

Domain specificity

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Brian Dillon

Shota Momma

University of Massachusetts, Amherst
Department of Linguistics

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Two views of the mind

Empiricism

Only innate components of minds
are sensor-motor apparatus +
domain-general learning
mechanisms



Rationalism

Numerous domain-
specific mechanisms,
each of which is shaped
by evolution



Two views of the mind

Empiricism

Only innate components of minds are sensor-motor apparatus + domain-general learning mechanisms



Limited set of domain-specific mechanisms



Rationalism

Numerous domain-specific mechanisms, each of which is shaped by evolution



Core knowledge - object

5 month old

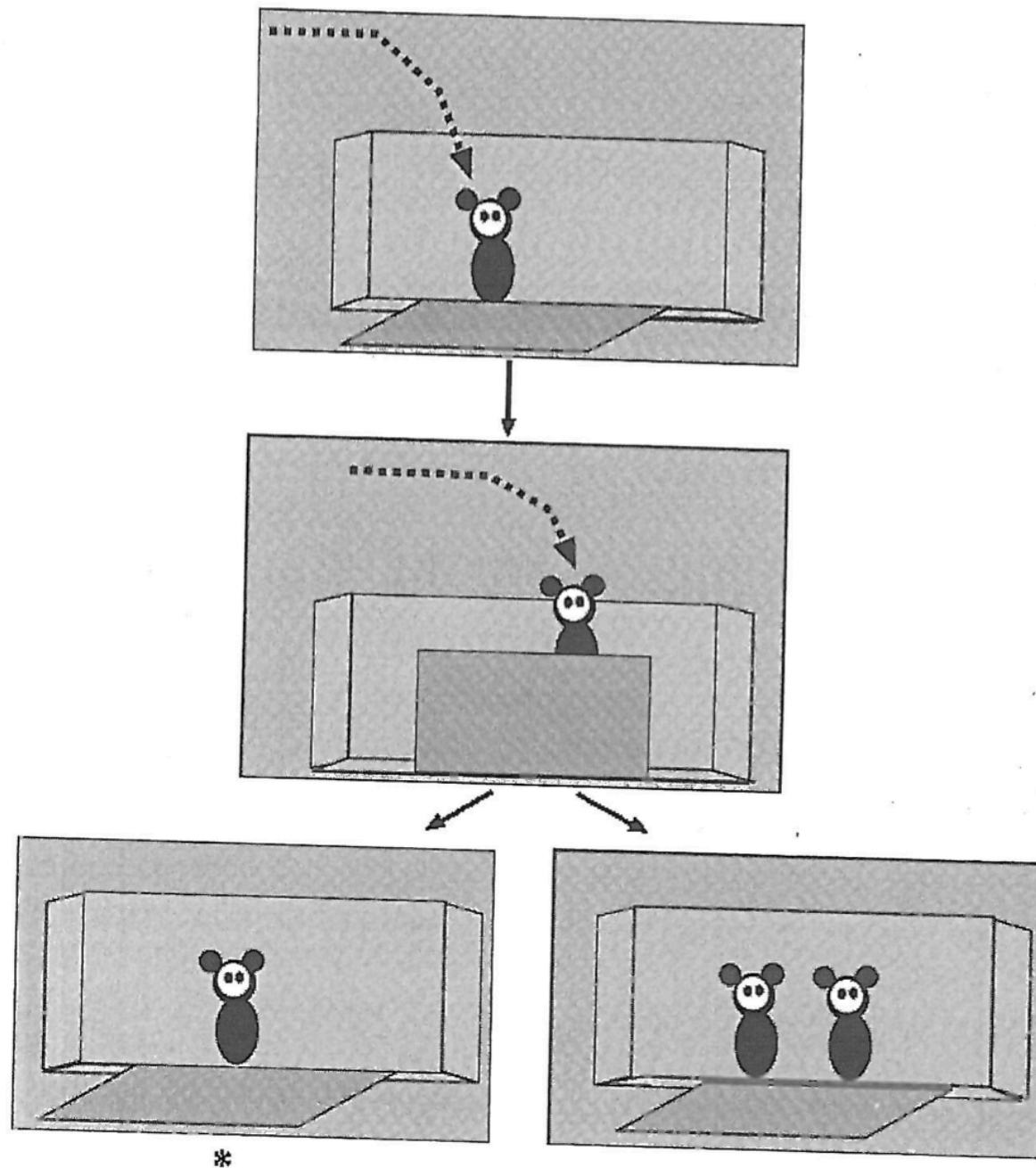


Figure 10.1
Schematic depiction of displays for a study of infants' representations of persisting, numerically distinct objects using a preferential looking method. (After Wynn 1992a.)



