Semantic Supersenses for English Possessives

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Austin Blodgett and Nathan Schneider
Georgetown University, Department of Linguistics
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Introduction

Possessor
- John’s car
- John’s house
- John’s computer

SocialRel
- John’s mother
- John’s sister
- John’s boss
Introduction

Possessor

John’s car
John’s house
John’s computer

SocialRel

John’s mother
John’s sister
John’s boss

... Polysemy!
Introduction

SocialRel

Kate’s sister

the sister of Kate
Introduction

Possessor

Kate’s dog

?the dog of Kate
Introduction

the boy’s murder

the murder of the boy
Introduction

Agent
the boy’s murder
Theme

the murder of the boy
Theme
Introduction

Agent
the boy’s murder
Theme
≠
the murder of the boy
Theme
Introduction

English possessive constructions:

- \([NP_1]'s\ [NP_2]\) - s-genitive
  - \([my,\ your,\ ...]\ [NP_2]\) - possessive pronouns
- \([NP_2]\ of\ [NP_1]\) - of-genitive
Introduction

English possessive constructions:

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  - $[my, your, ...]$ $[NP_2]$ - possessive pronouns
- $[NP_2]$ of $[NP_1]$ - of-genitive

Some relevant features: \textit{animacy, givenness, and syntactic weight}

Stefanowitsch (2003)
Research Questions

- How can we annotate a corpus of English possessives with a common inventory of semantic relations?

- What does this tell us about the distribution of relations with respect to constructions?
Contributions

- We adopt a semantic annotation scheme designed for adpositions and apply to English possessives constructions.

- We show the semantic divergence of s-genitive and of-genitive

- Corpus release: [http://tiny.cc/streusle](http://tiny.cc/streusle) (55,000 words)
  - **1,104 s-genitive** tokens annotated NEW
  - **509 of-genitive** tokens annotated

- Comprehensive annotation, no “other” category
The v2 hierarchy is a tree with 50 labels. They are organized into three major subhierarchies: **Circumstance** (18 labels), **Participant** (14 labels), and **Configuration** (18 labels).
Adposition Supersenses

- Adposition supersense inventory designed with adpositions (including of) and grammatical case in mind.

- 50 general categories - thematic role labels (Agent, Theme, Recipient, etc.) and relations that hold between entities (Possessor, Whole, SocialRel, etc.)

- Applied to English, German, Korean, Hebrew, and Hindi thus far.
Related Work

- Previous work labeling semantics of possessives by Tratz and Hovy (2013) and Badulescu and Moldovan (2009).

- Badulescu & Moldovan contrast of-genitive and s-genitive semantics with a schema designed for nominal relations

- Previous semantic categories specific to relations between nominals (Badulescu and Moldovan) or s-genitives (Tratz and Hovy).
Related Work

- We start with categories designed for adpositions/case and apply them to possessives

- Schneider et al. schema’s advantage: **Comparability!**
Corpus Annotation

- Annotation (by 2 Linguists) of all tokens of the genitive 's clitic and possessive pronouns (s-genitives) in a 55,000 word corpus of English web reviews.
- 28 attested supersense labels (out of 50 total).
- 1,104 s-genitives (509 of-genitives already annotated)
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- 28 attested supersense labels (out of 50 total).
- 1,104 s-genitives (509 of genitives already annotated)
- Annotators agree 72% of the time
- Cohen’s κ is 0.66
I was able to cancel it but only after paying a $50 fee (which the staff person who signed me up stated I would not have to pay if I had proof of moving) and being spoken to in a very belittling manner.

Note for sentence ewtb.r.071650: I am certain OF that. | Let bards sing now OF barbiturates as bright as violets. | (statement verbs) | These she would learn OF only through other people. | (hearing/learning verbs) | a photograph OF the bride | I don't know OF anything that would be suitable. | Hobbes conceived of what he called a state OF nature. | All three were convinced OF his innocence.

