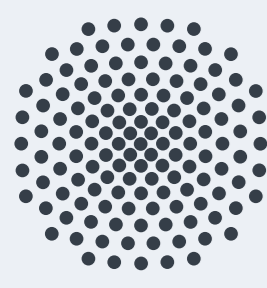


Aspectual Flexibility Increases with Agentivity and Concreteness

A Computational Classification Experiment on Polysemous Verbs

Ingrid Falk & Fabienne Martin



University of Stuttgart
Germany

Project B5 @ SFB 732: Incremental Specification in Context—Institut für Linguistik/Romanistik

About

► Infer (Vendlerian) aspectual classes for lexical readings of French verbs

► based on features provided by the lexicon.

Method

Using annotated verbal readings from French lexicon LVF train classifiers [Hall et al., 2009] to automatically predict aspectual class of LVF verbal readings

► 1199 readings for 167 verbs in French lexicon LVF

► annotated with 8 fine-grained aspectual classes

► morpho-syntactic and semantic feature sets extracted from the LVF:

syn/sem syntactic and semantic diagnostics

agentivity of each reading

concreteness or abstractness of each reading

Accuracy: Can the aspectual class be predicted by using lexical data?

Features:

► Which features are the most important ones for classification?

► What is the impact of agentivity and concreteness?

The Lexicon – LVF, Les Verbes français [Dubois and Dubois-Charlier, 1997]

► ≈12 300 verbs, ≈25 610 readings, ≈15 readings/verb

► elaborate morpho-syntactic and semantic description

id	example	semantic decomposition	sem. primitive	sem. class	id schema	encoded information
01	On <i>élargit</i> une route/ La route <i>s'élargit</i> .	r/d+qt	large	(make) become	Transformation	01 A30 intransitive with adjunct, inanimate subject
02	Cette veste <i>élargit</i> Paul aux épaules.	d	large	become	Transformation	T1308 transitive, human subject, inanimate direct object, instrumental adjunct
03	On <i>élargit</i> ses connaissances.	r/d	large abs	(make) become, figurative	Transformation	P3008 reflexive, inanimate subject, instrumental adjunct
04	On <i>élargit</i> le débat à la politique étrangère.	f.i.re	abs VRS	directed move, figurative	Enter/Leave	02 N1i intransitive, animate subject, prep. phrase headed by <i>de</i> (<i>of</i>) A90 intransitive with adjunct, subject human or thing T3900 transitive, inanimate subject, object human or thing

Table: Sample readings for *élargir/enlarge*

The Annotation – 8 value telicity scale \rightsquigarrow 3 value telicity scale

1 – STA	stative	<i>Cette veste élargit P aux épaules.</i> This jacket widens Paul's shoulders	ATElic
4 – ACT-ACC	variable telicity telic/atelic	<i>On élargit une route/La route s'élargit</i> They widen a road/The road widens	VARIABLE
5 – W-ACC	weak accomplishment accomplishment/activity	<i>Pierre remplit le seau d'eau</i> Pierre is filling the bucket with water	TELic
6 – S-ACC	strong accomplishment	<i>Le chasseur tue un lapin</i> The hunter is killing a rabbit.	
7 – ACC-ACH	accomplishment/ achievement	<i>On corrige facilement une erreur.</i> An error can be easily corrected.	
8 – ACH	achievements	<i>On commence les travaux/à travailler.</i> We start working.	

Distribution of 1199 annotated readings shows considerable aspectual variability:

1	2	3	4	5	6	7	8	1-3	4	5-8
S-STA	ACT-STA	S-ACT	ACT-ACC	W-ACC	S-ACC	ACC-ACH	S-ACH	ATE	VAR	TEL
182	67	175	195	172	227	29	152	424	195	580

Features

syn/sem syntactic frames, argument structure, adjuncts, semantic decomposition, semantic class, derived nominalisations and adjectives, degree of polysemy.

agent animacy of subject, semantic decomposition, semantic classes positively or negatively relevant for agentivity, *-age* and *-eur* nominalisations.

abs literal vs. figurative meanings, components in the semantic decomposition, semantic classes (psych-verbs).

	# sample feature
syn/sem	28 subcategorisation of an indirect object
agent	9 subject always inanimate
abs	10 literal or figurative sense

Results: overall classification performance

Feature reduction: use prediction performance of naivebayes to assess relative usefulness of feature subsets obtained by forward selection [Kohavi and John, 1997]

Evaluation: accuracy in 10-fold crossvalidation

Algorithm	syn/sem	agent	abs	agent-abs	syn/sem-agent	syn/sem-abs	syn/sem-agent-abs
trees.j48	63.55	56.00	58.13	56.55	63.00	63.72	62.47
lazy.kstar	67.56	55.88	55.38	57.38	67.47	65.56	65.39
bayes.naivebayes	64.55	56.55	56.71	58.55	65.80	64.97	66.14
rules.zeror	48.37	48.37	48.37	48.37	48.37	48.37	48.37

Conclusions

► We achieve an accurate classification of LVF verbal readings with respect to aspectual value based on features extracted from LVF.

► Lexical aspect varies along the dimensions of agentivity and abstractness/concreteness

► agentivity and/or abstractness/concreteness alone are not sufficient to determine aspectual value: syn/sem diagnostic features are decisive

► We gained further evidence for aspectual flexibility of predicates:

► more flexible under agentive than under non-agentive reading

► more flexible under concrete readings than under abstract ones

Results: by class

► Which features are the most helpful for identification of class?

► Feature maximisation metric (FMC): [Lamirel, 2013]

Most helpful:

syn/sem: Availability of canonical (non reflexive) passive, derivational family: non-availability of particular derivations (adjectives/nouns formed with particular suffixes), category of the root, transitivity.

agent: at least one feature of agentivity, no-agentivity indicator

By class:

ATE: dobj=FALSE, passive=FALSE, subj-only=TRUE, literal=FALSE

TEL: indobj=TRUE, non-agentive=FALSE

VAR: der-ment=TRUE, is-derivation=TRUE, subj-inanim=TRUE, has-adj-deriv=TRUE, is-derivation=TRUE

2 classes: has-derivation=FALSE, has-adj-deriv=TRUE, non-agentive=FALSE, conc=FALSE, conc=TRUE, dobj-inanim=TRUE, reflexive=TRUE.

References

[Dubois and Dubois-Charlier, 1997] Dubois, J. and Dubois-Charlier, F. (1997). *Les Verbes français*.

[Hall et al., 2009] Hall, M., Frank, E., Holmes, G., Pfahringer, B., Reutemann, P., and Witten, I. H. (2009). The WEKA Data Mining Software: An Update.

[Kohavi and John, 1997] Kohavi, R. and John, G. H. (1997). Wrappers for Feature Subset Selection.

[Lamirel, 2013] Lamirel, J.-C. (2013).

Enhancing Classification Accuracy with the Help of Feature Maximization Metric.