



An alternation study of Dutch psych verbs

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Psych verbs' problem

Problem for linking theories of argument realization:

(e.g. Bresnan & Kanerva 1989, Dowty 1991, Baker 1997, Van Valin 2004,...)

If argument realization is predictable by semantics, then why do verbs that express a very similar mental state, exhibit different argument realizations?

(Croft 1993; Kitis 2009; Verhoeven 2010; Grafmiller 2013)

Psych verbs' problem

John likes Elizabeth ↔ *Elizabeth pleases John*

John fears Elizabeth ↔ *Elizabeth frightens John*

Psych verbs' problem

Experiencer-subject

Stimulus-subject

John likes Elizabeth

↔

Elizabeth pleases John

John fears Elizabeth

↔

Elizabeth frightens John

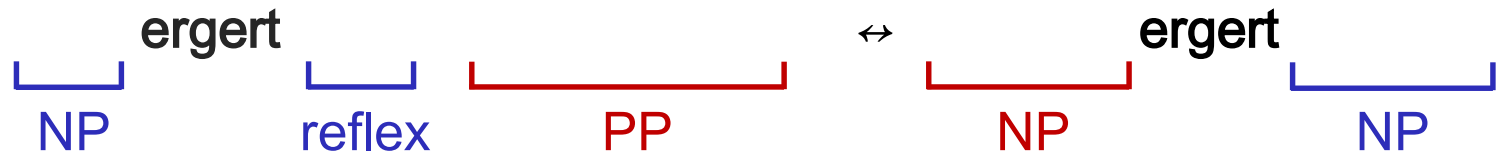
- **Experiencer**: experiences the mental state
- **Stimulus**: causes the mental state

Psych verbs' problem

Reflexive construction

Transitive construction

John ergert zich aan Elizabeth ↔ *Elizabeth ergert John*



'Elizabeth annoys John'

Psych verbs' problem

amuseren ('to amuse')
bedroeven ('to sadden')
benieuwen ('to make curious')
berouwen ('to rue')
ergeren ('to annoy')
frustreren ('to frustrate')
generen ('to embarrass')
interesseren ('to interest')
irriteren ('to irritate')
ontroeren ('to emotionally move')
opwinden ('to arouse')
plezieren ('to make happy')
spijten ('to regret')
storen ('to disturb')
verbazen ('to amaze')

verbijsteren ('to amaze')
verblijden ('to gladden')
verdrieten ('to grieve')
vergenoegen ('to content')
verheugen ('to rejoice')
vermaken ('to entertain')
verontwaardigen ('to indignify')
vervelen ('to bore')
verwonderen ('to surprise')
...

Psych verbs' problem

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...

⇒ *ergeren* ('to annoy')
interesseren ('to interest')
storen ('to disturb')
verbazen ('to amaze')

Hypotheses

- Agentivity hypothesis

Since the agentivity of the participants in a mental state – stimulus and experiencer – can vary, variation arises as to which one is appointed subject position. The most agentive of the two participants in the mental state to be expressed, is then realized as the subject.

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- **Umbrella term:** Hopper & Thompson (1980), Grimshaw (1990), Dowty (1991), Langacker (1991), Croft (1993), Zaenen (1993), Pesetsky (1995), Vanhoe (2002),...

Agentivity hypotheses

- Type level

Verbs that express a mental state in which the experiencer is more agentive, will be more compatible with experiencer-subject argument constructions.

Lexical construction

interesseren

'to take interest'

↳ EXPERIENCER > stimulus

Lexical construction

interesseren

'to take interest'

↳ EXPERIENCER > stimulus



Argument construction

NP V reflex PP

↳ compatible with EXPERIENCER > stimulus

Lexical construction

interesseren

'to take interest'

↳ EXPERIENCER > stimulus

Lexical construction

verbazen

'to amaze'

↳ STIMULUS > experiencer



Argument construction



↳ compatible with EXPERIENCER > stimulus

Lexical construction

interesseren

'to take interest'

↳ EXPERIENCER > stimulus



Argument construction



↳ compatible with EXPERIENCER > stimulus

Lexical construction

verbazen

'to amaze'

↳ STIMULUS > experiencer



Argument construction



↳ compatible with
'STIMULUS > experiencer'

Agentivity hypotheses

- Type level
 - ↳ The verb determines the argument construction
 - ↳ An argument construction may be more compatible with a certain lexical meaning of a verb
 - ↳ The argument constructions do not necessarily carry meaning, independently from verbs
 - ↳ Difference in agentivity = difference in meaning between verbs

Agentivity hypotheses

- Token level

The speaker will put the participant which he or she wants to represent as more agentive, in subject position.

