shown in (3) and (4).

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|-----|-----------|---------------------|---------------------------------|
| (3) | Tongan | | |
| | pelu | ‘cause become bent’ | (causative change of state) |
| | ma-pelu | ‘become bent’ | (non-causative change of state) |
| (4) | Tongan | | |
| | lahi | ‘become big’ | (non-causative change of state) |
| | faka-lahi | ‘cause become big’ | (causative change of state) |

While certain types of events are lexicalized with the causative as the morphologically basic form, deriving the word denoting the non-causative change of state, as in (3) for the word for ‘bend’, other events have the non-causative change of state lexicalized as the morphologically basic form, deriving the word denoting the causative change of state as in (4) for the word for ‘big’. Haspelmath (1993) argues that the direction of

morphological derivation correlates with the likelihood that the event can occur spontaneously – events more likely to occur spontaneously are lexicalized in their morphologically basic form as words denoting non-causative COS predicates (e.g. *melt*), while those less likely to occur spontaneously are lexicalized in their morphologically basic form as words denoting causatives (e.g. *break*). The leading idea behind his research program is that the morphological direction of derivation, within and across languages, is suggestive of how non-causative and causative COS predicates are conceptually related to one another.

We take Nedjalkov and Silnitsky's and Haspelmath's ideas further by bringing states into the picture, examining how the non-causative and causative COS predicates are related to their associated states. Specifically, for a given state such as 'broken' or 'wide', there has been no systematic investigation of the morphological relationship between words denoting the state, a non-causative change into the state, and a causative change into the state. In this paper we take the first steps in such an investigation. We begin by laying out what we believe to be some of the more important questions in this domain. We follow this with discussion of some suggestive data culled from reference grammars and native speakers of relevant languages.

1. Three Questions about Change of State Encoding

1.1 *How Are Words Denoting States and Changes of State Morphologically Related to One Another?*

The question of how words denoting states are related to their non-causative and causative COS counterparts is prefigured in the work of Hale and Keyser (2002) and Baker (2003), whose theories predict a very specific type of relationship between states and their causative and non-causative COS counterparts. Namely, causative and non-causative COS predicates are predicted to be derived from their state counterparts.

Hale and Keyser, especially, give suggestive data supporting the idea that words denoting non-causative and causative COS predicates are morphologically derived from words denoting the corresponding state.

- (5) O'odham (Hale and Keyser 1998: 92, (31))
- a. (s-)moik 'be soft'
 - b. moik-a 'become soft'
 - c. moik-a-(ji)d 'cause to become soft'
- (6) Warlpiri (Hale and Keyser 1998: 92, (31))
- a. wiri 'be big'
 - b. wiri-jarri- 'become big'
 - c. wiri-ma- 'cause to become big'

In O'odham in (5) the word denoting the causative is derived from the word denoting the non-causative, which is in turn derived from the word denoting the state. In Warlpiri in (6), on the other hand, the words denoting the causative and the non-causative COS predicates are derived from the word denoting the state. In both cases the state is morphologically basic, an observation Hale and Keyser use to argue for the derivation

of the changes of state from the state itself. Though it is clear that this sort of relationship holds sometimes, work by Dixon (1982) makes us wonder whether it can be taken for granted that the relationships between states and changes of state are identically encoded for all types of languages and for all types of states.

1.2 Is the Relationship the Same for All Ontological Types of States?

In contrast to what is suggested by the theories of Hale and Keyser (2002) and Baker (2003), Dixon shows that "... certain states, naturally described by adjectives, contrast with states that are the result of some action" (1982: 50), for example, they differ in their morphological encoding. Dixon refers to the class of states naturally described by adjectives – in languages that have that lexical category – as *property concepts* (e.g. predicates denoting states related to speed, age, dimension, color, value, etc. and that presuppose no prior change). Contrasting with the class of property concepts is the class of states "that are the result of some action", *result states*, which are morphologically derived from verbs in many languages. This contrast shows up even in English, which otherwise does not have much verbal morphology.