Core knowledge - object

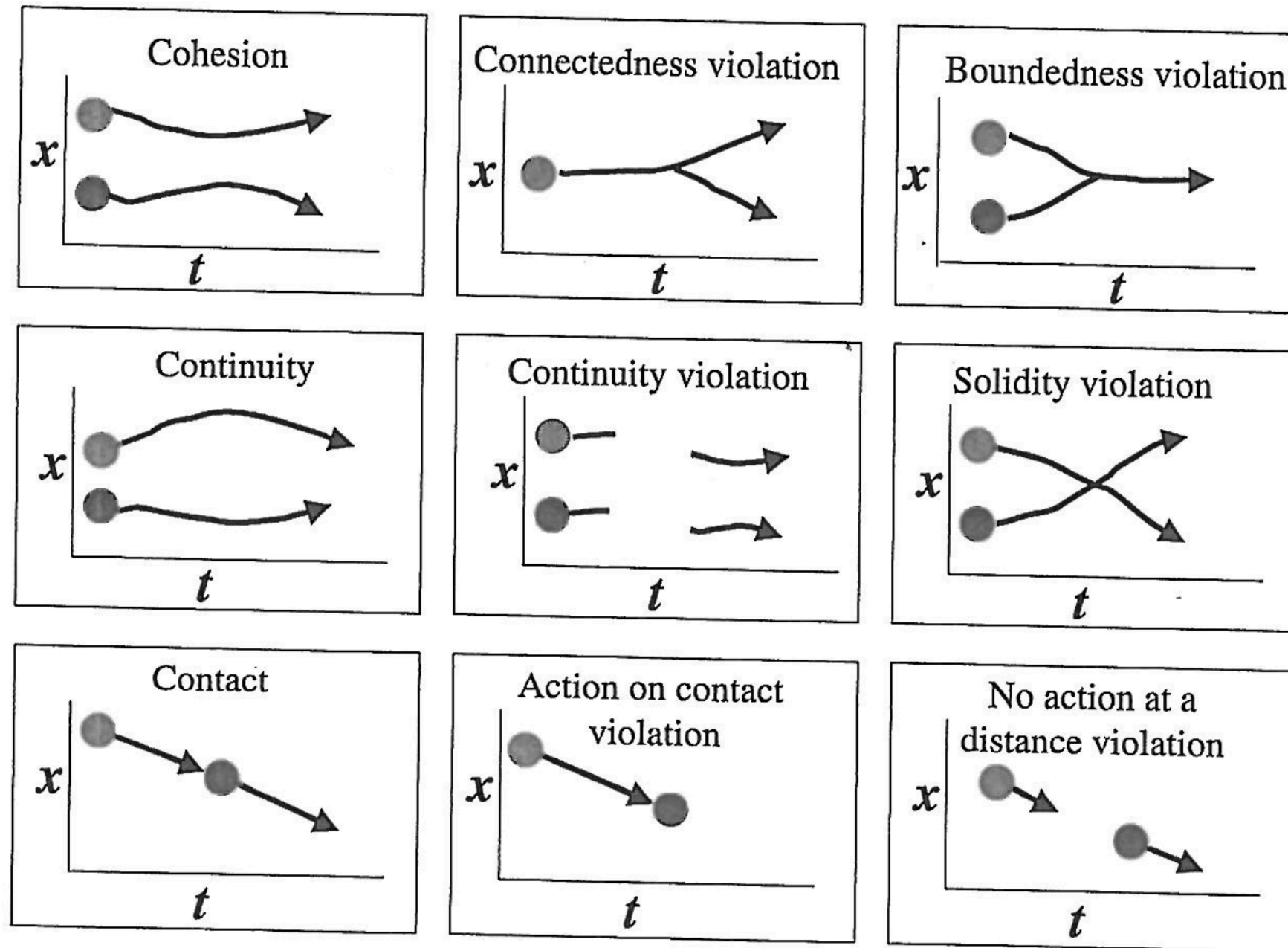


Figure 10.3
Principles of object representation in human infancy. (After Spelke 1990.)

