Overview

- An unusual event
- The CUT and BREAK domain
- The amazing bipolar world of complex predicates
- Design of our study
- Complex predicate types in our corpus
- Results and analysis
- Discussion
- Conclusions

An unusual event

- what makes this unusual
  - intuitively, a mismatch
    - b/w the state change the theme undergoes...
    - ...and the instrument used to effect that change
- more canonical alternatives
  - for the theme/change - for the instrument/action

An unusual event (Cont.)

- the atypical configuration elicits more inter-speaker variation
  - because none of the available verbs seems to quite do justice to this scene:
    (1.1) He hit the shirt w/ a mallet
      - fails to encode state change
    (1.2) ?He slashed the shirt w/ a mallet
      - slash entails or strongly implicates a bladed instrument
    (1.3) ??He cut the shirt (in half/two parts) w/ a mallet
      - cut entails a bladed instrument
    (1.4) ?He broke the shirt w/ a mallet
      - break implicates a (semi-)rigid theme

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The CUT and BREAK domain

C(UT)&B(REAK) verbs lexicalize externally caused state changes

they encode a minimum of two subevents
- a state change of "separation in material integrity" (Hale & Keyser 1987)
- and its external cause
  - which may be an activity involving the use of a certain kind of instrument in a certain manner

across languages, simplex (monomorphic) C&B verb roots tend to lexicalize
- either the use of an instrument of certain properties => CUT-type verbs
  - e.g., cut – bladed instrument; saw – serrated instrument; stab – pointed instrument; ...
- or a kind of change and/or a kind of object undergoing it
  - e.g., break – object of non-malleable shape; tear – fabric; shatter – glass or ceramics; ...
- these lexicalization patterns produce distinct a(rgument)-structure classes
  - cf. Fillmore 1967; Guerssel et al. 1985; Levin 1993; Bohnemeyer in press
- only BREAK-type verbs produce transparently related inchoative/anticausative forms
  (2.1) a. Floyd broke/cracked/shattered the vase
  b. The vase broke/cracked/shattered
- CUT-type verbs refer to the cause of an event they describe as part of their lexical core meaning
  - since they entail the use of an instrument

The CUT and BREAK domain (Cont.)

...these implicatures tap into cultural and universal (folk-physics) assumptions
- about prototypical instrument-theme configurations
  - e.g., stereotypical instrument for "fragmenting" ceramics – a heavy, blunt instrument such as a hammer
  - stereotypical instrument for "fragmenting" wood – a bladed instrument
  - typical theme for a saw – wood
  - typical theme for scissors – paper or fabric
- this combination of lexicalization patterns and stereotype implicatures means
  - that to describe a C&B scene, we categorize it either by instrument or by theme/change
  - and either way get an entire stereotypical configuration as a package deal
The amazing bipolar world of complex predicates

Overview

• An unusual event
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The amazing bipolar world of complex predicates

• The amazing bipolar world of complex predicates (Cont.)
– (e) allows for Goldbergian constructions to license complex predicates
  • cf. Ackerman & Webelhuth 1998 for discussion

• complex predicates have bipolar semantics
  – if their components specify different subevents
    • as predicted, complex predicates with bipolar semantics
      neither inchoative- nor conative-alternate

  (3.3) a. Sally cut/sawed (at) the twig
     b. Sally cut/sawed (*at) the twig off/in half
     c. *The twig cut/sawed off/in half

  (3.4) a. Floyd pounded (at) the yams
     b. Floyd pounded (*at) the yams into a pulp
     c. *The yams pounded into a pulp

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The CUT and BREAK domain (Cont.)

