Empathosphere: Promoting Constructive Communication in Ad-hoc Virtual Teams through Perspective-taking Spaces

Pranav Khadpe, Chinmay Kulkarni, and Geoff Kaufman

CSCW 2022

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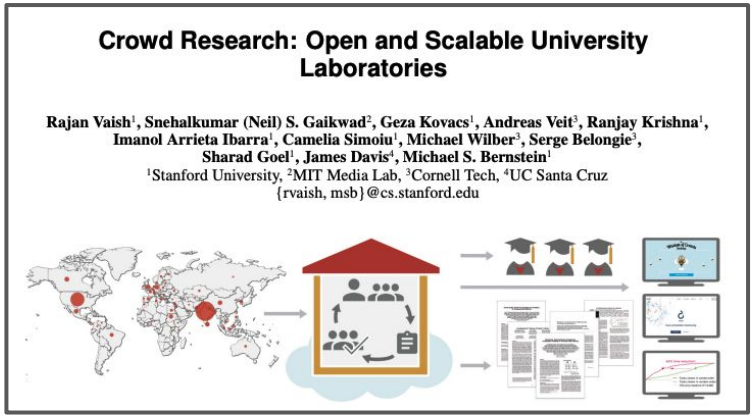
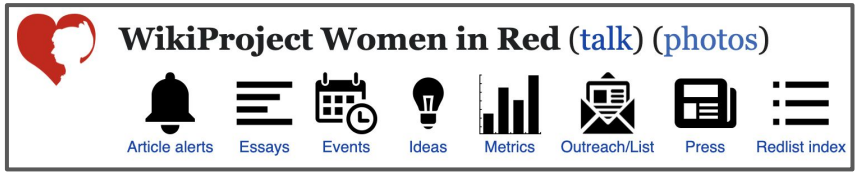
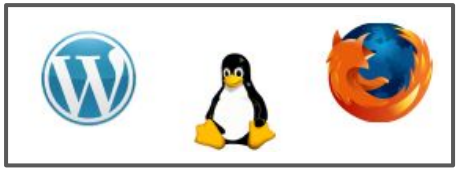
Online platforms allow people to convene in ad-hoc ways and contribute towards common goals



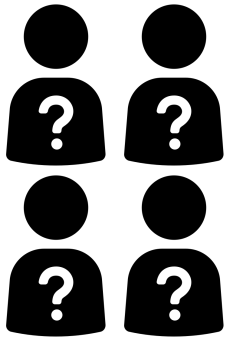




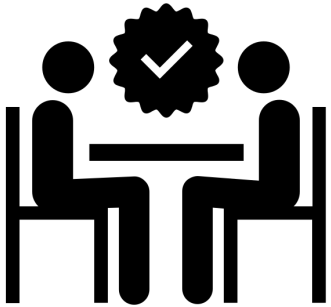
Niloufar Salehi and Michael S Bernstein. 2018. Hive: Collective Design Through Network Rotation. Proc. ACM Hum.-Comput. Interact. 2, CSCW (Nov. 2018).

Vaish, R., Gaikwad, S. N. S., Kovacs, G., Veit, A., Krishna, R., Arrieta Ibarra, I., ... & Bernstein, M. S. (2017, October). Crowd research: Open and scalable university laboratories. In Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology.

Such groups must solve complex interpersonal and organizational challenges to succeed

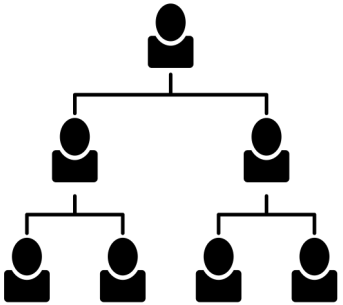


Strangers brought together by shared purpose



Don’t always have pre-established group norms

Can be difficult to develop trust, mutuality, reciprocity

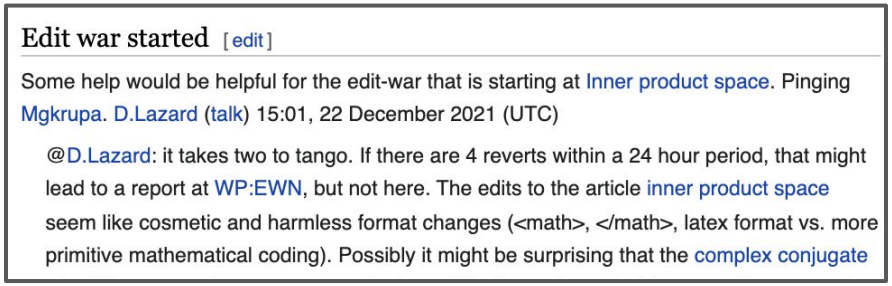


Need to learn to govern themselves

Ad-hoc teams can struggle to deliberate, and reach consensus on matters of collective importance

1

Team members **refuse to engage with other members' perspectives**, triggering conflict and **threatening the team's performance and sustainability** (Kittur 2007, Whiting 2019).



Edit war started [edit]

Some help would be helpful for the edit-war that is starting at Inner product space. Pinging Mgkrupa. D.Lazard (talk) 15:01, 22 December 2021 (UTC)

@D.Lazard: it takes two to tango. If there are 4 reverts within a 24 hour period, that might lead to a report at WP:EWN, but not here. The edits to the article inner product space seem like cosmetic and harmless format changes ($,$, latex format vs. more primitive mathematical coding). Possibly it might be surprising that the complex conjugate

(Kittur 2007) Kittur, A., Suh, B., Pendleton, B. A., & Chi, E. H. (2007, April). He says, she says: conflict and coordination in Wikipedia. In Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 453-462).

(Whiting 2019) Whiting, M. E., Blaising, A., Barreau, C., Fiuza, L., Marda, N., Valentine, M., & Bernstein, M. S. (2019). Did it have to end this way? Understanding the consistency of team fracture. Proceedings of the ACM on Human-Computer Interaction, 3(CSCW), 1-23.

(Kim 2021) Kim, S., Eun, J., Seering, J., & Lee, J. (2021). Moderator Chatbot for Deliberative Discussion: Effects of Discussion Structure and Discussant Facilitation. Proceedings of the ACM on Human-Computer Interaction, 5(CSCW1), 1-26.

Ad-hoc teams can struggle to deliberate, and reach consensus on matters of collective importance

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Team members **refuse to engage with other members' perspectives**, triggering conflict and **threatening the team's performance and sustainability** (Kittur 2007, Whiting 2019).

2

Team members **avoid expressing their dissenting perspectives** (Kim 2021) and **build artificial consensus**.

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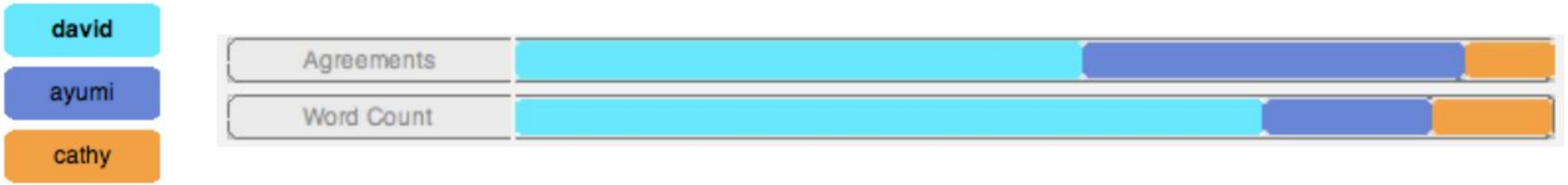
Research Question:

How can we help team members express opposing perspectives and engage with those of their teammates to improve teamwork?

