Conversations Predict Social Network Learning

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Background

- Relatively little is known about how people dynamically learn about real-world relational associations and social network structures[1,2]
- Features of interpersonal conversations – such as linguistic styles, positive and negative sentiment, and verbal tone – may play a key, yet understudied role in social network learning[3-8]
- **This research leverages naturalistic stimuli and natural language processing methods to examine how individuals learn about a real-world social network structure via passive observation**

Hypothesis 1

Successful network learning will be characterized by slower RTs for friend and rival judgments and greater than chance accuracy

Hypothesis 2

Greater semantic similarity, more positive sentiment, and higher clout will be uniquely predictive of relational judgments

Method

TASK DESIGN

Episode shown chronologically, split into 6 clips of equal length

N = 57 participants
M_{age} = 19.08, SD_{age} ± 1.48

Relationship response block following each episode clip

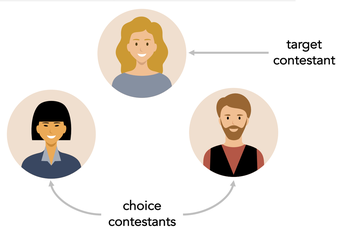
FRIEND
RIVAL
WIN

block types

participants complete each block type twice

Participants make binary responses about the extent to which either choice contestant is stronger friends with, stronger rivals with, or more likely to beat the target contestant.

Who has a stronger friendship with Amber?



Note: icons replaced with contestant photos in experimental task

NATURAL LANGUAGE PROCESSING

Semantic Similarity
Universal Sentence Encoder[9]

Sentiment
sentimentR[10]

Clout
Linguistic Inquiry and Word Count[11]

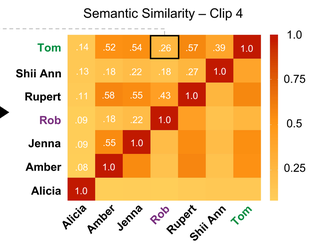
Clip 4 Dialogue

"I know what people think around the camp…"

"Me and you got to stick together…"

embed

[0.1, 0.4, 0.6, …]
[0.3, 0.1, 0.7, …]



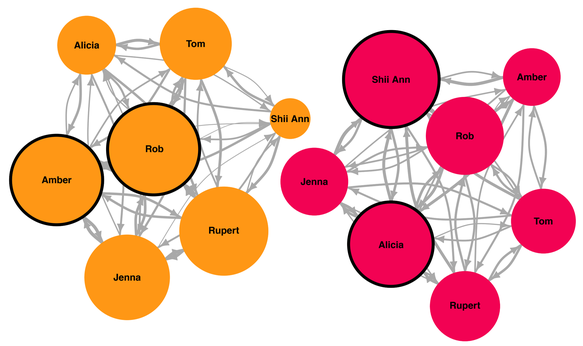
I love the fact that they're all sitting there squirming in their shorts, ignoring me yet again. They should have been cutting deals with me before my immunity win.

sentiment score: -0.183 (negative)
clout score: 23.34 (low)