Lexical construction

interesseren

'to take interest'

Lexical construction

interesseren
'to take interest'



Argument construction



'EXPERIENCER > stimulus'

Lexical construction

interesseren
'to take interest'



Argument construction



'EXPERIENCER > stimulus'



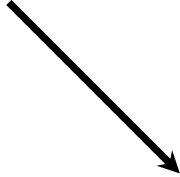
Utterance

John interesseert zich voor Elizabeth
'John takes an interest in Elizabeth.'

↳ EXPERIENCER > stimulus

Lexical construction

interesseren
'to take interest'



Argument construction



'EXPERIENCER > stimulus'

Argument construction



'STIMULUS > experiencer'



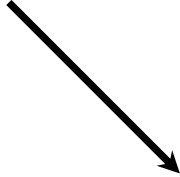
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Lexical construction

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'to take interest'



Argument construction



'EXPERIENCER > stimulus'



Utterance

John interesseert zich voor Elizabeth
'John takes an interest in Elizabeth.'

↳ EXPERIENCER > stimulus

Argument construction



'STIMULUS > experiencer'



Utterance

Elizabeth interesseert John
'Elizabeth interests John.'

↳ STIMULUS > experiencer

Agentivity hypotheses

- Token level
 - ↳ The speaker determines the argument construction
 - ↳ Argument constructions do carry meaning independently from verbs
 - ↳ Difference in agentivity = difference in meaning between the occurrences of a single verb

Agentivity hypotheses

- Type level

Verbs that express a mental state in which the experiencer is more agentive, will be more compatible with experiencer-subject argument constructions.

- Token level

The speaker will put the participant which he or she wants to represent as more agentive, in subject position.

Agentivity hypotheses

- Type level: operationalization taken over from Van de Velde (2004)

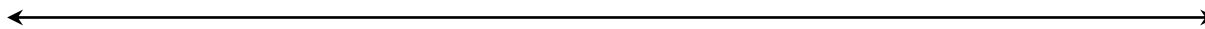
Experiencer	Volition	Control	Responsibility
<i>ergeren</i> ('to annoy')			
<i>interesseren</i> ('to interest')			
<i>storen</i> ('to disturb')			
<i>verbazen</i> ('to amaze')			

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Least agentive
experiencer



Most agentive
experiencer

verbazen
'to amaze'

storen / ergeren
'to disturb' 'to annoy'

interesseren
'to interest'

Transitive



Reflexive

Agentivity hypotheses

- Token level: operationalization taken over from Levin & Grafmiller (2012)
 - ⇒ Code for animacy: more animate stimuli will generally be more agentive, therefore, language users will be more inclined to put animate stimuli in subject position.

Agentivity hypotheses

Category	Corpus examples
<i>animate</i>	<i>We</i> ('we'), <i>Tony Herreman, de grote Israëlische delegatie</i> ('the large Israeli delegation')
<i>concrete</i>	<i>het wrak</i> ('the wreckage'), <i>auto's</i> ('cars'), <i>de hoge kostprijs van het apparaat</i> ('the high cost of the machine')
<i>event</i>	<i>het breken met de regel</i> ('the breaking with the rule'), <i>ned.-belgië</i> ('the Netherlands vs. Belgium'), <i>het gegroet</i> ('the greeting')
<i>abstract</i>	<i>de landelijke politiek</i> ('national politics'), <i>de inefficiëntie</i> ('the inefficiency'), <i>die hypocrisie</i> ('that hypocrisy')
<i>proposition</i>	<i>dat de afgelaste wedstrijden zo laat worden ingehaald</i> ('that the cancelled games are rescheduled so late'), <i>dat ik daar moeilijkheden mee krijg</i> ('that that will get me into trouble')
<i>inanimate residual category</i>	<i>iets</i> ('something'), <i>dit soort dingen</i> ('this kind of stuff'), <i>wat</i> ('what')

Etymology hypothesis

- The argument construction of psych verbs is not determined by their psychological meaning, but rather by their (ties with a former) physical meaning.

(Klein & Kutcher 2002)

Etymology hypothesis

Storen: 'to destroy'. Still present concerning connections & bird nests

Ergeren: 'to damage'. No longer present.

Verbazen: 'to make someone speak or act senselessly'. No longer present.

