Event integration in the English MEANS construction:

An RRG analysis

Erika Bellingham
University at Buffalo
RRG 2019
1. INTRODUCING THE MEANS CONSTRUCTION

(1) He angered Democrats by threatening to veto his own budget.

(2) He also encouraged you to learn by making mistakes.

(3) His own wife survived by clinging to a couple of chairs until she was rescued.

(4) By crafting regional metaphors, geographers can help the public to understand and expand regional choices.

(Corpus of Contemporary American English)
1. ANATOMY OF THE MEANS CONSTRUCTION

He angered Democrats by threatening to veto his own budget.
OUTLINE

● Syntax
  ○ Syntactic structure of the means construction

● Semantics
  ○ Previous literature
  ○ Semantic integration of events
  ○ Semantic restrictions on each event
  ○ Representation

● Means in the Interclausal Relations Hierarchy

● Voice and linking: two variants?
2. SYNTACTIC STRUCTURE: PREVIOUS LITERATURE

- Van Valin (2005)
  - Relative position in IRH
  - No explicit syntactic analysis

![Interclausal relations hierarchy diagram](image)
2. SYNTACTIC STRUCTURE

- Core peripheral subordination
2. SYNTAX: EVIDENCE FOR CORE PERIPHERAL SUBORDINATION

I. Means core headed by a preposition (by)
   ➔ A hallmark of the core periphery

II. Ordering freedom of cores

   (5) a. By analyzing the bomb, investigators began to develop its profile.
       b. Investigators began to develop the bomb’s profile by analyzing it.

III. Intervening core periphery elements are fine

   (6) a. You can do so this afternoon at 2:00 by logging on to our Web site.
       b. This number was calculated by the authors by dividing the population by 7.5.
2. SYNTAX: EVIDENCE FOR CORE PERIPHERAL SUBORDINATION

IV. Co-subordinate clauses can each have their own means core:

(7) Sandy studied *by reading her notes* and will celebrate finishing her exam *by burning them*.

V. The main core may be non-finite:

(8) Sandy wanted to **study for her exam** *by reading her notes*.

VI. The means construction is syntactically asymmetrical:

(9) a. Sandy celebrated her graduation *by burning her notes in the morning and drinking beer all afternoon*. [CLAUSAL COSUBORDINATION]

b. Stuxnet... is known for reportedly **destroying roughly a fifth of Iran's nuclear centrifuges** *by causing them to spin out of control*. [CORE COORDINATION]
Van Valin (2005: 206-207)

Means: the means by which an action is carried out

Means LS: \( \text{do'}(x, [. . .] \land \text{pred}_2'(x, y)] \)

\(\land\): a connective meaning ‘and simultaneously’ (p59)
3. SEMANTICS: PREVIOUS LITERATURE

**Ohori (2001)**

p1 SUPPORT p2: A supportive relation between two predicates:

- p1 is anchored (located in a mental model with its own epistemic status)
- p2 is not anchored, but is supported by p1

**Manner/means (subtype of SUPPORT):**

- p1: main event
- p2: means event

p1 SUPPORT p2, where p2 is an elaboration of the subpart of the causal structure of p1
3. SEMANTICS:

VARIANT 1

SPECIFY CAUSE

e.g. The dog **scared** the boy

\[\text{do'}\ (\text{dog}, \emptyset)\] CAUSE \[\text{feel'}\ (\text{boy}, [\text{afraid'}])\] 

\[\text{do'}(\text{dog, bark'}(\text{dog}))\]

(10) a. The dog **scared** the boy \textit{by barking.} (Causative state)

b. Max **melted** the ice \textit{by placing it in the sun.} (Causative accomplishment)

c. The cat **popped** the balloon \textit{by sitting on it.} (Causative achievement)

d. Sam **flashed** the light \textit{by flicking his wrist back and forth.} (Causative semelfactive)

e. John **walked** the dog \textit{by riding his bike and tying the leash to his handlebars.} (Causative activity)

f. Joe **fed** his daughter vegetables \textit{by hiding them in her spaghetti.} (Causative active accomplishment)
3. SEMANTICS:  

