

Space and Language: Crossed Hands Effects on Language Processing

Catalina Iricinschi
Psychology Department
Cornell University

Space, crossed hands and language

- Crossed hands effects on spatial language
- Space and language
- Crossed hands and language

Space: Crossing left and right



Crossed hands & (spatial) cognition

- Robust effects of crossed hands on cognition (Shore et al. 2002, Emberson et al. 2005, Holmes et al. 2006)
- First findings: temporal order judgments in tactile stimuli (Drew 1896)
- Spatial compatibility effects: stimulus and response hand in the same hemispace
- Left vs. right in crossed-hands illusions

Space and language

- ‘Language is spatial’ : Concrete spatial verbs - *lift*, *push* - & abstract verbs as well - *argue*, *respect* (Richardson et al. 2001, Spivey et al. 2005).

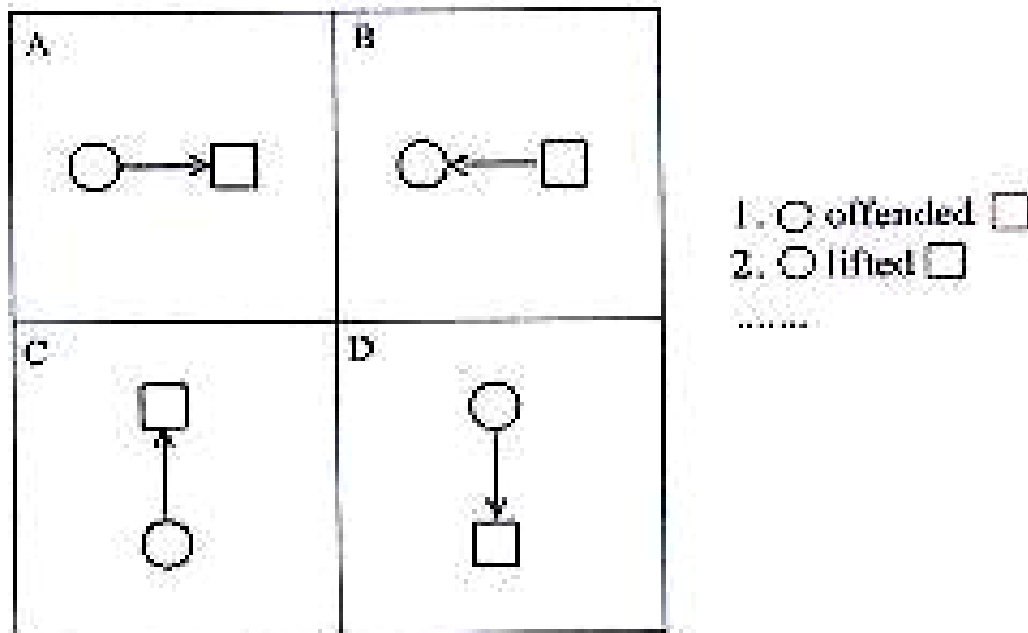


Figure 1: Example of the questionnaire in Experiment 1.

