Exploring Mismatches in Self-Others' Perceptions of Effort in Videoconferencing

Koutaro Kamada[*†]
Japan Advanced Institute of Science and Technology & NTT Social Informatics Labs
Nomi-shi, Ishikawa, Japan
kamada@jaist.ac.jp

Masami Takahashi[*]
NTT Social Informatics Labs
Yokosuka-shi, Kanagawa, Japan
msm.takahashi@ntt.com

Naomi Yamashita
Kyoto University & NTT Communication Science Labs
Kyoto-shi, Kyoto, Japan
naomiy@acm.org

Abstract

In distributed cooperative work, an individual's effort is often not properly perceived and mistakenly regarded as "loafing" by others, which can lower their motivation and potentially lead to unfortunate consequences. It remains unclear how mismatches in self-others' perceptions of effort arise in distributed environments. To explore this, we conducted an experiment with 12 four-person videoconferencing groups, followed by questionnaires and semi-structured interviews about mutual perceptions. The results showed that most participants whose self-evaluation exceeded evaluations from others explained their own effort through non-visible cues, such as listening or thinking, while others often focused on their seemingly passive behaviors, such as speaking mostly when prompted by the facilitator, instead of these non-visible cues. Conversely, facilitators or free riders were often evaluated higher by others yet judged themselves as putting in insufficient effort, such as not listening or generating ideas. We discuss future support methods for coordinating mismatches in distributed cooperative work.

CCS Concepts

• **Human-centered computing** → **Collaborative and social computing**; **Human computer interaction (HCI)**.

Keywords

Effort, Perceived loafing, Videoconferencing, Social loafing, Free riding, Engagement

ACM Reference Format:

Koutaro Kamada, Masami Takahashi, and Naomi Yamashita. 2025. Exploring Mismatches in Self-Others' Perceptions of Effort in Videoconferencing. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '25), April 26-May 1, 2025, Yokohama, Japan.* ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3706599.3719687

[*]Both authors contributed equally to this research.
[†]Work done during an internship at NTT.

CHI EA '25, Yokohama, Japan

ACM ISBN 978-1-4503-XXXX-X/2018/06
https://doi.org/10.1145/3706599.3719687

1 Introduction

Working in geographically distributed teams has become common, and computer-mediated communication (CMC) tools such as videoconferencing systems (e.g., Zoom or Microsoft Teams) are widely used. However, in such distributed environments, it is often difficult to judge how enthusiastically group members are working [16], so inaccurate perceptions of others' efforts can be formed [18]. In general, if a person is diligently working on a task yet is perceived by others as loafing, this can lead to a sense of unfairness or discomfort [1]. As a result, these mismatches in perception can often reduce long-term effort [5] and ultimately harm both individuals and groups.

In the domain of cooperative work, which includes the fields of Human Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW), there has long been a concern about the topic of loafing (low effort). Many prior works have focused on objective loafing (e.g., social loafing or free riding measured by the amount of speech [21, 22]) or perceptions of loafing from only one perspective, either self-only or others-only (e.g., self-perception of engagement [24]). They have often investigated methods or developed technical support to reduce loafing or increase motivation. However, as far as we know, there has been little attention devoted to situations where perceptions of loafing are mismatched between the self and others. Although a few studies have reported that mismatches are more likely to occur in distributed environments [18], where there is less access to social and contextual cues [42], there is a lack of research into how mismatches in mutual perceptions of effort arise.

Therefore, this paper focused on self-others' perceptions of effort in a videoconferencing environment and investigated how such mismatches arise. Our research question is as follows: How do mismatches between self-perception and others' perceptions of effort occur? (RQ)

We conducted an experiment with 12 four-person videoconferencing groups, followed by questionnaires and semi-structured interviews, to ask about self-others' perceptions of effort (N=48).

The results showed that most participants whose effort was evaluated lower by others than by themselves explained their own effort in terms of non-visible cues, such as listening or thinking. However, their group members often paid little attention to these cues and perceived what they interpreted as loafing on the basis of passive behaviors, such as speaking only when prompted by a facilitator. On the other hand, the effort of most facilitators or free riders was evaluated higher by others than by themselves. While most group members perceived them as working well, they explained that they

were not exerting sufficient effort because they did not adequately listen to others' opinions or think about their own ideas. This paper provides a detailed explanation of how mismatches in self-others' perceptions of effort occur and highlights design implications for future support methods to coordinate such mismatches.

