Construction Grammar

2017 LINGUISTIC INSTITUTE
INSTRUCTOR: ELAINE J. FRANCIS, PURDUE UNIVERSITY
LECTURE 3: ARGUMENT STRUCTURE
Predicates, arguments, and propositions

The semantic structure of a sentence consists of at least one *predicate* and its *arguments*.

[The hunter] **hugged** [the bear].

**Arguments** represent the participants in an event or situation (can be persons, things, or abstract entities). They are typically expressed by NPs and DPs, but may also be expressed by CPs.

A *predicate* expresses something about the participants (usually some action, property, or relation among the participants). They are typically expressed by verbs, but may also be expressed by adjectives, nouns, and prepositions.
Predicates, arguments, and propositions

A simple declarative sentence expresses a proposition. A proposition consists of a predicate and its arguments, and denotes a situation that can be either true or false.

[The hunter] hugged [the bear].

The word hugged is a two-place predicate because it takes two arguments, the hunter and the bear. The two arguments are needed to complete the meaning of the predicate.

The entire sentence forms a proposition which can be either true or false.
Predicates, arguments, and propositions

Each predicate selects a certain number of arguments.
Here, the arguments are in brackets, and the predicates are in boldface.

One-place predicate: [Henry] **smiled**.

Two-place predicate: [The police] **investigated** [the allegations]

Three-place predicate: [Sara] **gave** [John] [a gift]
Predicates, arguments, and propositions

**Predicates** can be syntactically realized as verbs, adjectives, nouns, or prepositions.

- **[Henry] left [his wife]**. (verb, two-place predicate)

- **[Henry] is tall**. (adjective, one-place predicate)

- **[Henry] is in [the kitchen]**. (preposition, two-place predicate)

- **[Henry] is a fool**. (noun, one-place predicate)

Note that the verb *be* in the above sentences is not a semantic predicate because it does not have a meaning of its own. Its function is to carry the tense marking.
Argument Roles

An **argument role** (aka semantic role, thematic role, theta role) is the role that an argument performs in the action or relation that the predicate describes.

[Jane] **kicked** [the soccer ball].

Jane is the **Agent** of kicking because she is the ‘doer’ of the action denoted by the predicate. An Agent is a human or animal which **intends** to perform the action.

The soccer ball is the **Patient** because it is the ‘undergoer’ of the action.

Traditionally, argument roles are said to be selected by the verb and specified in the lexical entry.

In CxG, argument roles are said to be specified by the **construction**, while verbs are specified with more specific roles called **participant roles** (e.g. kicker, kickee)
Argument Roles

Goal – the location or entity in the direction of which something moves
Theme – the entity moved or manipulated by the action

[Leslie] sent [a package] [to John].

[A package] arrived.

[A package] was shipped to [John].

Agent = Leslie
Goal = John
Theme = a package
Argument Roles

**Experiencer** – living entity that experiences a sensation, emotion, or cognitive state

**Stimulus** – the entity that is the source or cause of a particular sensation, emotion, or cognitive state

[Paul] *enjoys* [classical music].
Experiencer = Paul; Stimulus = classical music

[Paul] is *afraid* of [spiders].
[Spiders] *frighten* [Paul].
Experiencer = Paul; Stimulus = spiders
Argument Roles

**Instrument** – something an Agent uses to cause something to happen

**Cause** – something that unintentionally causes something to happen

[Someone] *opened* [the door].

[The key] *opened* [the door].

[The wind] *opened* [the door].

[The door] *opened*.

