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Spanish causative psychological verbs: Insights from their scalar structures

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Introduction

Psych(ological) verbs / Change of state verbs

- Transitive experiencer object (TEO) verbs (e.g. Spanish *deleitar* ‘delight’, *serenar* ‘calm’):
 - (1) [La película]_{CSR} deleitó [a Claudia]_{EXP}.
‘The movie delighted Claudia.’
- Transitive change of state (TCoS) verbs (e.g. Spanish *secar* ‘dry’, *arrugar* ‘wrinkle’):
 - (2) [El viento]_{CSR} secó [la ropa]_{OBJ}.
‘The wind dried the clothes.’
- Both types of verbs share basic similar semantic characteristics:
 - selection of an affected argument: experiencer (TEO), theme (TCoS)
 - affected object undergoes a change
 - change is caused by a causer
 - change: w.r.t. verbs’ semantic core meaning, i.e. state of being delighted (1), state of being dry (2)

Psych(ological) verbs / Change of state verbs

- TEO predicates (in their *agentive* and *eventive* readings): as causative and bi-eventive (like TCoS or accomplishment verbs).
(cf. Grimshaw 1990; Van Voorst 1992; Arad 1998; Landau 2010; Alexiadou & Iordăchioaia 2014)
- (A set of) TCoS and TEO predicates have been traditionally associated with a natural culminating change or telos.
(cf. Dowty 1991; Hay et al. 1999; Kennedy & McNally 2005; Kennedy & Levin 2008, a.o.)
- The culminating change of TEO predicates has made them be seen as telic.
- Telicity of TEO predicates has been challenged.
(cf. Fábregas & Marín 2015; Marín 2011, 2015)
- The (culminating) change is set differently w.r.t. the lexical item, affecting:
 - the predicates' scalar readings
 - how we perceive the telicity of the verbs

Research Questions

Focusing on Spanish TEO and TCoS predicates,
how the scalar properties of the predicates have an impact on:

- the aspectual behavior of the verbs,
- the predicates' (a)telic interpretations

In order to answer those questions:

- availability of scalar readings of TEO predicates
- scalar properties (Hay et al. 1999; Kennedy & McNally 2005; Kennedy & Levin 2008)
- two different types of TEO predicates are proposed (w.r.t. their scalar and aspectual properties):
 - **lower-bounded** (LB): min. degree in scale which EXP needs to fulfill (e.g. *deleitar* 'delight', *alegrar* 'make happy')
 - **upper-bounded** (UB): max. degree in scale that EXP needs to reach (e.g. *serenar* 'calm', *despreocupar* 'make free of worries')
- LB TEO behave as LB TCoS predicates (e.g. *arrugar* 'wrinkle', *manchar* 'stain')
- UB TEO behave as UB TCoS predicates (e.g. *secar* 'dry', *enderezar* 'straighten')

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Source of verbs' gradability

Notion of verbs of gradual change:

(Hay et al. 1999; Kennedy & McNally 2005; a.o.)

- Increase in a range of *values*
- Who undergoes the increase?
 - argument which possesses a gradable property
 - experiencer (TEO), theme (TCoS)
- Values are ordered in a particular *dimension*:
 - intensity of delight (TEO)
 - dimension of dryness (TCoS)
- **Standard degree of comparison** (SDC) represents the natural bound of the semantic core.
- The SDC is the degree that manifests the property determined by the semantic core of a verb (the degree that *stands out*). (Kennedy 1999; Kennedy & Levin 2008)
- *Lower-bounded* and *upper-bounded* TCoS verbs

(cf. English: Kennedy 2007; Kennedy & McNally 2005; Kennedy & Levin 2008, a.o.)

Standard degree of comparison

- **Upper-bounded** TCoS verb: semantic core determines a max. SDC, e.g. *secar* ‘dry’ (cf. (3)).
- Under normal usage, sentence (3a): no amount of water left in the affected object (i.e. the clothes).
- The clothes are maximally dry.
 - (3) a. El viento secó la ropa.
‘The wind dried the clothes.’
 - b. La ropa está (completamente) seca.
‘The clothes are (completely) dry.’
- Sentence (3a): the clothes have dried to a max. degree along the course of an event which was caused by the causer ‘the wind’.