Core knowledge - number

Approximate number sense
- follows Weber's law

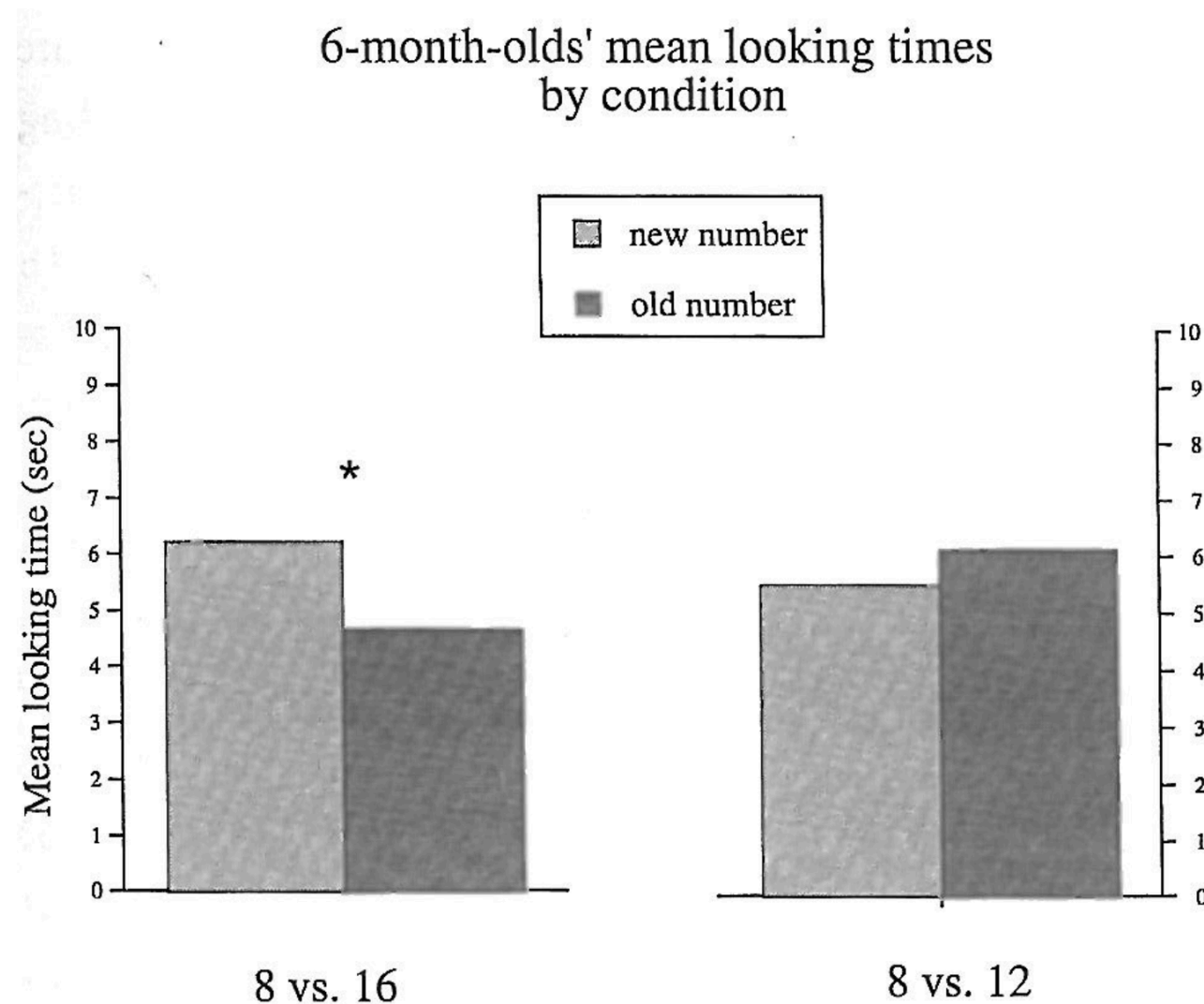
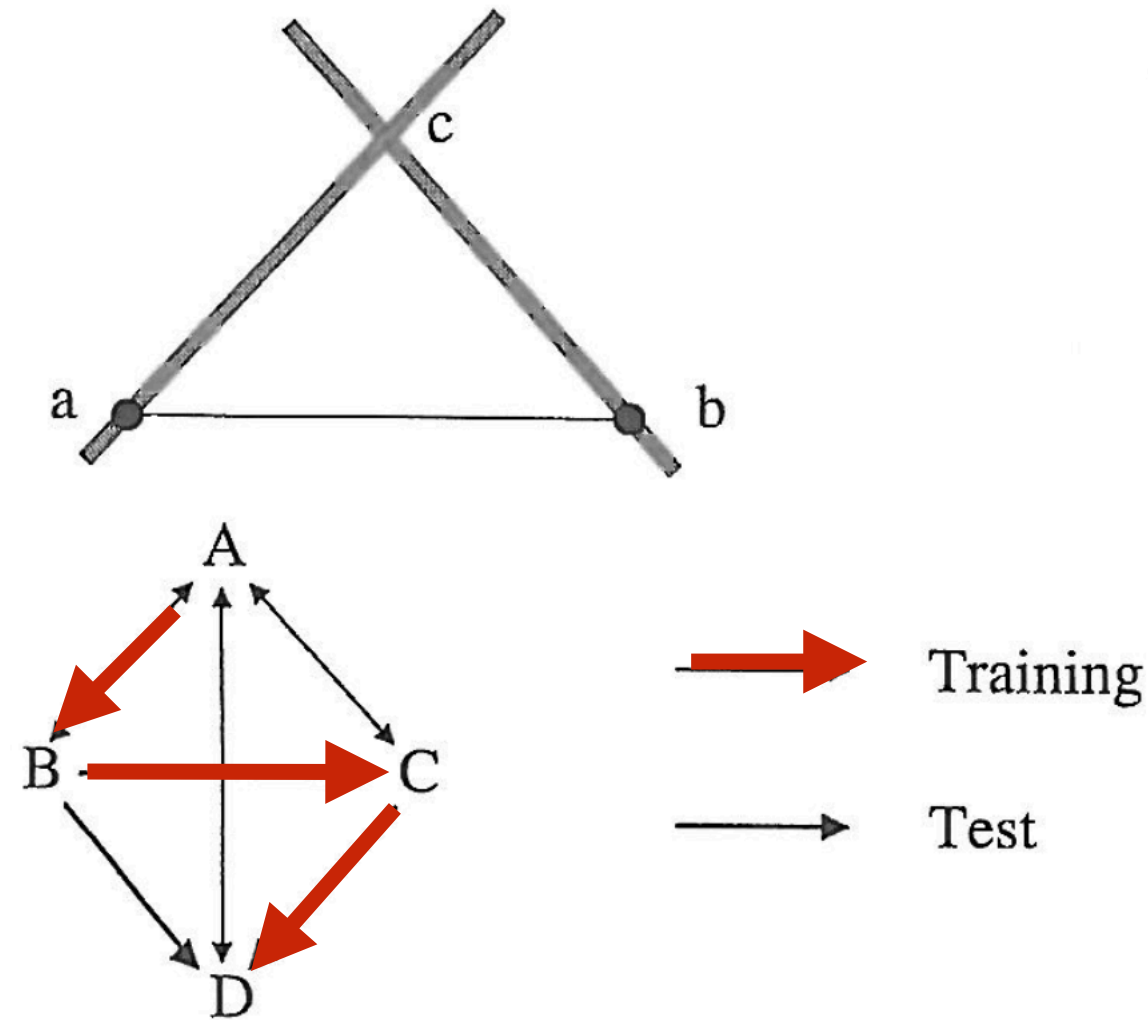


Figure 10.5

Looking times to displays presenting a novel number of dots, in experiments testing for discrimination of 8 from 16 or 12 dots. * indicates a significant difference. (After Xu and Spelke 2000b.)

Core knowledge - geometry



Descartes'
thought
experiment

Blind young
children can
navigate
themselves on
untrained path.

Figure 10.7

Top: schematic representation of the blind man's problem. (After Descartes 1647.) *Bottom:* schematic depiction of a task presented to blind and to blind-folded young children. (After Landau, Spelke, and Gleitman 1984.)