VARIANT 1  

SPECIFY CAUSE

RESTRICTIONS: causative main event; underspecified activity as causing event

EVENT INTEGRATION: means event specifies causing event in main event LS

(11) She shocked her relatives by moving out. (COCA)

\[
\text{[do' (she, Ø)] CAUSE [INGR shocked' (her relatives)]} \quad \quad \quad \quad \quad \quad \text{[do' (she, move.out'(she))]} \quad \quad \quad \quad \quad \quad \text{SPECIFY}
\]

Combined LS for (11):

\[
[\text{do' (she, move.out'(she))}] \text{ CAUSE [INGR shocked' (her relatives)]}
\]

Compare to Van Valin (2005)

\[
\text{do'} (x, [\ldots] \land [\text{pred2'} (x, y)])
\]

??  \[
\text{do'} (\text{she, [do' (she, Ø)] CAUSE [INGR shocked' (her relatives)]} \land [\text{move out'(she)}])
\]
3. SEMANTICS: VARIANTS

VARIANT 2  SPECIFY ACTIVITY

e.g. The kids **danced** by **jumping around**.

(12) a. Archy **wrote** by **hurling himself at the typewriter keys one at a time**.  (Activity)
    b. Bill **wiped** the table by **running his sleeve along the surface**.  (Activity)
    c. The kids **danced** by **jumping around**.
    d. Cohan... **wrote his score** by **whistling the melodies to a copyist**.  (Active accomp.)

(13) a. Sally **began to build** the house by pouring a foundation.  (Phase of active accomp.)
    b. Sally **began her speech** by quoting MLK.  (Phase of implicit active accomp.)

13
3. SEMANTICS:  

**VARIANT 2  SPECIFY ACTIVITY**

**RESTRICTIONS:** main event contains a specific activity predicate with PSA as actor

**EVENT INTEGRATION:** means event ELABORATES activity predicate in main event

e.g. The kids *danced by jumping around.*

(12c) The kids danced by jumping around.

Combined LS for (11):

\[ \text{do'}(\text{kids}, \text{dance'}(\text{kids})) \] ELABORATE \[ \text{do'}(\text{kids}, \text{jump\_around'}(\text{kids})) \]

or \[ \text{do'}(\text{kids}, [\text{jump\_around'}(\text{kids})]) \] ELABORATE \[ \text{do'}(\text{kids}, \text{dance'}(\text{kids})) \]

or \[ \text{do'}(\text{kids}, \text{dance'}(\text{kids})) \] ELABORATE \[ \text{do'}(\text{kids}, \text{jump\_around'}(\text{kids})) \]

Compare VV2005 \[ \text{do'}(x, [\ldots] \land [\text{pred2'}(x, y)]) \]

\[ \text{do'}(\text{kids}, [\text{dance'}(\text{kids})] \land [\text{jump\_around'}(\text{kids})]) \]
Semantic restr.: main event contains NO activity predicate with PSA as actor, but is typically part of a larger force-dynamic structure (frame?) in which cause is salient
Event integrat.: means event is the CAUSE of the main event

(14) a. Mary learned French by attending classes.
   b. His own wife survived by clinging to a couple of chairs until she was rescued.
   c. They stayed warm by eating bread dipped in cognac.
   d. Sancoff became wealthy by starting and selling medical-device companies.
   e. At least 165 youngsters have died by ingesting or aspirating toys since 1980.

E.g. Mary learned French. BECOME know’(Mary, French) (Van Valin, 2005: 47)
   Mary attended classes. do’ (Mary, [attend’ (Mary, classes)])

(15a) [do’ (Mary, [attend’ (Mary, classes)])] CAUSE [BECOME know’(Mary, French)]
3. SEMANTICS: COMPLEX CASES

➢ Complex causal structure, no underspecified activity predicates
(15) Bill wiped the table clean by running his sleeve along the surface.

\[ \text{[do'(Bill, wipe'(Bill, table))] CAUSE [clean'(table)]} \]
\[ \text{[do'(Bill, Ø)]CAUSE[traverse'(surface, sleeve)]} \]

ELABORATION

➢ Means clause has a complex causal structure
(16) By making him believe you trust him as a friend, you increase the chances that he really will be.

\[ \text{[do'(you, Ø)]CAUSE[believe'(him, trust…)]} \]
\[ \text{[do'(you, Ø)]CAUSE[increase'(chances…)]} \]

SPECIFY

How can we identify which part of the main event the means event should specify/elaborate?
How can we identify which part of the main event the means event should specify/elaborate?