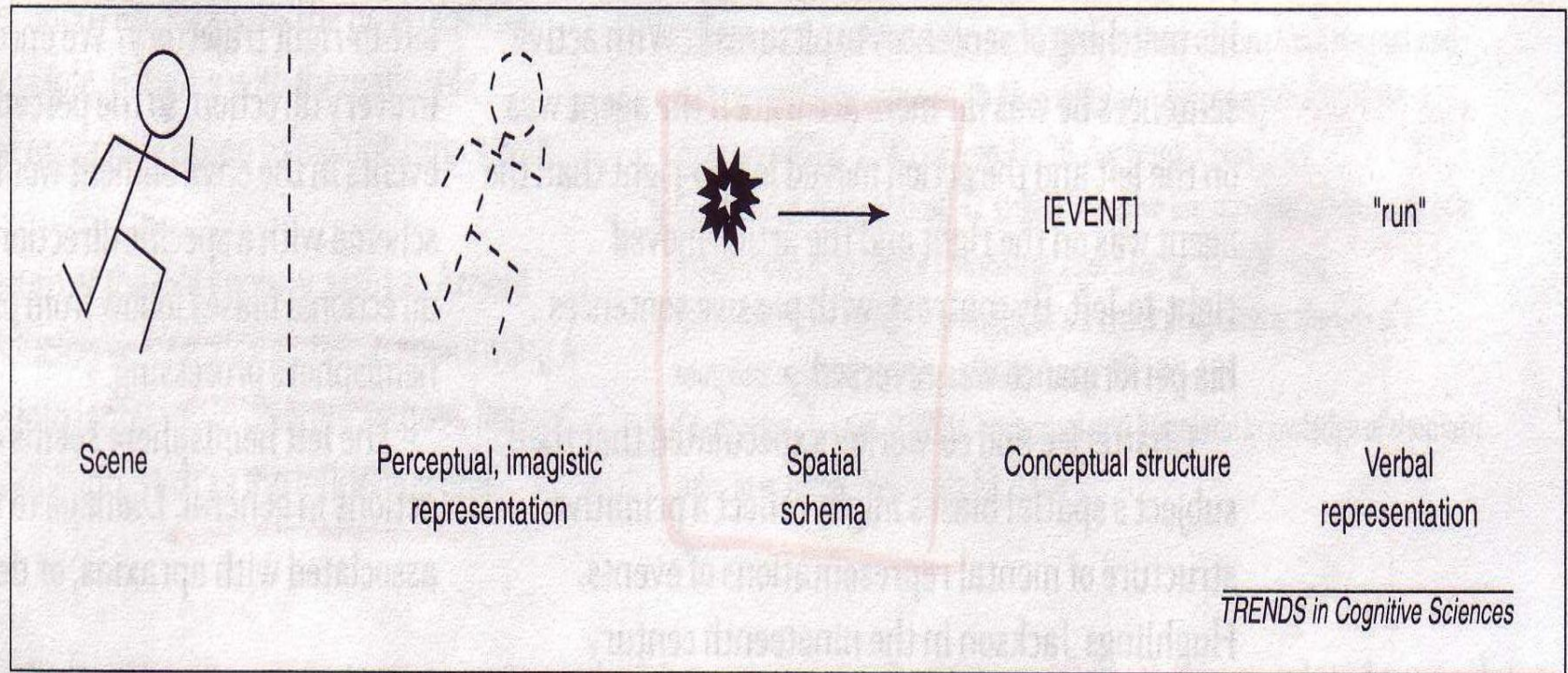
Spatial representation & structural linguistic aspects

- Structural aspects: word order
- Are words perceived as if arranged in space?
- Relationships between words may be conceptualized spatially (Chatterjee et al., 1995; Chatterjee, 2001).

