



# The Impact of Socioemotional Communication on Text-Based Group Decision-Making

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## Introduction

- Group collaboration has shifted to more virtual environments with its effectiveness compared to in-person being highly contested (Blanchard, 2021 & O'Neil et al. 2015)
- This study observed a unique learning environment called the hidden profile paradigm where knowledge is divided between participants and the solution can only be determined by sharing information through collaborative problem solving
- Socioemotional communication (SEC) in text-based discussions is done intentionally and has been found to have mixed results in improving group performance (Bakhtiar et al., 2017 & Jessup et al., 1990)
- The goal of this study is to evaluate the influence of socioemotional communication on the social knowledge construction process

## Research Question

How do varying levels of socioemotional communication impact the overall knowledge construction process when making decisions in a text-based, hidden profile environment?

## Data

### Participants:

- 525 UCI undergraduate students (363 women)
- Placed in a total of 134 groups (typically with 4 students in each group)

### Text Chat:

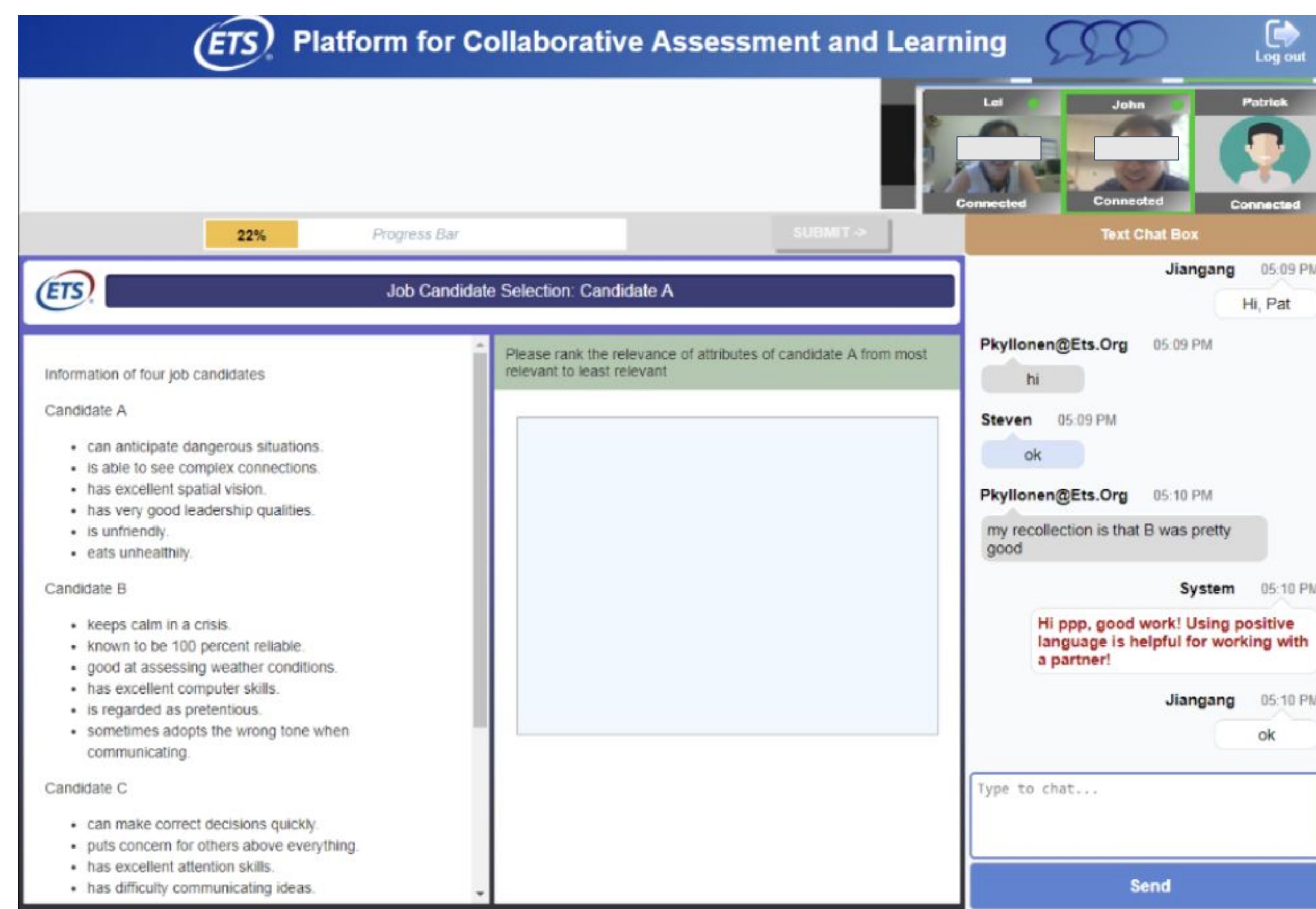
- ETS Platform for Collaborative Assessment and Learning (EP-CAL)
- 4 conditions (apartments, professors, party venue, and job candidates)
- Given shared/unshared positive, neutral, negative information
- Up to 20 minutes to discuss possible solutions