Agent = someone; Instrument = the key

Theme = the door; Cause = the wind
Practice: identify the predicate, the arguments, and the argument role of each argument

1. Jane saw a UFO.
2. Bill cut the bread with a knife.
3. The speaker stumbled.
4. Penny put the bread on the table.
5. The audience loved the performance.
6. The musicians were nervous.
7. The storm broke the window.
8. An intruder broke the window.
9. The window broke.
10. Sam took her friend to the movie.
Practice: identify the predicate, the arguments, and the argument role of each argument

1. [Jane] saw [a UFO]. Experiencer, Stimulus
2. [Bill] cut [the bread] with [a knife]. Agent, Patient, Instrument
3. [The speaker] stumbled. Theme
4. [Penny] put [the bread] on [the table]. Agent, Theme, Goal
5. [The audience] loved [the performance]. Experiencer, Stimulus
6. [The musicians] were nervous. Experiencer
7. [The storm] broke [the window]. Cause, Patient
8. [An intruder] broke [the window]. Agent, Patient
9. [The window] broke. Patient
10. [Sam] took [her friend] to [the movie]. Agent, Theme, Goal
Syntactic alternations

Many verbs participate in so-called syntactic alternations—different syntactic means for expressing the same event. Usually rough paraphrases with some subtle semantic and pragmatic differences.

**Dative-ditransitive alternation:**
- Rachel lent a book to Freddy. (dative) / Rachel lent Freddy a book. (ditransitive)

**Active-passive alternation:**
- Rachel contacted Freddy. (active) / Freddy was contacted by Rachel. (passive)

**Causative alternation:**
- Freddy broke the glass. (causative) / The glass broke. (intransitive)

**Load-spray alternation:**
- They loaded the truck with hay. (causative + with) / They loaded hay onto the truck. (caused motion)
Syntactic alternations

The first three of these alternations are traditionally related by movement in derivational approaches to grammar. Movement analysis assumes that one configuration is more basic than the other.

Movement is required to preserve **Uniform Theta Assignment**.

**Dative-ditransitive alternation:**
- Rachel lent a book to Freddy. (dative)
- Rachel lent Freddy a book __. (ditransitive)

**Active-passive alternation:**
- Rachel contacted Freddy. (active)
- Freddy was contacted __ by Rachel. (passive)

**Causative alternation:**
- Freddy broke the glass. (causative)
- The glass broke __. (intransitive)
Derivational explanations
Arguments against derivational analysis

Goldberg (2006) identifies two types of arguments that have been used to challenge derivational analyses of various phenomena.

1. target syntax/semantics – “derived” construction shares syntactic/semantic properties with non-derived construction which are not shared with “input” construction

2. input syntax/semantics – “input” construction is impossible in some contexts where “derived” construction is possible (i.e. there appears to be no input for a derived sentence)

Chomsky (1970) himself used these types of arguments to argue in favor of a non-derivational (lexical) approach to nominalization. An earlier proposal was the nominalizations were derived from semantically-equivalent full clauses.

That the data was destroyed → the destruction of the data
Arguments against derivational analysis

1. Target syntax – “it is preferable to generate A directly instead of deriving it from C if there exists a pattern B that has the same target syntax as A and clearly is not derived from C.” (Goldberg 2006, p. 23)

Example: nominalized and basic nouns share the same surface syntax and both are typically used as arguments and can be inverted to form a question.

- The destruction of the data was irresponsible.
- Was the destruction of the data irresponsible?
- The top of the mountain was snowy.
- Was the top of the mountain snowy?
Arguments against derivational analysis

2. Input syntax — “one should not attempt to derive 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 2006, p. 23)

Example: nominalizations differ from clauses in their distribution.

- Was the destruction of the data irresponsible?
- ??Was that the data were destroyed irresponsible?

- The destruction of the data was complete.
- *That the data were destroyed was complete.

Following Chomsky (1970), it has been generally agreed that nominalizations and their clausal paraphrases are not related by any derivation. Rather they are generated independently and related to each other by similarities in the lexical entries of related nouns and verbs.
Surface generalization hypothesis

Goldberg 2006, p. 25:

**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.
Case study: ditransitives

**Dative-ditransitive alternation:**

- Rachel lent a book to Freddy. (to-dative)  
  Rachel lent Freddy a book. (ditransitive)
- Sue baked a cake for Richard. (for-dative)  
  Sue baked Richard a cake. (ditransitive)

Ditransitives and their dative paraphrases differ semantically. Here are their central senses, as proposed by Goldberg.

