Sprucing up Supersenses:

Untangling the Semantic Clusters of Accompaniment and Purpose

Jena D. Hwang, Nathan Schneider, Vivek Srikumar
Sprucing up Supersenses:

*Dealing with semantic hippogriffs?*

Jena D. Hwang, Nathan Schneider, Vivek Srikumar
Bird?
Hippogriff?
Horse?
Prototypes & the HippogriFF
Harry fought with Voldemort.

Rice with beans

They arrived with a pie.

Walk with me!

Luna vacationed with her father.

Harry fought with Ron. (against Voldemort)

The forks are with the knives

Rice and beans

The folks are in the drawer

Possession

People with money

Groupings

Hippogriffs of Accompaniment

Location

The folks are in the drawer

Agent

Harry and Voldemort fought.
Minerva rose to give a speech. Everyone cheered for an encore. A shoulder to cry on. Tools for weeding. A great place for Quidditch. It is too large for groceries. I found a sandwich to eat. They paid for the meal. Everyone cheered for an encore. Let’s wait for Steve. It is bigger than me. Theme: Hippogriffs of Purpose.
This talk:

• New analysis of **accompaniment** (*with, without, together*) and **purpose** (*for, infinitive to*) in English
  • Lumping? Splitting? Both?

Paper:

• Details and argumentation relative to old analysis

Guidelines:


Corpus:

• Annotated in STREUSLE, [https://github.com/nert-nlp/streusle](https://github.com/nert-nlp/streusle)
  • Application to disambiguation (Schneider et al. 2018)
SNACS Framework
SNACS Framework

• Semantic Network of Adposition and Case Supersenses
• Specifically designed for semantics of prepositions
• Broad semantic labels
• Lexically Agnostic

The cat is on the mat in the kitchen on a Sunday in the afternoon

work on the engine, a speech on the economy, the light is on, …
SNACS Framework

- 50 coarse-grained supersenses for prepositions/possessives

- English: **STREUSLE corpus** with comprehensive gold annotations; web reviews
  - 4,000 prepositions and 1,000 possessives (Schneider et al. 2018; revised in this work)

- Other languages (**bold** = corpus release)
  - **Mandarin Chinese** (Peng et al., LREC 2020)
  - **Korean** (Hwang et al., DMR 2020)
  - Hindi (Arora and Schneider, SIGTYP 2020)
  - German (Prange and Schneider, in review)

Other SNACS papers being presented in COLING 2020 workshops:
  - Korean corpus (DMR)
  - Reddit L2 English corpus (LAW)
  - Proxy annotation tasks (LAW)
SNACS Framework: Construal

- Construal analysis:
  - scene role: preposition’s role with respect to the scene
  - function: preposition’s semantic contribution

The cat sits on the mat
Scene Role: Locus
Function: Locus

Put the cat on the mat
Scene Role: Goal
Function: Locus
Goal \rightarrow Locus

Banish the cat to the mat
Scene Role: Goal
Function: Goal
Harry fought with Voldemort. They arrived with a pie. Luna vacationed with her father. The folks are in the drawer. They arrived with a pie. People with money. Walk with me!

Harry fought with Ron. (against Voldemort) The forks are with the knives. Rice and beans.
Ancillary

Rice with beans

They arrived with a pie.

Harry fought with Voldemort.

The forks are with the knives

Luna vacationed with her father.

Walk with me!

Harry fought with Ron. (against Voldemort)

Protototype
“Surplus Participant”

Hippogriff
Co-Participant

Hippogriff
Configurational Ancillaries

Hippogriff
Compound Entity
Harry fought with Voldemort.

They arrived with a pie.

Rice with beans

Luna vacationed with her father.

Walk with me!

Harry fought with Ron. (against Voldemort)

The forks are with the knives

Harry fought with Voldemort.

**ANCILLARY**

**PROTOTYPE**

“Surplus Participant”

- Accompanies another participant in the context of event
- Participation is similar to that of the other participant
- Participation is of secondary importance
Harry fought with Voldemort.

They arrived with a pie.

Luna vacationed with her father.

Walk with me!

The forks are with the knives.

Harry fought with Ron. (against Voldemort)

Rice with beans

I agree with her

Luna vacationed together with her father.

Harry fought together with Ron.

Draco met together with Bellatrix.

Harry fought together with Voldemort.

walk with me! The forks are with the knives. Luna vacationed with her father. they arrived with a pie. harry fought with ron. (against voldemort) ancientary

Ancillary

agent→ancillary

does not allow for together-insertion text, while prototypical ancillaries do.

theme→ancillary

experiencer→ancillary

hippogryff co-participant

• Core participant in the situation engaged symmetrically, reciprocally, or in a qualitatively different way with respect to another participant

• Does not allow for together-insertion text, while prototypical ancillaries do.
Ancillary

Walk with me!