• “bipolar” C&B roots...
  • i.e., roots that are semantically specific on both the
    theme/change and the instrument used
  – ...do occur, though
    • an example are CARVE-type verbs in English such as
      carve, slice, cube, grind (Levin 1993: 157-158 )
      – these neither inchoative-alternate nor conative-alternate

(2.5) a. Carol carved (*at) the stone
    b. *The stone carved (Levin 1993: 158)

• but, first and foremost, “bipolar” semantics is
  the domain of complex predicates

The amazing bipolar world
of complex predicates

• an informal working definition

Complex Predicates:
(a) Event type descriptions composed of multiple words or morphemes
(b) whose components may, but need not, head their own syntactic projections,
(c) but which have a single a-structure which cannot be ascribed to any
component.
(d) This a-structure may be a property of the individual complex predicate type,
(e) but it can also be a property of a template that licenses the productive and
semi-compositional formation of complex predicate types.

– (b) accommodates resultative constructions, serial
verb (SVCs) and light verb constructions (LVCs)
  • where the components may have their own dependents

  (3.1) The dog barked him completely/ wide awake

  (3.2) Sally gave Floyd a quick/fleeting kiss/kick/hug

  • but it also admits verb-particle constructions, compound
verbs, etc., where this is not the case

The amazing bipolar world of complex predicates (Cont.)

– monopolar complex predicates
  • both components referring to the same subevent
  • as predicted, monopolar complex predicates with BREAK-
type semantics inchoative-alternate
    – but not conative-alternate

(3.5) a. Sally broke (*at) the twig
     b. Sally broke (*at) the twig off/in half
     c. The twig broke off/in half

(3.6) a. Floyd tore (*at) the shirt
     b. Floyd tore (*at) the shirt apart
     c. The shirt tore apart

• given the potential for bipolar semantics
  – do atypical instrument-theme/change configurations
    universally favor complex predicates?
Design of our study (Cont.)

• the CUT & BREAK Clips
  • Bohnemeyer, Bowerman, & Brown 2001
  – 61 short digital video clips
  – featuring C&B scenes varied in terms of
    – presence of a discernible cause
    – type of theme (fabric, rope, carrots, sticks, …)
    – type of instrument used (bare hands, hammer, scissors, saw, …)
    – manner of action (controlled vs. “frenzied”)
    – degree of change (complete vs. partial)

Design of our study (Cont.)

• aims
  – study universals and crosslinguistic variation
    in lexicalization and a-structure classes
  – examine the acquisition of language-specific a-structure patterns

• the sample
  – adult language C&B data has been collected from
    speakers of about 30 languages so far
    • cf., e.g., Majid & Bowerman (eds.), Bohnemeyer in press,
      Majid, van Staden, Boster, & Bowerman (ms.)
  – for the following, we draw on a sub-sample of four
    languages
      • all of which have complex predicate constructions of
        various kinds

• inter-speaker variation
  as a measure of typicality
  – we propose that inter-speaker variation is inversely
    proportional to the “semantic typicality” of a scene
  – our working assumption
    • the closer a particular scene is to the prototype of any
      one (complex or simplex) predicate of the language
      – the more likely the speakers of this language are to converge on
        this predicate in their descriptions of the scene
    • conversely, the farther removed the scene from the
      prototype of any predicate
      – the more likely the speakers are to diverge in their responses
  – we cannot evaluate this assumption here
    • except through the matching of high- and low-variation
      scenes in our corpus with our intuitions about typicality

Design of our study (Cont.)

• protocol
  – participants watched each clip several times
  – then answered two questions asked in their native language
    a) “What did the [actor] do in this clip?”
      – if appropriate, i.e., with the exception of “spontaneous breaking”
        clips
    b) “What happened to the [theme] in this clip?”
  – further elicitation
    • if still necessary, the applicability of three types of
      descriptions was subsequently tested:
      – active transitive, intransitive activity, and intransitive state
        change descriptions

Design of our study (Cont.)