- Ditransitive: Agent intentionally causes Recipient to receive Theme
- To-dative: Agent causes Theme to move to a Goal
- For-dative: Agent acts on Theme to benefit Recipient
Case study: ditransitives

Only ditransitives require transfer or intended transfer of Theme to Recipient. (example 35 from Goldberg 1992 “The inherent semantics of argument structure”)

(18)  a. *Bill baked Chris a cake, but never intended for her to have the cake.
     b. Bill baked a cake for Chris, but never intended for her to have the cake—instead he did as a favor for Chris because Chris was too busy to bake it herself.

(35)  a. Mary taught Bill French.

implies that Bill actually learned some French, i.e., that metaphorical transfer was successful. This is in contrast to:

     b. Mary taught French to Bill.
Case study: ditransitivites

The recipient argument of a ditransitive resists being the fronted argument in a wh-question, and it is typically an animate pronoun, in contrast to the theme argument, which resists occurring as a pronoun.

Goldberg (2006) gives a pragmatic explanation. The recipient in a ditransitive is usually a secondary topic. Thus it rarely introduces new information. The recipient in a dative is not specified as to topichood so can occur with a wider range of NPs.

    b. ??Who did Mina send a book? Who did Mina send a book to?  

(13) a. ??Mina bought Mel it. Mina bought it for Mel.  
    b. ?? Mina sent Mel it. Mina sent it to Mel.
Case study: ditransitives

Ditransitives and their dative paraphrases differ in what metaphorical extensions they readily allow. Goldberg explains this as a pragmatic difference.

- That noise is giving me a headache. / She threw him a parting glance.
- ??That noise is giving a headache to me. / ??She threw a parting glance to him.

Ditransitive generally allows theme as the focused element (new information). In this metaphor, focus is on theme (“a headache”). Dative prefers topical theme (e.g. “it”), so resists this kind of metaphoric extension.
Case study: ditransitives

Some derivational accounts say that ditransitives are derivable from two separate inputs: to-datives and for-datives. The two kinds of datives instantiate different constructions with different semantic roles.

- Mary sent a message to Hugo. → Mary sent Hugo a message.
- Mary baked a cake for Hugo. → Mary baked Hugo a cake.

However, Goldberg argues that the corresponding ditransitives are instances of the same construction, with no reason to assume separate inputs.

- Recipient of for-dative and goal of to-dative both end up as recipients in the ditransitive construction.
Surface generalizations

Ditransitives pattern alike regardless of to-dative vs. for-dative paraphrase

**Table 2.1.** Ditransitives pattern alike (left) and differently than their prepositional paraphrases (right)

<table>
<thead>
<tr>
<th>Ditransitives</th>
<th>Paraphrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subj V Obj Obj2 (paraphrasable with “to” or “for”)</td>
<td></td>
</tr>
<tr>
<td>b. ??Who did Mina send a book?</td>
<td>Who did Mina send a book to?</td>
</tr>
<tr>
<td>(13) a. ??Mina bought Mel it.</td>
<td>Mina bought it for Mel.</td>
</tr>
<tr>
<td>b. ?? Mina sent Mel it.</td>
<td>Mina sent it to Mel.</td>
</tr>
<tr>
<td>(14) a. ??Mina sent that place a box.</td>
<td>Mina sent a box to that place.</td>
</tr>
<tr>
<td>b. ??Mina bought that place a box.</td>
<td>Mina bought a box for that place.</td>
</tr>
</tbody>
</table>
Surface generalizations

To-datives pattern like caused-motion sentences that don’t have a ditransitive counterpart. Goldberg proposes that both belong to a general Caused Motion Construction.

To-dative: caused motion along a path to a goal, can be paraphrased as ditransitive

Rachel sent a book to Freddy.
Rachel sent Freddy a book.

