Argument Structure Constructions:
Theoretical arguments

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Constructions

: Learned pairings of form and function

Constructions at varying levels of complexity

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word</td>
<td>e.g., avocado, anaconda, and</td>
</tr>
<tr>
<td>Word (partially filled)</td>
<td>e.g., pre-N, V-ing</td>
</tr>
<tr>
<td>Idiom (filled)</td>
<td>e.g., Going great guns, give the Devil his due</td>
</tr>
<tr>
<td>Idiom (partially filled)</td>
<td>e.g., jog &lt;someone&gt;'s memory, and &lt;someone&gt;'s the cleaner (possessional NPI for the asking)</td>
</tr>
<tr>
<td>Idiom (partially filled)</td>
<td>e.g., The more you think about it, the less you understand</td>
</tr>
<tr>
<td>(unfilled)</td>
<td>(e.g., He gave her a fish taco; He baked her a muffin.)</td>
</tr>
<tr>
<td>Ditransitive construction: Subj V Obj1 Obj2</td>
<td>(e.g., The armadillo was hit by a car)</td>
</tr>
<tr>
<td>Passive: Subj aux VPp (PPIp)</td>
<td>(e.g., The armadillo was hit by a car)</td>
</tr>
</tbody>
</table>

Growing convergence in many quarters

- Theoretical:
- Acquisition:
- Processing:

Constructionist approach to argument structure:

Each argument structure construction specifies its formal properties and its semantic and information structure properties.
For the ditransitive, a semantic constraint is needed to account for the entailment of intended giving:

2) She baked him a cake. ≠ She baked a cake for him.

An information structure constraint is needed to account for the strong statistical skewing toward topical recipients (Dryer 1986; Givon 1979; Langacker 1987; Arnold et al. 2000; Bresnan and Nektina 2002; Levin and Rappaport Hovav 2004; Goldberg 2006)

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**Argument structure CONSTRUCTIONS**

<table>
<thead>
<tr>
<th>Meaning</th>
<th>Form</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>X causes Y to receive Z</td>
<td>Subj V Obj1 Obj2</td>
<td>She gave him something. She died him something.</td>
</tr>
<tr>
<td>X moves (to) Y</td>
<td>Subj V PP</td>
<td>She avoided down the street. She went down the street.</td>
</tr>
<tr>
<td>X causes Y to move Z</td>
<td>Subj V Obj PP</td>
<td>She smeared the foam off the cappuccino. She put the lid in the box.</td>
</tr>
<tr>
<td>X causes Y to become Z</td>
<td>Subj V Obj RP</td>
<td>She kissed him unconscious. He made her crazy.</td>
</tr>
</tbody>
</table>

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**How is it acquired?**

**What is acquired?**

- **Lexical rules**: Determined by Universal Grammar
- **“constructions”**: Learned on the basis of the input + domain general processes

- Jackendoff 1975; Grimshaw 1990; Pinker 1989
- Borer, Marantz, Hale and Keyser

- **Lexical rules**
  - Traditional
  - HPSG, CxG, Müller

- **constructions**
  - Constructionist approach: phrasal (Goldberg 1992, 1995, 2006; Jackendoff and Goldberg 2004; Culicover and Jackendoff 2003); lexical (V0) (Hecox & Levin 1996; Davis & Koenig 2000; Kay 2005)

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**Secondary question:**

How are the ideas implemented?  
Are these ideas best implemented by a symbolic, categorical representation?

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**lexical rules**

For resultatives:

“Lexical rule-based approaches assume a lexical rule that takes an intransitive (version of a) verb as input and licenses a special lexical item that selects for an additional object and a secondary predicate.” (Müller 2006: 25)

Cf. also Jackendoff 1975; Bresnan 1982; CxG 1990; traditional HPSG; Pinker 1989; Grimshaw 1990.
Lexical rule approach: alternations require distinct verb senses

- sneeze-1: <agt>
- sneeze-2: <agt theme path>
- send-1: <agt pat goal>
- send-2: <agt rec pat>

Advantages of constructions as against lexical rules

- Implausible verb senses are avoided
- The possibility of mismatches (or matches) between verb and constructional meaning is allowed for.
- The possibility of morphemes that have semantic scope only over the lexical verb is allowed for.
- Broader generalizations are captured without lexical rules (or derivations).
- Constructionist approach extends to natural treatment of idioms.

and sneezed that tooth all the way across town.

e.g., sneeze 2 “to cause something to move by sneezing”

If this were a plausible verb sense, there should exist some language that has a unique morpheme (snope) for this meaning. Does there exist such a language?

Pat sneezed.
She sneezed that tooth across town.
She sneezed a terrible sneeze.
She sneezed herself silly.
She sneezed onto the computer screen.
She sneezed her way to the emergency room.

sneez, snuffle, snick, stiff, and slog in some language?