Interresseren: Never had a physical meaning in the history of Dutch. Latin 'to be inbetween'

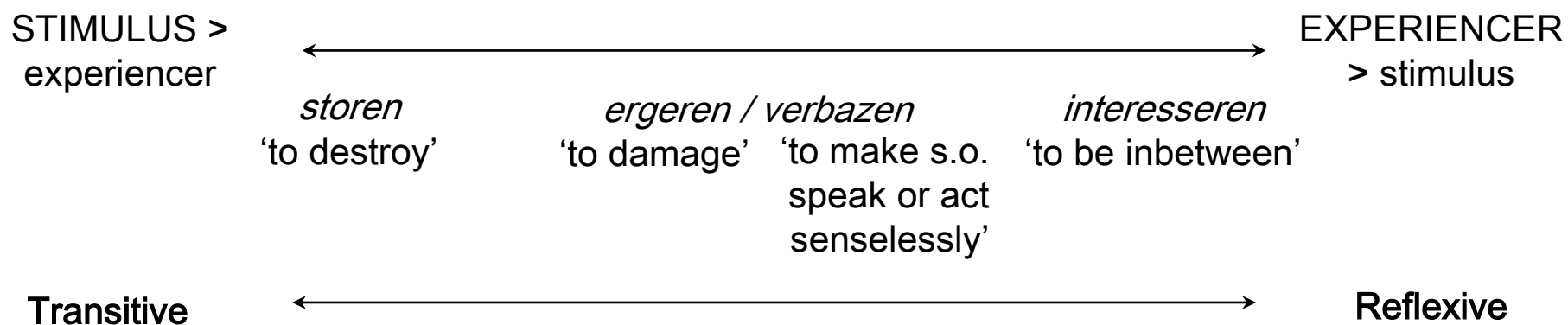
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Hypotheses

- Agentivity Hypothesis
 - Type level *Verb*
 - Token level *Stimulus-Animacy*
- Etymology Hypothesis *Verb*
- Topicality Hypothesis
 - Stimulus-Topicality*
 - Experiencer-Topicality*

Corpora

- Representative cross-cut of spoken & written Dutch
 - Corpus of Spoken Dutch 10 million words (Oostdijk 2002)
 - Synchronic ConDiv corpus 42 million words (Grondelaers et al. 2000)

Dataset

Excluded:

- All instances of *interesseren* in which the meaning was ‘to motivate’ rather than ‘to interest’.

Op termijn hoopt GroenLinks een aantal van deze vrouwen te interesseren voor raadswork.

‘In the long run, GroenLinks hopes to motivate a number of these women for council work.’

- All instances of *storen* (‘to disturb’) with a clear physical meaning
- All participles: *gestoord* (‘crazy’)
- All instances in which the experiencer or stimulus were not expressed (cf. Levin & Grafmiller 2012: 25)
- All instances in which a free relative clause functioned as the experiencer

⇒ 2785 instances

Variables

Response variable

- Variant: *transitive, reflexive*

Explanatory variables

• Hypothesis-driven variables

- Verb: *ergeren, interesseren, storen, verbazen*
- Stimulus-Animacy: *animate, inanimate, concrete, event, abstract*
- Stimulus-Topicality: *first person, second person, third person-pronoun, definite noun, indefinite noun*
- Experiencer-Topicality: *first person, second person, third person-pronoun, definite noun, indefinite noun*

• Nuisance variables

- Stimulus-Number: *singular, plural*
- Experiencer-Number: *singular, plural*
- Negation: *with, without*
- Finiteness: *finite, infinitive*
- Tense: *present, past, future, conditional*
- Country: *Belgium, the Netherlands*
- Register: *chat, informal speech, formal speech, e-mail, mass newspaper, quality newspaper*

Analysis

- Logistic regression
 - Dummy coding
 - Bidirectional stepwise variable selection procedure (Venables & Ripley 2002: 173-177)
 - Each predictor significantly improves the model
 - No more parameters than the number of occurrences of the least frequent response level divided by 20
 - Residual deviance not much higher than the degrees of freedom
 - Hosmer-Lemeshow-Cessie goodness of fit test did not return a significant p-value
 - Variance Inflation Factors < 4

(Baayen 2008; R Core Team 2013; Speelman 2014)