486 total sentences of dialogue

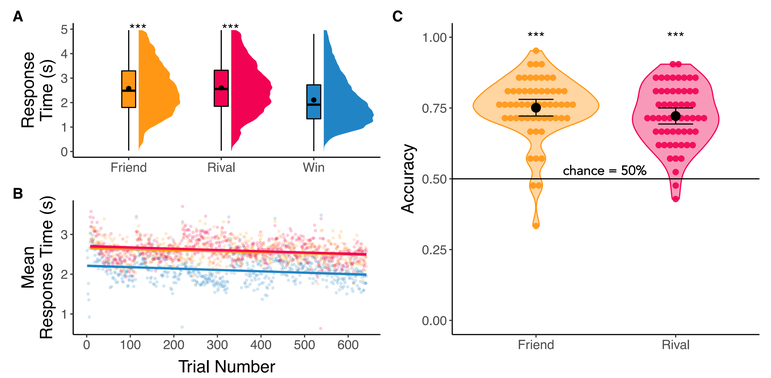
Results

Participants learned similar social network structures via passive observation



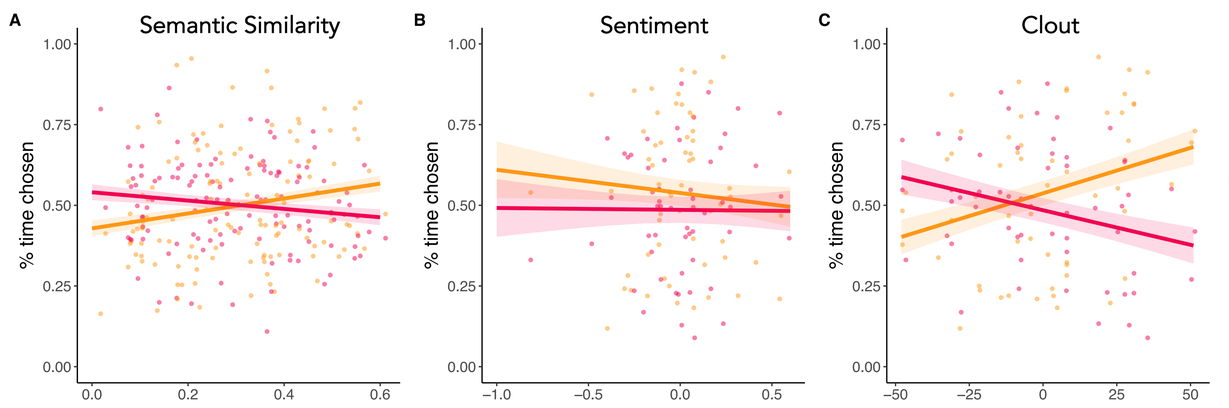
Amber was the season winner and Rob was the runner-up

Shii Ann was initially on a rival team and Alicia was voted in this episode



A. Participants took longer to answer friendship (**β** = .45) and rivalry (**β** = .48) questions than win questions. **B.** RTs decreased for all block types over time. **C.** Individuals agreed with group average greater than chance for friendships ($t(56)$ = 17.08) and rivalries ($t(56)$ = 15.68). *** $p < .001$

Semantic similarity and clout, but not sentiment, predicted relationship judgments



Semantic similarity predicted friendship judgments and negatively predicted rivalry judgments (b = 1.47, $p < .001$)

Sentiment did not predict friendship or rivalry judgments (b = .351, p = .137)

Clout predicted friendship judgments and negatively predicted rivalry judgments (b = .022, $p < .001$)

Conclusions

- Individuals learned similar social network structures via passive observation
- Conversational linguistic features predicted relational judgments & network learning

Future Directions

- Using fMRI, investigate neural mechanisms that support social network learning
- Generalize findings using NLP analysis methods with a different episode of *Survival*

SCAN FOR MORE INFO!

Or get in touch via email:
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References: [1]Tompson, S.H. et al. (2019). Individual differences in learning social and nonsocial network structures. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 45*(2), 253-271; [2]Marineu, J.E. (2017). Trust and distrust network accuracy and career advancement in an organization. *Group & Organization Management, 42*(4), 487-520; [3]Slatcher, R.B. et al. (2007). Winning words: Individual differences in linguistic style among U.S. presidential and vice presidential candidates. *Journal of Research in Personality, 41*(1), 63-75; [4]Argyle, M., Alkema, F., & Gilmour, R. (1971). The communication of friendly and hostile attitudes by verbal and non-verbal signals. *European Journal of Social Psychology, 1*(3) 385-402; [5]Krauss, R.M. et al. (1981). Verbal, vocal, and visible factors in judgments of another's affect. *Journal of Personality and Social Psychology, 40*(2), 312-320; [6]Ireland, M.E. et al. (2011). Language style matching predicts relationship initiation and stability. *Psychological Science, 22*(1), 39-44; [7]Cannava, K. & Bodie, G.D. (2017) Language use and style matching in supportive conversations between strangers and friends. *Journal of Social and Personal Relationships, 34*(4), 467-485; [8]Danescu-Niculescu-Mizil, C. et al. (2012). Echoes of power: Language effects and power differences in social interaction. *Proceedings of the 21st International Conference on World Wide Web*, 699-708; [9]Cer, D. et al. (2018). Universal Sentence Encoder. *arXiv preprint*; [10]Rinker, T. (2021). *Package "sentimentR"*; [11]Boyd, R.L. et al. (2022). *The development and psychometric properties of LIWC-22*. Austin, TX: University of Texas at Austin.