towards a lexicon of event-selecting predicates for a french factbank

Ingrid Falk and Fabienne Martin
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Universität Stuttgart - SFB 732
motivation
Long-term goal

- Factuality assessment of events in French newspaper texts
- as in [Saurí and Pustejovsky, 2012] for English

Factuality of events is evaluated w.r.t.

- a polarity: positive (+), negative (−)
- a modality: certain (CT), probable (PR), possible (PS), unspecified/uncommitted (U)
Factuality of events is expressed through:

- **polarity particles**: *not, never*
- **modality particles**: *maybe, possibly*
- **event selecting predicates (ESPs)**: predicates selecting an event as argument

**Effect of ESPs on embedded event predicate** $\text{leave}_e$:

- Freidin has failed to $\text{leave}_e$ the country.  

  $\text{CT} -$
Need:
a lexical resource capturing the effect of ESPs on the embedded event

Our short-term goal:
(semi-)automatical lexicon of ESPs for French.
related work
FactBank  [Saurí and Pustejovsky, 2009, 
Saurí and Pustejovsky, 2012]

Factive and implicative verbs

[Karttunen, 1971, Nairn et al., 2006]
corpus annotated with event factuality

TimeBank [Pustejovsky et al., 2005] events are assigned factuality profiles
  - manually [Saurí and Pustejovsky, 2009]
  - automatically [Saurí and Pustejovsky, 2012]

automatic detection based on lexicon of event selecting predicates

<table>
<thead>
<tr>
<th>polarity</th>
<th>CT</th>
<th>PR</th>
<th>PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>fail</td>
<td>CT−</td>
<td>CT+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PR−</td>
<td>PR+</td>
<td>PS−</td>
</tr>
</tbody>
</table>

Freidin has failed to leave the country.  

\[ CT^+ \rightarrow CT^- \]
factive and implicative verbs

- lexical resource for English [Nairn et al., 2006]
- complement-taking verbs (ESPs, $\approx 250$)
- classified w.r.t. the polarity of complement clauses (EMB) obtained under positive and negative polarity of ESP

- Freidin has failed to $\mathbf{leave}_e$ the country. $\text{ESP}^+ \rightarrow \text{EMB}^-$
- Freidin has not failed to $\mathbf{leave}_e$ the country. $\text{ESP}^- \rightarrow \text{EMB}^+$

<table>
<thead>
<tr>
<th>ESP</th>
<th>polarity</th>
<th>signature</th>
<th>semantic class</th>
</tr>
</thead>
<tbody>
<tr>
<td>fail to</td>
<td>$-$</td>
<td>$+$</td>
<td>$-1</td>
</tr>
</tbody>
</table>
# Factive and Implicative Verbs: Inferential Classification

<table>
<thead>
<tr>
<th></th>
<th>Polarity of ESP</th>
<th>Sample predicate</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2-way implicatives</strong></td>
<td>+    −</td>
<td>manage to fail to</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>−    +</td>
<td></td>
<td>−1</td>
</tr>
<tr>
<td><strong>1-way implicatives</strong></td>
<td>+    n</td>
<td>force to refuse to</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>−    n</td>
<td></td>
<td>−1</td>
</tr>
<tr>
<td><strong>1-way implicatives</strong></td>
<td>n    −</td>
<td>attempt to hesitate to</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>n    +</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td><strong>factives</strong></td>
<td>+    +</td>
<td>forget that pretend that</td>
<td>1</td>
</tr>
<tr>
<td><strong>counterfactives</strong></td>
<td>−    −</td>
<td></td>
<td>−1</td>
</tr>
<tr>
<td><strong>Neutral</strong></td>
<td>n    n</td>
<td>want to</td>
<td>N</td>
</tr>
</tbody>
</table>
our data and annotations
towards a french ESP lexicon: our experiments

1. build an English ESP lexicon based on Karttunen et al.’s inferential classification
2. instantiate a French ESP lexicon of verb readings
3. assign inferential signatures to each reading with two research questions in mind:
   - do signatures vary with outer aspect and animacy?
   - can we characterise inferential signatures by semantic/syntactic properties?
Ingrid Falk and Fabienne Martin
Event selecting predicates for French

Inferential semantic classes → ESP lexicon

<table>
<thead>
<tr>
<th>ESP</th>
<th>+</th>
<th>−</th>
<th>signature</th>
<th>semantic class</th>
</tr>
</thead>
<tbody>
<tr>
<td>fail to</td>
<td>−</td>
<td>+</td>
<td>−1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>fail to</th>
<th>fail to</th>
</tr>
</thead>
</table>

ESP    | +   | −   |
|fail to| +   | CT− | CT+ |
|fail to| −   | CT+ | CT− |
Towards a French ESP lexicon: our experiments

1. Build an English ESP lexicon based on Karttunen et al.’s inferential classification
2. Instantiate a French ESP lexicon of verb readings
3. Assign inferential signatures to each reading with two research questions in mind:
   ▶ Do signatures vary with outer aspect and animacy?
   ▶ Can we characterise inferential signatures by semantic/syntactic properties?
french inferential lexicon: verbs

ESPs from French TimeBank FTiB
[Bittar, 2010, Bittar et al., 2011]

\[\cap\]

manual translations of inferential classification by
[Nairn et al., 2006]

49 French verbs

extracted readings for these from 2 French valence lexicons

\[\approx 930\] readings
French inferential lexicon: annotation

- selected ESP readings
- manually assigned inferential signatures to readings

French: inferential profiles vary with
1. outer aspect [Hacquard, 2006]
2. animacy of subject [Martin and Schäfer, 2012]

Assigned 3 signatures for each reading with
- PFV/+ANIM perfective aspect, animate subject
- PFV/-ANIM perfective aspect, inanimate subject
- IMP imperfective aspect

Probabilistic signature à la [Karttunen et al., 2016]
- distinguish entailments, weak/strong/neutral inferences
french inferential lexicon: example

**obliger 02**

Pierre/cela a obligé Marie à partir = *obliger 02*

‘Peter/this oblige-PFV-3SG Mary to go.’

