The status of alternations in construction grammar: a sorting task experiment

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Overview

- Study in the architecture of Construction Grammar
  - i.e., what kind of generalizations does a construction grammar consist of?
  - generalizations of form and meaning only or also generalizations of meaning with different forms?
- A sorting task experiment
  - provides evidence for alternation-based generalizations
- Conclusion and prospects
Introduction

● Alternations
  - Pairs of constructions which can fulfill the same function:
    ● e.g., the genitive alternation: of-PP vs. ‘s
      *the goal of the government vs. the government’s goal*
    - Much focus in the domain of argument realization
      ● Dative alternation
        *John gave a book to Mary vs. John gave Mary a book*
        - Events of caused transfer of possession
        - No major difference in meaning but different discourse profiles
      ● Locative alternation (*spray*/load alternation)
        *John loaded hay onto the truck vs. John loaded the truck with hay*
        - Events of caused change of location
        - Different construals of the event: action on theme vs. action on location
Introduction

• Alternations in Construction Grammar
  – Variants of alternations are seen as independent constructions
  – Goldberg’s (2002: 329) surface generalizations hypothesis
    • “There are typically broader syntactic and semantic generalizations associated with a surface form than exist between the same surface form and a distinct form that it is hypothesized to be syntactically or semantically derived from.”
    • Against transformational and derivational accounts
  – But she also acknowledges the role of paraphrase relations
    • “[their] statistical use […] in actual discourse contexts is critical to unlocking Baker’s paradox of partial productivity” (ibid: 349)
    • “[they] can also be seen to be relevant to on-line choices made in production” (ibid.)
Yet, very little discussion of their theoretical status

- Much focus on functional differences between variants, but no account of their similarity

- Some scarce exceptions:
  - Goldberg’s (1995: 91) link of “S-synonymy” (same “truth conditions”) between the variants of the dative alternation
  - Cappelle’s (2006) “allostructions” for particle placement in English: “variant structural realizations of a construction that is left partially underspecified”

- But all in all, very few construction grammarians posit a level of alternation-based generalizations
  - Is that an accurate picture of speakers’ knowledge?
  - Such generalizations might be useful in several domains:
    - Language acquisition: statistical preemption
    - Language change: cf. De Smet’s (2008) paradigmatic analogies
Introduction

• Hypotheses
  – The constructional hypothesis: there are only construction-based generalizations.
  – The alternations hypothesis: there are also alternation-based generalizations that capture similarities between formally distinct constructions.

• Tested with a sorting task experiment
The experiment

- The experiment
  - Inspired by Bencini and Goldberg (2000)
    - Questioned the idea that verbs are the main determinant of sentence meaning => role of constructional meaning
    - They crossed four verbs with four constructions and asked participants to sort the sentences into four groups
    - Many subjects did sort by construction
    - Conclusion: “constructions are psychologically real linguistic categories that speakers use in comprehension” (ibid: 649-650)
  - Our experiment
    - Same design, but we include the alternation factor
    - Our dataset includes both constructions and alternations
The experiment

• Stimuli

  – 4 sentence types based on 2 alternations:
    • dative alternation: ditransitive ↔ to-dative
    • locative alternation: caused-motion ↔ with-applicative
    • Importantly, the to-dative is arguably an instance of caused-motion through the metaphor “Transfer of Ownership as Physical Transfer” (cf. Goldberg 1995: 3.4.2)
    • Hence, there are 3 constructions

  – Thus, to sort into 3 groups, there are two kinds of strategies:
    • following the constructional generalization (caused-motion)
      ditransitive – CM (locative + to-dative) – with-applicative
    • forming groups cutting across constructions, matching alternations
      dative (ditransitive + to-dative) – CM – with-applicative
ditranstive – to-dative – locative (CM + with-applicative)
The experiment

• Stimuli

  – To avoid parasitic sorting strategies, all sentences contain:
    • two human arguments (agent + goal/recipient; all female first names)
    • a generic theme argument “something”
    • e.g., *Nancy threw something to Juliet*
  – Verbs from the same semantic field in each sentence type
    • Proved impossible to find 16 suitable and maximally different verbs
    • Creates semantically coherent category for each sentence type
    • Does not fundamentally bias towards one type of generalization
The experiment

• Stimuli set

caused-motion construction

to-dative caused-motion construction

dative alternation

ditransitive construction

locative caused-motion construction

locative alternation

with-applicative construction

Rachel tossed something to Anna
Audrey kicked something to Sue
Nancy threw something to Juliet
Jennifer chucked something to Tara
Linda sprayed something on Jessica
Lyn splashed something on Maggie
Michelle sprinkled something over Sarah
Beth injected something into Lisa
Kim lent Rose something
Anita offered Kate something
Barbara served Claire something
Paula passed Liz something
Laura dabbed Jessica with something
Meg brushed Shannon with something
Dana plastered Marge with something
Pat rubbed Helen with something
Linda sprayed something on Jessica
Michelle sprinkled something over Sarah
Beth injected something into Lisa
Kim lent Rose something
Anita offered Kate something
Barbara served Claire something
Paula passed Liz something
Laura dabbed Jessica with something
Meg brushed Shannon with something
Dana plastered Marge with something
Pat rubbed Helen with something
The experiment