Core knowledge - agent

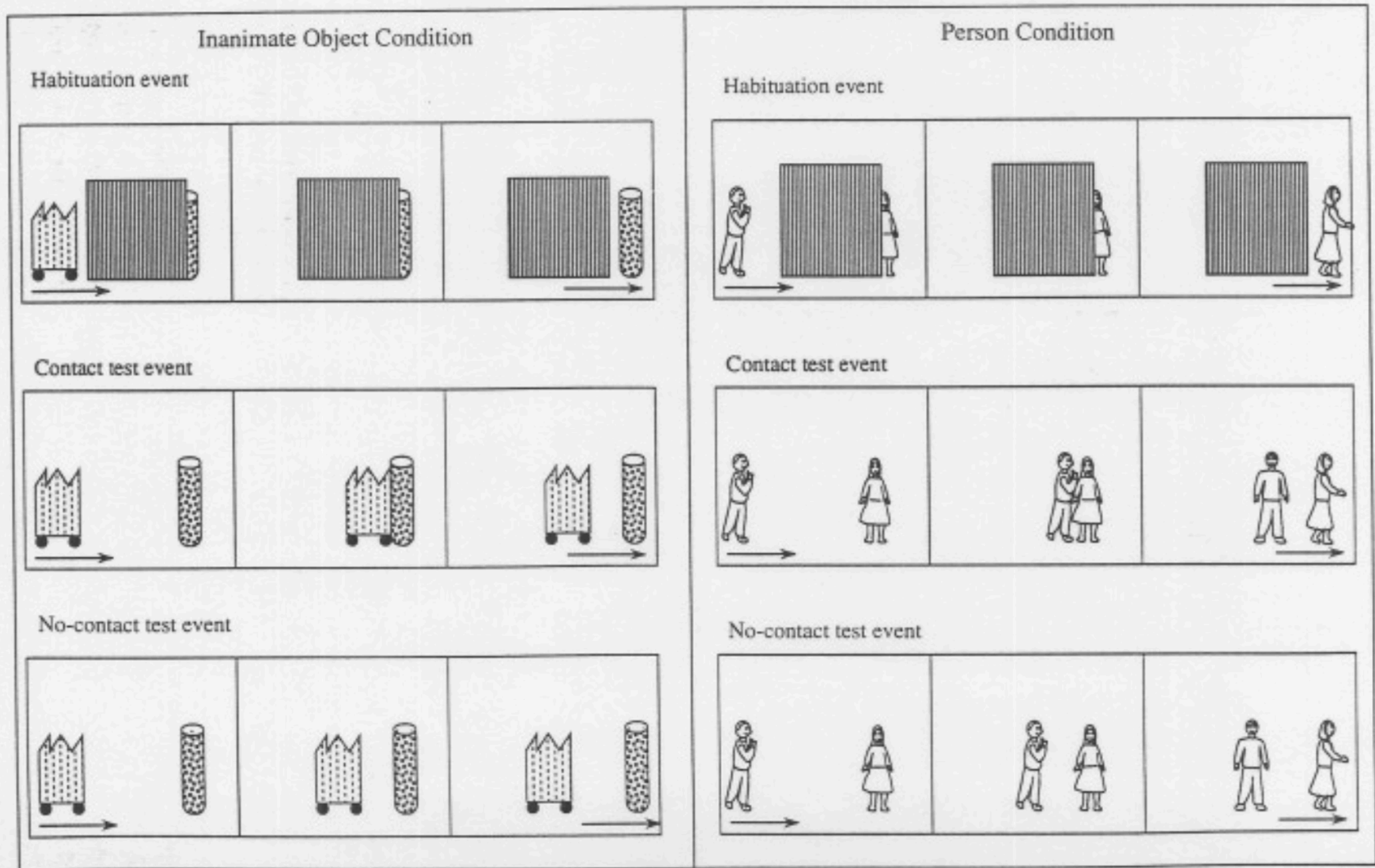


Fig. 3.7. Schematic depiction of the events for a study of infants' inferences about the contact relations between inanimate objects or people. (After Woodward *et al.* 1993.)

Core knowledge - agent

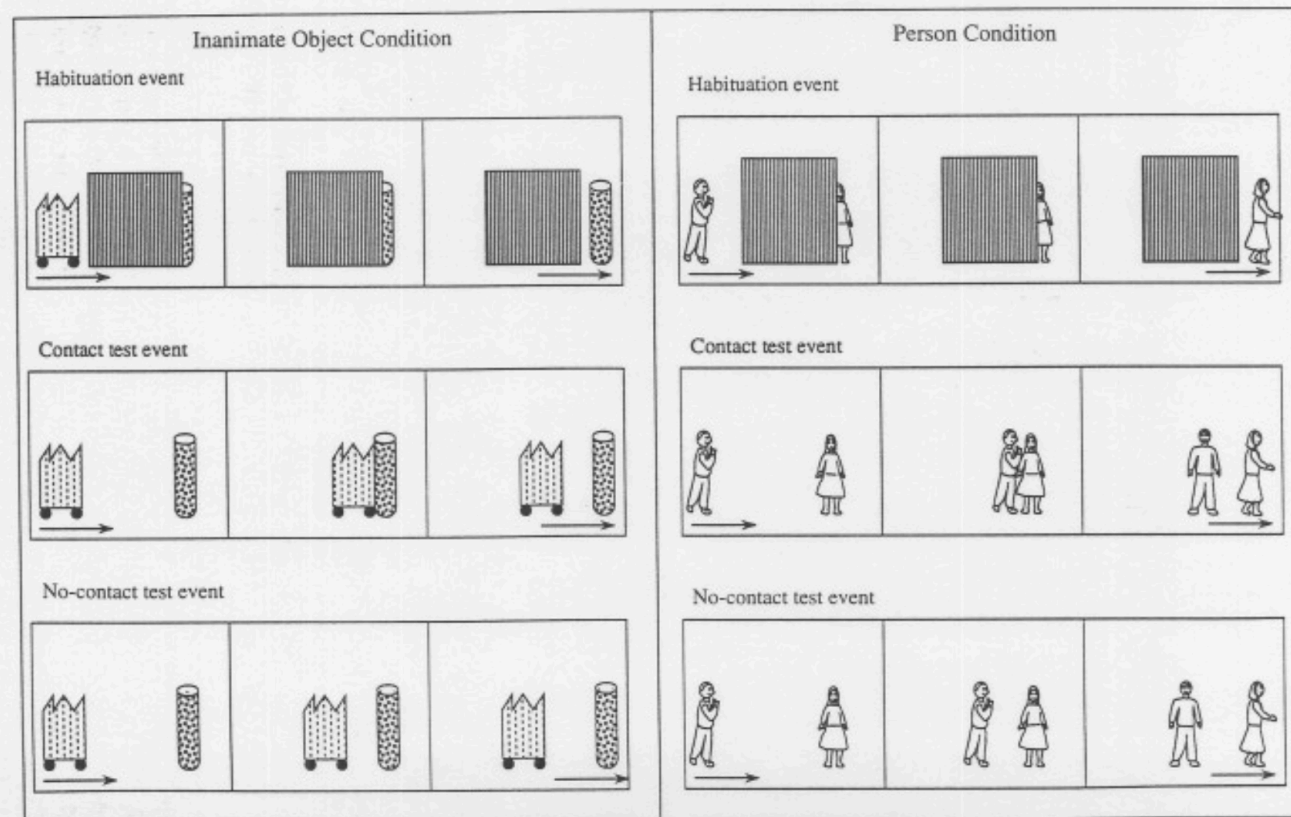


Fig. 3.7. Schematic depiction of the events for a study of infants' inferences about the contact relations between inanimate objects or people. (After Woodward *et al.* 1993.)