**PFV/+ANIM:** 0.9 | N  

- w. polarity +: strong inference, high probability that embedded event is fact  
- w. polarity −: no inference, neutral

**PFV/-ANIM:** 1 | -0.9  

- w. polarity +: entails that embedded event is fact  
- w. polarity −: strong inference, high probability that embedded event is counterfact

**IMP:** N | N
results on our data
Counts-based evidence for dependency of *inferential profile* on:

1. **Aspect**
   1.1 implicatives, but not factives, have an aspect dependent profile
   1.2 implicativity is weaker with imperfective aspect
   1.3 implicativity is weaker with an animate subject

2. **Syntax: types of embedded clauses**
   2.1 factive and implicative readings of same verb display distinct subcategorisation pattern
1.1: implicatives (but not factives) have an aspect-dependent profile

**fatables:** same entailment under both polarities, signature $1|1$ or $-1|-1$

**implicatives:** entailment at least under one polarity eg. $1|-1$, $1|N$, $-0.7|-1$

<table>
<thead>
<tr>
<th></th>
<th>with IMP signature</th>
<th>IMP sign $\neq$ PFV sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ffactives under PFV</td>
<td>54</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Implicit. under PFV</td>
<td>79</td>
<td>47 (60%)</td>
</tr>
</tbody>
</table>

- Outer aspect has no influence on factivity;
- Inferential profile of implicative verbs tends to change with aspect
Observation: the entailment triggered by implicative verbs under their PFV form is lost with IMP, or at least replaced by a defeasible inference:

- A ce moment-là, elle a réussi à s’enfuir. #Mais finalement, elle ne s’est pas enfuie.
  ‘At that moment, she managed to escape. But finally, she didn’t escape.’

- A ce moment-là, elle réussissait (encore) à s’enfuir. OK Mais finalement, elle ne s’est pas enfuie.
  ‘At that moment, she ‘was still managing’ to escape. But finally, she didn’t escape.’
Questions:

- Does *réussir* instantiate a more general pattern?
- Inference stronger for implicative readings with perfective aspect (PFV) than with imperfective aspect (IMP)?

56 implicative readings with perfective aspect:

<table>
<thead>
<tr>
<th>IMP$\rightarrow$ weaker infer</th>
<th>IMP$\rightarrow$ stronger infer</th>
<th>no change</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.4%</td>
<td>1.7%</td>
<td>57.2%</td>
</tr>
</tbody>
</table>

$\sim$ For almost half of the readings, the implicative inference with PFV is lost or weakened with IMP.
1.3: animacy weakens implicativity

Remember:

- Pierre/cela a obligé Marie à partir=obliger 02
  ‘Peter/this oblige-PFV-3SG Mary to go.’

- *obliger 02 PFV/+ANIM*: 0.9|N
- *obliger 02 PFV/-ANIM*: 1|-0.9

*obliger* instantiates a more general pattern:

- > 50% verbs trigger stronger inferences with inanimate subject
Counts-based evidence for dependency of inferential profile on:

1. Aspect
   1.1 implicatives, but not factives, have an aspect dependent profile
   1.2 implicativity is weaker with imperfective aspect
   1.3 implicativity is weaker with an animate subject

2. Syntax: types of embedded clauses
   2.1 factive and implicative readings of same verb display distinct subcategorisation patterns
2.1: syntax disambiguates verbs with implicative and factive readings

English (a.o. authors)

- [White, 2014]: implicative or factive inferential profile depending on finiteness of the embedded clause
  
  *remember that*: factive
  
  *remember to*: implicative

- [Landau, 2001]: implicatives
  
  - do not take finite (*that*)-clauses
  
  - take infinitival complement clauses
2.1: syntax disambiguates verbs with implicative and factive readings

French: 20 verbs w. (41) factive and (45) implicative readings

\[ \sim \] clear differences in the embedded clauses accepted by implicative vs. factive readings:

![Figure 1: Syntactic frames for verbs with factive and implicative readings](image_url)
future work
future work

Use annotated data as seed

- to identify semantic/syntactic properties characteristic of inferential classes
- to look for similar candidates
references

*Building a TimeBank for French: a reference corpus annotated according to the ISO-TimeML standard.*


*Aspects of modality.*

PhD thesis, Massachusetts Institute of Technology.
Implicative Verbs.

A Learning Corpus for Implicatives.
Presentation at the Semantics and Pragmatics Group meeting.

*Elements of control: Structure and meaning in infinitival constructions*,
volume 51.
    The modality of offer and other defeasible causative verbs.

    Computing relative polarity for textual inference.

    Temporal and event information in natural language text.
    Language resources and evaluation, 39(2):123–164.
FactBank: a corpus annotated with event factuality.

Are you sure that this happened? assessing the factuality degree of events in text.

Factive-implicatives and modalized complements.
In *Proceedings of the 44th annual meeting of the North East Linguistic Society*, pages 267–278.