2 RELATED WORK AND RESEARCH GAP

Social loafing and free riding are known as phenomena that reduce individual effort and motivation in group tasks, and they have long been a topic of interest in Cooperative Work, including the fields of HCI and CSCW (e.g.,[8, 16, 19, 26, 38]). Apart from actual loafing, perceived loafing among group members is believed to mutually influence each other's motivation [33]. Empirical studies have reported that there is a negative relationship between perceived loafing and group outcomes such as individual effort, group cohesion, group affective tone, or group members' satisfaction [2, 3, 14, 17, 25, 33, 40]. Therefore, understanding mutual perceptions of effort—not just one's own or others' own evaluations independently—is required.

Meanwhile, much of the existing research on distributed environments using CMC has focused on objective loafing behaviors or loafing perceptions from only one side (either the self or others) and has aimed at suppressing loafing or increasing effort. In the HCI and CSCW fields, based on Media Richness Theory [11, 12], strategies for enriching CMC and reinforcing social presence [36] have been shown to reduce perceived loafing [7]. Some studies have specifically tried to enhance engagement levels by strengthening eye contact and sharing gaze [24]. There is a possibility that intervening directly in a discussion can suppress loafing or increase motivation. A facilitator can be used as one method [23, 35], and to lessen the facilitator's cognitive load, some systems support human facilitation [27]. Another approach is to have conversational bots join the discussion as facilitators, allocating speaking turns and power more evenly among participants (e.g., encouraging quieter members to speak). This has been shown to facilitate more balanced discussion contributions [21, 22]. Alternatively, without using a facilitator, voice recognition technology can enable real-time visualization of speaking time to encourage balanced turn-taking [4, 28].

On the other hand, in a few empirical studies, mismatches in the perception of effort have been reported in distributed environments [18]. Attribution errors can occur even when members are physically co-located, but they can become exacerbated in distributed environments using CMC tools [9]. In general, people do not have the time, information, or cognitive resources to precisely evaluate all individuals' unique strengths and weaknesses, so they often form heuristic judgments and attributions of others' behavior, potentially leading to perceptual errors [10]. In distributed environments using CMC, participants' cognitive loads tend to be high [9], and access to social and contextual cues is limited [42] [15]. As a result, it becomes more difficult for group members to observe and evaluate each other's work [16], leading to more guessing about others' work [31]. This is thought to have the potential to affect perceptions of loafing [19]. Nevertheless, as previously mentioned, in distributed environments, little attention has been paid to mutual perceptions because the focus has been on objective loafing and perceptions of oneself or others only [18, 34]. One empirical study in the field of online communities does suggest that mismatches, such as not being perceived by others as doing the amount of work one actually does or being overvalued relative to one's own self-perception, can lead to decreased effort in the long term [5], with potentially negative consequences for individuals, groups, and communities. From this background, our paper focuses on mutual perceptions of effort in videoconferencing and, more specifically, on how mismatches between self and others' evaluations arise.

3 METHOD

In this exploratory study, a 40-minute videoconferencing experiment was conducted online with 12 groups of four participants each in September and October 2024. A questionnaire and semi-structured interview were conducted with all participants to ask about their self-other perceptions of effort (N = 48), and both quantitative and qualitative data were analyzed to answer the RQ. The experiment was conducted in Japan. This study was approved by the IRB of the author's institution.

3.1 Participants

We publicly recruited a total of 48 participants (aged 18 or older) through a third-party Japanese personnel agency for a study announced as "research on group dynamics in videoconferencing" (Table1). The people who registered for it viewed the recruitment and decided to participate of their own volition. Participants were paid 8,000 JPY. All the participants met each other for the first time. To eliminate the effect of differences in native language, we restricted participants to native Japanese speakers. Furthermore, because the experiment required an environment and the capability to conduct videoconferencing, participants had to be able to join a videoconference via PC and have prior experience with videoconferencing.