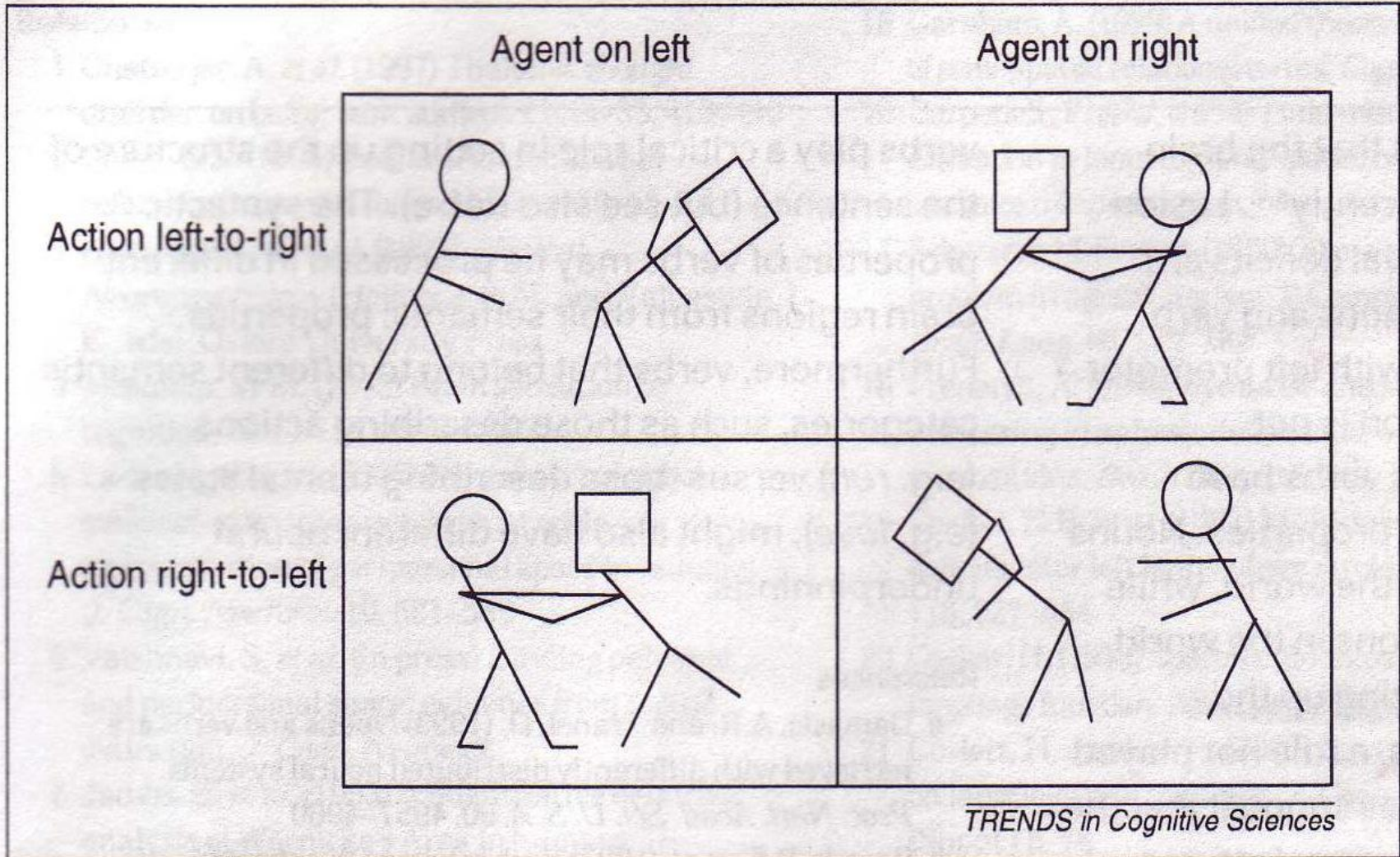
Left and right in language

- Chatterjee (1995) – agent is placed to the left of patient.
- Stimuli: Passive and active sentences.

Language and spatial schemas



Left-to-right biases



Crossing hands and language



- Proprioceptive information interfering with language processing?
- Crossed-hands technique in relation to language processing
- Research question: Is word order represented spatially?
- Crossed-hands technique

Experiment 1

- N=39.
- Stimuli: 40 active and passive voice sentences.
- Word-by-word centered display (to avoid spatial biases).
- Hand posture (crossed / uncrossed) x Voice (active / passive) → 2x2 design.

