Constructional approaches to grammar

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COGS 101C
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1. The idea of grammatical constructions
2. Some evidence that people use them
3. The functions of constructions
1. The idea of grammatical constructions
2. Some evidence that people use them
3. The functions of constructions
What are utterances made of?

You are sliding Sally the saucer
What are utterances made of?

words

You are sliding Sally the saucer
What are utterances made of?

Grammar

Sentence

Noun Phrase
You

Verb Phrase
Verb complex
are sliding
Noun Phrase
Sally
Noun Phrase
the saucer
The traditional separation of duties

- Words, morphemes, and idioms provide meaning
- Grammar is meaningless, but arranges the meaningful parts
If you use the same words with different grammar, it means pretty much the same thing.

<table>
<thead>
<tr>
<th>Dative</th>
<th>Ditransitive</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>You slid the cup to Mary.</em></td>
<td><em>You slid Mary the cup.</em></td>
</tr>
</tbody>
</table>

... or does it?
Grammatical meaning?

<table>
<thead>
<tr>
<th>Dative</th>
<th>Ditransitive</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>You threw the keys to the floor.</em></td>
<td><em>You threw the floor the keys.</em></td>
</tr>
<tr>
<td>only possible if <em>the floor</em> is a potential recipient</td>
<td></td>
</tr>
</tbody>
</table>

- Maybe the grammar has some meaning, too

<table>
<thead>
<tr>
<th>Dative</th>
<th>Ditransitive</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>You’re sliding the tray to Sally.</em></td>
<td><em>You’re sliding Sally the tray.</em></td>
</tr>
<tr>
<td>caused motion</td>
<td>transfer of possession</td>
</tr>
</tbody>
</table>
Grammatical constructions

- That is, maybe the different constructions make you attend to different parts of the same scene, or construct representations of it that are subtly different.
The basic idea of constructions

Ditransitive
Meaning: X transfer Y to Z by means
You slid Sally the saucer

Dative
Meaning: X move Y along path Z by means
You slid the saucer to Sally
Constructions are controversial

“[...] there are no rules for particular languages and no construction-specific principles [...] Traditional grammatical constructions are perhaps best regarded as taxonomic epiphenomena—collections of structures with properties resulting from the interaction of fixed principles with parameters set one way or another.”

(Chomsky, 1989:43)
Some questions:

- Do people use different grammatical patterns to convey different meanings?
- How they use these meanings?
- How do these meanings affect the meaning of an utterance as a whole?
Outline

1. The idea of grammatical constructions
2. Some evidence that people use them
3. The functions of constructions
Some evidence

- Do people use different grammatical patterns to convey different meanings?
- How they use these meanings?
- How do these meanings affect the meaning of an utterance as a whole?
Some evidence

- Do people use different grammatical patterns to convey different meanings?
- How they use these meanings?
- How do these meanings affect the meaning of an utterance as a whole?
If grammatical cxns have different meanings, they should be used with different verbs.
- ditransitive more frequent with transfer verbs
- dative more frequent with caused motion verbs

Distribution of verbs (Gries & Stefanowitsch, 2004)
- *give* is strongest verbal collocate of ditransitive; others include *offer, earn, take, grant, buy, throw*
- *bring* is strongest verbal collocate of dative; others include *put, add, take, pass*

But this could just reflect verb preferences
They should also be used with different goals

- Datives should prefer path/location goals
  - John pushed the man to the floor

- Ditransitives should prefer recipient goals
  - John pushed me the man.
  - *John pushed the floor the man
  [unless “the floor” refers to a potential recipient]
Goals with the verb *lend*

<table>
<thead>
<tr>
<th>lend</th>
<th>non-recipient</th>
<th>recipient</th>
</tr>
</thead>
<tbody>
<tr>
<td>ditransitive cxn</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>dative cxn</td>
<td>30</td>
<td>12</td>
</tr>
</tbody>
</table>

Fisher’s Exact test: $p = 0.008$

Goals are more likely to be recipients with ditransitive
Distribution in constructions

- Goals with the verb *send*

<table>
<thead>
<tr>
<th>send</th>
<th>non-recipient</th>
<th>recipient</th>
</tr>
</thead>
<tbody>
<tr>
<td>ditransitive cxn</td>
<td>0</td>
<td>41</td>
</tr>
<tr>
<td>dative cxn</td>
<td>100</td>
<td>122</td>
</tr>
</tbody>
</table>