Explanatory variable	Level	Estimate	Confidence interval		P-value
			2.5%	97.5%	
	intercept	-3.78	-4.27	-3.30	< 0.0001
Verb	<i>interesseren</i>	Reference level			
	<i>ergeren</i>	4.00	3.60	4.41	< 0.0001
	<i>storen</i>	2.14	1.80	2.48	< 0.0001
	<i>Verbazen</i>	1.26	0.90	1.64	< 0.0001
Stimulus-Topicality	<i>third person pronoun</i>	Reference level			
	<i>first person</i>	0.42	-0.49	1.32	0.3600
	<i>second person</i>	-0.05	-1.44	1.10	0.9342
	<i>definite noun</i>	1.80	1.45	2.16	< 0.0001
	<i>Indefinite noun</i>	1.97	1.51	2.45	< 0.0001
	<i>subordinate clause</i>	0.59	0.18	1.00	0.0048
Experiencer-Topicality	<i>first person</i>	Reference level			
	<i>second person</i>	0.69	0.31	1.07	0.0003
	<i>third person pronoun</i>	1.40	1.08	1.71	< 0.0001
	<i>definite noun</i>	1.38	1.02	1.75	< 0.0001
	<i>indefinite noun</i>	1.34	0.83	1.86	< 0.0001
Country	<i>Belgium</i>	Reference level			
	<i>the Netherlands</i>	0.88	0.64	1.13	< 0.0001
Stimulus-Animacy	<i>proposition</i>	Reference level			
	<i>animate</i>	-1.37	-1.91	-0.84	< 0.0001
	<i>inanimate</i>	0.34	-0.11	0.79	0.1404
	<i>concrete</i>	-0.08	-0.54	0.37	0.7163
	<i>event</i>	-0.63	-1.17	-0.10	0.0198
	<i>abstract</i>	0.94	0.44	1.44	0.0002
Tense	<i>present</i>	Reference level			
	<i>past</i>	0.20	-0.11	0.51	0.1967
	<i>future</i>	-0.82	-1.48	-0.21	0.0112
	<i>conditional</i>	-1.60	-2.42	-0.89	< 0.0001
Negation	<i>without</i>	Reference level			
	<i>with</i>	-0.61	-0.89	-0.35	< 0.0001
Stimulus-Number	<i>singular</i>	Reference level			
	<i>plural</i>	0.68	0.32	1.04	0.0002
Register	<i>e-mail</i>	Reference level			
	<i>chat</i>	-0.22	-0.64	0.18	0.2810
	<i>informal speech</i>	0.02	-0.42	0.45	0.9335
	<i>formal speech</i>	-0.29	-0.67	0.09	0.1331
	<i>mass newspaper</i>	-0.69	-1.03	-0.36	< 0.0001
	<i>quality newspaper</i>	-0.35	-0.78	0.07	0.1057

AIC	2071
C-index	0.904
Total number of occ.	2785
Transitive occ.	1911
Reflexive occ.	874