Sneeze is not unusual

She got into the car.
She got a new car.
She got sick.
She got him a car.
She got him sick.
She got the ball into the box.
She got him to agree.
Other examples

Ditransitive
- *He baked her a cake.
- *He deserved himself another start*
  <baseball announcer> (from M. Tomasello 2007)

Casual motion
- *Demi Moore thinks this will Halle Berry her back to the B List.* <from Mr. Brooks movie> (from R. Grush 2007)
- *“His thousands of travelling fans… had roared him into the Thomas and Mack Center ring”* www.topix.net/wire/world-soccer/manchester-united
- *“I actually had a moth go up my nose once. I… coughed him out of my mouth”* (bikeforums.net/archive/index.php/t-292132)

> Recognizing constructional meaning allows us to avoid implausible verb senses.

...Advantages

Implausibly constrained verb senses are avoided:
*She laughed her way across town.*

Laugh: Object with possessive determiner and *way + path phrase.*
- *She laughed him.
- *She laughed her path across town.
- *She laughed a way across town.*

Do we find unique verb stems with such specific constraints?

(note also locality violation)

Locality (as used here):

A constraint is local iff it can be stated as a constraint on a head and its sister arguments.

The head daughter of a sister node may also be constrained insofar as the features of the head are shared by its mother node:

/ | /
V NP PP
 /\ Det N

If a constraint on V is local, V cannot constrain both Det and N

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The lexical rule approach predicts:

meaning_i <-> argument structure pattern_i
The constructionist approach predicts that verb and construction are in principle distinguishable:

-> Some constraints may hold of the lexical verb; others may hold of the construction.

**Advantages**
The possibility of mismatches is allowed for. Case #1:

The *way* construction does not allow telic motion verbs such as *arrive, depart, …*

And yet the construction readily encodes telic motion:

*He arrived his way to the station.*
He forced his way to the station.

On lexicalist accounts, how can *force* be a verb of telic motion but not be a verb of telic motion?

Advantages

The possibility of mismatches is allowed for. Case #2:

Dutch impersonal passive construction requires atelic situation Zaenen (1991):

"Er werd opgestegen."
There was taken off.

*Er werd opgestegen.*
Van Schiphol wordt er de hele dag opgestegen.
From Schiphol, there is taking off the whole day.

Evidence against two instances of the main verb *opgestegen*, one telic, one atelic:

It always takes the auxiliary *zijn*, used with telic verbs:

1a. *Hij is (dagelijks) opgestegen.*
It has taken off (daily).

Also, allows us to recognize matches between lexical meaning and meaning of the construction:

Worm/inch "X moves slowly/with difficulty along Y path.”
Way construction: "X moves with difficulty along Y path.” (Goldberg 1995)

simple intransitive motion construction:
2a. *Pat inched ahead of Kim.*
b. Chris cannot worm out of that situation.

Advantages of constructions as against lexical rules

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E.g., *re-* requires lexically causative verb:

**Lexically causative**

John repositioned the book on the table.
John refilled the tub with water.
John resprayed paint on the wall.
John resold him the car.

**Lexically non-causative**

??She reate herself sick.
??She recried herself to sleep.
??The dog rebarked them awake.
??She resneezed the foam off the cappuccino.
Advantages of constructions as against lexical rules

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The Surface Generalization Hypothesis: there are typically broader syntactic and semantic generalizations associated with a surface argument structure form than exist between the same surface form and a distinct form that it is hypothesized to be syntactically or semantically derived from [or related to by lexical rule] (Goldberg, 2002, 2006).

- A Precedent: Chomsky (1970) demonstrated that NPs based on “derived” nouns (i.e., nouns that have verbal counterparts) have exactly the same syntax as NPs based on underived nouns:
  - destroy --> destruction

“Input” syntax and semantics arguments: it is preferable to avoid deriving A from C if there exists a pattern D that has the same syntax and semantics as C and yet cannot serve as input from which to derive A. (Goldberg 2002)

When both target syntax/semantics and input syntax/semantics hold:
Lexical rule?

\[ V<\text{agt loc theme}> \rightarrow V<\text{agt thm loc}> \]

E.g., load with \(\rightarrow\) load onto

Advantages of constructions as against lexical rules

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- Broader generalizations are captured without lexical rules (or derivations).
- Phrasal approach extends to natural treatment of idioms.

Lexical templates: unary branching structures that embed lexical verb within a lexical-constructional template. (SBCG; Hovav and Levin 1996; Davis and Koenig 2000; Kay 2005)

Advantages: phrasal approach extends naturally to idioms

Possibly underspecified phrasal form:

\[ \text{pull, strings}_{\text{v-pull}} \]

The semantics of the idiom is stated once as a phrasal meaning. Idioms combine with other constructions as long as the constraints on the constructions are satisfied:

E.g., \textit{Strings} can be topicalized iff “strings” can be construed as topical. This predicts that only relevantly “compositional” idioms are manipulable; cf. (Nunberg, Wasow and Sag 1994).