Other caused-motion: caused motion along a path, but no recipient, can’t be paraphrased as ditransitive

Rachel sent a book through the scanner.
*Rachel sent the scanner a book.
Summing up

Ditransitive sentences have been claimed to derive via movement operations from a structure akin to their prepositional dative paraphrase. (e.g. Baker 1997)

However...

- **Input syntax/semantics**: Some ditransitives are not derivable from any dative paraphrase.
  - Example: The noise gave me a headache. / ??The noise gave a headache to me.

- **Different pragmatic constraints:**
  - Recipient argument of a ditransitive is secondary topic so can’t easily be focused
  - Example: ??**Who** did she send it? **Who** did she send it to?
  - Theme argument of a ditransitive can’t be a pronoun.
  - She sent him a package. / ??She sent him it. / She sent it to him.
Summing up

**Surface generalizations:**

- Ditransitives pattern similarly to each other regardless of the type of dative paraphrase (or lack thereof)
- Meaning: Agent intentionally cause Recipient to receive Theme

- Caused motion sentences pattern similarly to each other regardless of whether they can be paraphrased using ditransitive or not
- Meaning: Agent cause Theme to move along a path
- To-dative is a subtype of Caused Motion Construction; for-dative is not
Summing up

- **Goldberg’s conclusion**: Ditransitives are not derived from anything resembling their prepositional paraphrase; they are generated independently.
- How then to express paraphrase relations?
  - Possible alternatives to syntactic derivation:
    - (1) lexical rule relating different senses of the same verb or verb class
      - assumes basic sense and derived sense: but sometimes basic form is ungrammatical
        - She begrudges/envies me my success (cf. *She begrudges/envies my success to me.)
      - lexical rule needs to specify addition/subtraction of special semantic and pragmatic conditions
    - (2) different surface forms reflect distinct form-meaning constructions
      - No rule or derivation relating the two constructions
      - Similarity is the result of overlap of syntactic and semantic features
Constructional analysis: ditransitive

Goldberg assumes that lexical items, including verbs, are specified with a rich frame semantics, which includes real-world knowledge and contextual information associated with each item.

As part of this frame semantics, each verb is specified with its own specific participant roles.

- Example: She *sent* Mel a package.
  - Send: sender send-goal send-theme
- Example: She *sent* a package to Mel.
  - Send: sender send-theme send-goal
Constructional analysis: ditransitive

General constructions must unify with particular verbs that come with their own semantic roles. In the simplest case, the participant roles of the verb each represent a subtype of the construction’s argument roles.

Example: She handed Mel the keys. Hand: hander hand-rec handed
Sem: intend-CAUSE-RECEIVE (agt rec(secondary topic) theme)
verb ( )
Syn: Subj Obj1 Obj2

**Figure 2.1.** The ditransitive construction
Constructional analysis: ditransitive

Sometimes the role of the verb is not obviously a subtype of the construction’s role. Here “Mel” can be *construed* as send-goal (a location) and Recipient at the same time. Note that Recipient is defined as “willing recipient” for this construction, ruling out inanimate recipients.

- Example: She sent Mel a package. Send:   sender   send-goal   send-theme

  ![Syntax Tree Image]

  **Figure 2.1.** The ditransitive construction
Constructional analysis: ditransitive

Sometimes the construction has more arguments than the verb itself specifies. Here “Mel” is assigned its Recipient role from the construction alone.

- Example: She baked Mel a cake. Bake: baker bake-theme

\[
\text{Sem: intend-CAUSE-RECEIVE} \quad (\text{agt} \quad \text{rec(secondary topic)} \quad \text{theme})
\]

\[
\text{verb} \quad (\quad)
\]

\[
\text{Syn:} \quad \text{Subj} \quad \text{Obj1} \quad \text{Obj2}
\]

**Figure 2.1. The ditransitive construction**
Constructional analysis: caused motion

General constructions must unify with particular verbs that come with their own semantic roles.