Does simple awareness help?

Some systems try to **highlight existing communication patterns** (turn-taking, linguistic agreement) so teams can **identify "problems"** (Kim 2012, Leshed 2009).



Some systems point out **how** teams should **change their communication patterns**(Tausczik 2013).

Cathy should talk more

(Kim 2012) Kim, T., Hinds, P., & Pentland, A. (2012, February). Awareness as an antidote to distance: making distributed groups cooperative and consistent. In Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work (pp. 1237-1246).

(Leshed 2009) Leshed, G., Perez, D., Hancock, J. T., Cosley, D., Birnholtz, J., Lee, S., ... & Gay, G. (2009, April). Visualizing real-time language-based feedback on teamwork behavior in computer-mediated groups. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 537-546).

(Tausczik 2013) Tausczik, Y. R., & Pennebaker, J. W. (2013, April). Improving teamwork using real-time language feedback. In Proceedings of the SIGCHI conference on human factors in computing systems (pp. 459-468).

Does simple awareness help? Not always

Visualizing group-level agreement led to a form of **social loafing**, where **team members expressed agreement with the majority opinion even if they did not agree with it**, ultimately resulting in lower quality work (Leshed 2009).

2

Team members **avoid expressing their dissenting perspectives** (Kim 2021) and **build artificial consensus**.

Why?

(Leshed 2009) Leshed, G., Perez, D., Hancock, J. T., Cosley, D., Birnholtz, J., Lee, S., ... & Gay, G. (2009, April). Visualizing real-time language-based feedback on teamwork behavior in computer-mediated groups. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 537-546).

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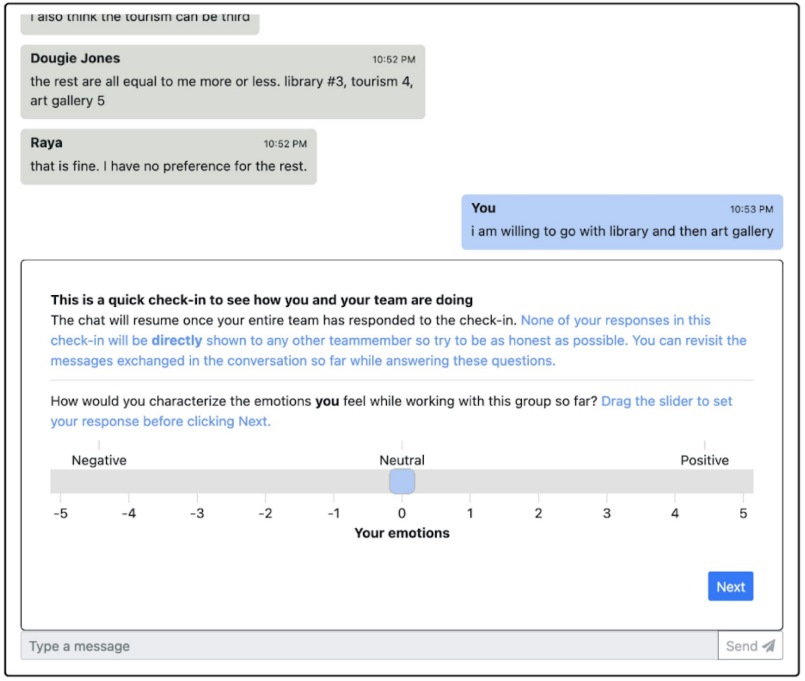
Team members don't express and engage with opposing perspectives due to a lack of safety and efficacy

For team members to speak up, they must feel it is both **safe** and **effective** to voice their opinions but in newly convened teams there is an uncertainty about group communication norms which can lead to low perceived safety and efficacy (Morrison 2000).

Morrison, E. W., & Milliken, F. J. (2000). Organizational silence: A barrier to change and development in a pluralistic world. Academy of Management review, 25(4), 706-725.

Empathosphere

A **chat-embedded intervention** to promote constructive communication in ad-hoc virtual teams.

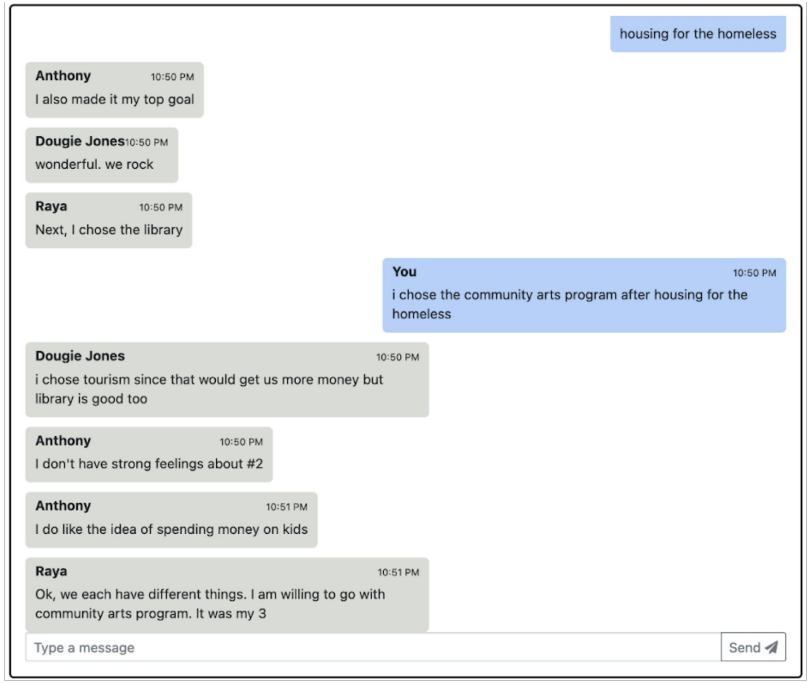


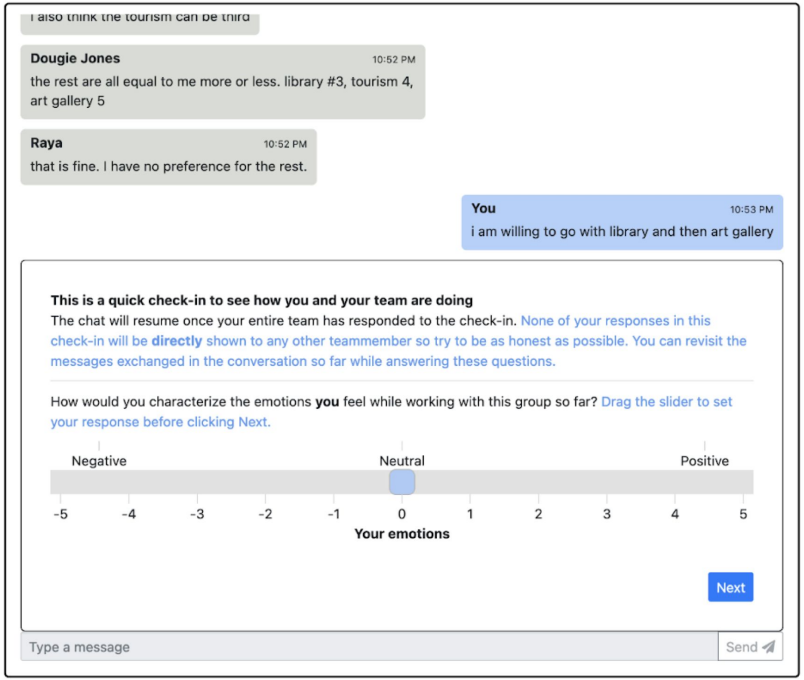
slack

Discord

Microsoft Teams

Empathosphere





Empathosphere

Fostering perspective-taking to create safety and efficacy

Through perspective taking, team members are **more likely to anticipate disagreement**, recognizing that other people will have different views. This can both **reduce initial opposition to others' ideas**, as well as mentally prepare individuals to **handle opposition to their ideas (**Sessa 1996**).**

Safety

Perspective-taking can lead to a **cognitive reframing** that leads to **better integration** of others' ideas (Hargadon 2006).