Harry fought with Ron. (against Voldemort)

They arrived with a pie.

Luna vacationed with her father.

Rice with beans

The forks are with the knives

Harry fought with Voldemort.

HIPPOGRIFF Configurational Ancillaries

- Mediates configurational information with respect to the governing head

LOCUS~Ancillary

They arrived with a pie

POSSESSION~Ancillary

The forks are with the knives

ORG~Ancillary

Vernon is with Grunnings
Harry fought with Voldemort.

Rice with beans

They arrived with a pie.

Luna vacationed with her father.

Walk with me!

Harry fought with Ron. (against Voldemort)

The forks are with the knives

Harry fought with Voldemort.

**ANCILLARY**

**Compound Entity**

- Two items on equal semantic footing

  Rice with beans

**ENSEMBLE-ANCILLARY**

~ “Rice and beans”

**ENSEMBLE:**

- Grouping of two (or more) entities that are on equal semantic footing with one another

- In English, **ENSEMBLE** has no prepositional prototype; equivalent to coordinating conjunctions (e.g. Korean)
Minerva rose to give a speech. Everyone cheered for an encore.

Purpose

A great place for Quidditch
A shoulder to cry on
Tools for weeding

Minerva rose to give a speech
Everyone cheered for an encore
They paid for the meal
I found a sandwich to eat

Theme
Let’s wait for Steve

Comparison
It is bigger than me

It is too large for groceries
Purpose
Minerva rose to give a speech

Everyone cheered for an encore

A shoulder to cry on

Tools for weeding

A great place for Quidditch

It is too large for groceries

I found a sandwich to eat

They paid for the meal

Purpose

Motivation & Desired Outcome

Intended and Evaluated Use

Other Purpose
Minerva rose to give a speech. Everyone cheered for an encore. They paid for the meal.

Minerva rose to give a speech.

A shoulder to cry on.

A great place for Quidditch.

Tools for weeding.

It is too large for groceries.

Everyone cheered for an encore.

I found a sandwich to eat.

Why did Minerva get up?

**Prototype**

* Motivation & Desired Outcome

- Expresses the ‘why’ of the event, indicating a desired outcome as the motive for action.
Minerva rose to give a speech. Everyone cheered for an encore.

PURPOSE

A shoulder to cry on

Tools for weeding

A great place for Quidditch

It is too large for groceries

Everyone cheered for an encore

I found a sandwich to eat

They paid for the meal

- Covers a range of abstract goals an action or entity can be applied to

- Considered inclusion of a new label, AFFORDANCE. However, the boundaries are overlapping.

I bought some detergent to wash hardwood floors.

\[\Rightarrow\] washing floors is a desired outcome of buying the detergent

I bought some detergent for washing hardwood floors.

\[\Rightarrow\] washing floors is the intended use of the detergent
Minerva rose to give a speech. Everyone cheered for an encore.

**PURPOSE**

- A great place for Quidditch
- A shoulder to cry on
- Tools for weeding
- Everyone cheered for an encore
- I found a sandwich to eat

**Prototypic statements**

- It is too large for groceries
- They paid for the meal

**Prototype Purpose tests**

- Intention-based paraphrase tests
  - “in order to”, “for the purpose of”, “that I intend” insertions
- To distinguish from other labels, e.g.,:

  - Minerva rose **in order** to give a speech
  - Allison built a house **the purpose of** her mum
  - I found a sandwich **that I intend** to eat
  - I want a sandwich **that I intend** to eat
  - He needs to leave **in order to** soon
Minerva rose to give a speech. Everyone cheered for an encore. It is too large for groceries. They paid for the meal. 

- Two construals for even more non-prototypical cases
- Infinitival clauses licensed by extent adverbials like *too* and *enough*. PP provides a reference point against which sufficiency or excess is evaluated.

Further details are available in the paper.
Conclusion

• Clarified category boundaries, tests for English prepositions and infinitive clauses marking accompaniment and purpose.

• Challenge: thorny non-prototypical examples
  • Strategy for accompaniment: **distinguish** the various non-prototypes via **construal**
  • Strategy for purpose: **lump** distinctions with new definitions and guidelines

• See paper for argumentation vis-à-vis previous guidelines

• Implemented in STREUSLE 4.3+ releases

• Future: To what extent do these criteria work in other languages?
## STREUSLE 4.4 Counts

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*Lemmas: for, to, for the sake of, in hope to, into, (out) to eat*

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*Lemmas: with, without, along with, together*
Acknowledgments

Many thanks to Bill Croft for helpful discussions as we were formulating the analysis!