Lexical account requires massive redundancy:

needs to say that \textit{pull} has a special sense when it appears with \textit{strings}; and also that \textit{strings} has a special sense when it appears with \textit{pull}.

\textit{kick} means “die” when it appears with \textit{the bucket and the bucket} both mean nothing iff they appear with \textit{kick}.
The lexical account requires truly implausible word senses (Fellbaum 2007): The complex, full semantic information associated with many idioms is far richer than that normally associated with verbs:

- A rising tide lifts all boats.
  *lift*; “when an economy (or other group) is doing well, everyone benefits”

- The devil you know is better than the devil you don’t.
  *be*; “something unpleasant but familiar/predictable is preferable to something unpleasant that is unknown/of unknown magnitude”

Locality is violated by idioms

By the skin of <one’s> teeth

If this is a special sense of *by*, it has to specify its great grandniece teeth.

From constructions to idioms:

<table>
<thead>
<tr>
<th>construction</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>ditransitive</td>
<td>give &lt;someone&gt; a kiss</td>
</tr>
<tr>
<td></td>
<td>give &lt;someone&gt; a piece of &lt;one’s&gt; mind.</td>
</tr>
<tr>
<td>any construction</td>
<td>work &lt;one&gt; way through school.</td>
</tr>
<tr>
<td></td>
<td>sleep &lt;one&gt; way to the top.</td>
</tr>
<tr>
<td>caused-motion</td>
<td>make &lt;someone&gt; hair stand on end.</td>
</tr>
<tr>
<td></td>
<td>eat &lt;someone&gt; out of house and home.</td>
</tr>
<tr>
<td>resultative</td>
<td>eat &lt;one&gt; sick</td>
</tr>
<tr>
<td></td>
<td>make &lt;one&gt; scarce</td>
</tr>
</tbody>
</table>

Advantages: constructionist account extends naturally to the many clearly exocentric constructions

- N P N construction (day by day, year after year)
- Topicalization (Bagels, I like.)
- SAI (are you?)
- Mad magazine construction (Him, a doctor?)
- Gapping (She gave one to Pat and three to Chris)

Possible concerns:

(Müller 2007)

- Linear order is assumed to be rigidly fixed in advance leading to massive proliferation of constructions.
- “relation changing” passive, middle constructions require additional constructions to capture relevant linking.
- Complex predicate behavior is taken to entail that argument structure patterns are lexical.

Additional possible criticisms:

- Morphological markers are commonly used on argument structure patterns.
- Linking rules look more general than construction-specific form-function pairings.
Does allowing phrasal constructions require that their constituents be strictly and completely ordered in advance?

No:

UNDERSPECIFICATION

Caused motion construction in both:

a) She threw the book to Joe.

b) She threw to Joe the book she had just finished reading.

A general VP construction specifies statistical constraints on the ordering of postverbal complements (dependent on weight and information structure, cf. Wasow 2002).

Adjunct construction(s) specify the placement of adjuncts along with their corresponding scope properties.

English: [Adjunct* V (Obj) Adjunct* (PP* Adjunct*)]*_{VP}

Independent topicalization construction, cleft constructions allow for various frontings.

I.e. Constructions unify on the fly to form utterances as long as they don’t conflict (Fillmore and Kay 1990’s; Culicover and Jackendoff 2005; Ambridge and Goldberg 2008)

• We don’t compute all possible combinations of constructions in advance.

• Inheritance hierarchy is used (only) to capture relationships among conventionalized individual constructions.

Long distance dependency constructions may require that grammatical relations be satisfied non-locally (but see Sag 2005):

– What did he think she gave Pat __?

What is the Obj2 of the ditransitive.
locality

- Clearly both lexical and phrasal approaches owe an explanation of when (and why!) locality holds and when it doesn’t...

- Muller (p.c.) uses traces to avoid violated locality in long-distance dependencies.

- Constructionist approach could do the same thing… (but prefer to recognize violations of locality instead of allowing invisible elements)

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“Relation changing” passive, middle constructions

- Underspecification for these cases? E.g., ditransitive as an “extra object” construction? (Kay 1996)

- Require additional constructions: allow inheritance hierarchy (like GPSG metarules) to specify related form-related meaning links (Goldberg 1995, 2006; Goldberg and Jackendoff 2004).

ALLOCONSTRUCTIONS (Pike 1972; Lambrecht 1994).

Alloconstructions

- Allophones are motivated but not predicted:
  - Many languages have final word devoicing (to varying extents)
  - Intervocalic /t/ appears as a /flap/ in American, not Br. English.