### Analysis:

- Chat transcripts were scored using the 5 phases of KC according to the interaction analysis model (Gunawardena, 1997). A phase 6 was added to capture SEC.
- KC phases temporal and sequential relationships were measured using Lag Sequential Analysis in RStudio (Guillelme et al., 2023)
- Significance levels between different KC phases for each lag (distance of chat messages compared) are shown using Yule's Q Values (Adeyemi, 2011)

## Key Figures

### Methods: ETS (EP-CAL) Interface



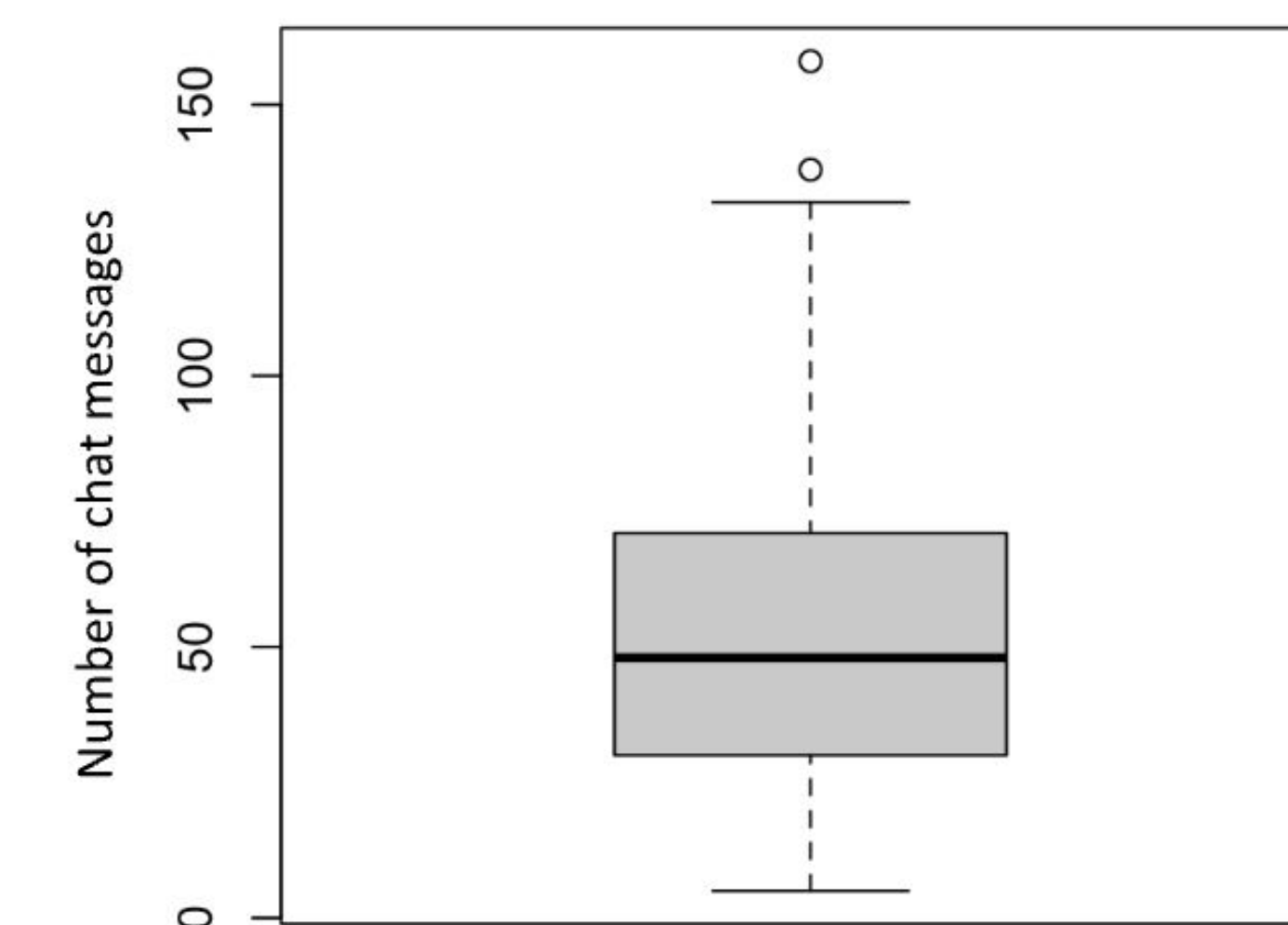
### Coding Scheme for Knowledge Construction Phases