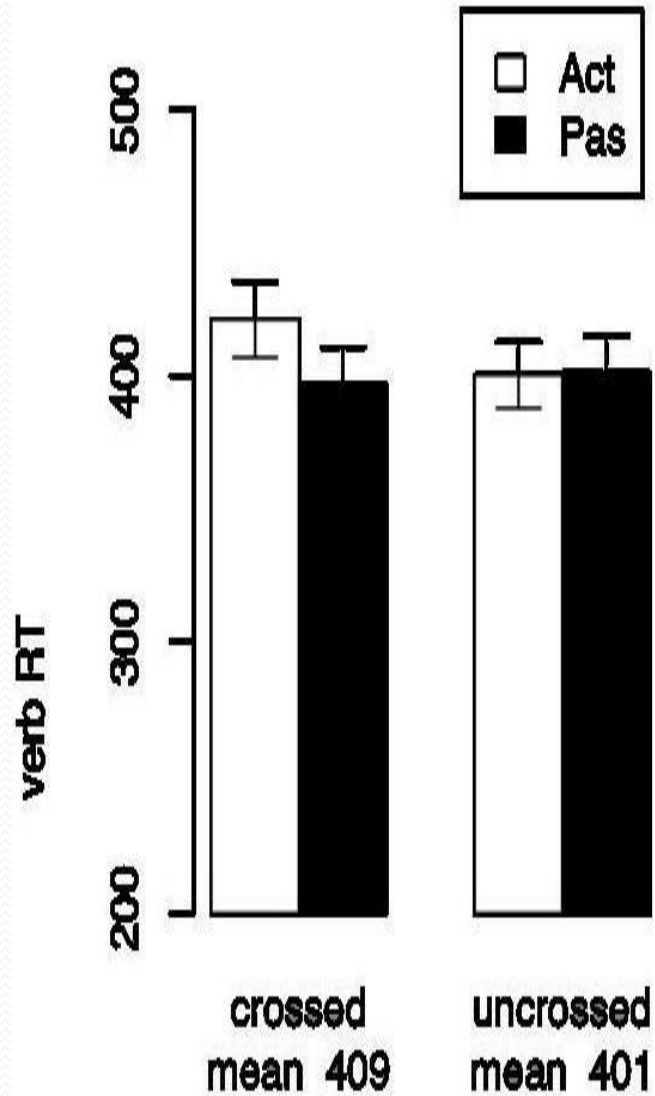
Experimental setting: crossed condition



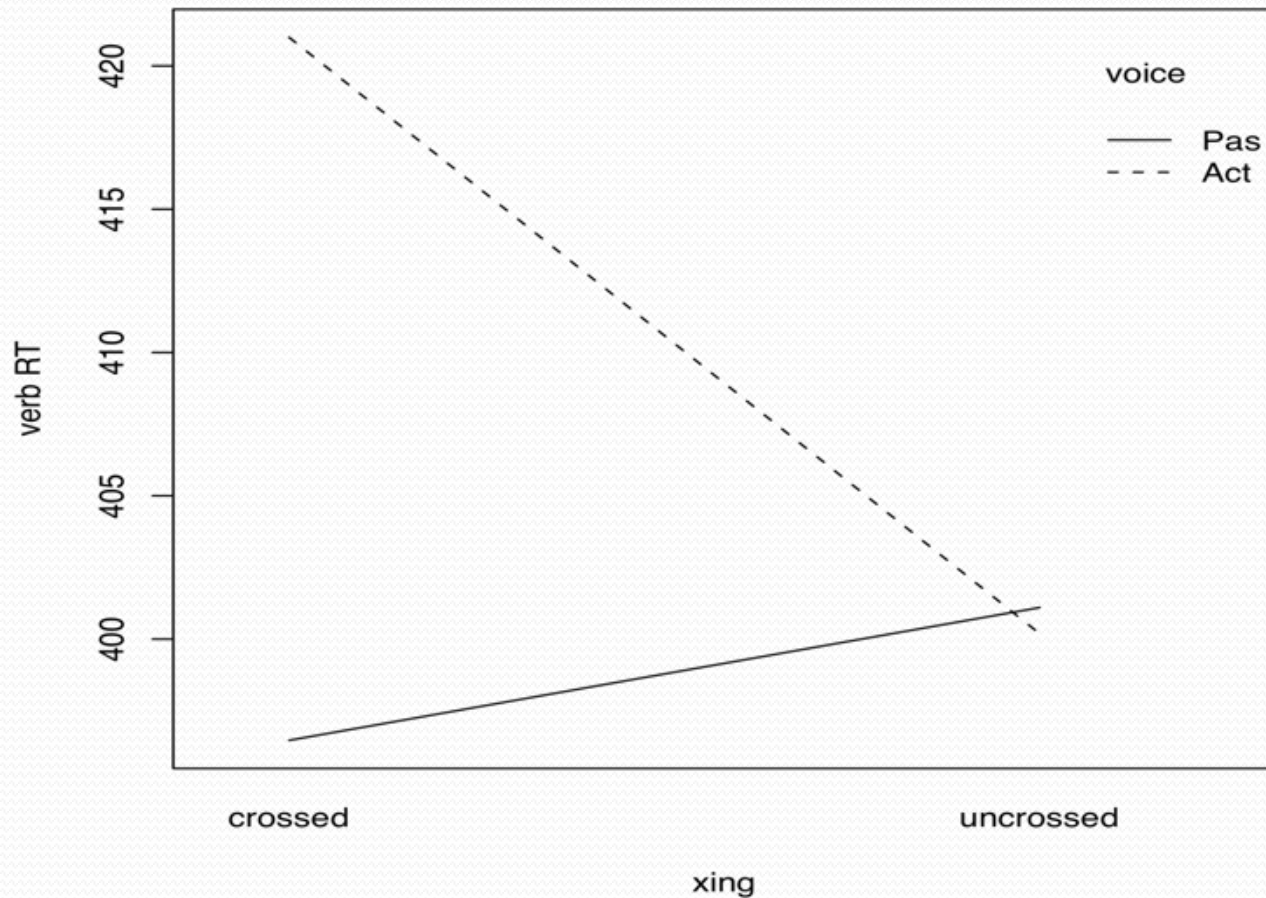
Uncrossed condition



voice by xing



Interaction: Hand posture by verb RT