Estimated
probability
of the
**reflexive
construction**

- 1 -

ergeren



- 0.8 -

- 0.6 -

storen



- 0.4 -

verbazen

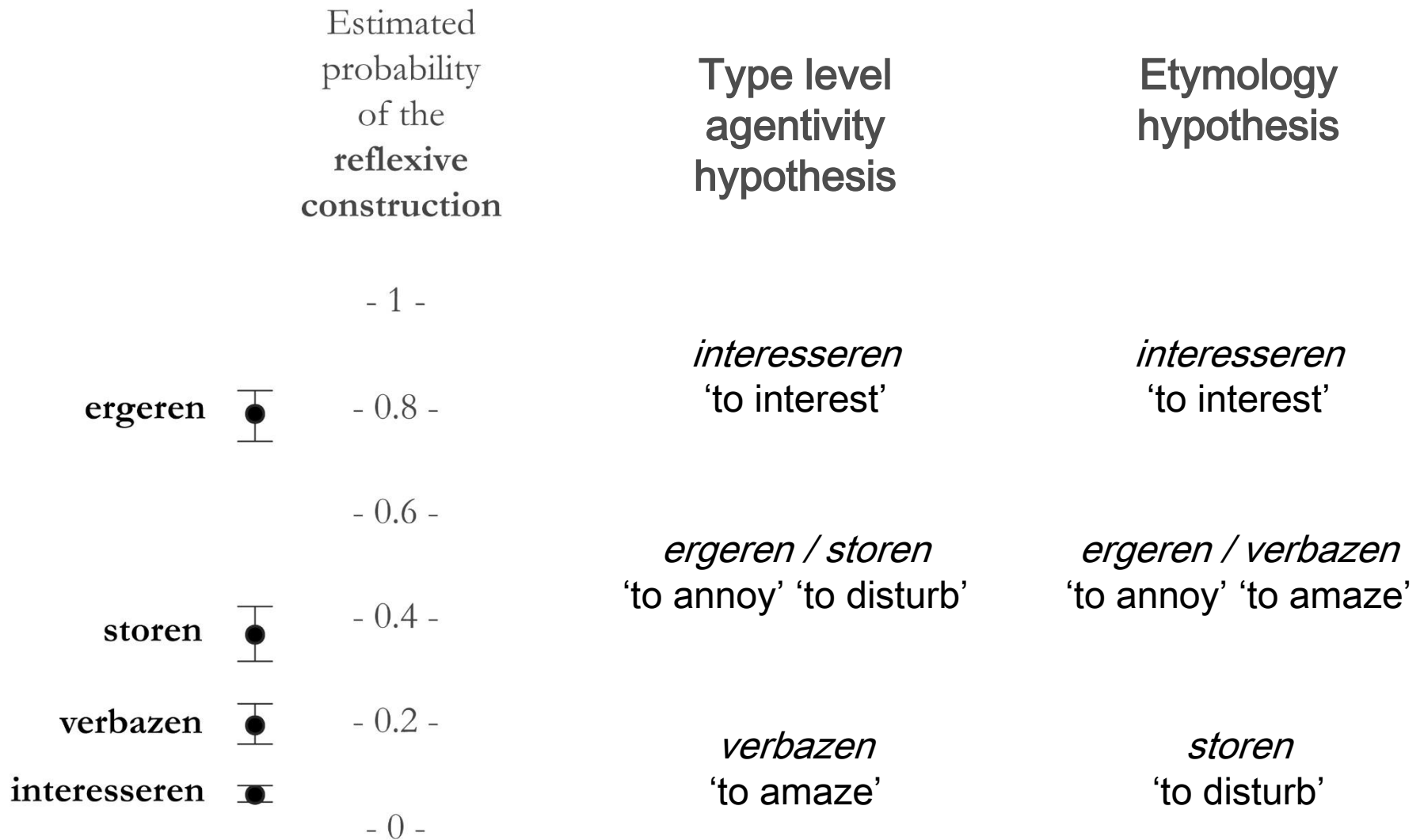


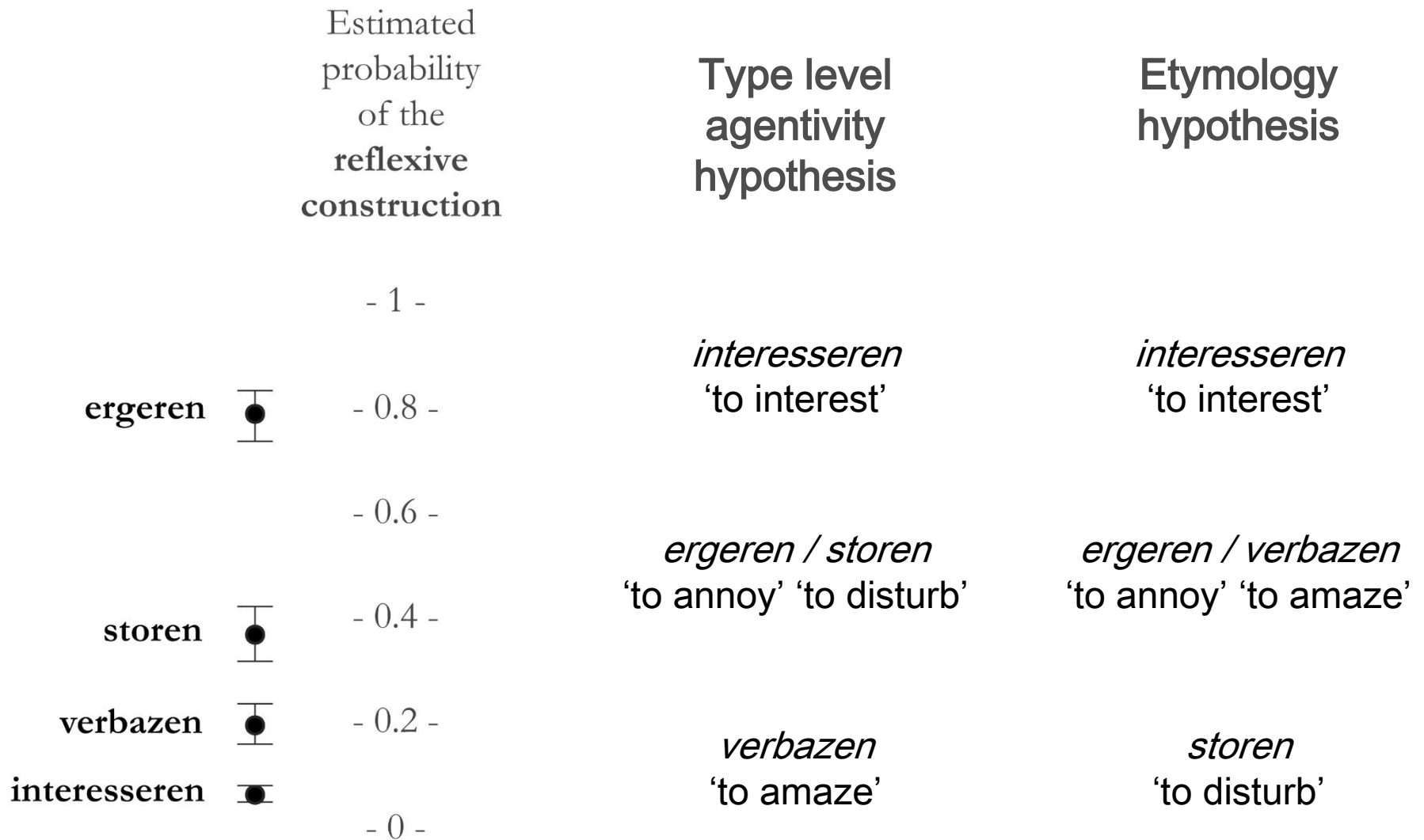
- 0.2 -

interesseren



- 0 -





Not confirmed

Type level agentivity hypothesis

Etymology hypothesis

<i>ergeren</i>	Reflexive	Tr
	387	83

<i>storen</i>	Reflex	Transitive
	220	322

<i>verbazen</i>	Re	Transitive
	148	584

<i>interesseren</i>	R	Transitive
	119	922

interesseren
'to interest'

interesseren
'to interest'

ergeren / storen
'to annoy' 'to disturb'

ergeren / verbazen
'to annoy' 'to amaze'

verbazen
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storen