Efficacy

(Sessa 1996) Sessa, V. I. (1996). Using perspective taking to manage conflict and affect in teams. The Journal of applied behavioral science, 32(1), 101-115.

(Hargadon 2006) Hargadon, A. B., & Bechky, B. A. (2006). When collections of creatives become creative collectives: A field study of problem solving at work. Organization science, 17(4), 484-500.

Empathosphere

Fostering perspective-taking to create safety and efficacy

Perspective-taking can be regulated by attention modulation: **drawing attention to others' emotions and affective states can increase perspective-taking** (Zaki 2014)**.**

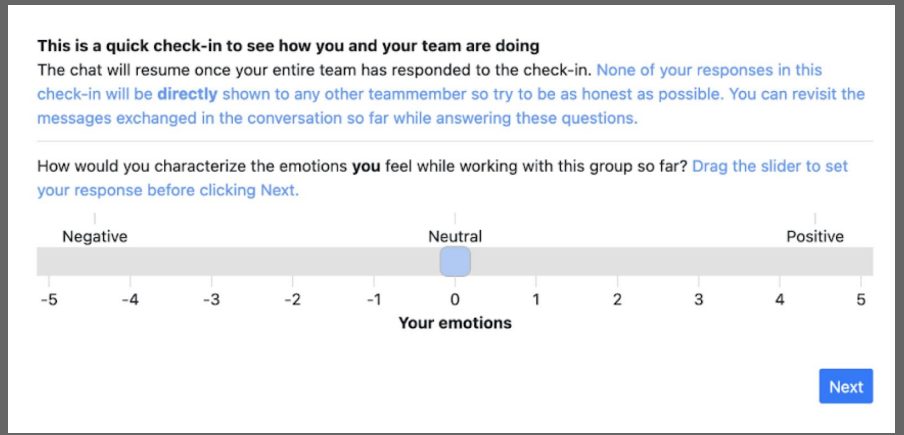
(Zaki 2014) Zaki, J. (2014). Empathy: a motivated account. Psychological bulletin, 140(6), 1608.

Empathosphere

Fostering perspective-taking to create safety and efficacy

Step 1:

Privately elicit how team members feel about working with the team

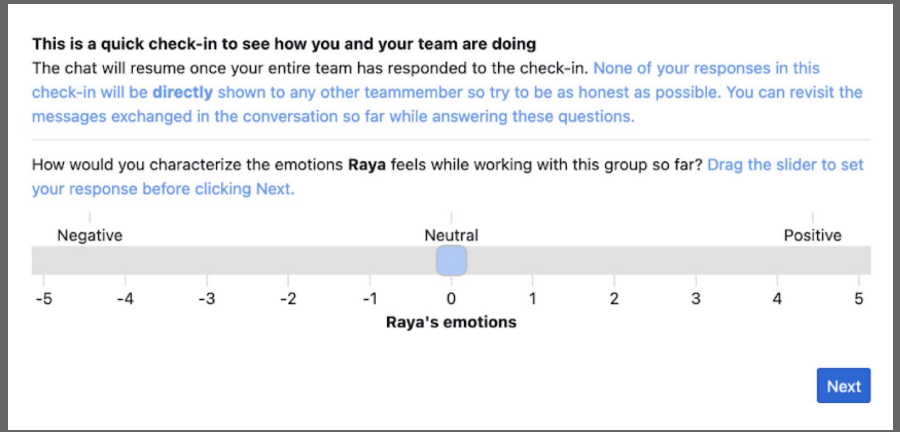


Empathosphere

Fostering perspective-taking to create safety and efficacy

Step 2:

Ask each member, in private, to guess how each of the other members in the team might be feeling on the same scale, to nudge them to direct their attention towards others in the team

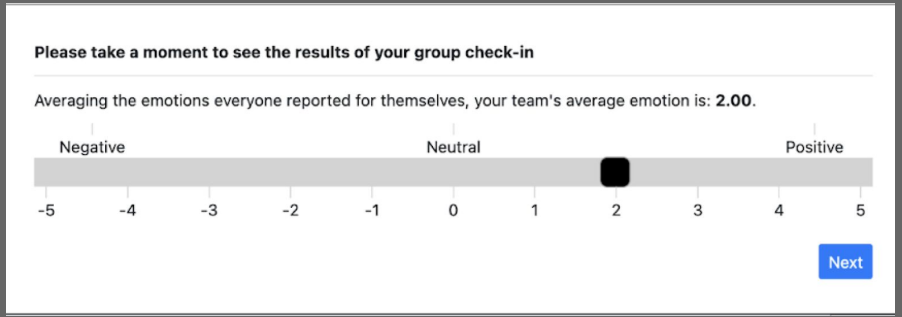


Empathosphere

Fostering perspective-taking to create safety and efficacy

Step 3:

System calculates the mean of responses from the first stage to present each participant with feedback about the aggregate group climate

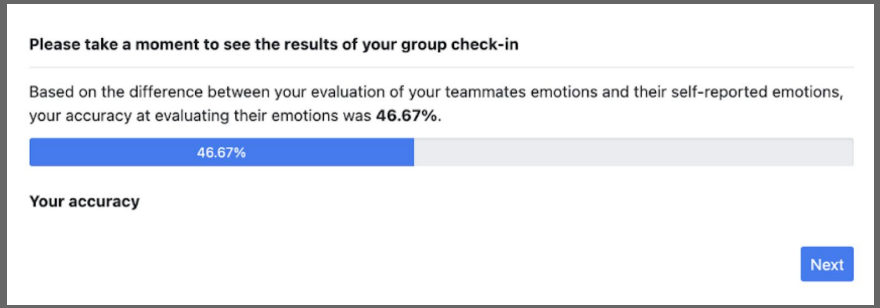


Empathosphere

Fostering perspective-taking to create safety and efficacy

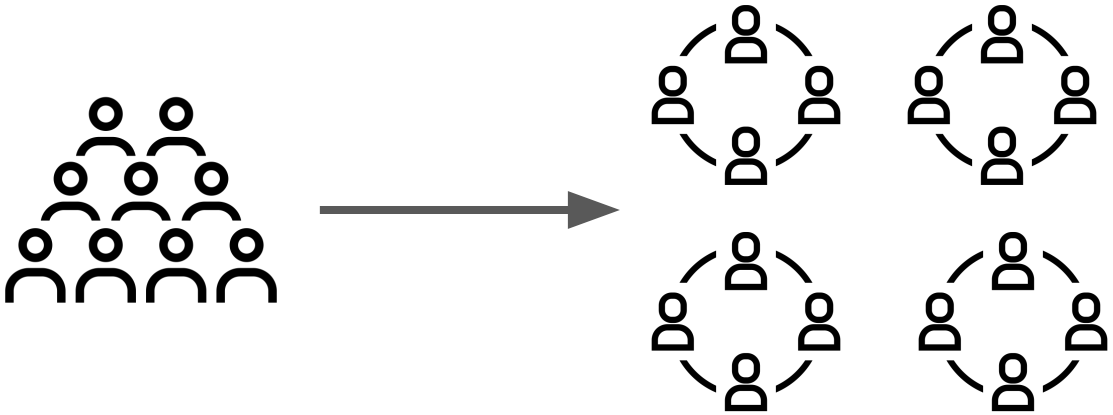
Step 4:

Empathosphere presents every member with feedback on how accurate they were at guessing others' emotions in their responses in the second stage.