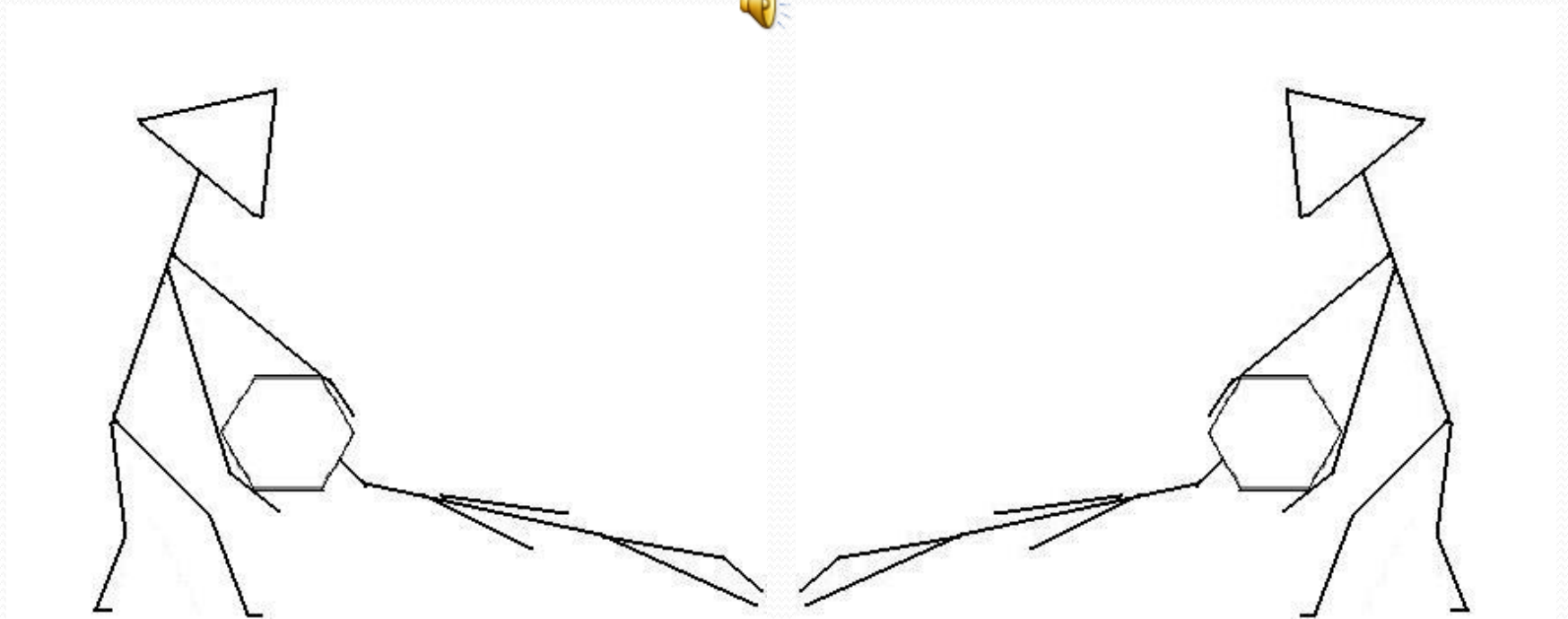
Experiment 2

- Semantic neutrality obtained by using Chatterjee's stick figure paradigm.
- Sentences presented auditorily.
- Sentence-picture matching task.