Code	Behavior	Example
P1	<u>Sharing/comparing information</u> Teammates share previous knowledge or their understanding of the task A statement of agreement, observation, and/or opinion Asking and answering questions to clarify details of statements	Ari: i said B is best Kat: me too Em: Same Kat: what order did you guys put Ari: BAC Zi: BCA Em: BCA
P2	<u>Disagree</u> Teammates express disagreement Express misunderstanding or lack of understanding of a concept/task Questions to clarify the source of disagreement	Mitch: do we have the same candidates because my B seems self-motivated and dedicated to the company while C is stubborn and holds grudges
P3	<u>Negotiate (a shared understanding)</u> Make progress in the process of shared meaning/understanding Identification of areas of agreement/overlap Propose/negotiate new statements embodying compromise Clarification of the meaning of terms, ideas, intentions Negotiation of the relative weight assigned to their own and others' arguments/ideas	Mitch: who do you guys feel is the best then Mitch: now im thinking C is Stan: since we have only been discussing B and A as the worst it makes sense that C would be the best Vince: true but the holding grudge is throwing me off Stan: me too
P4	<u>Test/evaluate/modify</u> Proposing a solution (complete ranking/order) Summarization of agreements (order/ranking) Applications of new knowledge Metacognitive statements by the participants illustrating their understanding have changed regarding the solution (ranking/order) because of the interactions	Stan: people tell me sometimes theyd rather work with people that are easy to work with than those who can do better
P5	<u>Agree/apply</u> Proposing a solution (complete ranking/order) Summarization of agreements (order/ranking) Applications of new knowledge Metacognitive statements by the participants illustrating their understanding have changed regarding the solution (ranking/order) because of the interactions	Ya: so BAC? Ya: is everyone else good with that
P6	<u>Socio-emotional/off-topic Interactions</u> Teammates exchanging greetings Teammates getting to know each other Any chat data that does not fit into phases 1-5	Autumn: we're good now!!! Savvy: yea we ok now Savvy: we're a fast group xDD Autumn: Let's goooooo!!!

### Frequency Charts

Phase	Frequency
1	1659
2	159
3	614
4	87
5	275
6	668

Conversation Length Boxplot



Note: Conversations span each condition and take each chat message as an individual input regardless of length. Outlier datasets have been filtered out.

### Lag Sequential Analysis

	Yule's Coef						P6 LSA					
<b>1 Lag Interactions</b>												
	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6						
Code 1	0.95	-0.44	-0.69	-0.61	-0.82	-0.88						
Code 2	-0.40	0.93	-0.05	-1.00	-0.56	-0.41						
Code 3	-0.77	-0.05	0.94	0.14	-0.14	-0.76						
Code 4	-0.61	-0.61	0.10	0.97	0.00	-0.75						
Code 5	-0.89	-0.32	-0.56	-0.58	0.97	-0.15						
Code 6	-0.80	-0.44	-0.78	-0.42	-0.74	0.97						