Study- Evaluating Empathosphere

To investigate the impacts of Empathosphere, we conducted a **between-subjects study** with **teams of crowdworkers on Amazon Mechanical Turk**



Method- Study Conditions

Empathosphere:

Empathosphere was triggered at the midpoint of the task and the team was prompted to **carry out the perspective-taking exercise.**

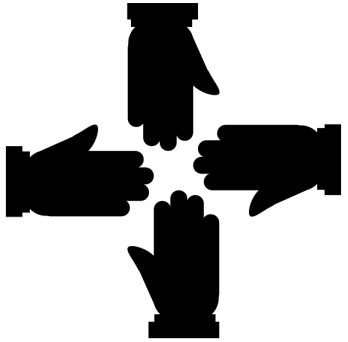
Control:

Teams in the control condition were **asked to take a two-minute pause and reflect on their teamwork experience individually**. The specific prompt we used was:

“The experiment will proceed after a brief two-minute pause. Use this time to revisit the messages exchanged in the conversation so far and reflect on how the experience of working with this group has been.”

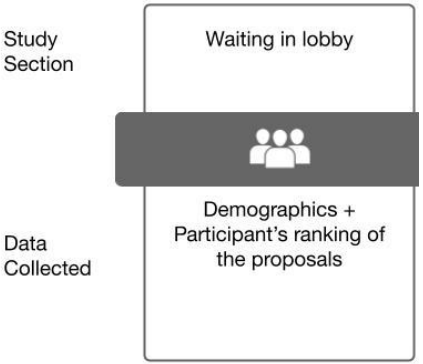
Method- Task

We use the “foundation task” (Watson et al) to create our specific task. **Groups were asked to allocate $500,000 across five competing project proposals**, each in need of $500,000. Team members need to **work interdependently** and **resolve conflicting opinions** and perspectives to **arrive at a solution**.



(Watson et al) Watson, R. T., DeSanctis, G., & Poole, M. S. (1988). Using a GDSS to facilitate group consensus: Some intended and unintended consequences. Mis Quarterly, 463-478.

Method- Study Workflow



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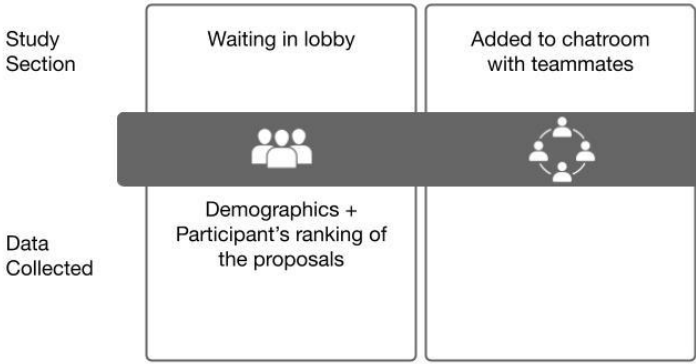

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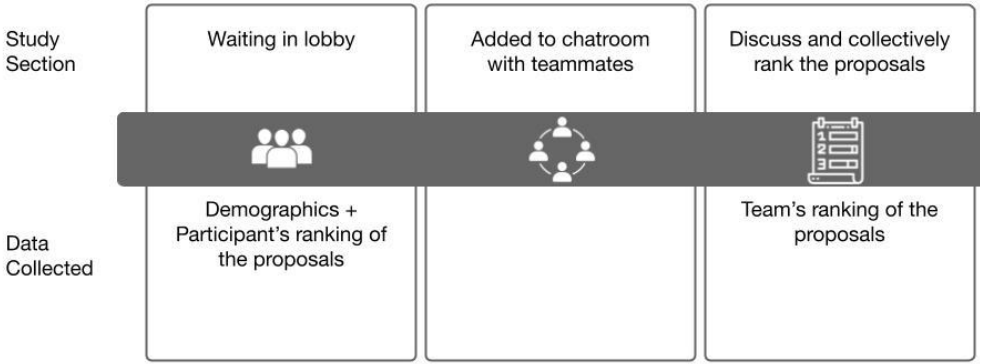

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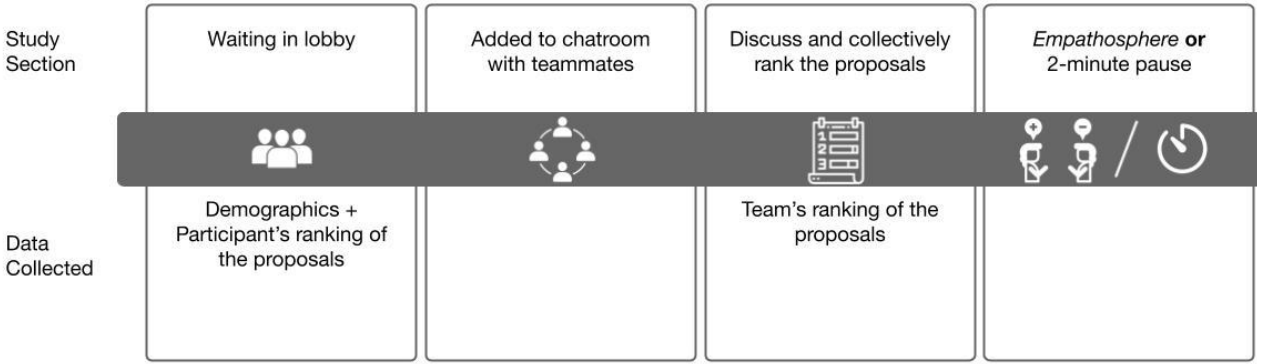