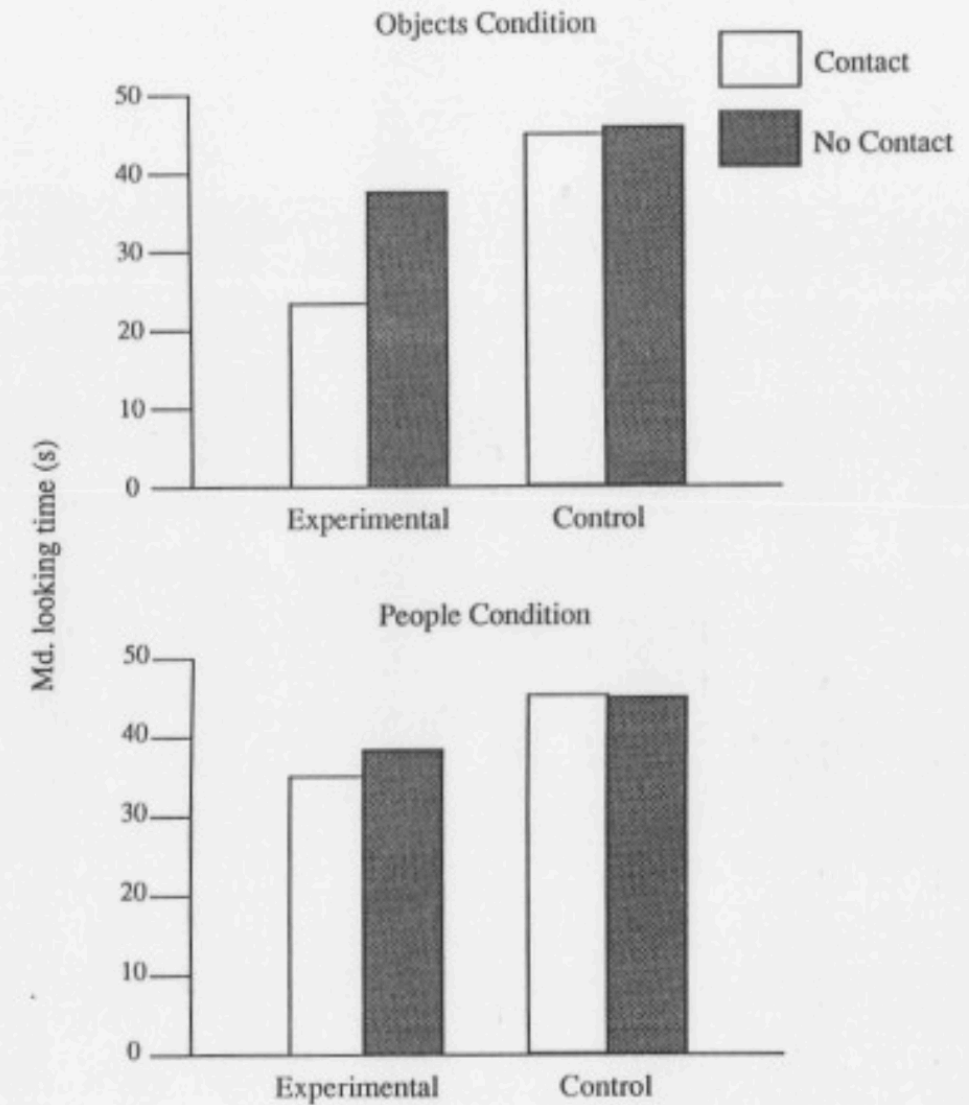


Fig. 3.8. Median looking times for events in which inanimate objects or people change their motion with or without contact. (After Woodward *et al.* 1993.)

A case study in psycholinguistics

- How much domain specific mechanisms are needed to explain linguistic phenomena?

Production, Distribution, Comprehension

- The Production, Distribution, Comprehension (PDC) framework (MacDonald, 2012)
- Production has some biases that shape the corpus
 - “Easy first” (the availability effect)
 - “Plan reuse” (the syntactic priming effect)
 - “Reduce interference” (the ‘distancing’ effect)
- The corpus frequencies then shape comprehenders’ expectations AND typological pattern.

Easy first

- Speakers tend to put easy things earlier in utterances & at a more prominent syntactic position
- Claimed to be a source of word order flexibility (active-passive, double-object vs. prepositional dative, scrambling, etc.)
- Known as the *availability effect* in the literature
- What is “easy/available”?
 - Frequency
 - Phonological length
 - Complexity
 - Conceptual salience (animacy?)
 - Givenness

Bock & Warren (1985)

“Subjects heard the entire 40-item question list first, followed immediately by the 40-item answer list. The question list was then read again, with subjects responding with a written answer to each question immediately after it was read.”

TABLE 1
A DATIVE QUESTION–ANSWER SET FROM EXPERIMENT 1 IN FOUR APPROPRIATENESS/IDENTITY CONDITIONS

Q ₁	A rancher received an inquiry from a cowboy about something he needed for his act. What did the rancher do? A ₁ The rancher sold the cowboy the horse. (Appropriate/Identical) A ₂ The rancher sold the horse to the cowboy. (Inappropriate/Identical)
Q ₂	A rancher received an inquiry from Roy Rogers about something he needed for his act. What did the rancher do? A ₁ The rancher sold the cowboy the horse. (Appropriate/Related) A ₂ The rancher sold the horse to the cowboy. (Inappropriate/Related)
Q ₃	A rancher had a horse who kept running away. What did the rancher do? A ₂ The rancher sold the horse to the cowboy. (Appropriate/Identical) A ₁ The rancher sold the cowboy the horse. (Inappropriate/Identical)
Q ₄	A rancher had a stallion who kept running away. What did the rancher do? A ₂ The rancher sold the horse to the cowboy. (Appropriate/Related) A ₁ The rancher sold the cowboy the horse. (Inappropriate/Related)

Appropriateness (2 levels :whether the answer obeys the given-new ordering) x
Identity (2 levels: whether the answer uses the same word or related word)

10 different kinds of alternations

- Adverb preposing, cleft, conjunct movement dative, equative, particle movement, active/passive

Bock & Warren (1985)

A rancher received an inquiry from a cowboy about something he needed for his act. What did the rancher do?