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Not confirmed

Estimated
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Stimulus-Animacy

- 0.8 -

- 0.6 -

- 0.4 -

- 0.2 -

- 0 -

Animate Concrete Event Abstract Inanimate
residual
category Propositions



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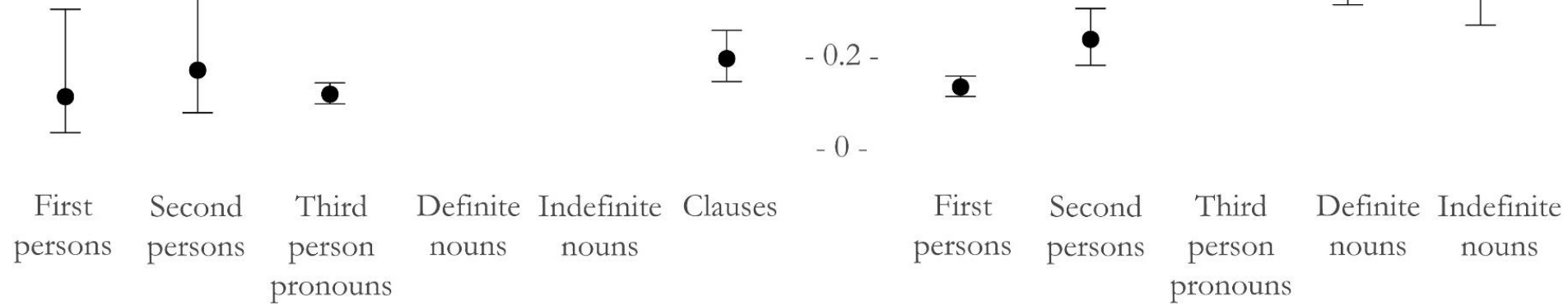
- 0.4 -

- 0.2 -

- 0 -

Stimulus-Topicality

Experiencer-Topicality



Estimated probability of the reflexive construction

- 1 -

- 0.8 -

- 0.6 -

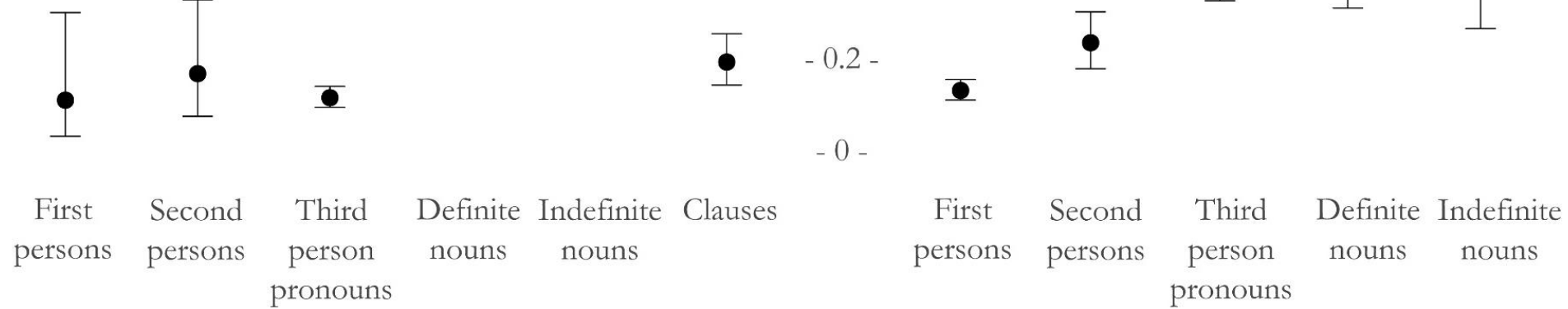
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Stimulus-Topicality