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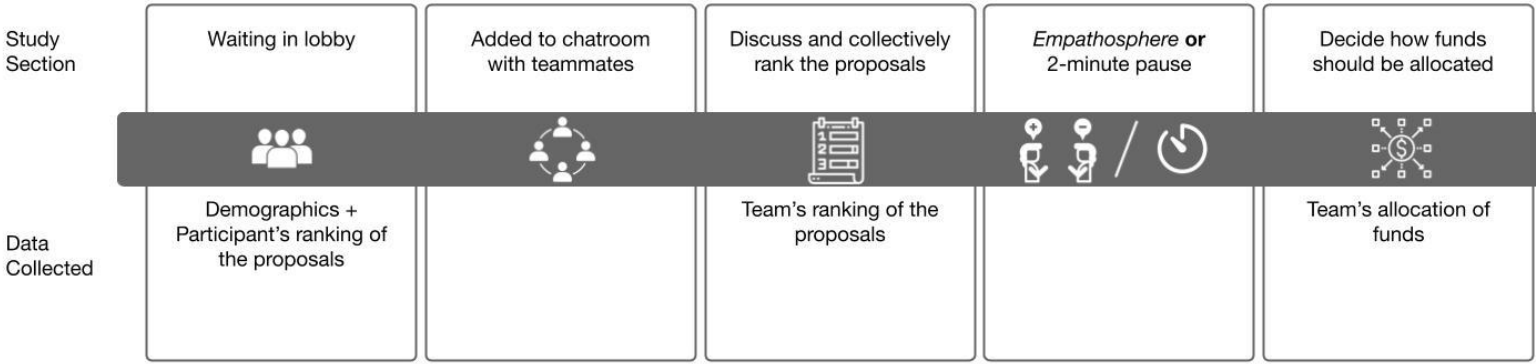
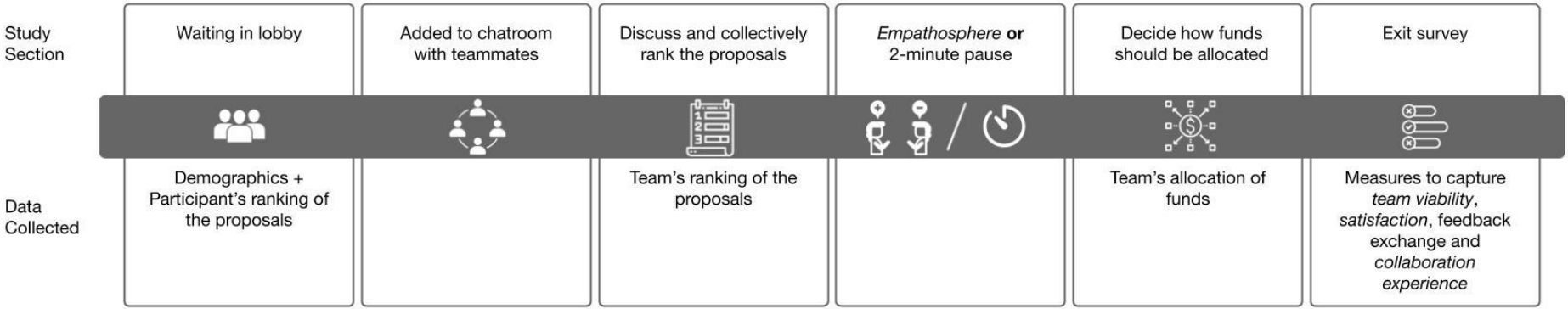
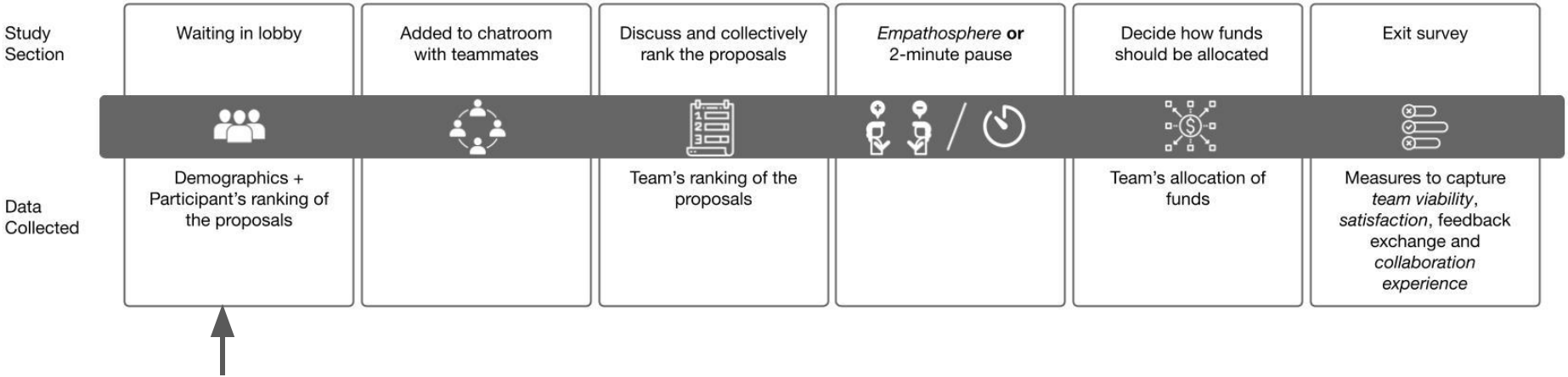


