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Comprehension and Propositional Content

Last time — meaning is different from tree+words (‘surface model’):

▶ Syntactic form of past sentences may be forgotten (Sachs).
▶ Words in prev. clause of current sentence may be forgotten (Jarvella).
▶ Subjects remember propositions, forget sentences (Bransford&Franks).

We need notion of **propositions**: asserted or assumed true/false claims.

Propositions hold over **discourse referent entities**: objects/eventualities

e.g. ‘the ants in the kitchen ate the sweet jelly which was on the table’

1. (Eating $e\ a\ j$) — $e, a, j$ referents of $V, N, N$ in $V-aN-bN$ *
2. (BeingIn $i\ a\ k$) — $i, a, k$ referents of $A, N, N$ in $A-aN-bN$ *
3. (BeingOn $o\ j\ t$) — $o, j, t$ referents of $A, N, N$ in $A-aN-bN$ *
4. (BeingSweet $s\ j$) — $s, j$ referents of $A, N$ in $A-aN$ *
5. (BeingAnts $ba\ a$) — $a$ referent of $N$
6. (BeingAKitchen $bk\ k$) — $k$ referent of $N$
7. (BeingJelly $bj\ j$) — $j$ referent of $N$
8. (BeingATable $bt\ t$) — $t$ referent of $N$

* Some studies just count multi-arg **relations**, but all are propositions.
But words can be abstracted away / paraphrased as well!

‘Kim paid $5 for the toy’ confusable with ‘Kim bought the toy for $5’

- (BeingKim bk k)
- (BeingDollars bd d)
- (BeingAToy bt t)
- (Having h1 k d)
- (Consequent h1 h2)
- (Having h2 k t)

These can be modeled with meaning postulates:

(PayingFor i a m o) ↔ (Having h1 a m), (Conseq h1 h2), (Having h2 a o)
(BuyingFor i a o m) ↔ (Having h1 a m), (Conseq h1 h2), (Having h2 a o)
Theta roles are shorthand for event-structure propositions:

e.g. \((\text{TravelingByFromTo } i \ j \ c \ b \ h)\)

- predicate: travel
  - instrument: car
    \((\text{Containing } bi \ i) \ (\text{BeingIn } bi \ j \ c) \ (\text{BeingACar } bc \ c)\)
  - agent/experiencer: John
    \((\text{BeingJohn } bj \ j)\)
  - source: bridge
    \((\text{BeingAt } ba1 \ j \ b) \ (\text{Consequent } ba1 \ i)\)
  - destination: house
    \((\text{BeginAt } ba2 \ j \ h) \ (\text{Consequent } i \ ba2)\)
John Bransford et al ’72: comprehension adds propositions

- **stimuli**: written sentence:
  - ‘Three turtles rested on/beside a log and a fish swam beneath them.’

followed by distractor task, followed by query: which did you read?

  - (a) ‘Three turtles rested on/beside a log and a fish swam beneath them.’
  - (b) ‘Three turtles rested on/beside a log and a fish swam beneath it.’

- **measure**: accuracy of query response
- **results**: subjects’ accuracy was lower in the ‘on’ case.

Subjects add propositions:

- (On o t l) (BeingTurtles bt t) (BeingALog bl l)
- (Above a1 t f) (BeingAFish bf f)
- (Above a2 l f) new!

Meaning postulates do more than translate: they make bridging inferences!

(On o t l) ∧ (Above a1 t f) → (Above a2 l f)
Susan Zimny ’87: paraphrases

- **stimuli:** written sentence:
  - ‘Nick decided to go to the movies. He looked at the newspaper to see what was playing.’

followed by distractor task, followed by query: which did you read?

(a) Old: ‘He looked at the newspaper.’
(b) Paraphrase: ‘Nick studied the newspaper.’
(c) Inference: ‘Nick wanted to see a film.’
(d) New: ‘Nick went swimming.’

- **measure:** accuracy of query response

- **results:** Old > Para > Inf > New, diverge with time.
Walter Kintsch et al '90: these can be modeled!
Predicts Zimny results w. Construction-Integration (sem. network) model:

- **surface structure**: trees and words
- **text-base**: propositions without bridging inferences
- **situation model**: propositions with bridging inferences
For next time... 

Read:

▶ Traxler ch 5, pp. 210–229