- (7) English
a. The road is *wide*
b. The machine is *brok+en*

While the word denoting a property concept in (7a) is morphologically basic, the word denoting the result state in (7b) is morphologically derived from its corresponding change of state verb. Just as Hale and Keyser (1998: 100), Haspelmath (1993) and others argue that morphological makeup is an indication of semantic composition for non-causative and causative COS verbs in the causative alternation, so we believe that morphological makeup should be considered in understanding the semantic nature of states, and their relationship to related COS predicates.

1.3 What Effect Does a Language's Lexical Category Inventory Have on this Relationship?

An additional relevant question in this domain of study is what effect a language's lexical category inventory has on the relationship between words denoting states and words denoting their associated changes of state. It is well-known that not all languages have adjectives. Property concepts show up as nouns in some of these languages, and as verbs in others (Dixon 1982). Given that derivational morphology is often sensitive to lexical categoryhood, it seems quite possible that crosslinguistic variation in lexical category inventory might contribute to different types of relationships between words denoting states and their related changes of state. So far as we are aware, this is a question that has not been asked before.

2. Some Suggestive Data

Having now laid out several questions regarding the relationship between states and changes of state, we turn to some preliminary data suggesting answers and further areas

for research related to these questions. We begin by addressing the questions in §1.1 and §1.2 and then move on to the question raised in §1.3.

2.1 *Are All States Conceptually and Morphologically Basic?*

Data from a variety of languages, such as English and Quechua, suggest that in contrast to what is suggested by theories such as those of Hale and Keyser (2002) and Baker (2003), not all states are conceptually and morphologically basic. In the following sections we give data supporting this observation.

2.1.1 *English*

A major finding of Dixon's (1982) study is that the morphological complexity of a word denoting a state depends on the nature of the state: words denoting property concepts are morphologically simple in their stative denotation, while words denoting states that presuppose some change (i.e. result states) are often morphologically complex. The data in (8) and (9) illustrate this point.

Words whose denotation includes a property concept are morphologically basic in their stative denotation, as shown in (8) for *loose*, where the words denoting the changes of state are derived from the word denoting the property concept state with the *-en* suffix.

- (8) a. The knot is loose
b. The knot loosened
c. Kim loosened the knot

The same sort of relationship between states and changes of state holds for other adjectives in English, such as *bright*, *broad*, *cheap*, *coarse*, *damp*, *dark*, *deep*, *fat*, *flat*, *fresh* and others (Levin 1993). In other instances, the word denoting the change of state and the associated state are morphologically identical, but we assume that the COS predicates are again derived, as represented by the category change. We attribute the absence of the affix to a failure to meet the phonological conditions governing its appearance (Jespersen 1939).

This contrasts with the situation for words whose denotation includes a result state – for these types of words in English, the word denoting the state tends to be the one that forms English past participles, derived with the *-en* suffix (and its allomorphs) from the word denoting the changes of state, as shown in (9).

- (9) a. The machine is broken
b. The machine broke
c. John broke the machine

The same sort of relationship holds for other verbs denoting an action giving rise to a result state, such as *bend*, *crease*, *crinkle*, *crumple*, *fold*, *rumple*, *wrinkle*, *break*, *chip*, *crack*, *crash*, *crush*, *fracture*, *rip*, *shatter*, *smash*, *snap*, *splinter*, *split*, *tear*, and others (Levin 1993).

2.1.2 *Cuzco Quechua*

It is not only in English that this asymmetry between property concepts and result states is observed. In Quechua it is also the case that words whose denotation includes a property concept have a morphologically underived form that denotes a state. This is illustrated by the data in (10) from the Cuzco dialect.