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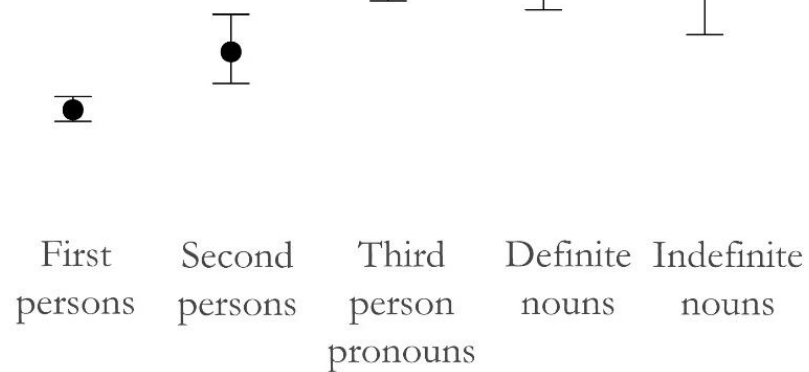
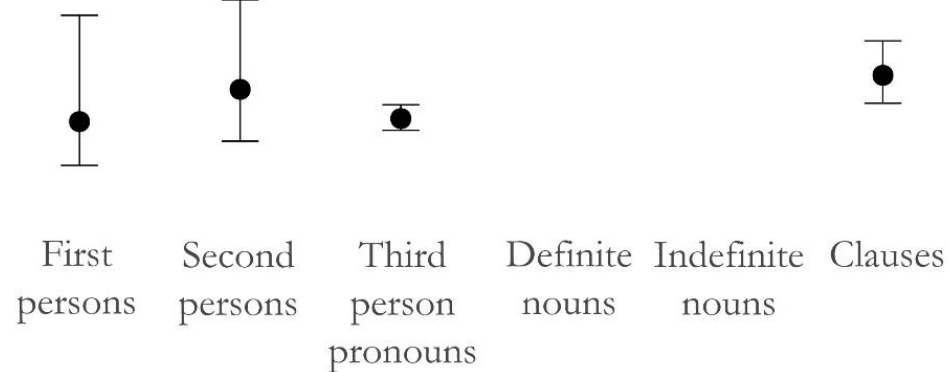
- 0.4 -