Table 1: Demographic Information

Gender	Age
Female: 26 (54.2%)	18-24: 5 (10.4%)
Male: 21 (43.8%)	25-34: 10(20.8%)
Others: 1 (2.1%)	35-44: 14 (29.2%)
	45-54: 16 (33.3%)
	55-: 3 (6.3%)

3.2 Task

We adopted a modified version of the task developed by Duan et al. [13], which was based on the Legislative Dilemma Task [30]. In this scenario, participants took on the role of UNESCO representatives who had to allocate a total of $1.8 billion in funding among four competing healthcare-related support projects. The constraint was that they could select only two projects: one could be fully funded with $1 billion, and the other partially funded with $800 million. This task was a dilemma task with no clear correct answer, and it simulated many multi-party collaborations.

3.3 Procedure

All participants followed the same procedure. Participants who had previously given informed consent for this experiment took part in the experiment via Zoom from their homes at the scheduled time. During the experiment, participants were addressed anonymously as A, B, C, or D. After entering the Zoom session, they first checked their audio and webcam settings and received an explanation of the procedures. Before the start of the main discussion, a 5-minute training discussion was conducted to check the environment and their understanding of the task, and a 40-minute main discussion was conducted. Before the discussion, participants had 5 minutes of individual preparation time to decide which project they would choose. In the main discussion, they were asked to discuss their reasons for supporting a project, any supplementary information, and personal experiences while considering other members' opinions. During the discussion, the display window positions of the participants were fixed using the Zoom pinning function so that participants, who were meeting for the first time, could easily recognize each other. Participants were also able to check the remaining time and read the PDF file explaining the task at any time. They were also permitted to use any tools or devices (e.g., Zoom's built-in collaboration tools, internet search, personal smartphones) to simulate a real-life discussion environment. After the discussion, all participants completed a 10–15-minute questionnaire via Microsoft Forms about their self-other perceptions of effort. Finally, each participant was moved to a breakout room and took part in a 20–35-minute semi-structured interview session for a more in-depth discussion of their self-other perceptions of effort. During the experiment, each participant's video and audio were recorded via Zoom. All spoken content during the discussion and interviews was transcribed automatically using a Zoom function, saved as text data. The entire experiment lasted approximately 2.5 hours.

3.4 Measurement

After the discussion, a questionnaire was administered to all participants to collect demographic data and questions about their self-other perceptions of effort. Demographic questions included gender, age range, videoconferencing experience, and whether they knew anyone else in the group. Participants were asked about their own efforts and the other three members' efforts. The question was phrased as "Apart from their contribution, how much effort do you think A (or B, C, D, you) put in?", and participants were asked to answer using a 7-point Likert scale (1 = Not putting in effort at all, to 7 = Fully putting in effort). After the questionnaire was completed, we conducted a semi-structured interview with all participants to further explore their self-other perceptions of effort. Each participant moved to a breakout room and participated individually in a 20–35-minute semi-structured interview. One of the three authors served as the interviewer, using the same protocol in Japanese. The interview questions covered the impressions participants formed of themselves and each of the other group members, their impressions of each member's effort and the specific situations leading to those impressions, specific situations where they themselves tried hard or did not try hard, strategies for showing effort, strategies to avoid letting others notice any lack of effort, and other emerging topics.

3.5 Data Analysis

On the basis of the questionnaire responses, we identified participants (and their group members) who showed mismatches in their self-other evaluation of effort and examined how these mismatches arose in their groups. In this study, mismatches in self-other evaluations were defined with two patterns, using the self and other (three members) effort scores from the questionnaire: 1) Self-evaluation exceeds other evaluations: The participant's self-evaluation was the highest in the group, surpassing the average of the other three members' evaluations; 2) Others' evaluations exceed self-evaluation: The participant's self-evaluation was the lowest in the group, falling below the average of the other three members' evaluations.

In our analysis, we first identified participants who met this definition of mismatches. We then focused on those participants' groups and extracted from the transcripts any statements related to their self-perception of effort, such as specific situations where they themselves tried hard or did not try hard, strategies for showing effort, and strategies to avoid letting others notice any lack of effort. These statements were coded exploratory by one of the authors. For others' perceptions of a participant's effort, we coded statements regarding their impressions of each member's effort and the specific situations leading to those impressions. Using thematic analysis [6], one of the authors arranged the code into themes. The authors then collaboratively and iteratively reviewed and discussed the codes and themes, reaching a consensus.