- (10) a. wasi-qa *hatun-mi* (ka-sha-n)
house-TOP big-EVIDENTIAL be-PROG-3P
'The house is big' (Martina Faller, p.c.)
- b. *hatun-ya-y*
big-TRANSFORMATIVE-INF
'become big' (cf. Sp. *agrandarse*) (Cusihuaman 1976: 195)
- c. wasi-ta *hatun-ya-chi-rqa-n*
house-ACC big-TRANSFORMATIVE-CAUS-PAST-3P
'(s)he made the house big' (Martina Faller, p.c.)

Other words denoting property concepts seem to behave similarly. According to Weber, describing the related Huallaga dialect, *-ya:* is an inchoative marker and "... seems to be completely productive ..." occurring with property concept words with meanings such as 'big', 'crazy', 'white', 'rich', 'red', 'sick-ness/sick person', 'curly', 'hard', 'deaf', etc. (Weber 1989: 30–31). Words denoting causative changes of state can then be derived from the *-ya:* marked non-causative changes of state with the *-chi* causative suffix (Weber (1989: 166), Cusihuaman (1976: 194), Martina Faller, p.c.); compare (10b) to (10c).

This direction of derivation from state to non-causative change of state to causative change of state contrasts with the direction of derivation for states that presuppose a change. In these cases, the word denoting the state is a participle derived from a verb (Weber 1989: 282–283; Cusihuaman 1976: 225). The word denoting the non-causative change of state, for its part, is derived from the word denoting the causative change of state with some some sort of reflexive marker. This is illustrated by the data in (11).

- (11) a. Tela *qhasu-sqa* ka-sha-n.
cloth tear-PAST.PART be-PROG-3P
'The cloth is torn' (Martina Faller, p.c.)
- b. tela *qhasu-ku-n*.
cloth tear-REFL.-3P
'The shirt tore/got torN' (Martina Faller, p.c.)
- c. tela-ta *qhasu-sha-n*.
cloth-ACC tear-PROG-3P
'She/he tore the shirt / She tears/is tearing the cloth' (Martina Faller, p.c.)

In both English and Quechua, then, while the direction of derivation for words whose denotation includes a property concept meaning appears to be state to change of state,

the direction of derivation for words whose denotation includes a result state is the reverse – from change of state to (result) state.¹

2.2 *Which States Are Morphologically Derived, and Which Are Basic?*

Given the asymmetry observed above for both English and Quechua, one wonders if there is any sort of generalization holding across languages. These data, taken alongside Dixon's study of languages without adjectives, suggest that property concepts are denoted by morphologically simple words. They may be lexicalized as either stative verbs, nouns, or adjectives, depending on the language, but are morphologically simple words whatever their lexical category encoding. This generalization is stated in (12).

(12) Generalization 1:

If X is a property concept meaning, then the word Y denoting X is morphologically simple.

Given (12), if there is any overt derivational relationship between words denoting states, non-causative and causative changes of state, then, the words denoting the changes of state will be derived from the word denoting the state, as illustrated in (8) for English and in (10) for Quechua. The generalization also holds in other languages we have looked at.²

The lexicalization of result states and COS predicates related to them requires further research, as some languages such as Lakhota (Boas and Deloria 1939; Foley and Van Valin 1984) and Tagalog (Foley and Van Valin 1984) seem to lexicalize result states as morphologically simple forms, with words denoting the non-causative and causative changes of state built on top of them. What is noteworthy, though, is that in all languages we have examined, the paradigms involving result states are morphosyntactically distinct from those involving property concepts. For example, based on data in Boas and Deloria (1939), it seems that only roots with property concept meanings can be used without additional affixes in Lakhota, while roots with result state meanings must combine with certain affixes to be used with a stative meaning. Further, the two kinds of roots take different affixes to form non-causative and causative changes of state. Data like these and those discussed above support the idea that property concepts and result states are two fundamentally different types of states, down to the level of morphological encoding.

2.3 *What Is the Impact of Crosslinguistic Variation in Lexical Category Inventory?*

Dixon's observation regarding the diversity in lexical category encoding of property concepts was discussed above. This diversity turns out to have an interesting impact on the relationship of words denoting property concept states to words denoting their

¹ More research is needed on the possible morphological relations between words denoting causative and non-causative changes of state. Haspelmath's (1993) work on this question is suggestive, but unfortunately his survey preponderantly involves words whose denotation includes result states, so that it only presents a partial picture.