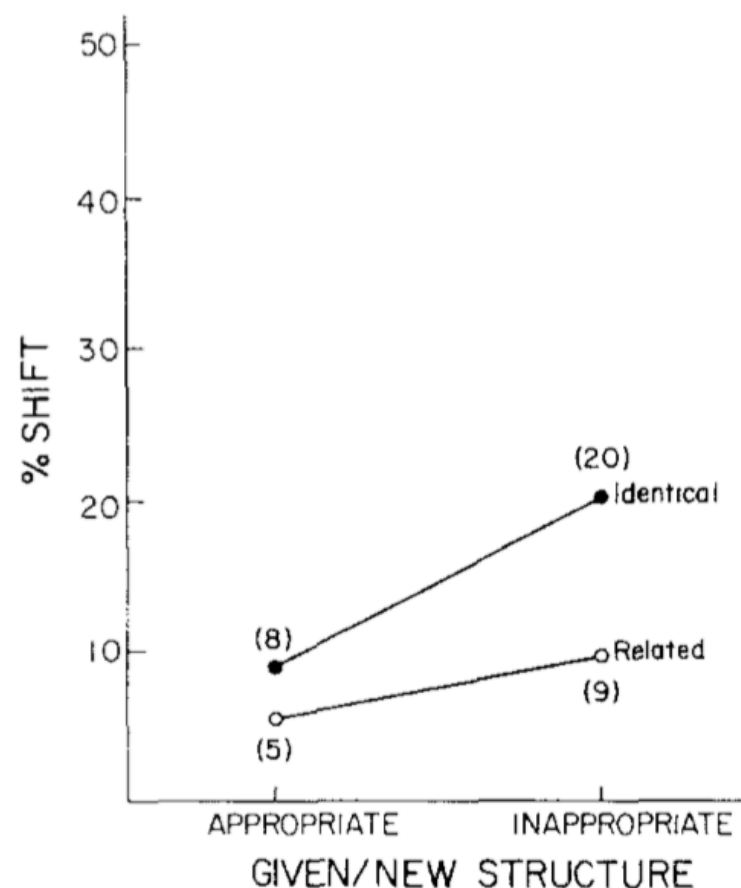
A₁ The rancher sold the cowboy the horse. (Appropriate/Identical)

A₂ The rancher sold the horse to the cowboy. (Inappropriate/Identical)

A rancher received an inquiry from Roy Rogers about something he needed for his act. What did the rancher do?

A₁ The rancher sold the cowboy the horse. (Appropriate/Related)

A₂ The rancher sold the horse to the cowboy. (Inappropriate/Related)



Sentences that violated the given-new ordering tend to be 'shifted' more often.

... especially when the word was identical between the question and the answer.

-> both discourse availability and lexical availability affect the word position.

Linear position or syntactic position?

McDonald, Bock & Kelly (1993)

- The same task as in Bock & Warren (1995)

Active/passive

Conjunction

Example Vignette Prompts and To-Be-Recalled Sentences from Experiment 1		
Prompts	To-be-recalled sentences	
	Transitives	
Appliances were rare in rural America until after World War II. What occasioned a lot of talk in Deadwood, South Dakota, one week in March, 1940?	<u>Animate short condition</u> (active)	<u>Animate short condition</u> (original order) The crew and the camera suffered minor injuries. <u>Inanimate long condition</u> (reversed order) The camera and the crew suffered minor injuries.
	A farmer purchased a refrigerator.	
	<u>Inanimate long condition</u> (passive)	
Queen Elizabeth allowed the royal jewels to go on tour, and a gang of thieves planned to steal one especially valuable piece. How were they foiled?	A refrigerator was purchased by a farmer.	<u>Animate long condition</u> (original order)
	<u>Animate long condition</u> (active)	The manager and the key were nowhere to be found.
	A policeman guarded the crown around the clock.	<u>Inanimate short condition</u> (reversed order)
After investigating the loud rumbling in the hallway, the elementary school teacher returned to find her entire class under their desks. Why?	<u>Inanimate short condition</u> (passive)	The key and the manager were nowhere to be found.
	The crown was guarded by a policeman around the clock.	<u>Animate short condition</u> (original order)
	<u>Inanimate short condition</u> (active)	He sat in front of a roaring fire with his cat and some whiskey.
The crying in the nursery stopped. Why?	The sound frightened the students.	<u>Inanimate long condition</u> (reversed order)
	<u>Animate long condition</u> (passive)	He sat in front of a roaring fire with some whiskey and his cat.
	The students were frightened by the sound.	<u>Inanimate short condition</u> (original order)
	<u>Inanimate long condition</u> (active)	The police cracked down on the bars and the customers.
	The music soothed the child.	<u>Animate long condition</u> (reversed order)
	<u>Animate short condition</u> (passive)	The police cracked down on the customers and the bars.
	The child was soothed by the music	

After an earthquake in China, NBC sent a team to cover the disaster. What happened when an unexpected aftershock occurred?	
Paul was moving into a new apartment. Why was he unable to get in?	
The old bachelor decided to spend a quiet evening at home. What happened?	
There had been many alcohol-related accidents in the Chicago area. What did law-enforcement officers do to try to decrease drunk driving?	

McDonald, Bock & Kelly (1993)

Active/passive

Conjunction

Appliances were rare in rural America until after World War II. What occasioned a lot of talk in Deadwood, South Dakota, one week in March, 1940?

Transitives

Animate short condition (active)

A farmer purchased a refrigerator.

