Does physical co-presence mediate the effects of gesture on spatiotemporal metaphor?: Gestural priming in virtual discourse space

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Metaphorical relationship between space and time
- Ego-based perspective (*we’re approaching the deadline*)
- Time-based perspective (*the deadline is approaching*)

The now-famous ambiguous question

*Next Wednesday’s meeting has been moved forward two days. What day is the meeting on now?*

**Friday: Ego-based**
- Being on a plane
- Reading the sentence *“The road goes all the way to NY”*
- (Thinking about) moving across a room

**Monday: Time-based**
- Waiting for a plane
- Reading the sentence *“The road comes all the way from NY”*
- (Thinking about) moving an object toward you
Background: Prior study

- Stickles & Lewis 2013
  - Investigated influence of metaphoric gesture on metaphor use
  - Elicited answer to the ambiguous test question
    
    Next Wednesday’s meeting has been moved forward two days. What day is the meeting on now?
  
  - Gesture away from speaker consistent with Ego-based: predict Fridays
  - Gesture towards speaker consistent with Time-based: predict Mondays

Findings:

- Gesture influences spatiotemporal metaphor use
  - Gesture towards the speaker primes Time-based metaphor in listeners

- Listeners respond using metaphors consistent with the speaker’s viewpoint
  - In both shared viewpoint and face-to-face conditions
Prior study: Face-to-face communication (FFC)
- Addressees take speaker’s viewpoint
  - New question: Does a lack of *physical co-presence* alter the way speakers process gesture?

Prior work on visibility and gesture production
- Lower gesture rates and size in non-visible conditions (Bavelas & Chovil 2000; Bavelas et al. 2008)

Prior work on computer-mediated communication (CMC) and gesture production
- Lower gesture rate and smaller gesture size in CMC than FFC (Mol et al. 2009)

Is there an effect of CMC on gesture *comprehension*?
- Do people maintain the speaker’s viewpoint in CMC (as they do in FFC) or do they keep their own viewpoint?
Current study design

- 374 participants on Amazon Mechanical Turk
- Viewed video eliciting answer to the ambiguous test question
  
  Next Wednesday’s meeting has been moved forward two days.  
  What day is the meeting on now?

- Control: no gesture
- Direction of gesture movement
  - Sagittal condition
    - Gesture away from the speaker
    - Gesture toward the speaker
  - Lateral condition
    - Gesture right to left
    - Gesture left to right
- Palm orientation
  - Upright
  - Sideways
- Perspective
  - First person
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- Palm orientation
  - Upright
  - Sideways
- Perspective
  - First person
  - Third person
Results: Perspective & Control

- Contrast-coded multiple logistic regression
- No significant effect of presence or absence of gesture
- No significant effect of perspective
Results: Palm orientation

Contrast-coded multiple logistic regression

No significant effect of palm orientation condition
Results: Direction of movement

- Contrast-coded multiple logistic regression

- No significant effect of movement in the lateral condition
Results: Direction of movement

- Contrast-coded multiple logistic regression
- Sagittal movement significantly improved fit of model ($p < 0.05$) due to gesture direction
- “Toward” gesture more likely to elicit Friday
  - Odds ratio = 2.521
  - $p < 0.001$
Results: Direction of movement

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Discussion

- Control
  - Results as expected
- Palm orientation does not affect spatiotemporal metaphor use
  - Sagittal or lateral
- Perspective does not affect spatiotemporal metaphor use
  - First person or third person
- Lateral direction of movement
  - No effect of direction in lateral condition
- Sagittal direction of movement
  - Effect of direction in sagittal condition
  - Synchronization between gesture and speech
Discussion

- Listener viewpoint or speaker viewpoint?
  - FFC: Listeners maintained speaker’s viewpoint
    - More Monday responses in “towards” condition
    - Time-based metaphor from speaker’s viewpoint
    - Interpreted metaphoric gestures from speaker’s viewpoint
  - CMC: Listeners maintained own viewpoint
    - More Monday responses in “away” condition
    - Time-based metaphor from listener’s viewpoint
    - More Friday responses in “towards” condition
    - Ego-based metaphor from listener’s viewpoint
    - Interpreted metaphoric gestures from own viewpoint
Conclusion

- Effect of physical co-presence on gesture comprehension
  - Physical discourse space: Speaker’s viewpoint
  - Virtual discourse space: Listener’s viewpoint

- Implications for CMC
  - Gesture production:
    - Lower gesture rates and smaller gesture size in CMC
  - Gesture comprehension:
    - Gestures still salient and communicative
    - Interpreted from listener’s viewpoint
Future directions

- Effects of physical co-presence on lateral gesture comprehension
  - Left to right gestures: Speaker’s right is the listener’s left

- Effects of physical co-presence on deictic gesture comprehension
  - Whose viewpoint do listeners take in route-giving tasks?
Thank you!

- **References**


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