² This empirical generalization is predicted if the construction of word meaning is monotonic, as proposed e.g. in Olsen (1996) and Rappaport Hovav and Levin (1998). See Koontz-Garboden (2004) for discussion related to these facts specifically and for a proposal to derive (12) from monotonicity.

associated non-causative changes of state. We have observed two types of languages so far as this relationship is concerned. The more familiar kind of language is exemplified by O’odham, Spanish, and Warlpiri in (13)-(15). These are languages in which the word denoting the non-causative change of state is derived from the word denoting the property concept through some sort of morpholexical process overtly marked by morphology. In O’odham, as shown in (13), where property concepts are said to be lexicalized as adjectives, the addition of a suffix derives a non-causative change of state from the property concept state, and the causative change of state is, in turn, derived from the non-causative change of state. In Spanish, as shown in (14), where property concepts are also lexicalized as adjectives, this is done by some combination of prefixes and suffixes. Warlpiri, as shown in (15), where property concepts are lexicalized as nouns, derives words denoting non-causative changes of state from the word denoting the state with a suffix. Words denoting causative changes of state are also derived from the state-denoting word, but with a different suffix.

(13) O’odham (Hale and Keyser 1998: 92)

	<u>Adjective</u>	<u>Non-causative COS</u>	<u>Causative COS</u>	
a.	(s-)wegi	weg-i	weg-i-(ji)d	‘red’
b.	(s-)moik	moik-a	moik-a-(ji)d	‘soft’
c.	(s-)'oam	'oam-a	'oam-a-(ji)d	‘yellow’

(14) Spanish

	<u>Adjective</u>	<u>Non-causative COS</u>	<u>Causative COS</u>	
a.	rojo	en-roje-cer	en-roje-cer	‘red’
b.	duro	en-dure-cer se	en-dure-cer	‘hard’

(15) Warlpiri (Hale and Keyser 1998: 93)

	<u>Noun</u>	<u>Non-causative COS</u>	<u>Causative COS</u>	
a.	wiri	wiri-jarri-	wiri-ma-	‘big’
b.	maju	maju-jarri-	maju-ma-	‘bad’

This situation contrasts with that observed in certain other languages, such as Tongan (Polynesian). In this language property concepts are lexicalized as verbs and the same word is polysemous between a state and a non-causative COS denotation, as shown by the data in (16). Words denoting causative changes of state are derived from the state denoting words with a distinct morpheme, *faka-*, as shown in (16c).

(16) Tongan (Koontz-Garboden, field notes)

a.	Ko	e	hala	'oku	<i>lahi</i>	
	PRSTNL		the road	PRES	wide	
	‘The road is wide’					
b.	Hili	pe	'uluaki	fo'i'akau',	kuo	<i>lahi</i> ia.
	after	only	first	medicine,	PERF	big him
	‘After only one pill, he became big’					

- c. Na'e *faka-lahi* e he puleanga 'a e hala
 PAST CAUSE-wide ERG the government ABS the road
 'The government widened the road'

Though there is no derivational morpheme signaling the difference between the state and the non-causative COS denotation in (16a,b) above, there is a difference in aspect marking – while the use of the continuous marker *'oku* correlates with an ongoing state denotation, use of the perfect marker *kuo* correlates with a non-causative COS denotation.³ This polysemy is not unusual as it has been observed in the literature on the typology of aspect marking that perfective marking of a stative verb often yields a change of state interpretation (Comrie 1976: 19–20; Bybee *et al.* 1994: 75–76; Chung and Timberlake 1985: 217). Further, similar facts have been observed for other languages in which property concepts are lexicalized as verbs, such as Fongbe (Lefebvre and Brousseau 2002: 88), Thai (Prasithratsint 2000: 262), Lao (Enfield 2003: 6), Mokilese (Chung and Timberlake 1985: 238), and Mandarin, as illustrated in (17), for example.