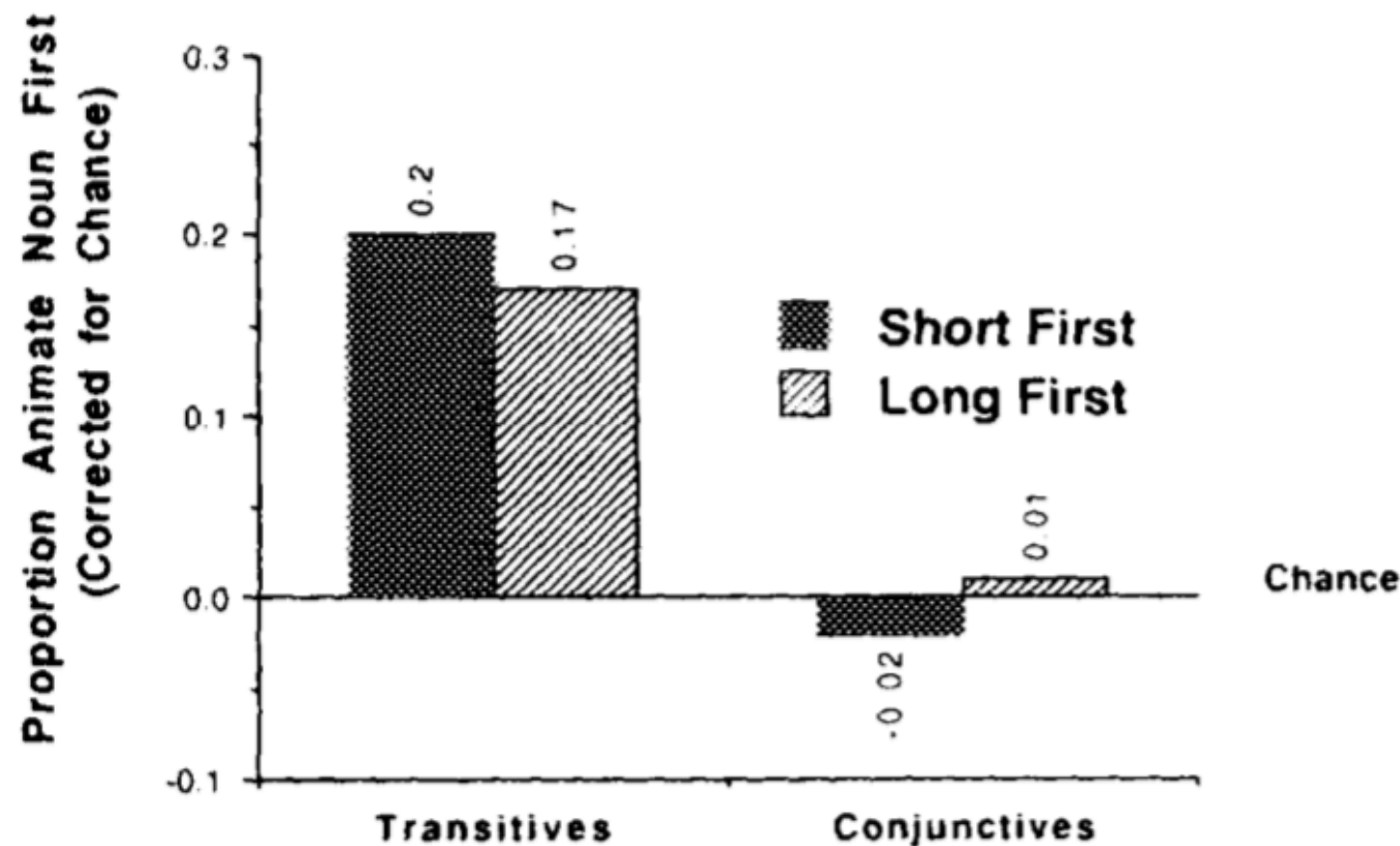
Inanimate long condition (passive)

A refrigerator was purchased by a farmer.

After an earthquake in China, NBC sent a team to cover the disaster. What happened when an unexpected aftershock occurred?

Animate short condition (original order)
The crew and the camera suffered minor injuries.

Inanimate long condition (reversed order)
The camera and the crew suffered minor injuries.



No effect of word length.

Effect of animacy **selectively** in the active/passive conditions, not in the conjunction condition.

Kubo et al. (2015, cuny)

- Picture description task in Kaqchikel, measuring the rate of VOS (vs. SVO) production

(1) a. Nujik ri wakx ri ti ala. (VOS 語順)

引く -Verb 牛 -Obj. 少年 -Sub.

少年が牛を引いている。

b. Ri ti ala nujik ri wakx. (SVO 語順)

少年 -Sub. 引く -Verb 牛 -Obj.

少年が引いている、牛を。



(a) ヒト-ヒト



(b) ヒト-動物



(c) ヒト-モノ



(d) フィラー

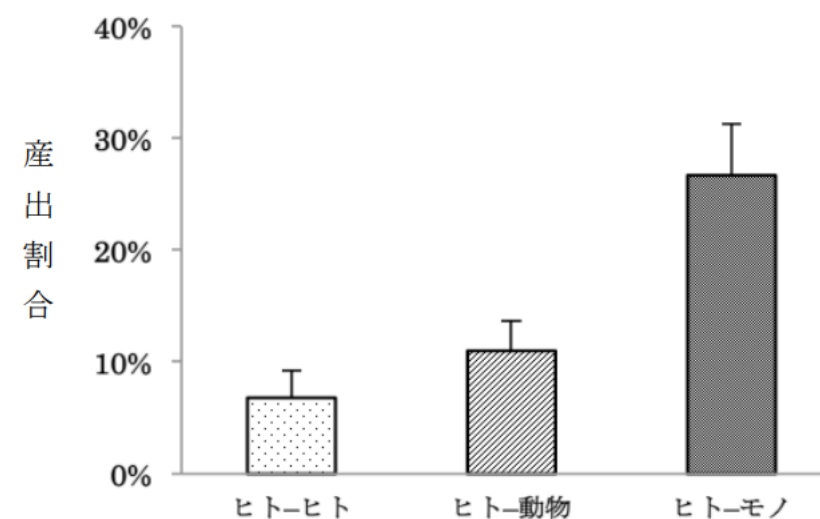


Figure 2. 条件別 VOS 語順の産出割合
(エラーバーは標準誤差を示す。)

- “Easy last”??

Easy first

- Speakers tend to put easy things earlier in utterances & at a more prominent syntactic position
- Claimed to be a source of word order flexibility (active-passive, double-object vs. prepositional dative, scrambling, etc.)
- Known as the *availability effect* in the literature
- What is “easy/available”?
 - Frequency
 - Phonological length ??
 - Complexity
 - Conceptual salience (animacy?)
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Plan reuse

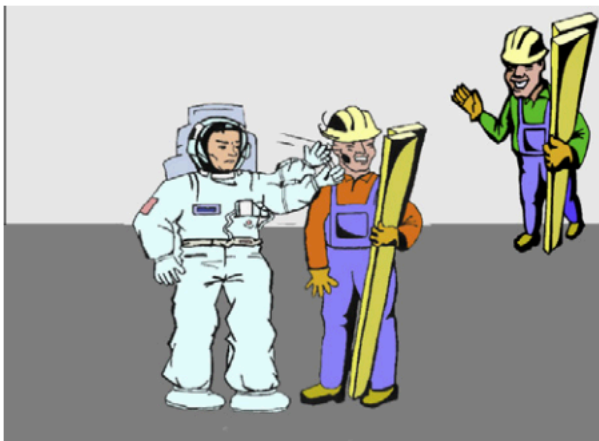
- The tendency of speakers to reuse the same syntactic structures e.g., the syntactic priming effect
- Claimed to be a source of word order rigidity
- Claimed to be observed in other domains
 - Reuse of serial order in recall tasks
 - Motor learning