- 0.2 -

- 0 -

Stimulus-Topicality

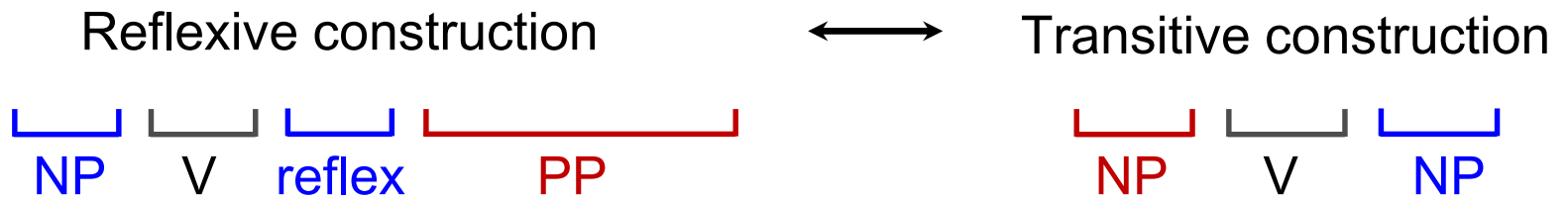
Experiencer-Topicality



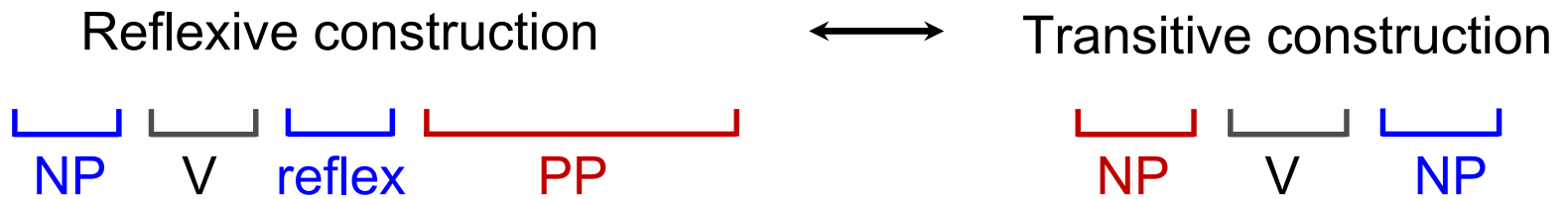
Confirmed

Not confirmed

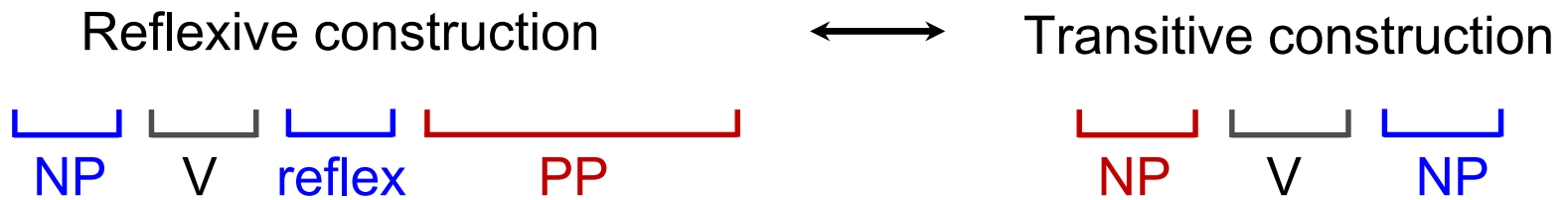
- Heavy stimulus



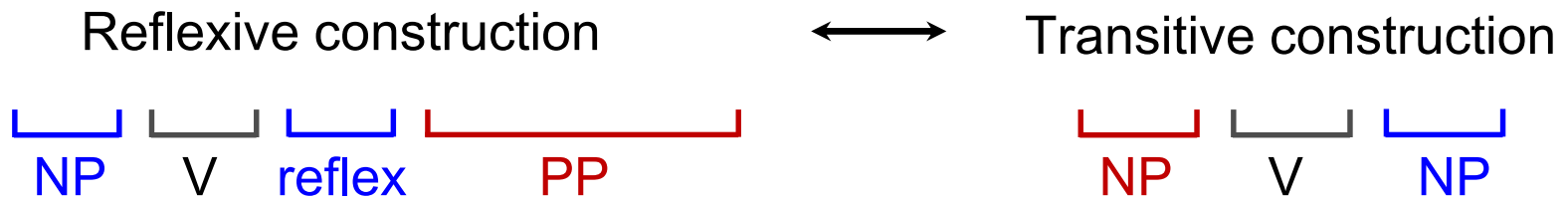
- Heavy stimulus
 - Reflexive: prepositional object
 - Transitive: subject



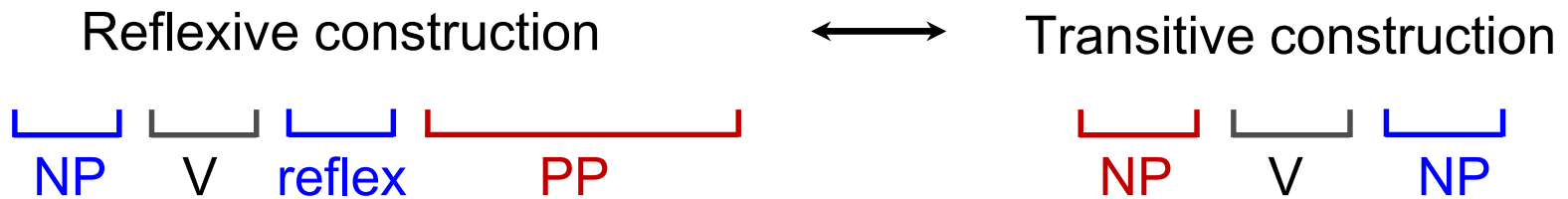
- Heavy stimulus
 - Reflexive: prepositional object
 - Transitive: subject
- Heavy experiencer
 - Reflexive: subject
 - Transitive: direct object



- Heavy stimulus
 - Reflexive: prepositional object
 - Transitive: subject
 - Heavy experiencer
 - Reflexive: subject
 - Transitive: direct object
- ⇒ Reflexive: reflexive pronoun and preposition can enlarge the distance between stimulus and experiencer



- Heavy stimulus
 - Reflexive: prepositional object
 - Transitive: subject
 - Heavy experiencer
 - Reflexive: subject
 - Transitive: direct object
- ⇒ Reflexive: reflexive pronoun and preposition can enlarge the distance between stimulus and experiencer
- ⇒ Transitive: stimulus and experiencer need to be placed close to one another



Results

- Agentivity Hypotheses
 - Type level not confirmed
 - Token level confirmed
- Etymology Hypothesis not confirmed
- Topicality Hypothesis revised version confirmed

Conclusions

- Failure to confirm the type level agentivity hypothesis: findings cannot be used in support of linking theories
- Confirmed the token level agentivity hypothesis: findings do indicate that argument constructions contribute to the compositional meaning of the utterance, separately from the verb
- Important to distinguish between the type and token level for theoretical and methodological reasons
- Findings dovetail with Levin & Grafmiller (2012) and Grafmiller (2013: 167-202)

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Thanks!

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