Table 1: Language sample of the present study

<table>
<thead>
<tr>
<th>language</th>
<th>genealogical group</th>
<th>where recorded</th>
<th>researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>Germanic</td>
<td>The Netherlands</td>
<td>van Staden</td>
</tr>
<tr>
<td>Lao</td>
<td>Tai–Kadai</td>
<td>Laos</td>
<td>Eitfield</td>
</tr>
<tr>
<td>Sranan</td>
<td>English-based Creole</td>
<td>Surinam</td>
<td>Essegbey</td>
</tr>
<tr>
<td>Yucatec</td>
<td>Mayan</td>
<td>Mexico</td>
<td>Bohnemeyer</td>
</tr>
</tbody>
</table>

  – five speakers per language were recorded
  – the analysis presented in the following is based
    on responses to 43 of the 61 scenes
  – all minus the “magic causation” and opening scenes
  – only responses to questions (a) are considered
    a) “What did the [actor] do in this clip?”
      • plus, where necessary, subsequent elicitation of a
        caused state change description

Design of our study (Cont.)

• English examples (five speakers)
  – 1 response type: cut (5)

  • 3 response types: cut (3); cut through (1); cut in two (1)

  • 5 response types: cut in two/half, break, hit, slash
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Complex predicates in our corpus

• German
  – prefix verbs (e.g., Ackerman & Lesourd 1997, Ackerman & Webelhuth 1998)
  (5.1) Er zer-hämmert Omas Kleid
  GER he apart-hammers granny’s dress
  ‘He hammers granny’s dress apart’
  – particle verbs (e.g., Müller 2002)
  (5.2) Sie durch=trennt ein Stück Stoff
  GER she through=separates a piece of cloth
  ‘She severs the piece of cloth’

• Lao; Sranan
  – various types of serial verb constructions
    • e.g., Durie 1997; Enfield in press; Schiller 1989; Sebba 1987
  (5.5) laaw2 qaw3 khòòn4_ tii3 faat4 phaa5 khaat5
  LAO 3SG take hammer thwack cloth sever
  ‘He takes a hammer thwacks the cloth apart’
  (5.6) A boi naki a krosi prati
  SRA DEF boy hit DEF cloth split
  ‘The boy hit the cloth split’

• Yucatec
  – compound verbs (e.g., Bohnemeyer 2003; Li 1993; Thompson 1973)
  (5.7) T-u=t’ok+hats’-t-ah le=nòok’
  YUC PRV-A3=rip+hit-APP-CMP(B3SG) DET=cloth
  y=étel martiyo=o’
  A3=with hammer=D2
  ‘He rip-hit the cloth with a hammer’

• so how are these predicate types used in response to (a-)typical C&B scenes?

Overview
Results and analysis

• overall token frequencies of simplex-vs. complex-predicate responses

Table 2: Token frequencies of simplex vs. complex-predicate responses

<table>
<thead>
<tr>
<th>Language</th>
<th>Simplex</th>
<th>Complex</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>24 (11.1%)</td>
<td>190 (88.8%)</td>
<td>214</td>
</tr>
<tr>
<td>Lao</td>
<td>139 (63.3%)</td>
<td>78 (36.7%)</td>
<td>215</td>
</tr>
<tr>
<td>Yukatec</td>
<td>166 (77.2%)</td>
<td>50 (22.8%)</td>
<td>215</td>
</tr>
<tr>
<td>Sranan</td>
<td>192 (90.1%)</td>
<td>21 (9.9%)</td>
<td>213</td>
</tr>
</tbody>
</table>

Figure 1: Percentage of simplex responses for German, Lao, Yukatec and Sranan (bars represent standard error)

• highly significant effect of language ($F (3, 126) = 127.55, p < .0001$); all languages significantly different from each other ($t (42) > 2.85, p < .007$)

Results and analysis (Cont.)

• overall type frequencies of simplex-vs. complex-predicate responses

Table 3: Type frequencies of simplex vs. complex predicates

<table>
<thead>
<tr>
<th>Language</th>
<th>Simplex</th>
<th>Complex</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>15 (20%)</td>
<td>60 (80%)</td>
<td>75</td>
</tr>
<tr>
<td>Lao</td>
<td>18 (31.6%)</td>
<td>39 (68.4%)</td>
<td>57</td>
</tr>
<tr>
<td>Yukatec</td>
<td>20 (57%)</td>
<td>34 (43%)</td>
<td>54</td>
</tr>
<tr>
<td>Sranan</td>
<td>12 (54.5%)</td>
<td>10 (45.5%)</td>
<td>22</td>
</tr>
</tbody>
</table>

Figure 2: Percentage of simplex types for German, Lao, Yukatec and Sranan (bars represent standard error)

• significant effect of language ($F (3, 126) = 83.63$, $p < .0001$); pairwise comparisons are significant ($t (42) > 5.12, p < .0001$) except for Lao-Yukatec

Results and analysis (Cont.)