- Alloconstructions: (e.g., passive-ditransitive) are also motivated but not predicted:

  - The passive-ditransitive didn’t arise until c. 1375, almost 2 centuries after casemarking on recipient disappeared. (Allen 2001)

  - *My brother-in-law sells cars easily.
  - *Cars sell my brother-in-law easily. (*’d On recipient reading)
-> the combined constructions are not implausible

Yucatec Maya (cited by Müller 2006: 21 ex 35d):

It is possible to causativize a passive verb:

\[ K = u \ ka' an \ - s - ik \ le \ te r i o - o' \]
\[ \text{Incompl=3.erg} \ \text{learn.PASS-cause} \ - \text{impf} \ \text{det theory-D1} \]

"He is teaching the theory" (He causes that the theory is being learned)

This complex form can then be passivized (again):

\[ K = u \ ka' an \ - s - a' a l \ le \ te r i o - o' \]
\[ \text{Incompl=3.erg} \ \text{learn.PASS-cause-PASS} \ - \text{impf} \ \text{det theory-D1} \]

"The theory is being taught." (Somebody causes that the theory is being learned.)

We seem to not only need a causative-passive construction, but also a passive-causative-passive construction.

Possible concerns

- Linear order is assumed to be rigidly fixed in advance leading to massive proliferation of constructions.
- "relation changing" passive, middle constructions require additional constructions to capture relevant linking.
- Complex predicate behavior is taken to entail that argument structure patterns are lexical.
- Morphological markers are commonly used on argument structure patterns.
- Linking rules look more general than construction-specific form-function pairings.

Resultatives as complex predicates

It is clear that resultatives involve V+Adj combinations that are in some sense stored as units:

Some verbs idiosyncratically take certain Adj.'s:

- He ate himself sick.
- He ate himself ill/nauseous/full.
- He cried himself to sleep.
- She cried herself asleep.
- She cried herself calm/wet. (Goldberg 1995: 192)

Complex predicates in Persian are realized as V0's by default (Goldberg 1996; 2003)

\[ \text{Ali bâ Babak} \ \text{harf zad} \quad \text{(complex predicate: CP)} \]
\[ \text{Ali with Babak} \ \text{word hit} \]

"Ali talked with Babak."

- CP cannot be separated (by adjuncts, DO)
- CP bears stress like V0's
- CP can be nominalized
- CP host (surf) is not direct object
- CP conveys meanings that are expressed by simple verbs in other languages
English resultatives are a different animal:

a. The metal was [hammered [even flatter than a pancake that has been run over by a steam roller and stomped on by elephants and even wider than a truck]] (adapted from Embick 2004, cited by Müller 2006).

Possible concerns:

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- “relation changing” passive, middle constructions require additional constructions to capture relevant linking.
- Complex predicate behavior is taken to entail that argument structure patterns are lexical.
- Morphological markers are commonly used on argument structure patterns.
- Linking rules look more general than construction-specific form-function pairings.

Morphological marking on argument structure constructions.

Requires that the construction specify morphological cues.

This sometimes requires non-local specifications (again), but we already need non-locally specified morphology, e.g., *for The Xer the Yer* construction.

Possible concerns:

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Notice that many linking rules are construction-specific

- **theme** -> direct object (in the transitive construction)
  - She kicked the ball.

- **theme** -> subject (in intransitive construction)
  - The ball rolled.

- **theme** -> second object (in ditransitive)
  - She kicked him the ball.

- **recipient** -> subject (in the transitive construction)
  - She received it.

- **recipient** -> first object (in ditransitive)
  - He gave her a letter.

- **recipient** -> prepositional phrase (in “dative” construction)
  - She gave the letter to her.
 Aren’t there some generalizations across constructions?

Yes. E.g., Dowty’s generalization about the transitive construction.

It is possible to capture this via the inheritance network.

E.g., the caused-motion, ditransitive constructions inherit from the transitive construction (cf. Goldberg 1995, chapter 4).

-> both construction-specific aspects of linking and generalizations across constructions are naturally accounted for.

Summary

• Linear order is not fixed in advance by argument structure constructions: underspecification + relaxing locality.

• “relation changing” passive, middle constructions require related alloconstructions.

• Complex predicate behavior indicates a need to recognize predicates (such predicates can be X0 or phrasal by default (Persian CPs are more lexical than English resultatives)).

• Morphological markers of argument structure constructions requires relaxing locality.

• The linking generalizations that do exist are captured in inheritance hierarchy; other generalizations are construction-specific.

Advantages of recognizing argument structure constructions

• Implausible verb senses are avoided

• The possibility of mismatches (or matches) between verb and constructional meaning is allowed for.

• The possibility of morphemes that have semantic scope only over the lexical verb is allowed for.

• Broader generalizations are captured without lexical rules (or derivations).

• Constructionist approach extends to natural treatment of idioms and other constructions.

Thank you!