Method- Study Workflow

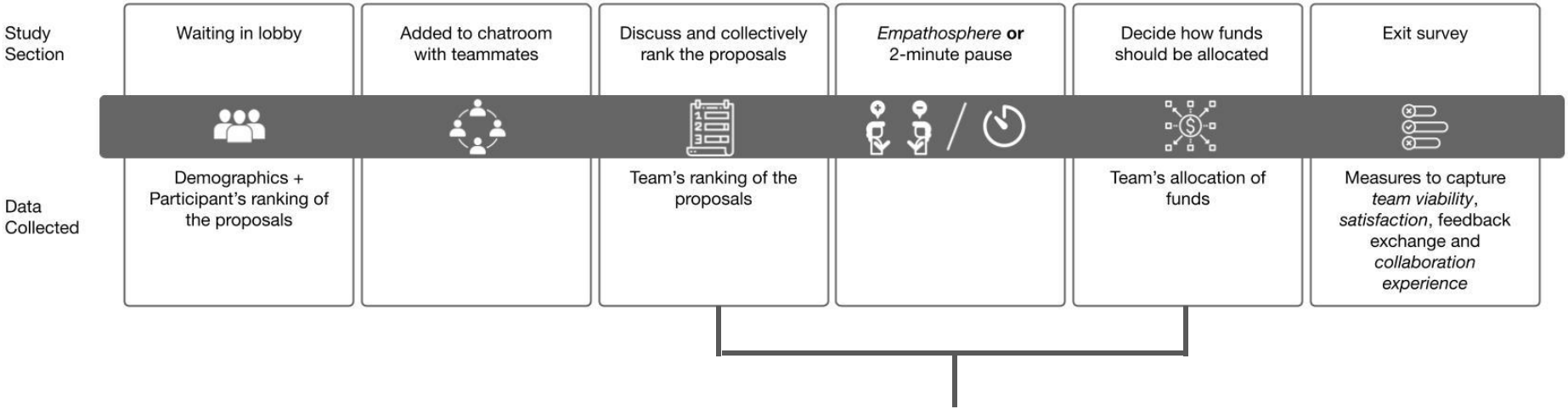


Method- Measures



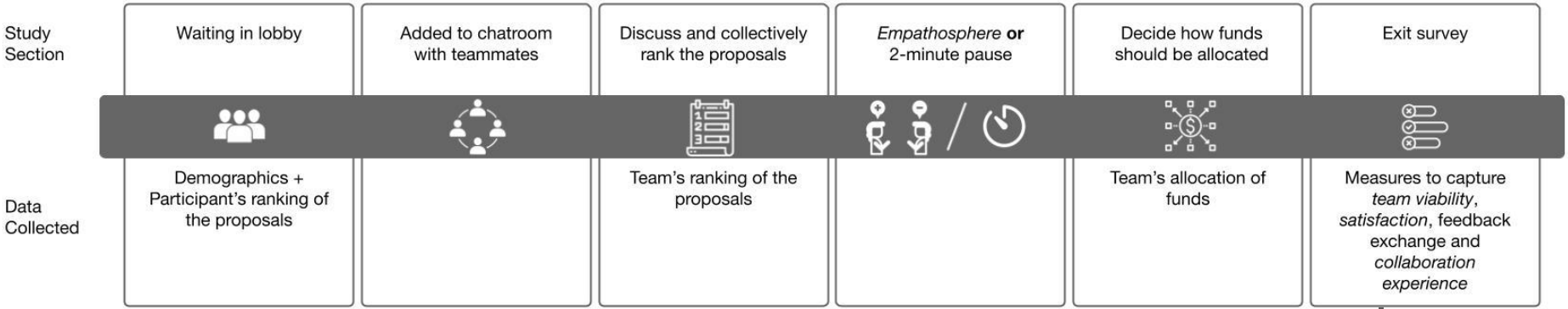
Baseline disagreement in a group

Method- Measures



Conversational behavior:
Changes in interaction patterns across the two phases

Method- Measures



Likert:
team viability, satisfaction with solution

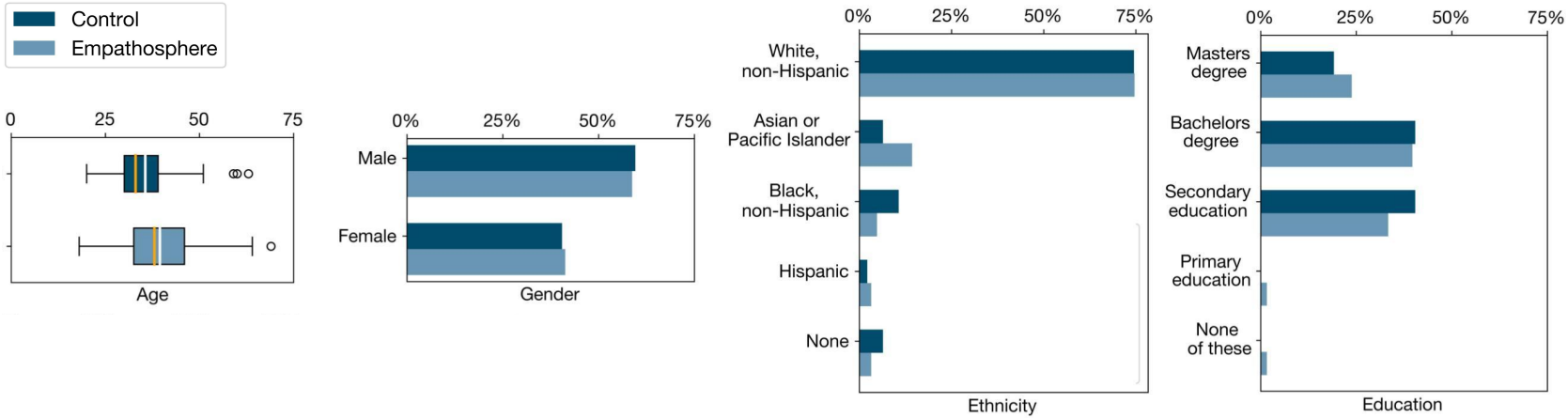
Binary:
willingness to give and receive feedback

Open ended:
"Would characterize the conversation in their group as open or guarded?"

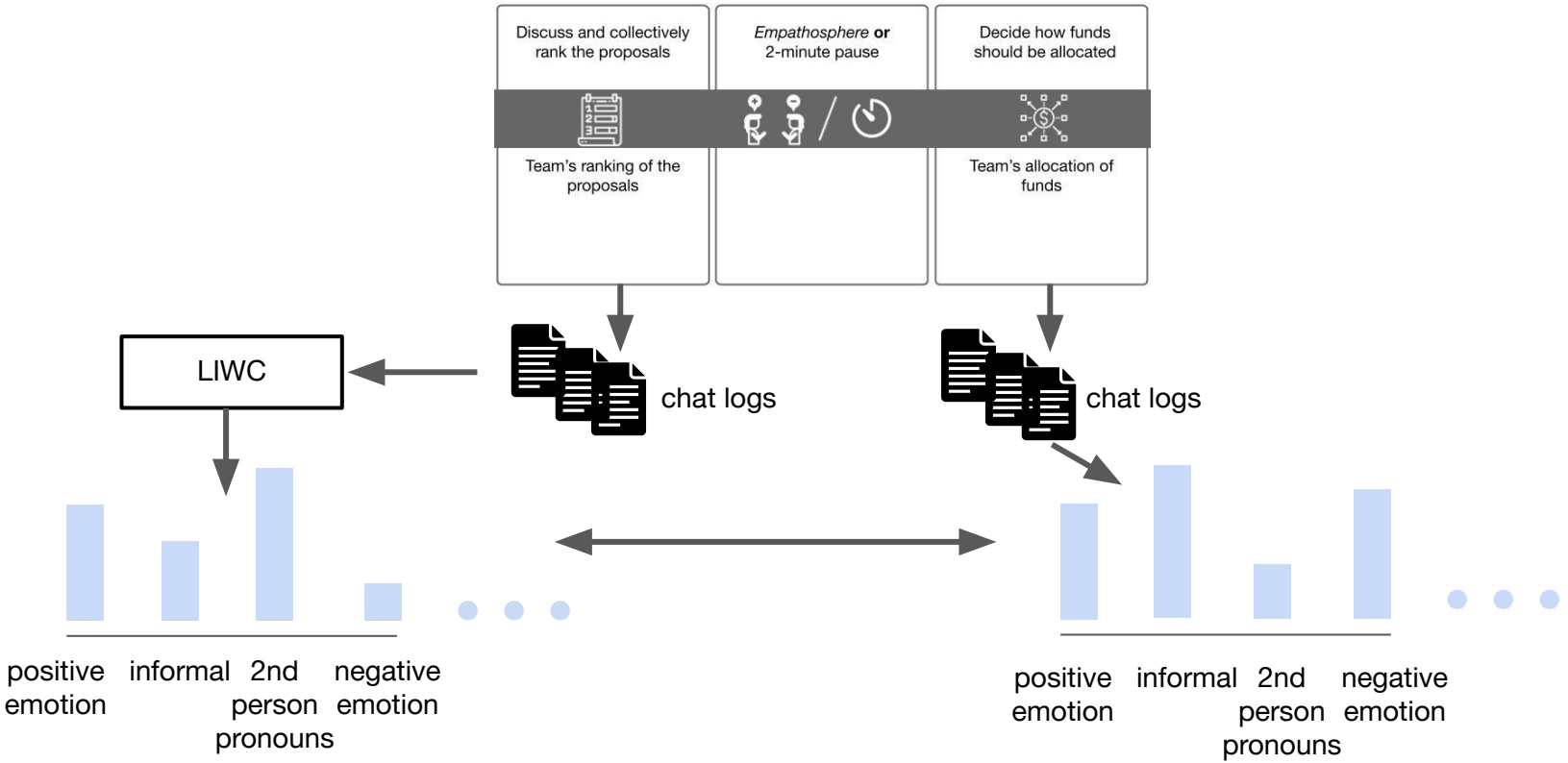
"How did you engage with the group in the second stage?"