4 RESULTS

According to our definitions, a mismatch where their self-evaluation exceeded others' evaluations occurred for 9 out of 48 participants (18.8%), and the opposite, where others' evaluations exceeded their self-evaluations, occurred for 21 participants (43.8%). Below, we delve into how these mismatches occurred by analyzing interviews from groups with participants who demonstrated mismatches. For interview quotations, we refer to each participant by their group number and anonymous label (e.g., G1A). At the end of quotes, we indicate the participant's rating for the target (1 = Not putting in effort at all, to 7 = Fully putting in effort).

4.1 Cases Where Self-Evaluation Exceeded Others' Evaluation

Among the 9 participants whose self-evaluation exceeded others' evaluations, the interview revealed the specific circumstances of 6 participants (66.7%), and seven of these 9 participants (77.8%) assigned themselves the maximum score of 7. Below, we focus on the 6 participants and show how these mismatches arose in the groups. Three participants reported that they worked hard such as on "listening" or "thinking," but their group members did not focus on or notice these non-visible cues, resulting in lower evaluations from others than self-evaluations. For example, participant G1B said they focused on following the discussion and thinking about the task, which is challenging for G1B, but this situation was not taken into account by their group members, leading this participant to be perceived as loafing. Even though G1C had predicted this situation, the small amount of conversation led them to form the perception that G1B was a loafer.

> G1B: *"First of all, I was really trying to listen to everyone. [...] I did my best to answer the questions I was asked. [...] (Did you search for information?) I was listening and thinking, so I didn't have time to search..."* (Self-evaluation: 5, Mean of others' evaluations: 3.33)
>
> G1C: *"In B's case, it looked like there were times he/she didn't seem to be putting in much effort. [...] I think B probably lacked knowledge and thus talked less, and it became harder to see how hard he/she was actually working."* (Evaluation of G1B: 3)

Furthermore, G1B was perceived as passive by G1D because they did not engage in information searching activities and only spoke when prompted to by the facilitator:

> G1D: *"He/She could have been a bit more proactive. [...] He/She barely spoke unless prompted. [...] It didn't look like he/she was looking anything up during the discussion, so I didn't get the impression that he/she was working hard."* (Evaluation of G1B: 2)

Such as this case, 3 participants were deemed to not be making sufficient effort because they did not appear to be searching for information on the Internet, and 2 participants were perceived as loafing because they only spoke after the facilitator prompted them. Although several other participants made similar comments, the opportunity to demonstrate information search activities often hinged on explicitly saying that they were researching or sharing their screen, making it less likely for others to notice. Indeed, some participants discussed information search activities as follows.

> G7B: *"If A had not actually said that they had looked something up, I wouldn't have known. You really can't tell unless you say it."*

Additionally, some participants refrained from offering opinions in an attempt to avoid creating confusion or to maintain consensus. However, others interpreted this silence differently, creating mismatches in the perception of effort:

> G2A: *"I refrained from speaking because I wanted to help everyone reach a consensus. I was aiming to arrive at a conclusion in 40 minutes."* (Self-evaluation: 7, Mean of others' evaluations: 5.67)
>
> G2B: *"(About G2A) I felt he/she was a bit reserved with other people and discussion. [...] I didn't see him/her expressing his/her opinions very proactively."* (Evaluation of G2A: 4)

4.2 Cases Where Others' Evaluation Exceeded Self-Evaluation

Among the 21 participants whose evaluations of others exceeded their self-evaluation, the interview revealed the 18 participants (85.7%) referenced specific behaviors to explain why they thought they had not worked hard, but other group members based their positive evaluations on entirely different behaviors. Below, we focus on two main factors: 1) Facilitators perceived they lacked outputs, but group members highly valued facilitation (7/18, 38.9%); 2) Social loafing or free riding went unnoticed by others (4/18, 22.2%).

4.2.1 Facilitators who evaluated themselves lower than others. Most facilitators received high evaluations based on their actions in coordinating the discussion, such as prompting others to speak, taking notes, and summarizing (Mean evaluation from others for all facilitators = 6.35, SD = 0.40). In total, among the 48 participants, 16 were identified in the questionnaire or interviews as facilitators, and 11 of these facilitators received higher evaluations from others than self-evaluations. Moreover, 7 facilitators reported that due to cognitive load, they could not afford to listen to others or think of their own ideas, so self-evaluations were lower than others' evaluations because there were few outputs such as expressed opinions. The following quotes summarize this case:

> G1C: *"I was juggling multiple tasks at once, like prompting others to talk and trying to understand what they said. Honestly, there were moments when I was writing notes but not really listening."* (Self-evaluation: 5, Mean of others' evaluations: 7)

4.2.2 Social loafing or free riding going unnoticed. Four participants admitted to loafing but were nonetheless evaluated as working well by many others. They explained that they concealed it by nodding or verbally affirming others to appear engaged. This is a typical example of social loafing/free riding. There were also 4 participants across all groups (12 groups) who self-reported themselves as free riders. Most group members were unaware of their lack of effort, and although some group members felt something was wrong on the basis of clues such as their comments that were off-topic (3/12, 25%), and a few group members identified them as loafing (2/12, 16.7%). Below are comments from G10B, who considered themselves a free rider, G10A, who noticed something "off" about G10B, and G10D, the facilitator who did not notice G10B's loafing:

> G10B: *"There were definitely times when I just wanted to loaf (because I was sleepy and lost concentration). To avoid detection, I made sure to show I was listening by throwing in nods. [...] I might not have actually followed what people were saying, but I tried to at least look like I was listening."* (Self-evaluation: 3, Mean of others' evaluations: 5.34)
>
> G10A: *"(Pointing out a statement from G10B that didn't quite match the context of the discussion) It kind of gave me the impression that B might be a bit scatterbrained."* (Evaluation of G10B: 5)
>
> G10D: *"(About G10B) I think he/she was working the hardest besides me. He/She was definitely putting out a lot of opinions and listening to others."* (Evaluation of G10B: 6)

5 DISCUSSION

Our findings indicated that mismatches in self-others' perceptions of effort often occur in videoconferencing environments. We focused on the cases of these participants and highlighted the main factors.

When individuals base their self-evaluations on internal states such as "listening" or "thinking," these non-visible cues cannot be directly observed, so others might give a lower evaluation than

themselves. Previous research [18] believed that in distributed environments, people tend to evaluate their own efforts primarily via internal factors, while they judge others' efforts on the basis of observable behaviors. Moreover, participants who felt that the task was difficult or who perceived a knowledge or experience gap with other members devoted significant cognitive resources to simply following the discussion, increasing their cognitive load. Even if other members guessed that might be the case, they often did not focus on or notice it, relying instead on cues about passive behaviors, such as speaking when prompted to do so. Previous research has shown that cognitive load can make it more likely for people to experience impression mismatches because they cannot afford to manage their impressions [9, 15], and this is particularly likely to occur in distributed environments [9]. Our results also showed that cognitive load might have limited behavior that manages the impression of effort. Also, 7 of the 9 participants with lower evaluations from others than self-evaluations gave themselves 7 points (maximum). It is also thought that particularly high self-evaluations are one of the factors leading to mismatches with group members. On the other hand, most facilitators had a high cognitive load and were unable to provide outputs such as their own opinions, and there was a tendency for them to evaluate themselves lower than others. It is thought that they also could not afford to manage their impression because of cognitive load, but it is inferred from the interview results that they received particularly high evaluations from others due to their visible actions of coordinating the discussion. Therefore, our findings suggest that the problem of mutual perception caused by cognitive load in videoconferencing may occur in a variety of contexts. Finally, the self-reported free riders often went undetected by group members. Because others had only limited views of their behavior through the video interface, interpreting the meaning behind such behavior proved difficult. This is in line with previous findings that in distributed environments, group members have difficulty observing and evaluating each other's work, resorting more frequently to guesswork [16, 31].

5.1 Design Implications

5.1.1 Implications for facilitation design that does not exacerbate mismatch. One of the typical designs of existing discussion facilitation is to encourage quiet people to speak up, but this can increase the mismatch in self-others' perceptions of effort and have a negative impact on long-term individual motivation [5]. Many current facilitator bots have implemented prompts to ask participants who are not speaking or expressing their opinions to speak up in order to balance the amount of conversation, and this can lead to equal contributions to the discussion (e.g., [21, 22, 28]). However, as our research has shown, participants who are named by the facilitator to speak may be judged as having a passive attitude, regardless of their own intentions, so this support could increase mismatches in mutual perception of effort. Therefore, from an impression management perspective, we do not recommend announcing to the entire group that a facilitator (or system) is encouraging a quieter member to talk. For example, a private message nudging the quieter participant to speak might be a better approach.