Standard degree of comparison

- **Lower-bounded** TCoS verb: semantic core identifies a min. SDC, e.g. *arrugar* ‘wrinkle (cf. (4)).
- Under normal usage, sentence (4a): affected object has some minimal amount of small lines in it.
- The paper is minimally wrinkled.
 - (4) a. La impresora arrugó el papel.
‘The printer wrinkled the paper.’
 - b. El papel está (al menos un poco) arrugado.
‘The paper is (at least a little) wrinkled.’
- Natural transition of the object from not having any degree of the property (zero degree) to have some degree (non-zero degree) of the property.

Standard degree of comparison

- **Proposal:** 2 types of TEO verbs, **lower-bounded** and **upper-bounded**.
- *Inchoative state causative* verbs: TEOs which lexicalize the starting of an experiential state. (Fábregas & Marín 2015; Fritz-Huechante et al. 2020)
- Inchoative state causatives' semantic core determines a min. SDC (as psych adjectives) with **no** max. value. (cf. Kennedy & McNally 2005)
 - (5) a. La película deleitó a Claudia.
'The movie delighted Claudia.'
 - b. Claudia está (al menos un poco) deleitada.
'Claudia is (at least a little) delighted.'
- The experiencer Claudia is delighted as soon as she is minimally affected (non-zero degree), which is caused by 'the movie'.
- Min. degree serves as a candidate for a natural identifiable bound in the scale of delight for the entire event.

Standard degree of comparison

- **Upper-bounded**: small subset of TEO verbs sets a max. value , e.g. *serenar* ‘calm’, *despreocupar* ‘make free of worries’.
 - Central idea: **absence** of a **previous** emotion or state
 - Sentence (6a):
 - Claudia in previous state (e.g. angry, worried)
 - Claudia undergoes a gradual change.
 - Property: calmness
 - Change: from not being calm to gradually being calm
 - Caused by a causer (the melody)
- (6) a. La melodía serenó a Claudia.
‘The melody calmed Claudia.’
- b. Claudia está (totalmente) serena.
‘Claudia is (totally) calm.’

Standard degree of comparison

- **Prefix *des-*:** ‘absence of’ or ‘reversal of’ (among other meanings)
(cf. Brea 1976; Serrano-Dolader 1995, 2011)
 - *des-* also adding Cause: ‘make have the absence of’, ‘make free of (emotion)’
(cf. Haouet 2000; Varela Ortega & Martín García 1999)
 - The prefix adds a causing eventuality which accommodates the causer.
 - Causing eventuality can be gradual.
 - In (7a): Claudia undergoes a gradual change from the state of being worried to not being worried caused by ‘the melody’.
- (7) a. La melodía despreocupó a Claudia.
‘The melody made Claudia free of worries.’
- b. Claudia está (totalmente) despreocupada.
‘Claudia is (totally) free of worries.’

‘Measure of change’ function

- Measure of change function (MCF): responsible for associating the affected object with ordered values on a scale. (cf. Kennedy & Levin 2008)
 - **MCF and upper-bounded scales:**
 - **TCoS** verbs, e.g. *secar* ‘dry’ in (8)
 - **TEO** verbs (psych accomplishment), e.g. *serenar* ‘calm’ in (9)
- (8) El viento **secó** completamente la ropa, #pero podría secarla aún más.
 ‘The wind dried the clothes completely, #but it could dry them even more.’
- (9) La melodía **serenó** completamente a Claudia, #pero podría serenarla aún más.
 ‘The melody calmed Claudia completely, #but it could calm her even more.’

'Measure of change' function

- MCF maps [object] and its measured degree of [property] the object has at the initiation of the [event] onto a min. element of the scale.
- MCF returns a degree: positive difference degree of the measured [property] at the beginning and end of the [event].
- Verb inherits the SDC determined at the semantic core.
- In (8), max. degree of **dryness**, in (9), max. degree of **calmness**
- *Completely*: targets max. degree, *but*-clause generates a contradiction.
- Importantly, MCF establishes the obligatory presence of a min. value (explaining comparative readings).
- Hence, we understand upper-bounded scale structures as possessing a min. and a max. bound.