Participants

A total of 110 participants completed the experiments across 24 teams with 4-6 members each. 11 teams in the control condition and 13 teams in the intervention condition.



Analyzing LIWC Indicators to understand changes in conversational behavior

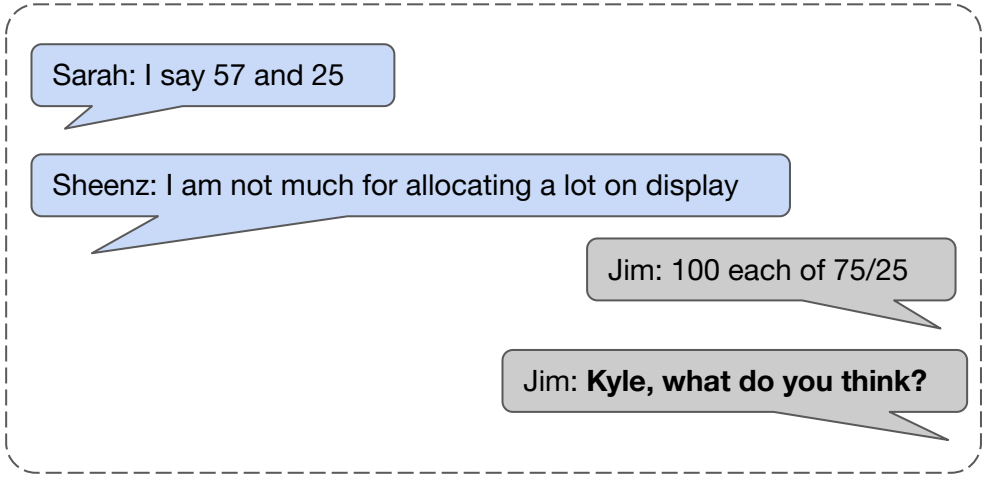


Result

Empathosphere led to an **increase in use of second-person pronouns (you, you've y'all, u)** suggesting that people **drew others into the conversation.** Teams used 89% more second-person pronouns in the decide phase ($p < 0.05$) than the discuss phase.

No significant difference in control condition.

Inviting others to voice their opinion:



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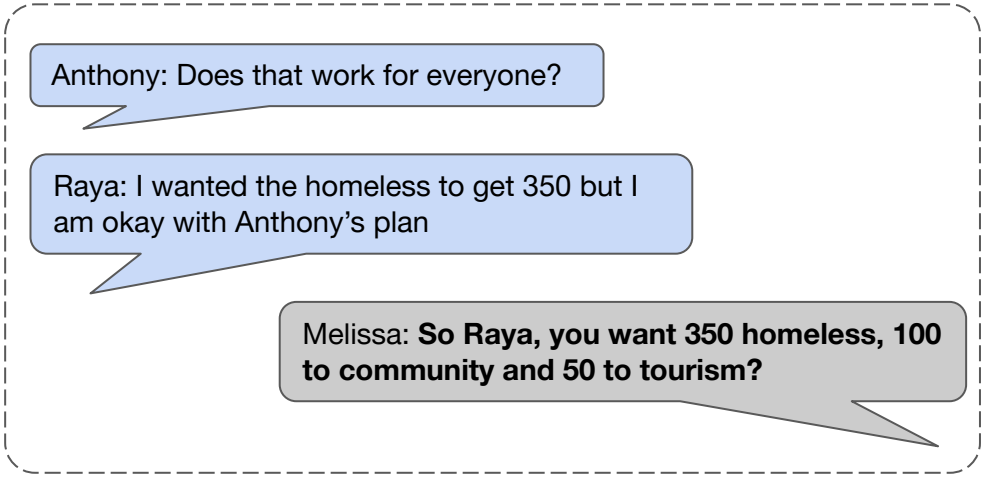
Trying **to understand** others' preferences:



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No significant difference in control condition.

Empathosphere led to a **27% increase in informal words** ($p < 0.05$) **and a 281% increase in netspeak** ($p < 0.001$) from the discuss to the decide phase.

In the control condition, use of **informal language decreased** by 24% but the difference was only marginally significant ($p = 0.09$).

Examples of responses to open-ended questions to understand participants' experiences in both conditions

Result: Empathosphere encouraged participants to voice disagreement while also making participants perceptive to other team members' behaviors

> "I felt like **everyone could voice their opinion**s, and **no one was shot down unfairly**."

> "Kate seemed to be the one that had the most ideas that differed from the group. The other 2 people seemed to be the most in line with me."

Result: Participants in the control condition reported a lack of engagement with others' opinions

> It was **not really as engaging** as I hoped. I had to get the ball rolling and **didn't really get any conflicting opinions**.

> It **did not appear that anyone wanted to dominate the conversation/debate** and therefore potentially **yielded quicker** than they would in person or make real decisions.

Result: Teams in the control condition reported polarized experiences with either too little to too much conflict.

> “I engaged with caution, trying to let some of the other members bounce ideas off of one another, but **no one was really into it**.”

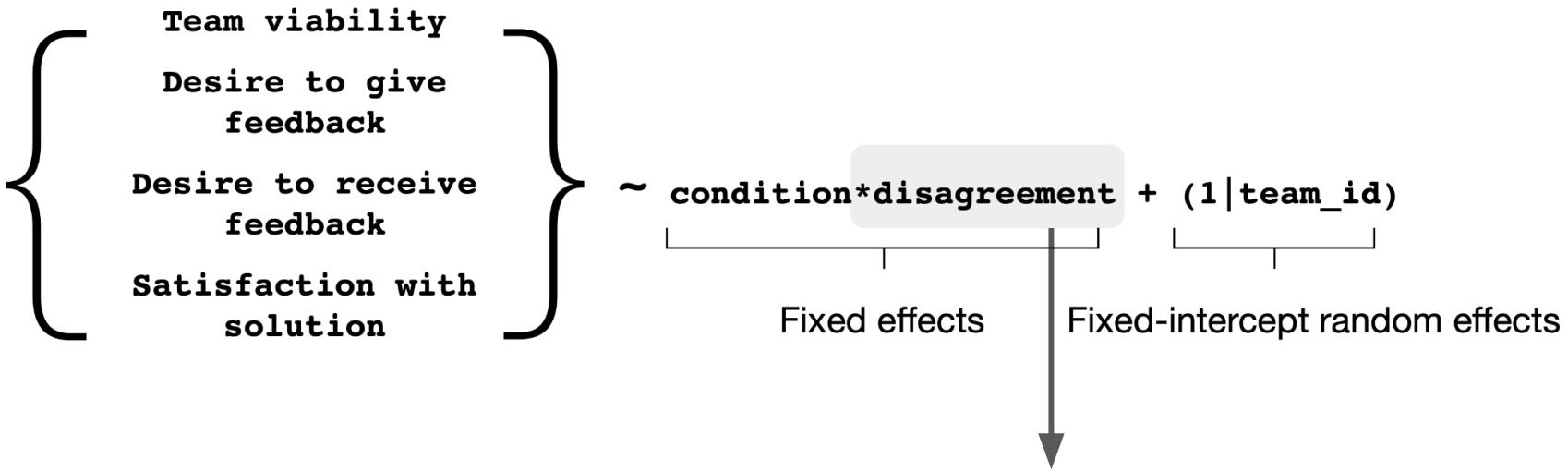
> “I tried to keep the group focused. However, **one person was not respectful of my ideas and made snide remarks about me being insecure**. That definitely hampered our progress.”