5.1.2 Implications for CMC tools for coordinating mismatch. In previous research on cooperative work, based on Media Richness Theory [11, 12], there have often been studies that have sought to suppress perceived loafing by enriching CMC, particularly by strengthening the transmission of non-verbal information [7]. In distributed environments using CMC, it is thought that group members' impressions are constructed by cues that are easier to convey [37], so it is thought that care should be taken to consider what awareness should be enhanced. To coordinate mismatches in self-others' perceptions of effort, we propose ways to extend CMC so that effort can be more accurately perceived.

First, for people who are listening and thinking hard and following the discussion but whose efforts are not visible in their actions, others can recognize their hard work by visualizing their internal states as actions on the basis of physiological data (e.g., [41]). For example, we propose that one way to convey cognitive load is through animations that show what people are listening to or thinking in real time. Also, many participants linked effort to information search activities using the Internet. However, existing methods for demonstrating one's search behavior by explicitly stating it or screen sharing were insufficient. Merely announcing one is doing a search can be inaccurate and might make actual free riders harder to detect. Screen sharing does allow members to see who is searching for what in real time, but it forces others to watch a shared screen, placing additional cognitive demands on them. Therefore, we propose the development of a collaborative search support tool that automatically shares information such as search histories, with reference to existing collaborative search systems [20, 32], in the context of coordinating mismatches in self-others' perceptions of effort.

5.2 Limitations

We understand the following limitations of this experiment and consider that future work will need to address them. First, there may be biases due to the laboratory-based nature of the experiment. Participants were recruited through crowdsourcing and might have had varying levels of interest in the experiment, the videoconferencing, or the task, potentially influencing their effort. In social psychology, laboratory experiments on loafing have discussed these limitations [19, 29], and some researchers recommend field studies (e.g., [29]). Future work could involve conducting field investigations to compare with our laboratory findings. Second, all participants in this study were Japanese. Differences in social backgrounds, such as culture and linguistics, can influence social loafing [19], so the generalizability of our results should be considered with caution. Prior research indicates that Japanese participants tend to exhibit a self-critical bias [39], and indeed, several participants explicitly mentioned a self-critical trait during our interviews. Future work should replicate these experiments with participants from diverse cultural and linguistic backgrounds to explore how social context, social cognition, and cues shape perceptions of effort in distributed environments. Finally, our experiment was conducted using a single task in a short-term collaboration, which may limit the generalizability of our findings. Future work should be conducted using several types of tasks and in a long-term collaboration environment.

6 CONCLUSION

This paper investigated mismatches in self-others' perceptions of effort in videoconferencing environments. Our findings indicate that participants who received lower evaluations from others than their own self-evaluation often considered themselves to be working hard, such as listening or thinking, while their group members had little focus on these non-visible cues and perceived loafing on the basis of the participant's seemingly passive behaviors. Conversely, facilitators or free riders were often credited with high effort by their group members, but they reported not making sufficient effort themselves as evidenced by a lack of work, such as not listening to others' opinions or thinking about their own ideas, leading to mismatches. We offered a detailed explanation of how mismatches occur and proposed insights for designing future support methods that reconcile mismatches. In particular, we highlighted the consideration of facilitation designs that do not magnify mismatches and ways to extend CMC tools so that effort is more accurately observed and understood.

References

[1] J. Stacy Adams. 1965. *Inequity in social exchange*. Vol. 2. Academic Press. 267–299 pages.

[2] Praveen Aggarwal and Connie L. O'Brien. 2008. Social loafing on group projects: Structural antecedents and effect on student satisfaction. *Journal of Marketing Education* 30 (2008), 255–264. doi:10.1177/0273475308322283

[3] Robert Albanese and David D. Van Fleet. 1985. Rational behavior in groups: The free-riding tendency. *Academy of Management Review* 10 (1985), 244–255.