• generalizations

– the more complex C&B predicate types a language has
  • the more frequently its speakers use complex as opposed to simplex verbs in the C&B domain
  • i.o.w., for any two languages A and B, if A has more (or a higher proportion) of complex C&B verb types than B
    – than speakers of A also produce more (or a higher proportion) of complex C&B verb tokens than speakers of B
  – all languages except for Sranan have more complex than simplex types of C&B verbs
  – but all speakers except for the Germans use simplex C&B verbs more frequently

Results and analysis (Cont.)

• a baseline for inter-speaker variation

  – the number of “unique responses”
    • i.e., the sum over the number of response types for each scene within each population
  – the more unique responses, the higher the overall level of variation within one population

Table 4: Number of unique responses and type/token frequency of complex predicates

<table>
<thead>
<tr>
<th>Language</th>
<th>N unique responses</th>
<th>Percentage of complex types</th>
<th>Percentage of complex tokens</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>161</td>
<td>80%</td>
<td>88.8%</td>
</tr>
<tr>
<td>Lao</td>
<td>136</td>
<td>68.4%</td>
<td>36.7%</td>
</tr>
<tr>
<td>Yukatec</td>
<td>119</td>
<td>63%</td>
<td>22.8%</td>
</tr>
<tr>
<td>Sranan</td>
<td>90</td>
<td>45.5%</td>
<td>9.3%</td>
</tr>
</tbody>
</table>

– the extremely high frequency of complex-predicate responses in German stands out

– many caused-state-change scenes cannot be idiomatically described with simplex verbs

(6.1) a. Floyd kratzte Sally
Floyd scratched Sally
‘Floyd scratched Sally.’

b. ?Floyd kratzte das Glas
Floyd apart-scratched the glass
‘Floyd scratched the glass.’

c. Floyd zer-kratzte das Glas
Floyd apart-scratched the glass
‘Floyd scratched the glass.’

Results and analysis (Cont.)

– the overall level of variation across speakers

• increases with both the number of complex predicate types in the language
  – and with the frequency with which they are used
• conversely, the more complex predicate types, the more variation
  – and the more frequently complex predicates are used, the more variation

– however, it is difficult to test the significance of these correlations
Results and analysis (Cont.)

- language-specific variation maxima/minima
  - language-specific variation maxima
    - scenes that elicited five different predicate types in a given language
  - language-specific variation minima
    - scenes that elicited only a single predicate type in a given language

<table>
<thead>
<tr>
<th>Language</th>
<th>N unique responses</th>
<th>N variation-maximal scenes</th>
<th>N variation-minimal scenes</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>161</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Lao</td>
<td>136</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Yucatec</td>
<td>119</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Sranan</td>
<td>90</td>
<td>1</td>
<td>16</td>
</tr>
</tbody>
</table>

- the higher the overall level of variation, the higher the number of variation-maximal scenes

Results and analysis (Cont.)

- similarly, cross-sample variation minima
  - scenes that elicited 7 or fewer response types across the four languages combined
    - there are six such scenes

- as expected, it seems intuitively that these scenes feature rather more stereotypical configurations

Results and analysis (Cont.)

- correlation b/w variability of responses and frequency of complex/simplex predicates
  - the higher the amount of inter-speaker variation a scene elicits in a given language
  - the more likely the speakers of that language are to prefer a complex over a simple predicate

<table>
<thead>
<tr>
<th>Variation</th>
<th>Complex predicate</th>
<th>Simplex predicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>0.121</td>
<td>-0.062</td>
</tr>
<tr>
<td>Lao</td>
<td>0.074***</td>
<td>-0.072***</td>
</tr>
<tr>
<td>Sranan</td>
<td>0.715***</td>
<td>-0.652***</td>
</tr>
<tr>
<td>Yukatek</td>
<td>0.561***</td>
<td>-0.365***</td>
</tr>
</tbody>
</table>

- the correlation is not significant for German
  - but highly significant for the other languages

Results and analysis (Cont.)