- Hypotheses
  - The constructional hypothesis: there are only construction-based generalizations.
    - Subjects might see the similarity between the variants of an alternation, but the constructional generalization should be stronger.
    - Most subjects will thus sort the CMs and the to-datives together
  - The alternation hypothesis: there are also alternation-based generalizations.
    - Subjects will easily see the semantic similarity between instances of variants in an alternation, and prefer it if they judge this generalization stronger as a purely constructional one.
    - Many subjects (if not most) will thus sort together either the ditransitives and the to-datives, or the CMs and the with-applicatives.
The experiment

- Participants
  - 26 native speakers of English, aged 19-33 (22 on average)
  - All students at the University of Freiburg, Germany
  - Mostly from UK and US, but also Australia and Canada
  - Received 5€ as compensation (except two)
The experiment

- **Procedure**
  - Same as Bencini and Goldberg’s (2000)
  - Sentences were printed on 15 x 10.5 cards
  - Subjects were presented with a shuffled pile of the 16 cards
  - They were asked
    - to write a paraphrase for each sentence
    - then to sort the sentences into three groups, “according to their overall meaning”
  - Post-experiment interview for them to explain their sorting
Results

• Analysis
  - To what extent do speakers use constructional vs. an alternation-based generalizations?
  - To measure this, we count:
    • C: the number of pairs of CMs and to-datives sorted together
    • L: the number of pairs of CMs and with-applicatives sorted together
    • D: the number of pairs of ditransitives and to-datives sorted together
  - Example:
    group 1: 4 x to-dative + 3 x CM
    group 2: 4 x with-applicative + 1 x CM
    group 3: 4 x ditransitive
    C = 12
    L = 4
    D = 0
Results

The \{C, L, D\} triplets were submitted to a cluster analysis

- Automatic classification of objects according to their similarity
- Analytical tool:
  - groups sortings according to quantitative criteria
  - identifies the broad types of sorting performed by subjects
- Four sorting types emerge
Cluster dendrogram of subjects' sortings (euclidean distance, complete linkage)
Results

Cluster dendrogram of subjects' sortings
(euclidean distance, complete linkage)

6 dative sortings:
all datives in one group
Cluster dendrogram of subjects' sortings
(euclidean distance, complete linkage)

11 locative sortings:
all locatives in one group
Results

Cluster dendrogram of subjects' sortings
(euclidean distance, complete linkage)

3 (loosely) constructional sortings:
most CMs and to-datives in one group
Cluster dendrogram of subjects' sortings
(euclidean distance, complete linkage)

6 miscellaneous (verb-based?) sortings:
based on some feature of the verb
Results

- Distribution
  - Dative: 6
  - Locative: 11
  - Constructional: 3
  - Verb: 6

- Subjects strongly disfavored the constructional sorting
Results

- Quantitative analysis confirmed by post-experiment interviews:
  - 2 on 3 constructional,
  - 6 on 6 dative and
  - 7 on 11 locative sorters provided coherent definitions for their caused-motion, dative or locative group, e.g.:
    - caused-motion construction: “indirect contact”, “at a distance”
    - locative alternation: “something put on the person or inside the person”, “usually some kind of substance being applied to someone else”
    - dative alternation: “somebody gives something to somebody else”, “an object was exchanged, went from one person’s possession to another’s”
• Consistent across varieties
Conclusion

- The alternation-based generalizations are reflected in the subjects’ sorting behavior more often than the purely constructional ones.
- This result is more in line with the alternation hypothesis.
- i.e., that there are broader generalizations of a constructional meaning shared by formally distinct constructions.
Conclusion

- Evidence that generalizations of a constructional meaning with an underspecified form are plausible
- Modeling with Cappelle’s (2006) allostructions:

```
X cause Y to have Z
NP_X V { ?_Y ?_Z }
```

```
X cause Y to go Z
NP_X V { ?_Y ?_Z }
```

- **caused-motion**
  - `NP_X V NP_Y PP_{Z}`
- **with-applicative**
  - `NP_X V NP_{Z} with NP_Y`

- **ditransitive**
  - `NP_X V NP_Y NP_Z`

- **to-dative**
  - `NP_X V NP_Z to NP_Y`
Prospects

- The place of alternations in construction grammar: a thought-worthy research question

- Pending questions
  
  • Higher-level generalizations or “links” between constructions?
  • There can always be the slightest semantic similarity between formally distinct constructions: where does grammar stop?
  • Usage-based explanation?

- Calls for more empirical evidence
  
  • We demonstrated the plausibility of alternation-based generalizations
  • But assessing their cognitive reality calls for more “on-line” evidence
Thanks for your attention!


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