'Measure of change' function

- **Measure of change function** (MCF) and lower-bounded scales:
 - **TCoS** verbs, e.g. *arrugar* 'wrinkle' in (10)
 - **TEO** verbs (inchoative state causative), e.g. *deleitar* 'delight' in (11)
- (10) La impresora **arrugó** completamente el papel, ¿pero podría arrugarlo aún más.
'The printer wrinkled the paper completely, ¿but it could wrinkle it even more.'
- (11) La película **deleitó** completamente a Claudia, ¿pero podría deleitarla aún más.
'The movie delighted Claudia completely, ¿but it could delight her even more.'

'Measure of change' function

- MCF maps [object] and its measured degree of [property] the object has at the initiation of the [event] onto a min. element of the scale.
 - MCF returns a degree: positive difference degree of the measured [property] at the beginning and end of the [event].
 - Verb inherits the SDC determined at the semantic core, **no** max. degree.
 - In (10), min. degree of **wrinkle**, in (11), min. degree of **delight**
 - *Completely* infelicitous with lower-bounded scales
 - Adverb gets reinterpreted as a synonymous of *very*.
- (Hay et al. 1999; Kennedy & McNally 2005)
- Once adverb is reinterpreted, *but*-clause does not generate a contradiction.

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Lexical aspect

- Both TEO and TCoS predicates involve a causing eventuality responsible for the change.
- As TCoS predicates, TEO predicates are bi-eventive consisting of a causing eventuality and a state component. (Fábregas & Marín 2015; based on Pesetsky 1995)
- **Bi-eventivity**: *again* test. Ambiguity between:
 - *repetitive reading*: repetition of the causing event
 - *restitutive reading*: “resumption of a previous state”
 (cf. Stechow 1996; Alexiadou & Iordăchioaia 2014: 22)
- **TCoS predicates**, both readings:

- (12) a. Pablo **secó** la ropa de nuevo.
 ‘Pablo dried the clothes again.’
 Rep.: Pablo did something again and as a result the clothes are dry.
 Res.: Pablo did something and as a result the clothes are dry again.
- b. Pablo **arrugó** el papel de nuevo.
 ‘Pablo wrinkled the paper again.’
 Rep.: Pablo did something again and as a result the paper is wrinkled.
 Res.: Pablo did something and as a result the paper is wrinkled again.

Lexical aspect

- TEO predicates, both readings

- (13) a. Pablo **deleitó** a Camila de nuevo .
 ‘Pablo delighted Camila again.’
 Rep.: Pablo did something again and as a result Camila is delighted.
 Res.: Pablo did something and as a result Camila is delighted again.
- b. Pablo **serenó** a Camila de nuevo.
 ‘Pablo calmed Camila again.’
 Rep.: Pablo did something again and as a result Camila is calmed.
 Res.: Pablo did something and as a result Camila is calmed again.
- Note: *again* test seems to be sensitive to agentivity as well.
 - According to native speakers, a repetitive reading is more marked with an inanimate causer for both TCoS and TEO sentences.

Telicity

- **Upper-bounded scale** predicates are naturally interpreted as telic.
(cf. TCoS Kennedy & Levin 2008)
- A predicate is true only of an event whose endpoint corresponds to the point in time where the max. SDC has been reached.
- **Lower-bounded scale** predicates are naturally interpreted as atelic.
(cf. TCoS: Kennedy & Levin 2008; TEO: Fábregas & Marín 2015)
- Only a min. value is required to obtain a true predicate.

Telicity

- **Progressive** licenses the inference to the perfect with atelic predicates.
- Perfect inference is not possible with telic predicates.
- Lower-bounded **TEO** predicates (14) and **TCoS** predicates (15): ongoing [event] licenses that [object] is already in the state specified by the verb.

- (14) La película está **deleitando** a Claudia. ⇒ Claudia está **deleitada**.
 ‘The movie is delighting Claudia.’ ‘Claudia is delighted.’
- (15) La impresora está **arrugando** el papel. ⇒ El papel está **arrugado**.
 ‘The printer is wrinkling the paper.’ ‘The paper is wrinkled.’

