Constructional families in the lab

Novel experimental approaches to the study of constructional relations

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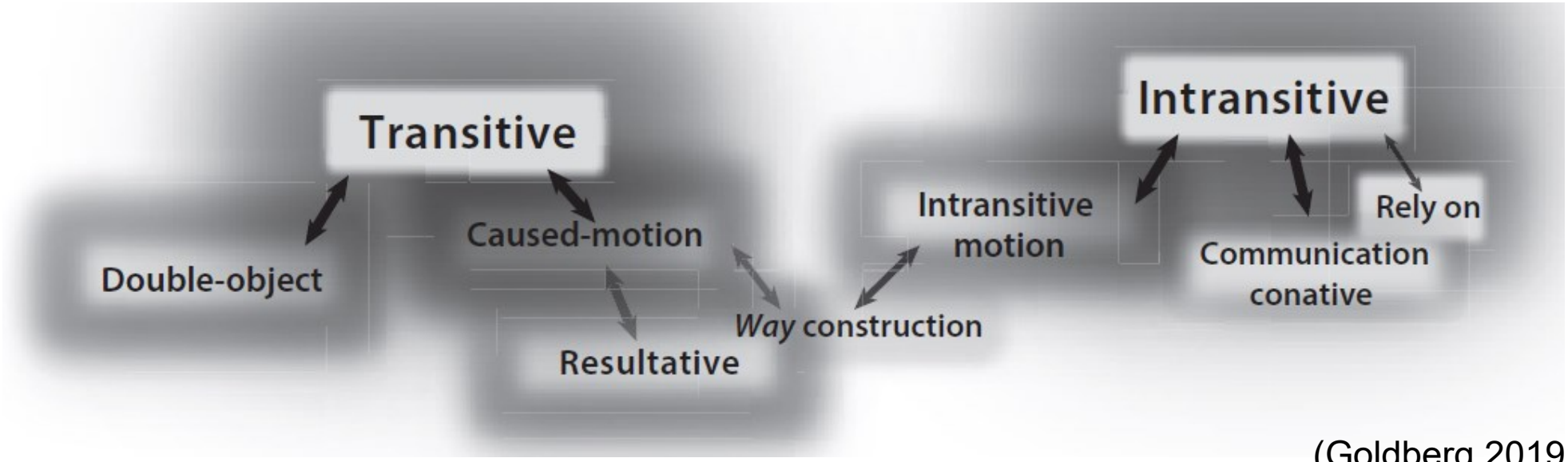
Intro: constructional families in the lab

- Cognitive linguists assume that speakers' grammatical knowledge is organised as a mental network of related constructions (Croft 2001; Goldberg 1995; Langacker 1987)



(Goldberg 2019: 37)

- **Question:** how can these network relations be tested experimentally?

Testing constructional relations

- Sorting tasks (Bencini and Goldberg 2000; Gries and Wulff 2005; Perek 2012)
- Acquisition studies (Diessel and Tomasello 2005)
- Artificial learning (Perek and Goldberg 2015; Perek and Goldberg 2017; Wonnacott et al. 2008)
- **Structural priming** (Bock 1986; Branigan and Pickering 2017): processing a prime structure affects participants' response to the same or a similar target structure

  → "Structural priming provides perhaps the best evidence for constructional relations" (Diessel 2019: 204)

Two questions for today

Question 1: What are the limitations of previous structural priming studies, and how can the paradigm be extended?

Question 2: What other methods can be used to test constructional relations?

Extending structural priming research

Two limitations of previous studies

Previous structural priming research has…

(1) focused on relatively few constructions, especially alternations

- E.g., dative alternation, active/passive alternation, benefactive alternation, locative alternation (Bock 1986; Bock 1989; Chang et al. 2003; Mahowald et al. 2016; Ziegler and Snedeker 2018)
- Because production priming methods (e.g., picture description) require 'structural alternatives' that express roughly the same meaning (Branigan and Pickering 2017: 7)

(2) rarely tested *cross-constructional* priming (between instances of <u>different</u> constructions)

- Most studies focus on 'within-construction' priming (between instances of the same construction)
- Hare and Goldberg (1999): '*provide-with*' sentences (*His editor credited Bob with the hot story*) prime double-object sentences (*John gave the dog a biscuit*) (see also Ziegler and Snedeker 2018)

Question: how can <u>cross-constructional</u> priming be extended to <u>non-alternating</u> constructions?