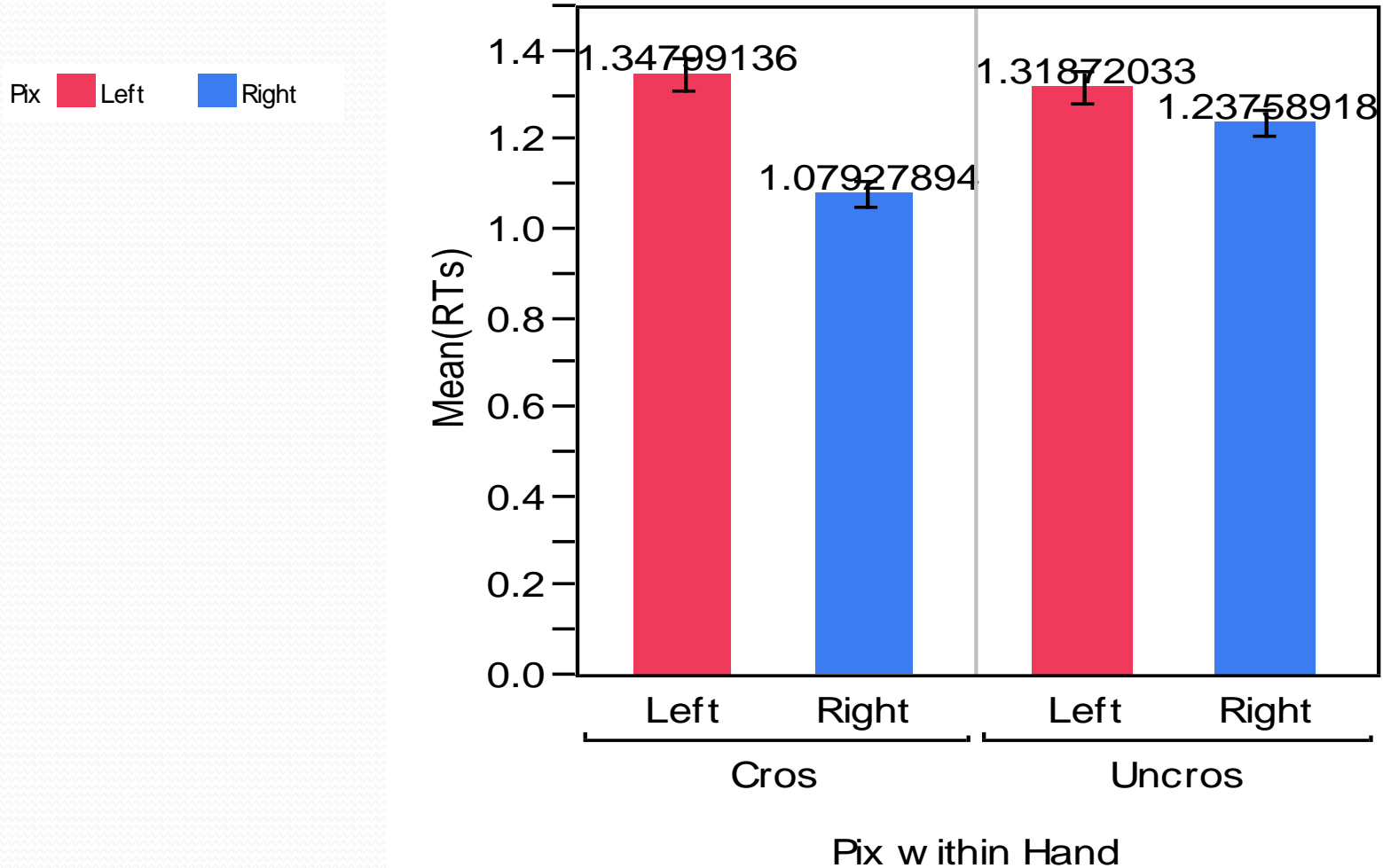
Experiment 2

- Dependent variable: RT.
- 2x2x2 design: Hand posture **x** Voice **x** Picture
- N=51
- 6 practice trials with feedback.
- 26 sentences: 16 targets, 10 fillers.

Experiment 2



Results experiment 2



Conclusions

- Online sentence processing & spatial cognition: hand postures interacts with word order processing
- Relevance of proprioceptive information during language processing
- Language and the rest of cognition: Perceptual Symbol System Theory (Barsalou 1999)
- Writing systems?

Thank you!

Shimon Edelman (Cornell University)

Lauren Emberson (Weill/Cornell University)

Luca Onnis (Hawaii University)

- Claudia Gilson, Tywanquila Walker (Cornell University)
- **Undergraduate RAs in Shimon Edelman's Language Lab:** Nevena Pilipovic-Wengler, John Michael Grant, Christine Lee