Fisher’s Exact test: $p < 1 \times 10^{-10}$

- Goals are more likely to be recipients with ditransitive
Goals with the verb *get*

<table>
<thead>
<tr>
<th></th>
<th>non-recipient</th>
<th>recipient</th>
</tr>
</thead>
<tbody>
<tr>
<td>ditransitive cxn</td>
<td>0</td>
<td>31</td>
</tr>
<tr>
<td>dative cxn</td>
<td>24</td>
<td>17</td>
</tr>
</tbody>
</table>

Fisher’s Exact test: $p < 1 \times 10^{-7}$

Goals are more likely to be recipients with ditransitive
The dative and ditransitive tend to occur with different types of verbs; those denoting caused motion and transfer, respectively.

The ditransitive more commonly has a goal who is a potential recipient than does dative.

People use these grammatical structures to convey different meanings.
Some evidence

- Do people use different grammatical patterns to convey different meanings?
- How they use these meanings?
- How do these meanings affect the meaning of an utterance as a whole?
New uses of verbs

You can use old verbs in new ways.

When young worker lamas stop picking up trash to mug for the camera, a gruff police monk barks them back to work. (Newsweek 9/97, cited by Michaelis, to appear)

You can also use new verbs

The message of these vigilante films: Push a man too far and the screen will be Jackson Pollocked with blood. (Vanity Fair 4/02, cited by Michaelis, p.c.)

How do you know what these verbs mean? Do you use grammar to make inferences?
New uses of verbs

- For people to use grammar to infer meaning, they would have to mentally represent relationships between grammatical structures and their meanings (i.e. constructions)

- Then they could use the meanings of constructions when processing new words

- Do they? (Kaschak & Glenberg, 2000)
New uses of verbs

- Participants saw pairs of sentences.
  
  Lyn crutched Tom her apple so he wouldn’t starve. [ditransitive]
  Lyn crutched her apple so Tom wouldn’t starve. [transitive]

- And an inference statement (below). Ppts indicated which sentence most strongly implied that the inference statement was true.
  
  Tom got the apple. [transfer inference]
  Lyn acted on the apple. [act-on inference]

- The verbs have no preexisting transfer meaning, so any such meaning must come from the grammar.
New uses of verbs

% sentence chosen

<table>
<thead>
<tr>
<th></th>
<th>Ditransitive sentences</th>
<th>Transitive sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer inference</td>
<td>100%</td>
<td>10%</td>
</tr>
<tr>
<td>Act-on inference</td>
<td>0%</td>
<td>90%</td>
</tr>
</tbody>
</table>
New uses of verbs

- So people can access the meanings of constructions.

- Do they use them in understanding the meanings of new verbs?
New uses of verbs

- Ppts saw the same novel verb sentences
  Lyn crutched Tom her apple so he wouldn’t starve. [ditransitive]
  Lyn crutched her apple so Tom wouldn’t starve. [transitive]

- Chose the meaning that more closely matched the meaning of the verb in the sentence.
  “to act on using a crutch” [act-on definition]
  “to transfer using a crutch” [transfer definition]

- Does the grammatical structure used affect the inferred meaning of novel verbs?
New uses of verbs

% sentence chosen

<table>
<thead>
<tr>
<th></th>
<th>Ditransitive sentences</th>
<th>Transitive sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer definition</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Act-on definition</td>
<td>40%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Note: The diagram shows the percentage of sentences chosen for ditransitive and transitive sentences according to two definitions: Transfer definition and Act-on definition.
Some evidence

- Do people use different grammatical patterns to convey different meanings?

- How they use these meanings?

- How do these meanings affect the meaning of an utterance as a whole?
If grammatical constructions are used in normal processing of the meaning of utterances, then they should affect mental representations of described events.

- Do datives highlight the caused motion more than ditransitives do? (Bergen & Han, In Prep)
Basic idea of the experiment

- Participants listen to dative or ditransitive sentences
- Them perform a manual action
- We measure how long the manual action takes
Dative versus ditransitive in action
**Procedure**

- Click on blue box
- Hear sentence (keeping cursor in blue box)
- At end of sentence, cursor becomes invisible, target appears
- Move the mouse to hit target
  - Three target positions, but in critical trials, the target always appears in the middle one
Dative versus ditransitive in action