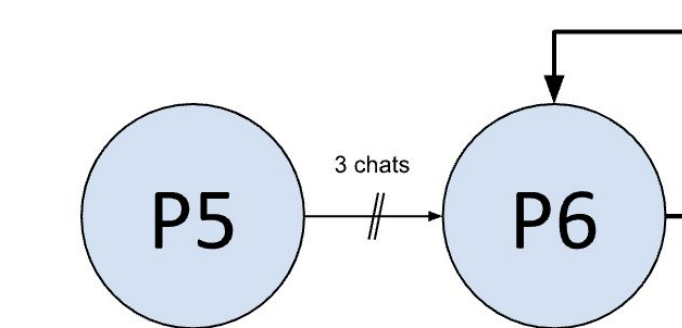
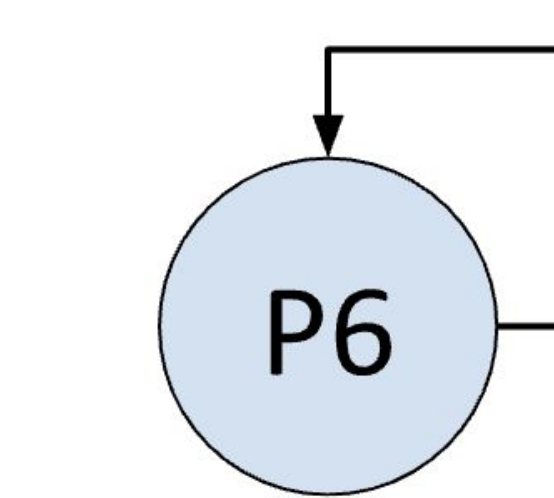
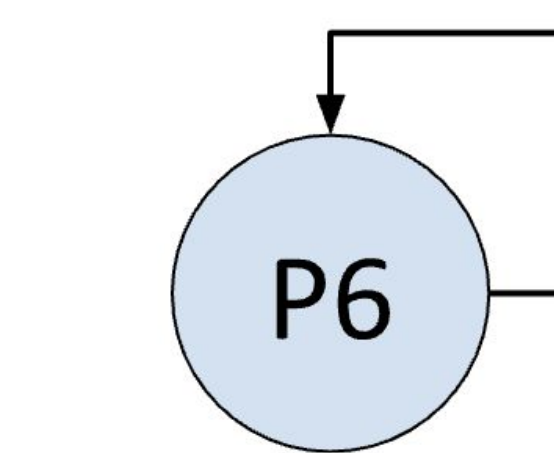
### 2 Lag Interactions

	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6
Code 1	0.89	-0.24	-0.53	-0.53	-0.68	-0.85
Code 2	-0.30	0.85	0.24	-0.61	-0.87	-0.38
Code 3	-0.71	-0.08	0.87	0.41	0.20	-0.67
Code 4	-0.58	0.01	0.17	0.94	0.20	-0.54
Code 5	-0.87	-0.13	-0.49	-0.58	0.92	0.27
Code 6	-0.62	-0.44	-0.77	-0.48	-0.65	0.93

### 3 Lag Interactions

	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6
Code 1	0.81	-0.08	-0.35	-0.46	-0.55	-0.83
Code 2	-0.26	0.78	0.12	-0.34	-0.32	-0.18
Code 3	-0.64	-0.10	0.80	0.41	0.32	-0.54
Code 4	-0.61	0.14	0.21	0.93	0.14	-0.42
Code 5	-0.82	-0.19	-0.42	-0.77	0.82	0.51
Code 6	-0.44	-0.44	-0.75	-0.54	-0.55	0.87

Note: Values 0.3-0.49 are said to have a moderate positive association, 0.5-0.69 has a substantial positive association, and >0.7 is a very strong association (Adeyemi, 2011).



## Results

- In the first two lags, there are no significant positive interactions between KC phases besides each phase being recursive for themselves
- Socioemotional communication is only correlated with itself in the first 2 lags, but 3 lags (messages) apart there is an interaction between the Agree/Apply Phase 5 and Socioemotional Communication Phase 6
- When group agreement is made, in 3 lags there is a significant likelihood that socioemotional communication will follow when engaging in collaborative problem solving for a hidden profile paradigm task
- Previous studies typically either disregarded socioemotional conversation or did not assess higher lag sequences, but there have been some analyses for P1 leading to P6 when the group has high engagement and interaction (Lin et al., 2021 & Yang et al., 2017)

## Discussion

### Impact on Group Knowledge Construction

- For lags 1 and 2 the LSA models did not predict an interaction with other KC phases in a hidden profile paradigm, showing group discussion tends to stay stuck in individual phases and diverse in their transitions
- Variety of chat lengths additionally highlight that group decision-making happens at varying rates
- 3 lags in the future shows group agreement leading to socioemotional communication, highlighting there still is a presence of this SE communication despite a virtual, text-based environment
- SE communication was largely present at the end of decision making, so while not relevant to the task directly it was still found to occur significantly across subjects
- Different than previous studies that saw SE conversation follow Share/compare to now being present after group agreement

### Limitations and future directions

- Lack of equal distribution of KC phases (see frequency charts) so the rubrics could be modified to distribute more evenly
- Scoring the data was done by individuals, and inter-coder reliability was met for only 5 out of the 6 phases
- In the future could look at audio recordings of a verbal version of this task to see if socioemotional communication changes with the addition of body language cues and face-to-face instruction

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