Experimental approaches to understanding non-culmination in infants, children, and adults

Sudha Arunachalam
Speech, Language, and Hearing Sciences & Linguistics
sarunach@bu.edu

TELIC 2017
Angela He, postdoc

Max Kaplan, MA student
Munro stood, and said something quickly in a language that was not Swahili. The pygmy replied. Munro gave him one of the cigarettes they had been using to burn off the leeches. The pygmy did not want it lit; instead he dropped it into a small leather pouch attached to his quiver. A brief conversation followed. The pygmy pointed off into the jungle several times.

“He says a white man is dead in their village,” Munro said. He picked up his pack, which contained the first-aid kit. “I’ll have to hurry.”

Ross said, “We can’t afford the time.”

Munro frowned at her.

“Well, the man’s dead anyway.”

“He’s not *completely* dead,” Munro said. “He’s not dead-for-ever.”

The pygmy nodded vigorously. Munro explained that pygmies graded illness in several stages. First a person was hot, then he was with fever, then ill, then dead, then completely dead—and finally dead-for-ever.
concepts
early language
concepts, language
Study 1

concepts  concepts, early language

concepts, language
concepts

concepts, early language

Study 2

concepts, language
Study 1

- concepts
- concepts, early language
- concepts, language
Study 1

- Children may “neglect” the endstates of events (e.g., Wittek, 2002).
- Do they fail to encode the relevance of endstate at all?
- The results of experimental and corpus studies are mixed.
- How do infants conceptualize event endstates?
Study 1

- (English-acquiring) infants ages 13-15 months
- Habituation paradigm: habituate to either a fully- or partially-complete event, test for dishabituation to the other
FULL – THEN – PARTIAL
Infants aged 13 to 15 months (N = 13)
Study 1 Conclusions

- For infants, order matters. If you expect a specific natural endstate, you are surprised if you don’t see it again.

Next steps:

- Event type must matter—events in which a theme is incrementally affected may show an even stronger effect.

- How does this pattern play out with other types of changes (e.g., covering one half of the spoon versus the other)?
Study 2
Study 2

- English-speaking adults with a wide variety of events
- Non-linguistic task!
- Similarity judgment paradigm
  
  (least similar) 1  2  3  4  5  6  7 (most similar)

- A completion-related change vs. a “perceptual” change
Papafragou & Selimis (2010)
ENDSTATE / COMPLETION CHANGE

OTHER CHANGE
ENDSTATE / COMPLETION CHANGE

OTHER CHANGE
FILLER TRIALS WITH ACTOR OR OBJECT CHANGE
(least similar) 1  2  3  4  5  6  7 (most similar)

Adults, N = 32
(least similar) 1  2  3  4  5  6  7 (most similar)

Similarity Rating

<table>
<thead>
<tr>
<th>Completion Change</th>
<th>Other Change</th>
<th>Completion Change</th>
<th>Other Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animate Agent</td>
<td></td>
<td>No Animate Agent</td>
<td></td>
</tr>
</tbody>
</table>
Study 2 Conclusions

- Adults see completion-related changes as more salient than other changes of a similar type or magnitude.

- Like infants, adults see completion as a critically important event component.
Study 3
Arunachalam & Kothari (2011)

Experimental exploration of the basic phenomenon

- With a wide variety of event types
- In both English- and Hindi-speaking adults
SV:
maayaa-ne biskuT-ko khaa-yaa par use puuraa nahiin khaa-yaa
Maya-erg cookie-acc eat-perf but it-acc full not eat-perf
Maya ate the cookie but not completely.

SVs compatible with arbitrary endpoints and partial realization
(but the default interpretation is completive)

CV:
maayaa-ne biskuT-ko khaa li-yaa #par use puuraa nahiin khaa-yaa
Maya-erg cookie-acc eat take-perf but it-acc full not eat-perf
Maya ate the cookie but not completely.

CVs compatible only with natural endpoints and full event realization
Study 3

- Elicited Hindi and English speakers’ judgments of perfectives with partially-completed and fully-completed events (TVJT: truth value judgment task)

- 2 x 2 design (both within-subject):
  - partial completion vs. full completion
  - SV vs. CV (Hindi); eat vs. eat up (English)
Eat the cookie
Eat the cookie

Partial

Full
Events

- Draw (a flower)
- Eat (a cookie)
- Fill (a glass)
- Extinguish (a candle)
- Close (a door)
- Cover (a pot)
- Pluck (a banana)
- Wake (a sleeping person)
Hindi:

SV:  us-ne  biskuT-ko  khaa-yaa
     she-ERG  cookie-ACC  eat-PERF

CV:  us-ne  biskuT-ko  khaa  li-yaa
     she-ERG  cookie-ACC  eat  take-PERF
Hindi Predictions

- fully-completed events: 100% acceptance for SVs and CVs
- partially-completed events: differ by syntactic condition
Hindi Results

- fully-completed events: 100% acceptance for SVs and CVs

- partially-completed events: differ by syntactic condition
  SV: 53%, CV: 29%

- no effect of incremental theme
Hindi:
SV:  us-ne  biskuT-ko  khaa-yaa
    she-ERG  cookie-ACC  eat-PERF
CV:  us-ne  biskuT-ko  khaa li-yaa
    she-ERG  cookie-ACC  eat  take-PERF

English:
ate:  She ate the cookie.
English Predictions

- If the English simple past permits only natural endpoint readings, then speakers should perform as in the CV condition in Hindi (100% for full completion, 29% for partial completion).
English Results

- If the English simple past permits only natural endpoint readings, then speakers should perform as in the CV condition in Hindi (100% for full completion, 29% for partial completion).

