Introduction

Recent work demonstrates multimodal interpersonal alignment (i.e., “interaction network”) across multiple interaction channels. Previous research supports cross-modal alignment (e.g., infant movement to adult speech; Condon & Sander, 1974).

With our interest in asymmetric interaction, we preliminarily explored how alignment of interacting individuals’ speech and body movement are affected by different conversational contexts, affiliation and argument.

Methods

- N = 6 self-selected dyads.
  - 5 female dyads, 1 mixed-sex dyad.
- Individual participants completed opinion surveys and rated strength of belief.
- Sociopolitical topics (e.g., death penalty, abortion, legalization of gay marriage).
- Dyads recorded while holding 2 conversations (random order).
- Affiliative: prompted to discuss media that both enjoy.
- Argumentative: prompt based on answers to opinion survey.
- Data collection setup (Paxton & Dale, in press):
  - High-definition cameras:
  - Individual lapel microphones with on-camera mixer.
  - Recorded videos using frame-differencing methods (body movement analysis based on pixel changes; Paxton & Dale, in press).
- Derived multiple time series:
  - Raw movement scores and speech states for each speaker.
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  - Raw movement scores and speech states for each participant.
  - Intrapsychic cross-covariance (multimodal).
- Interpersonal cross-covariance (multimodal).
- Exploratory analyses testing for multimodal interpersonal and intrapersonal alignment included:
  - Correlations of raw time series:
  - Linear mixed-effects models using cross-covariance (fixed effects: lag size and conversation type; random: dyad and conversation order).

Analyses

- Correlations of time series for each conversation type:
  - Intrapersonal multimodal: affiliation, r = .20 (p < .05); argument, r = .21 (p < .05).
  - Interpersonal multimodal: affiliation, r = .03 (n.s.); argument, r = .20 (p < .05).
  - Interpersonal speech: affiliation, r = .08 (n.s.); argument, r = .29 (p < .05).
  - Intrapersonal multimodal: affiliation, r = .03 (n.s.); argument, r = .06 (n.s.).
- Linear mixed-effects models using cross-covariation:
  - Predicting speech state: time slice (est. = .0012); conversation type (est. = .10); interaction (est. = .0014).
  - Predicting body movement: time slice (est. = .001); conversation type (est. = .04); interaction (est. = .002).
- Predicting multimodal interpersonal cross-covariance: time slice (est. = .002); conversation type (est. = .04); interaction (est. = .005).

Results

- Significant p-values: * = p < .05; ** = p < .005; *** = p < .001.
- Correlations of time series for each conversation type:
  - Intrapersonal multimodal: affiliation, r = .20; argument, r = .21.
  - Interpersonal multimodal: affiliation, r = .03; argument, r = .20 (n.s.).
  - Interpersonal speech: affiliation, r = .08; argument, r = .29 (p < .05).
  - Intrapersonal multimodal: affiliation, r = .03; argument, r = .06 (n.s.).
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Discussion

- Multimodal communication is reliably correlated between interlocutors in conversation, suggesting an alignment structure beyond strict in-phase synchrony that is sensitive to conversational context.
- Speech: longer-phase alignment, likely due to turn-taking.
- Conflict enhances intrapersonal multimodal alignment and, overall, diminishes interpersonal alignment.
- Future directions:
  - Increase power by analyzing additional dyads.
  - Expand network to include other channels (e.g., affect, gesture).

References


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