- Example: She sent a package to Mel.
- Send: sender send-theme send-goal
- Sem: CAUSE-MOVE Agent Theme Goal
- Syn: Verb SUBJ OBJ OBL
Constructional analysis: caused motion

Sometimes the construction has a role not assigned by the verb. Here the verb “sneeze” is assumed to only assign one role, while the other two come from the construction.

- Example: She sneezed the napkin off the table.
- Sneeze: sneezer
- Sem: CAUSE-MOVE Agent Theme Goal
- Syn: Verb SUBJ OBJ OBL
Constructional analysis: passive

The passive construction deprofiles the higher-ranked participant role of the verb and profiles the second-ranked participant role. It does not require specific argument roles like Agent and Theme—these are given by the verb. It does require reference to a hierarchy of argument roles to determine which argument is higher-ranked.

- Example: The book was written by an unknown author.

- Write: written writer
- Sem: Arg2 Arg1
- Syn: be+ past-participle SUBJ OBL (by-PP)
Verb-construction unification

Mismatches between participant roles and argument roles are allowed, subject to the Semantic Coherence Principle and the Correspondence Principle.

**Semantic Coherence Principle**

“The Semantic Coherence Principle ensures that the participant role of the verb and the argument role of the construction must be semantically compatible. In particular, the more specific participant role of the verb must be construable as an instance of the more general argument role. General categorization processes are responsible for this categorization task and it is always operative.” (Goldberg 2006: 40)

The idea of construal is important, if a little vague. The roles don’t need to match exactly to be construable in an instance relation. Different speakers might differ in the flexibility with which they allow certain construals, accounting for variability in judgments.
Verb-construction unification

Mismatches between participant roles and argument roles are allowed, subject to the Semantic Coherence Principle and the Correspondence Principle

**Correspondence Principle**

“...profiled participant roles of the verb must be encoded by profiled argument roles of the construction, with the exception that if a verb has three profiled roles, one can be represented by an unprofiled argument role and realized as an oblique argument. The Correspondence Principle is a default principle, which is at root iconic. ...the Correspondence Principle requires that the semantically salient profiled participant roles are encoded by grammatical relations that provide them a sufficient degree of discourse prominence: i.e. by profiled argument roles. As a default principle, the Correspondence Principle can be overridden by particular constructions that specify that a particular argument be deemphasized and expressed by an oblique or not at all.” (Goldberg 2006: 40)
Different senses of a construction are related by polysemy links and associated with certain classes of verbs.

The verbs might or might not specify all of the arguments of the construction.

Diagram from Goldberg 1992 “The inherent semantics of argument structure”
Advantages of constructional account
(Goldberg 1995)

Implausible verb senses are avoided (e.g. transitive sneeze, ditransitive bake)
- We don’t find any language with morphologically distinct verb lexemes for these different senses
- We do find languages with inflectional morphemes that add or subtract arguments (e.g. causative morpheme). Argument structure constructions are directly analogous to these kind of morphemes.
- Polysemy account predicts that verbs will be ambiguous in online processing until relevant context is identified, but no psycholinguistic evidence that this is the case

Compositionality is preserved
- Lexical approach requires valency-changing rules associated with specific semantic and pragmatic conditions to achieve semantic composition
- Constructional approach unifies lexical and constructional meanings to achieve semantic composition

Polysemy (e.g. metaphoric extension) can be represented efficiently, at construction level, without proposing separate metaphoric senses of each verb
Questions for discussion

1. What are some further examples from English or other languages of verbs occurring in a construction that does not match their specified argument roles?

2. What are the null arguments in (a), (b), and (c) and how do they differ?
   - (a) Kim was reading. I just don’t remember what.
   - (b) Kim understood. I just don’t remember what.
   - (c) Please read the next chapter for Monday.

3. What are some potential drawbacks of a constructional approach to argument structure?