Reduce interference

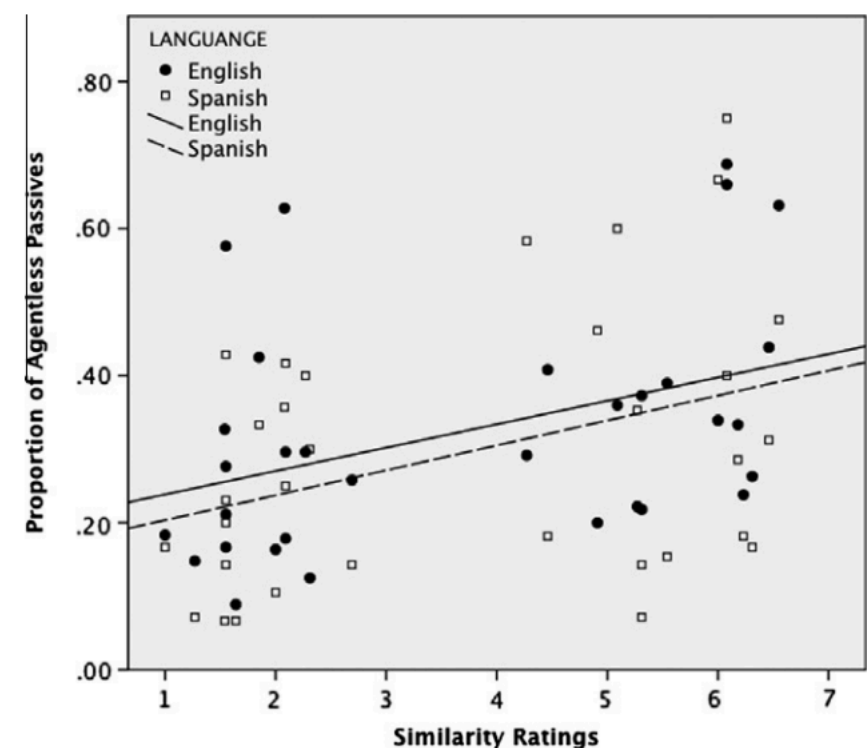
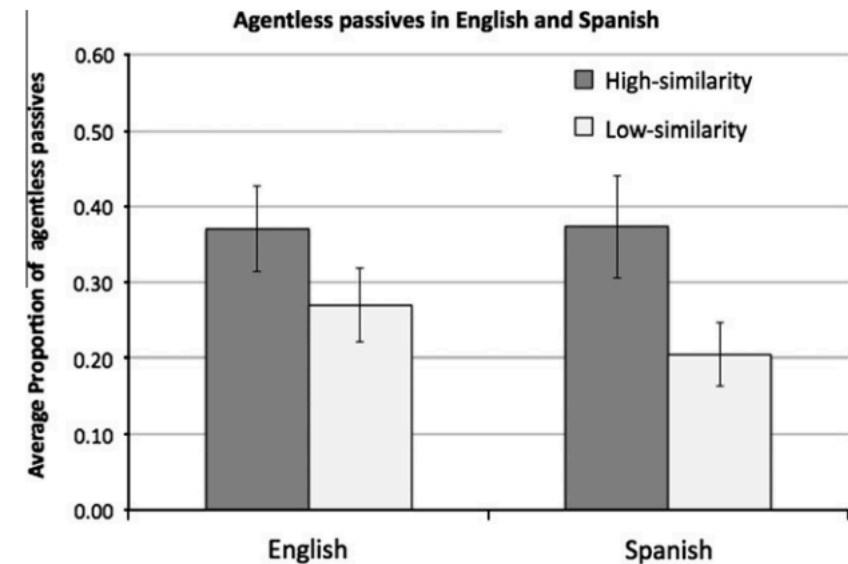
- Avoid planning things that are too similar to each other (phonologically & semantically)
- Gennari et al. (2012)

Who is wearing orange?

Low-similarity
(Astronaut & builder)



High-similarity
(Miner & builder)



PDC in action: passives

1a. Active: The ball hit the boy hard, but he was OK.

1b. Passive: The boy was hit hard by the ball, but he was OK.

Easy first: put 'boy' first

Plan reuse: use active voice

The choice between (1a) & (1b) is based on those two competing tendencies

Prediction: languages with stronger active voice bias (e.g., Slavic language) should show less “easy first” effect.

PDC in action: verb modification

- 2a. Verb Modification Ambiguity: John said that his cousins left ← Ambiguous yesterday.
- 2b. Local Modification: John will say that his cousins left yesterday. ← Easy
- 2c. Distant Modification: John will say that his cousins left ← Hard tomorrow.

Traditionally explained by things like Late Closure / Recency

The PDC account:

1. "Easy first" prefers "yesterday" to be put earlier than "that his cousins left" (short, less complex, etc)
2. This makes structures like (c) rarer, b/c there is a better alternative according to "Easy first."
3. Less common structures like (c) are harder to process, b/c comprehenders have less expectation about it.

PDC in action: relative clauses

- 4a. Object relative: The reporter [that the senator attacked] ← Hard
admitted the error.
- 4b. Subject relative: The reporter [that attacked the senator] ← Easy
admitted the error.

Traditionally explained by things like locality (linear or structural).

The PDC account:

1. Animate things want to be the subject (Easy first)
2. Similar things don't want to be close together (Reduce interference)
3. So speakers want to use the passive voice, against the bias to use the active voice (Plan reuse).
4. As a result, comprehenders are trained to expect SRCs **given the animate noun head.**

Discussion points

- Granularity: Do we keep track of separate statistic for two sub-types of a construction X? Isn't the theory too flexible if what counts as X isn't specified a priori?
- Isn't the PDC account presupposing structured representations (which is necessary for counting?) and its involvement in comprehension and learning?
- Any concrete cases where experience-based account and memory-based/representation-based models make diverging predictions (a good final project topic!)?