➢ A complex series of IF...THEN....ELSE rules to integrate the logical structures

<table>
<thead>
<tr>
<th>Main Core LS</th>
<th>Periphery Core LS Insertion Rule</th>
</tr>
</thead>
</table>
| if main core LS matches: 
  [...[do'(x,\emptyset)]CAUSE...]_L_{main} | ∅ |
| else if main core LS matches: 
  [...[do'(x,[pred_i'(x,y)])...]]_L_{main} | → [[pred_i'(x,y)]...ELABORATE[...]_L_{peripheral} |
| else | → [...L_{main}CAUSE [...L_{peripheral}] |

OR

➢ The means event provides more specific information about a compatible subpart of the main event that involves an action by the actor in the means event.
  ○ A subpart within the existing event structure
  ○ The entire existing event
  ○ A subpart of the larger frame (not profiled by the main clause)

➢ This then becomes a task of conceptual unification: what part of the main event can be conceptually unified with the means event?
### 3. SEMANTICS: SUMMARY OF EVENT INTEGRATION

<table>
<thead>
<tr>
<th>Variant</th>
<th>Main event properties</th>
<th>Semantic integration of events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify cause</td>
<td>Causally complex, with an underspecified causing event</td>
<td>Means event specifies causing event within the main event LS</td>
</tr>
<tr>
<td>Elaborate activity</td>
<td>An activity/accomplishment, or a phase of an event</td>
<td>Means event is an elaboration of the activity or phase</td>
</tr>
<tr>
<td>Add cause</td>
<td>Achievement/accomplishment associated with salient force-dynamic structure</td>
<td>Means event adds the cause of the main event</td>
</tr>
</tbody>
</table>
4. MEANS IN THE INTERCLAUSAL RELATIONS HIERARCHY

Van Valin (2005)
4. MEANS IN THE INTERCLAUSAL RELATIONS HIERARCHY

- Main & means are conceptually “facets of a single event”
- But at different granularities of construal
  - closer to a discourse level phenomenon?
- Syntactically:
  - Core peripheral subordination
  - Looser than Psych-action, Causative [2]
    - e.g. try to X: core cosubordination
    - e.g. make X Y: core cosubordination
5 VOICE AND LINKING: TWO VARIANTS?

➢ Pivot & controller typically both syntactically determined (PSA)

(17) a. Sally danced by __ jumping back and forth.
    b. Jamie broke the plate by __ hitting it with a hammer.
    c. * Jamie broke the plate by him hitting __ with a hammer.
    d. * The plate was broken by Jamie hitting __ with a hammer.
    e. The authors calculated this by __ dividing the population by 7.5.
    f. John was punished by __ being banned from the library.
    g. He violated his probation by __ being caught with a loaded gun.
5 VOICE AND LINKING: TWO VARIANTS?

➢ Sometimes, the controller is semantic (the Actor in the main event), but is not realized due to passive voice

(18) a. This was calculated (by the authors) by dividing the population by 7.5.
   b. The house was entered by breaking a window.

➢ Typically in academic and crime report genres.

➢ Two constructional variants?

➢ Or a transformation for stylistic purposes?
   ○ Syntax generated with active main core then reformulated
SUMMARY

- Syntax: Core peripheral subordination
- 3 major patterns of event integration:
  - Specifying causing event
  - Elaborating activity
  - Adding causing event
- An overall pattern summary:
  - Means core: PSA action
  - Elaborates a compatible event in the Main core
- Interclausal relations hierarchy:
  - Both syntactically and semantically more complex?
- Voice and linking:
  - Two constructional variants?
THANK YOU!

This work was supported by funding from the Fellowship Fund Inc of Graduate Women Queensland