Telicity

- Upper-bounded **TEO** predicates (16) and **TCoS** predicates (17): ongoing [event] does not entail that [object] is already in the state specified by the verb.

(16) La melodía está **serenando** a Claudia. \nRightarrow Claudia está **serena**.
 ‘The melody is calming Claudia.’ ‘Claudia is calm.’

(17) El viento está **secando** la ropa. \nRightarrow La ropa está **seca**.
 ‘The wind is drying the clothes.’ ‘The clothes are dry.’

Interim summary

	EXPERIENCER OBJECT		CHANGE OF STATE	
	inchoative	accomplishment	lower-bounded	upper-bounded
standard degree	minimum	maximum	minimum	maximum
bound	lower	upper	lower	upper
scale structure	partially closed	totally closed	partially closed	totally closed
telicity	atelic	telic	prot. atelic	prot. telic

Table 1: Scalar and semantic properties of TEO and TCoS predicates.

prot.atelic = prototypically atelic, prot.telic = prototypically telic

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Casi 'almost' test

- *Almost* has a scalar reading.
- It has scope over the bound of the scales, i.e. either the lower bound or upper bound.
- Almost gives a value close by, but lower than the SDC.

(Hitzeman 1992; Penka 2006; Amaral & Del Prete 2010)

- **Upper-bounded** verbs: **TEO** (18a) and **TCoS** (18b) mean that [object] approached a high degree in the [property] specified by the verb, but not the max. degree.

- (18) a. La melodía casi **serenó** a Camila.
 'The melody almost calmed Camila.'
- b. El viento casi **secó** la ropa.
 'The wind almost dried the clothes.'

Casi 'almost' test

- **Lower-bounded** verbs: **TEO** (19a) and **TCoS** (19b) mean that [object] did not reach the min. degree. That is, [object] did not change.

- (19) a. La película casi **deleitó** a Camila.
'The movie almost delighted Camila.'
- b. La impresora casi **arrugó** el papel.
'The printer almost wrinkled the paper.'

Study design and material

- Test presentation: forced-choice selection
- Target verbs embedded in *casi* ‘almost’ frame:
 - (20) a. La película casi **deleitó** a Camila.
‘The movie almost **delighted** Camila.’
 - b. El viento casi **secó** la ropa.
‘The wind almost **dried** the clothes.’
- Sentences were presented individually.
- After sentence, a question targeting the state of the affected object:
Is x in the state?
- Response to question: 2 options
 - *para nada* ‘nothing at all’
 - *bastante* ‘very much’
- Online on IBEX (<https://www.pcibex.net/>)

Study design and material

- Design: 2x2
 - VERB TYPE: psych vs. change of state
 - BOUND: lower vs. upper
- Dependent variable: Response
 - *para nada* ‘nothing at all’
 - *bastante* ‘very much’

		BOUND	
		lower	upper
VERB	psych	para nada	bastante
TYPE	CoS	para nada	bastante

Table 2: Experimental categories and expectations.

- critical items = 48 (divided in 4 different groups)
- fillers = 36
- Participants: n = 73 (age $M = 35,88$)

Results

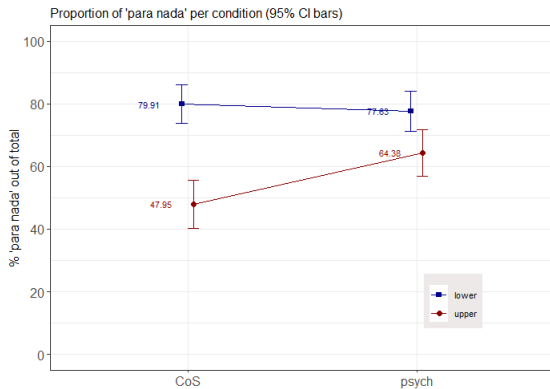


Figure 1: Proportion of critical 'para nada' by verb type and bound (95% C.I.).