An alternative: comprehension priming methods

- E.g.: self-paced reading, eye-tracking during reading, ERP/fMRI during reading
- Advantages:
  - Can be applied to non-alternating constructions because participants do not choose between alternatives
  - Experimenters can choose the exact constructions that they want participants to process, including complex or infrequent patterns
  - These methods provide ‘online’ measures of speakers’ real-time processing
- Let’s look at an example…

An example

Priming between the resultative (RES) and the depictive (DEP) construction (Ungerer 2022)

RES: *Max cooked the chicken tender.* → DEP: *John cut the grass wet.*
DEP: *Gary cooked the chicken whole.* → RES: *Nancy cut the grass short.*

- Method: 'maze task' version of self-paced reading (Forster et al. 2009)
- Result: faster responses to resultative targets after depictive primes, but not vice versa (i.e., *asymmetric facilitatory cross-constructional priming*)
- Conclusion 1: speakers treat constructions as related despite their semantic differences
- Conclusion 2: asymmetric priming probably due to lower frequency and lower acceptability of depictives ('inverse frequency effect'; Ferreira 2003)
- Interesting differences from priming between the caused-motion and the resultative construction (Ungerer 2021)

Possible further extensions

Question 1: Do ‘homostructions’ (Percillier 2020) prime each other? Do speakers draw generalisations based purely on form?

Double-object construction: *She sent her friend a letter.*

Predicative complement construction: *He considered the teacher a fool.*

Question 2: Do speakers construe *into*-causatives as an extension of the caused-motion construction?

Caused-motion*: She pushed the chair into / out of / across the room.*

into-causative: *He coaxed his colleague into helping him with the project.*

Question 3: Are speakers sensitive to differences in the obligatoriness of adverbials?

Obligatory adverbial: *She put the knife in the drawer.*

Semi-obligatory adverbial: *He found the towel in the cupboard.*

Optional adverbial: *They played football in the schoolyard.*

Outlook: another method?

Verb-construction networks from free association data

- Background: meanings of clause-level constructions are closely related to the semantics of the verbs that occur in them (Fried and Boas 2005; Perek 2014; Herbst at this conference)
- Question: can the verbs that speakers spontaneously associate with constructions be used to model network relations between these constructions?
- Previous work by Ellis et al. (2016):
  - Free association task: participants generate verbs for constructional templates like *He/she/it ___ across the…* or *He/she/it ___ about the…*
  - Participants' use of verbs in each construction is predicted by the frequency, contingency and semantic prototypicality of the verbs
  - But: investigation is restricted to verb + preposition constructions; and each construction is analysed on its own terms, not as part of a network

A possible extension

- Collect free association data for other constructions, e.g.:

She _____ *the…* (monotransitive)	*She* _____ *that he…* (*that*-clause)
She _____ *him the…* (double-object)	*She* _____ *him that…* (object + that-clause)
She _____ *the… to him* (*to*-dative)	*She* _____ *him to…* (object + to-infinitive)
She _____ *the… for him* (*for*-dative)	*She* _____ *for him to…* (*for*-NP + to-infinitive)

- Based on the association data, create **verb-construction networks** in which verbs are linked to the constructions in which they occur (strength of the links = frequency of association)
- Use network science tools (Barabási 2016) to examine the network structure:
  e.g., analyse how similar constructions are based on their shared verbs in the network;
  and analyse how similar verbs are based on their shared constructions in the network
- Compare verb-construction networks between different speaker populations, such as
  L1 vs. L2 speakers or neurotypical vs. neurodivergent speakers

Summary

Summary

- To test speakers' representations of constructional networks, converging evidence from different experimental methods is needed
- Two ways forward:
  - Extending existing methods: e.g., using structural priming in comprehension to test new constructions (caused-motion, resultative, depictive)

    → Other phenomena yet await investigation: e.g., priming between 'homostructions'
  - Explore new methods: e.g., using free association data to build and analyse verb-construction networks for different speaker populations

Thank you!

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