Result: Participants in the Empathosphere condition reported more compromise

> “I knew Williams’ personality and **he would have a suggestion and would want to be heard**.”

> “I suggested an alternative allocation of funds at one point and the **group reached an amicable decision taking** in everyone’s vote.”

Mixed effects models for likert-type and binary measures

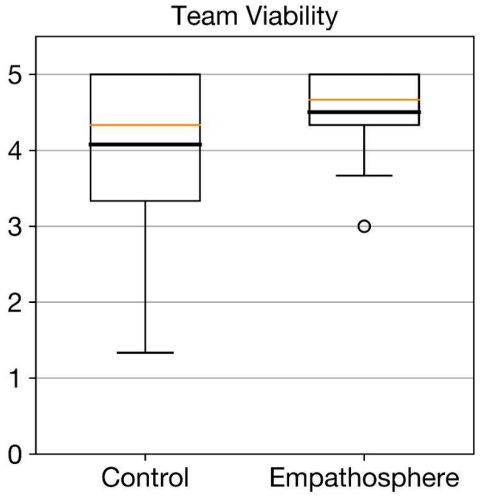


We use the participants' initial rankings of proposals and calculate the Spearman footrule between all pairs of rank vectors in a group.

Result

Result

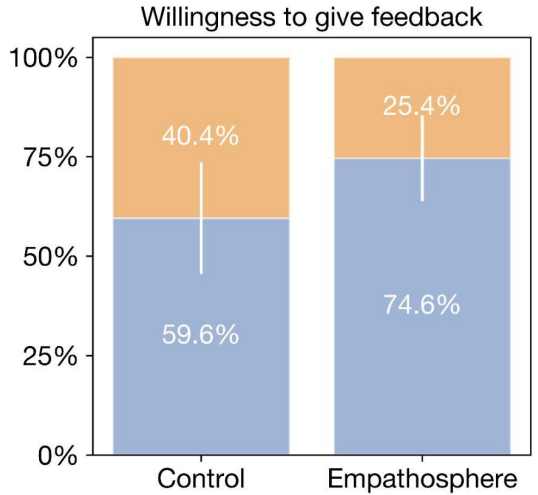
1 Empathosphere led to **higher** team viability



We observe a significant effect of **condition** (β = 0.49; 95% CI = 0.06,0.93; $p < 0.05$) and **disagreement** (β = –0.35; 95% CI = –0.63, – 0.07; $p < 0.05$) on team viability.

Result

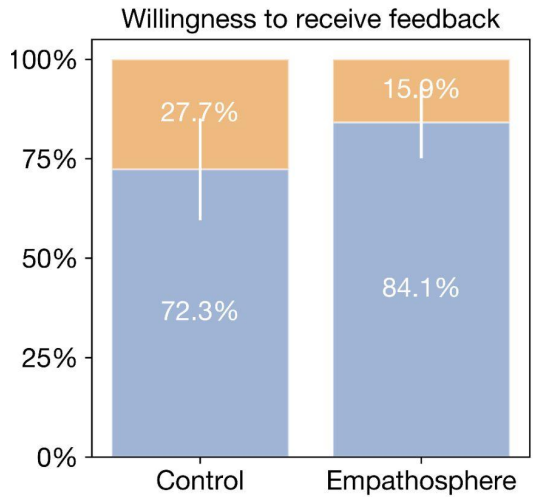
1. Empathosphere led to **higher** team viability
2. Empathosphere led to **higher** willingness to give feedback



We found a marginally significant effect of **condition** on **willingness to give feedback** (β = 0.78; 95% CI = –0.05,1.76; p = 0.067).

Result

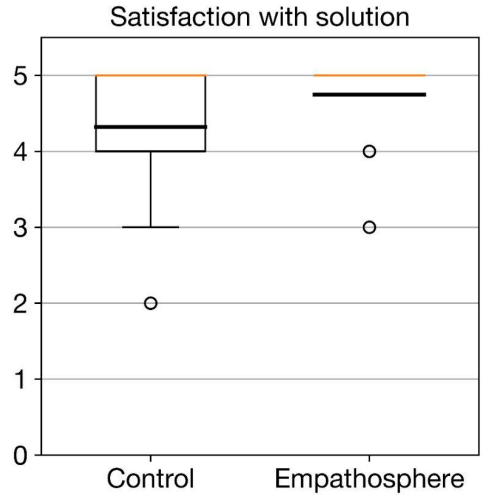
1. Empathosphere led to **higher** team viability
2. Empathosphere led to **higher** willingness to give feedback
3. Empathosphere led to **higher** willingness to receive feedback



We found a marginally significant effect of the experiment **condition** on **willingness to receive feedback** (β = 0.95; 95% CI = –0.14,2.24; p = 0.092).

Result

1. Empathosphere led to **higher** team viability
2. Empathosphere led to **higher** willingness to give feedback
3. Empathosphere led to **higher** willingness to receive feedback
4. Empathosphere led to **higher** satisfaction with the team's solution



We observed a significant effect of the **condition** on **satisfaction with solution** (β = 0.45; 95% CI = 0.09,0.80; $p < 0.05$).

Summary

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2. Empathosphere led to **higher** willingness to give feedback
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4. Empathosphere led to **higher** satisfaction with the team's solution

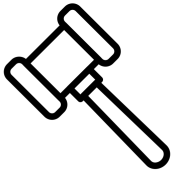
Empathosphere led to an **increase** in use of **second-person pronouns**.

> "I felt like **everyone could voice their opinion**s, and **no one was shot down unfairly**."

Ongoing and Future Work

- **Interventions to boost minority voices in teams?**
  Challenge: Even when members of the group might care about fairness and equitable participation, a lack of intentionality in enforcing inclusive norms can create a “chilly climate” for marginalized or underrepresented group members

- **Can we help online collectives negotiate governance systems for themselves?**
  Challenge: Self-organization inherent to online collectives. It challenging to establish and evolve governance systems since no one person is responsible for supplying norms and procedures.



- **Can we support consensus building at scale?**
  Challenge: Voting as a mechanism for decision making doesn’t allow new solutions to emerge nor does it allow people to develop the trust required for compromise. Consensus building allows both of those but it can be hard to engage large groups in constructive dialogue.

Contributions

- Empathosphere demonstrates the promise of **spaces for reflection and perspective-taking**
- Encouraging ad-hoc teams to **communicate openly**, and **expression of diverse and conflicting viewpoints improves team satisfaction and viability**

Reflections

- Technological support so far has viewed contributors as **detached providers of effort** instead of **stakeholders in the decision making**
- Technological supports for virtual groups should not just focus on performance and efficiency at scale but also **focus on well-being and group climate**

Thank you!

Contributions and reflections

- Empathosphere demonstrates the promise of **spaces for reflection and perspective-taking**
- Encouraging ad-hoc teams to **communicate openly**, and **expression of diverse and conflicting viewpoints improves team satisfaction and viability**
- Technological support so far has viewed contributors as **passive providers of effort** instead of **stakeholders in the decision making**
- Technological supports for virtual groups should not just focus on performance and efficiency at scale but also **focus on well-being and group climate**

Paper: bit.ly/empathosphere

Empathosphere: Promoting Constructive Communication in Ad-hoc Virtual Teams through Perspective-taking Spaces
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