Results

effect	estimate	st. error	z-value	Pr(> z)
INTERCEPT	2.2835	0.3781	6.040	1.54e-09 ***
TYPE (psych)	-0.2280	0.3746	-0.609	0.54281
BOUND (upper)	-2.4197	0.3828	-6.321	2.60e-10 ***
TYPE^BOUND	1.3725	0.5141	2.670	0.00759 **

Table 3: Model parameters for the Spanish *casi* test.

- Statistic inferences based on generalized linear mixed-effects models.
- Random factors: SUBJECTS and ITEMS

Results

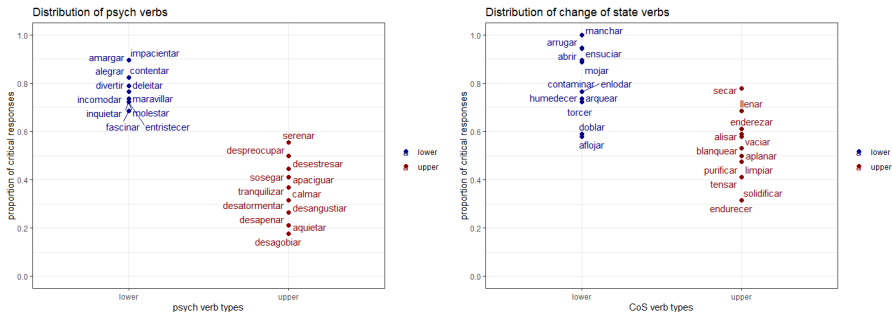


Figure 2: Proportion of critical responses by individual verbs.

Discussion

- Results partially in line with predictions.
 - BOUND: significant difference between a lower and upper bound.
 - TYPE^BOUND: significant interaction effect when controlling for bound (lower vs. upper) and verb type (TCoS vs. psych).
 - **Upper-bounded TCoS and TEO results:**
 - sentences generate 2 possible readings competing with each other.
 - *casi* ‘almost’ has scope over either the lower bound or upper bound.
- (21) El tractor casi aplanó la tierra.
 ‘The tractor almost flattened the ground.’
 Lower-bounded reading: the change in the object did not start.
 Upper-bounded reading: the ground changed but not to the max. degree.
- Reading focusing on the state described by the verb

Discussion

- **Upper-bounded TEO:**
- State is more pervasive with psych verbs.
- Items such as *serenar* ‘calm’, *despreocupar* ‘make free of worries’, *desestresar* ‘make free of stress’ pose more conflict for interpretation.
- More complex eventualities
- Remember: items denote the absence of a previous emotion or state.
- Upper bound is the bound of previous emotion (provided by prefix *des-*)?
- New emotion has a lower bound.

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Next on the agenda

- Analysis of verbs individually
- Follow-up experimental stage for upper-bounded verbs
- Experimental design

6 Appendix

7 Literature

Experimental material

	LOWER-BOUNDED		UPPER-BOUNDED	
	verb	translation	verb	translation
1	molestar	bother	serenar	calm
2	entristecer	sadden	tranquilizar	calm down
3	inquietar	make uneasy	calmar	calm
4	amargar	depress	sosegar	soothe
5	incomodar	disturb	apaciguar	ease
6	impacientar	make impatient	aquietar	quieten
7	contentar	please	desestresar	make free of stress
8	alegrar	make happy	despreocupar	make free of worries
9	deleitar	delight	desangustiar	make free of distress
10	divertir	entertain	desagobiar	make free of frustration
11	fascinar	fascinate	desatormentar	make free of torment
12	maravillar	amaze	desapenar	make free of sadness

Table 4: List of TEO verbs.

Experimental material

	LOWER-BOUNDED		UPPER-BOUNDED	
	verb	translation	verb	translation
1	torcer	bend	enderezar	straighten
2	mojar	make wet	secar	dry
3	ensuciar	make dirty	aplanar	flatten
4	arquear	arch	limpiar	clean
5	aflojar	loosen	vaciar	empty
6	arrugar	wrinkle	endurecer	harden
7	contaminar	contaminate	blanquear	whiten
8	enlodar	cover in mud	tensar	tighten
9	doblar	fold	alisar	smooth
10	humedecer	humidify	purificar	purify
11	manchar	stain	solidificar	solidify
12	abrir	open	llenar	fill

Table 5: List of TCoS verbs.

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