- 32 pairs of critical sentences (identical except that one was ditransitive and the other dative)
  - 16 Concrete pairs describing hand motion
    - You are sliding the tray to Sally. [dative]
    - You are sliding Sally the tray. [ditransitive]
  - 16 Abstract pairs describing transfer of information
    - You are offering tips to the newcomers. [dative]
    - You are offering the newcomers tips. [ditransitive]
- 16 pairs of control sentences differing in length
  - You are comparing notes with other students. [7 words]
  - You are comparing notes with the other students. [8 words]
- 32 fillers
Dative versus ditransitive in action

- **Dependent measure**
  - Time (how long they moved the mouse for, from the time they left the blue box until they clicked on the target)

- **Prediction**
  - Dative sentence should produce longer-lasting actions than ditransitives
Dative versus ditransitive in action

![Bar graph showing reaction times for different sentence types: Dative and Ditransitive. The graph compares reaction times across abstract, concrete, and control sentence types.]
Dative versus ditransitive in action

- Processing hand-motion sentences using dative produces longer-lasting manual actions than those using ditransitive.

- Dative sentences appear to more strongly highlight the path of motion than ditransitives do.
Grammatical *aspect* marks event structure
- Perfect: *John has opened the drawer.*
- Progressive: *John is opening the drawer.*

Mental simulation is performed with varying granularity (Strohecker 2000)

Aspect may modulate attention to events (Comrie 1976, Chang et al. 1998)
- Perfect focuses simulation on the endstate
- Progressive focuses simulation on the nucleus
Perfect (Madden & Zwaan 2003)

- Read either perfect or progressive sentences
  - He was closing the door.
  - He closed the door.

- Then see a picture that depicted the event
  - a door being closed [ongoing]
  - a door completely closed [completed]

- Faster responses to completed-state pictures following perfect sentences
Progressive

- Ppts read sentences denoting motion away from the body or toward the body (Glenberg & Kaschak 2002)
  - *John is closing the drawer.* [away]
  - *John is opening the drawer.* [towards]
- They make sensibility judgments, moving their hand towards or away from their body.
- The motion described by the sentence is compatible or incompatible with the one they perform
The Action-Sentence Compatibility Effect
Quicker response movements when the two actions are in the same direction

Shows that action execution and motor language understanding share neurocognitive mechanisms
Progressive (Bergen & Wheeler, 2010)

- Manipulated aspect between ppts
  - Perfect: John has opened/closed the drawer.
  - Prog: John is opening/closing the drawer.

- Also included abstract sentences:
  - Perfect: John has sent/received the email.
  - Prog: John is sending/receiving the email.

- Prediction: More simulated action in progressive than perfect condition for concrete sentences.
Aspect results

$F_1(1,54)=9.34, p<0.01$
$F_2(1,39)=6.93, p<0.05$

Mean RT (msec)

<table>
<thead>
<tr>
<th></th>
<th>Concrete</th>
<th>Abstract</th>
<th>Concrete</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perfect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $F_s<1$

Compatable
Incompatible
Perfect aspect highlights the endstate of a described event.

Progressive aspect highlights the nucleus of the action itself.

This is a contribution to meaning that is of a higher order than basic meaning contributions like event type; it operates over other meanings.
All languages have personal pronouns (you, he, etc.)

Mental representations of events can take a particular perspective (Nigro and Neisser 1983)
  - Participant perspective: experience the event as though it were happening to you
  - Observer perspective: envision observing someone else engaging in the event

Does grammatical person (you versus he) affect perspective taken in mental simulation?
Person results

- Grammatical person affects the perspective understanders adopt in mental simulation
  - Second person yields participant simulation
  - Third person yields observer simulation

- This is another example of a higher-order affect of grammar on meaning
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What are utterances made of?

2nd person

You
are sliding

Progressive

Ditransitive

Sally
the saucer
Types of constructional meaning

- Constructions can contribute to the meaning of an utterance in at least three ways
Types of constructional meaning

- They contribute meaning, like words do
  - E.g., that an event is a transfer event, a caused-motion event, or an acting-on event
Types of constructional meaning

- They organize meaning contributions of their parts
  - *John bit the monkey* vs *The monkey bit John*
Types of constructional meaning

- They provide \(2^{nd}\)-order constraints on meaning processing
  - What part of the event to focus on (aspect)
  - What perspective to adopt (person)
Functions of constructions

- Grammatical patterns are distributed differently with respect to meanings people want to convey.

- People have knowledge (perhaps unconsciously) of these meaning differences.

- They use them to construct mental representations of the meanings of utterances.

- They also use them to understand novel language, and perhaps to learn the meanings of new words.
Thanks