- cross-sample variation maxima/minima
  - no scene elicited absolutely variation-maximal or variation-minimal responses in all four languages
  - we determined cross-sample variation maxima
    - as scenes that elicited 17 response types or more across the four languages combined
      - there are four such scenes

- it does seem intuitively plausible that inter-speaker variation is driven by the low typicality
  - of the instrument-theme/change configurations

Table 6: Correlation of types across languages (* indicates significant at p < .05; ** indicates significant at p < .01)

<table>
<thead>
<tr>
<th></th>
<th>German</th>
<th>Lao</th>
<th>Sranan</th>
<th>Yukatek</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>0.357*</td>
<td>0.272</td>
<td>0.176</td>
<td></td>
</tr>
<tr>
<td>Lao</td>
<td>0.594**</td>
<td>0.543**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sranan</td>
<td></td>
<td></td>
<td>0.502**</td>
<td></td>
</tr>
<tr>
<td>Yukatek</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results and analysis (Cont.)

- cross-sample agreement in “codability”
  - there is a correlation across languages in which scenes elicit the most variable responses
  - however this correlation is not significant b/w German and Sranan and b/w German and Yucatek

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Discussion

- why do atypical instrument-theme/change configurations favor complex predicates?
  - **stereotype vs. manner implicatures** – in a contrast between complex and simplex predicates
    - simplex predicates pick up Q2 implicatures to stereotypicality of states of affairs
    - complex predicates pick up M1/3 implicatures to lack of typicality of states of affairs
      - e.g., consider the contrast between simplex and periphrastic causatives (McCawley 1978; Levinson 2000: 140-142)
    - (7.1) a. *Floyd stopped the car* [Q2+ > 'in some stereotypical manner, probably by hitting the brakes']
    - b. *Floyd caused the car to stop* [M1/3+ > 'in some less straightforward way, e.g., pulling the emergency brake']

Discussion (Cont.)

- why does the correlation not hold for German?
  - for independent (and as yet unknown) reasons, the use of complex predicates is near ceiling level
  - the use of simplex predicates is a marginal strategy in the C&B domain
    - so there is no clear division of labor b/w simplex verbs (Q2 implicatures) and complex ones (M implicatures)

Conclusions

- inter-speaker variation as a measure of prototypicality
  - the amount of variation among speakers of the same language in describing a particular scene
    - seems to reflect the distance of relevant properties of that scene from the prototypes of available descriptors
  - stereotype implicatures from “mono-polar” verbs of cutting and breaking
    - CUT-type verbs entail some kind of instrument use and may implicate a typical theme or change
    - BREAK-type verbs specify a kind of theme or change and may implicate a typical instrument

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- “bipolar” semantics
  - verbs may lexically encode both a kind of theme and/or state change and a form of instrument use
  - syntactically, such “bipolar” verbs are inert
    - they show neither the characteristic a-structure properties of BREAK-type verbs nor those of CUT verbs
  - complex predicates in the C&B domain
    - are “mono-polar” (and, most likely, BREAK-type) if both constituents specify the same subevent
    - and “bipolar” otherwise

Productivity

- complex predicates may instantiate productive templates/constructions
  - which may be adapted to atypical instrument-theme/change configurations on the fly
  - example: zer-hämmern

(7.2) *Er zer-hämmert Omas Kleid*

GER *he apart-hammers granny’s dress*

‘He hammers granny’s dress apart’

- Google produces a combined 1,263 hits for all morphological forms of this verb, which one is unlikely to find in a dictionary

Bipolar semantics

- semantically bipolar complex predicates are not as restricted by typicality
  - compared to monopolar predicates
    - which may trigger implicatures to either stereotypical instrument use or stereotypical theme/change
References (Cont.)


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