Information content. {about, around, as regards, as to, concerning, for, in, into, of, on, over, re, regarding, round, towards, with}
Whole

S-genitive 6%

Of-genitive 12.2%

my cars gears and brakes

the southeast side of Murfreesboro
SocialRel

S-genitive 19.5%

- my boyfriend's aunt

Of-genitive 0.8%

- parents of my high school friends
Possessor

- S-genitive: 34.2%
- Of-genitive: 0%

[he] even remembered her dog

(COCA: the office of the Prime Minister)
Quantity

S-genitive 0%

***parking’s plenty

Of-genitive 36.9%

There’s plenty of parking
Results

- Supersenses only attested for *of*: Characteristic, ComparisonRef, Cost, Extent, Identity, Instrument, Manner, Possession, Quantity, Species, Stimulus, Stuff, and Topic.

- Supersenses only attested for ’s and possessive prepositions: Beneficiary, Duration, Recipient, and perhaps most interestingly Possessor.
Results

![Pie chart showing the distribution of possessive pronouns]

- my: 48.6%
- their: 13.0%
- our: 12.2%
- your: 11.1%
- her/his: 8.2%
- 's: 4.5%
- its: 2.9%
- whose: 0.4%
<table>
<thead>
<tr>
<th>Supersense</th>
<th>(Tratz and Hovy, 2013)</th>
<th>(Badulescu and Moldovan, 2009)</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent</td>
<td>Subjective</td>
<td>Agent</td>
<td>her help</td>
</tr>
<tr>
<td>Beneficiary</td>
<td>Recipient</td>
<td>Recipient</td>
<td>children's clothes</td>
</tr>
<tr>
<td>Causer</td>
<td>Producer's Product</td>
<td>Cause</td>
<td>victim of hard times</td>
</tr>
<tr>
<td>Characteristic</td>
<td></td>
<td>Property</td>
<td>a place of beauty</td>
</tr>
<tr>
<td>ComparisonRef</td>
<td>Extent</td>
<td>Measure</td>
<td>the opposite of QuikTrip</td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td>a price of $160</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>Recipient</td>
<td>Measure</td>
<td>plenty of parking</td>
</tr>
<tr>
<td>Recipient</td>
<td></td>
<td></td>
<td>my delivery</td>
</tr>
<tr>
<td>SocialRel</td>
<td>Kinship, Member's Collection, Other Relational Noun</td>
<td></td>
<td>her brother, her family, her friend</td>
</tr>
<tr>
<td>Species</td>
<td></td>
<td>Stimulus</td>
<td>that kind of behavior</td>
</tr>
<tr>
<td>Stimulus</td>
<td></td>
<td></td>
<td>a fear of snakes</td>
</tr>
<tr>
<td>Stuff</td>
<td></td>
<td></td>
<td>the piece of metal</td>
</tr>
</tbody>
</table>

Some labels with no equivalent: ComparisonRef, Manner, Species, Stuff
Possessive Multiword Expressions

s-genitive MWEs

*try [one]’s best*

*be quick on [one]’s feet*

*be on [one]’s own*

of-genitive MWEs

*of course*

*out of business*

*time of need*

Agrees with subject (*I tried Mary’s best*)
Conclusions & Future Work

Our ACL Paper:

Conclusions & Future Work

- Corpus release: [http://tiny.cc/streusle](http://tiny.cc/streusle)
  - 1,104 s-genitive tokens annotated
  - 509 of-genitive tokens annotated
  - Comprehensive annotation

- A semantic annotation scheme designed for adpositions can be applied to English possessive constructions.

- The semantic distributions of s-genitive and of-genitive diverge
Thank you

Corpus: http://tiny.cc/streusle
References


References


- Stephanie Shih, Jason Grafmiller, Richard Futrell, and Joan Bresnan. 2012. *Rhythm’s role in genitive construction choice in spoken English*.


I have many fond memories of my college evenings (Possessor vs. Experiencer)
This one won’t be getting my business (Originator vs. Agent)
Jane’s knowledge of the subject matter (Possessor vs. Experiencer vs. Gestalt)