54% acceptance
Hindi:

**SV:** us-ne biskuT-ko khaa-yaa
she-ERG cookie-ACC eat-PERF

**CV:** us-ne biskuT-ko khaa li-yaa
she-ERG cookie-ACC eat take-PERF

English:

**ate:** She ate the cookie.

**ate up:** She ate up the cookie.
English Predictions

- If the English simple past permits only natural endpoint readings, then there should be no difference between conditions.

OR

- If the availability of the particle construction draws speakers’ attention to the difference between the constructions, then the bare construction should be accepted more often than the particle construction.
English Results

- If the English simple past permits only natural endpoint readings, then there should be no difference between conditions.

- OR

- If the availability of the particle construction draws speakers’ attention to the difference between the constructions, then the bare construction should be accepted more often than the particle construction.
Study 3 Conclusions

- Evidence that naïve Hindi speakers make judgments consistent with the literature in an experimental task.
- They showed the SV/CV distinction across event types (e.g., both incremental theme and non-incremental theme events).
- English speakers too often accept non-culmination interpretations and are sensitive to the differences between syntactic constructions that emphasize completion.
Study 4

- Even for English speaking adults, partial completion interpretations are acceptable.

- But in non-linguistic tasks, completion may be very important throughout the lifespan.

- Could acceptance of partial completion interpretations be “after-the-fact”? (Pragmatic? Coerced?)

- How do partial completion interpretations emerge over the course of processing a sentence?
The man will drink the beer
The man has drunk the wine
The man will drink the beer
The man *has drunk* the wine

Altmann & Kamide (2007)
This one is about a girl.

The girl has eaten the cookie.
OR
The girl was eating the cookie.
This one is about a girl.

FULL COMPLETION CONDITION

The girl has eaten the cookie.
OR
The girl was eating the cookie.
This one is about a girl.

The girl has eaten the cookie. OR
The girl was eating the cookie.
Study 4 “Has” Predictions

- If partial completion interpretations are immediately seen as good candidates, there should be no difference in the preference for the target across conditions.

- If the partial completion interpretations that arise in offline judgments only come about offline, the full completion condition should show a larger target preference than the partial completion condition.
“Has” condition

Time, msec

Target Advantage

Trial Type
- Full Completion
- Partial Completion
“Has” condition

Trial Type
- Red: Full Completion
- Blue: Partial Completion

Target Advantage vs. Time, msec
"Has" condition

Trial Type
- Red: Full Completion
- Blue: Partial Completion

… has eaten…
“Has” condition

Target Window

Target Advantage

Full Completion

Partial Completion
“Has” condition

Target Window

Target Advantage

Full Completion

Partial Completion
Study 4 “Was” Predictions

- Possibly a target preference in the Partial Completion condition, signifying that participants think the event is ongoing.

- Or maybe not (e.g., Madden & Zwaan, 2003)
“Was” condition

Trial Type
- Full Completion
- Partial Completion

Target Advantage vs. Time (msec)

Time, msec
0 2000 4000 6000

Target Advantage
-0.25 0.00 0.25 0.50 1.00

... was eating...
“Was” condition

Target Window

Target Advantage

Full Condition
Partial Condition
ADULTS

Target Window

Data collection in progress!

“Has” condition

CHILDREN, ages 4-5

Data collection in progress!
Study 4 Conclusions

- English-speaking adults may immediately, in real-time, assign a full culmination interpretation to, e.g., *has eaten*, only overriding this to permit a partial completion interpretation if it is the best one available.

- Preschoolers may be in an “endstate neglect” stage. Their representations for these predicates may permit both complete and partial culmination interpretations.

- Next step: Test in languages that more readily permit non-culmination interpretations – compare two forms (e.g., Hindi SV vs. CV)
General Discussion

- Infants ("pre-English" wrt this phenomenon) and English-speaking adults both perceive culmination as important when considering events non-linguistically.

- For adults, non-culmination interpretations may be computed in a later processing stage.

- Preschoolers may permit both culmination and non-culmination interpretations ("endstate neglect"), though they too may ultimately prefer the affected referent.
Thank you!

This research was supported by NIH K01 DC013306.

The content is solely the responsibility of the author and does not necessarily represent the official views of the National Institutes of Health.