- (17) Mandarin
 a. tā gāo
 'he is tall'
 b. tā gāo-le
 (Pfv. [perfective]) 'he became tall, has become tall'
 (Comrie 1976: 19–20)

It seems that this sort of polysemy arises only in languages where property concepts are lexicalized as verbs; in languages where they are lexicalized as nouns or adjectives, we observe no such polysemy. This leads us to a second generalization, stated as in (18).

- (18) Generalization 2:
 Only in languages where property concepts are lexicalized as verbs can a single word be polysemous, denoting a property concept state and its associated non-causative change of state.

The typological generalization, then, is that there seem to be two types of languages as far as the derivation of non-causative changes of state from property concept states is concerned, and that the type of derivation a language uses is in part correlated with how it lexicalizes property concept notions. There can only be polysemy to derive non-causative changes of state from states where the latter are lexicalized as verbs. The explanation for this lies in the nature of the mapping between lexical semantics and morphosyntax. While words of many different lexical categories can denote states, only verbs can denote changes of state. Because of this, the same word

³ Here we are actually simplifying significantly due to space considerations. It is actually the case that a COS meaning can arise with *'oku* marked states in the presence of an adverb requiring such a meaning, though the default interpretation of *'oku* constructions is a stative one. This suggests that what determines whether a property concept word has a state or a COS reading goes beyond grammatical aspect marking. Which reading arises depends on the sentential context, which can lead to the coercion of one meaning or another (Zucchi 1998). These issues are discussed extensively in Koontz-Garboden (2004).

can denote both states and changes of state only in a language where states are lexicalized as verbs. In languages where property concepts are lexicalized as nouns or as adjectives, these cannot be polysemous between a state and change of state reading, since only verbs can denote meanings of the latter type.⁴ The facts we have seen above support this claim. Indeed, Spanish, Warlpiri, and O’odham are all languages where property concepts are said to be lexicalized as either nouns (Warlpiri) or as adjectives (Spanish and O’odham). In this way, these languages contrast with Tongan and Mandarin, where property concepts are said to be lexicalized as verbs.

3. Conclusion

Though the research we have reported is still in its preliminary stages, several important empirical generalizations have already emerged. First, we find that property concepts and result states are lexicalized as words with different morphological makeups. While property concepts are lexicalized as morphologically simple words, this is not always the case for result states. Secondly, we find that some languages fail to have morpholexical non-causative changes of state derived from the associated property concept state. Rather than having a morpholexical derivation of a change of state from a property concept state, in these languages, one morphologically simple word is polysemous between a property concept state and a non-causative COS meaning. We find, then, that there exist two types of languages – those with non-causative changes of state derived morpholexically and those with polysemy. Due to a constraint on the mapping between lexical semantic and morphosyntactic categories that only verbs can denote changes of state, polysemy arises only in languages where property concepts are lexicalized as verbs.

From a theoretical perspective, we believe that our observations suggest that theories of event structure that give homogeneous representations to all COS predicates (e.g. Hale & Keyser 2002; Baker 2003) need to be revisited. There seems to be a contrast in the behavior of property concept states and result states, and in how non-causative changes of state are derived from property concepts, depending on other morphosyntactic properties of different languages. Theories of event structure should capture these asymmetries.

Acknowledgements

We would like to thank the participants of the Fourth Mediterranean Morphology Meeting for their questions and comments. We are also grateful to Sisilia Lutui for help with Tongan and to Martina Faller for help with Quechua. This research was supported in part by Graduate Research Funds from the Department of Linguistics at Stanford to Koontz-Garboden and by NSF Grant BCS-0004437 to Levin.

⁴ This claim is fleshed out in Koontz-Garboden (2004), where it is shown that when properly formulated, potential counterexamples such as *birth*, *conception*, etc. actually support the theory.

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