[4] Tony Bergstrom and Karrie Karahalios. 2007. Conversation Clock: Visualizing audio patterns in co-located groups. In *2007 40th Annual Hawaii International Conference on System Sciences (HICSS'07)*. IEEE, Waikoloa, HI, USA, 78–78. doi:10.1109/HICSS.2007.151

[5] Samadrita Bhattacharyya, Shankhadeep Banerjee, Indranil Bose, and Atreyi Kankanhalli. 2020. Temporal Effects of Repeated Recognition and Lack of Recognition on Online Community Contributions. *Journal of Management Information Systems* 37 (2020), 536 – 562. doi:10.1080/07421222.2020.1759341

[6] Virginia Braun and Victoria Clarke. 2006. Using Thematic Analysis in Psychology. *Qualitative Research in Psychology* 3 (2006), 77–101. doi:10.1191/1478088706qp063oa

[7] Stephanie M. Bryant, Susan M. Albring, and Uday Murthy. 2009. The effects of reward structure, media richness and gender on virtual teams. *Int. J. Account. Inf. Syst.* 10 (2009), 190–213. doi:10.1016/j.accinf.2009.09.002

[8] Laku Chidambaram and Lai-Lai Tung. 2005. Is out of sight, out of mind? An empirical study of social loafing in technology-supported groups. *Information Systems Research* 16 (2005), 149–168. doi:10.1287/isre.1050.0051

[9] Catherine D. Cramton. 2002. *Attribution in Distributed Work Groups*. The MIT Press. 191–212 pages.

[10] Amy J. C. Cuddy, Peter Glick, and Anna Beninger. 2011. The dynamics of warmth and competence judgements, and their outcomes in organizations. *Research in Org. Behavior* 31 (2011), 73–98.

[11] Richard L. Daft and Robert H. Lengel. 1986. Organizational information requirements, media richness and structural design. *Management Science* 32, 5 (1986), 554–571.

[12] Richard L. Daft and John C. Wiginton. 1979. Language and organization. *The Academy of Management Review* 4, 2 (1979), 179–191.

[13] Wen Duan, Naomi Yamashita, Yoshinari Shirai, and Susan R. Fussell. 2021. Bridging Fluency Disparity between Native and Nonnative Speakers in Multilingual Multiparty Collaboration Using a Clarification Agent. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW2 (2021), Article 435, 1–31.

[14] Michelle K Duffy and Jason D Shaw. 2000. The Salieri syndrome: Consequences of envy in groups. *Small Group Research* 31 (2000), 3–23. doi:10.1177/104649640003100101

[15] Helen Ai He, Naomi Yamashita, Ari Hautasaari, Xun Cao, and Elaine M. Huang. 2017. Why Did They Do That? Exploring Attribution Mismatches Between Native and Non-Native Speakers Using Videoconferencing. In *CSCW '17*. 297–309.

[16] Guido Hertel, Susanne Geister, and Udo Konradt. 2005. Managing virtual teams: A review of current empirical research. *Human Resource Management Review* 15 (2005), 69–95. doi:10.1016/j.hrmr.2005.01.002

[17] Rune Høigaard, Reidar Säfvenbom, and Finn Egil Tønnessen. 2006. The relationship between group cohesion, group norms, and perceived social loafing in soccer teams. *Small Group Research* 37, 3 (2006), 217–232.

[18] Koutaro Kamada, Ryuya Watarai, Tzu-Yang Wang, Kentaro Takashima, Yasuyuki Sumi, and Takaya Yuizono. 2023. Explorative study of perceived social loafing in VR group discussion: A comparison between the poster presentation environment and the typical conference environment. In *IFIP TC.13 International Conference on INTERACT, LNCS*, Vol. 14144. 115–134.

[19] Steven J. Karau and Kipling D. Williams. 1993. Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology* 65 (1993), 681–706. doi:10.1037/0022-3514.65.4.681

[20] Ryan Kelly and Stephen J. Payne. 2014. Collaborative Web Search in Context: A Study of Tool Use in Everyday Tasks. In *CSCW*. ACM, 807–819.

[21] Soomin Kim, Jinsu Eun, Changhoon Oh, Bongwon Suh, and Joonhwan Lee. 2020. Bot in the Bunch: Facilitating Group Chat Discussion by Improving Efficiency and Participation with a Chatbot. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. 1–13.

[22] Soomin Kim, Jinsu Eun, Joseph Seering, and Joonhwan Lee. 2021. Moderator Chatbot for Deliberative Discussion: Effects of Discussion Structure and Discussant Facilitation. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW1 (2021), Article 87, 26 pages. doi:10.1145/3449161

[23] Malcolm S. Knowles. 1989. *The making of an adult educator. An autobiographical journey*. Jossey-Bass, San Francisco.

[24] Chandan Kumar, Bhupender Kumar Saini, and Steffen Staab. 2024. Enhancing Online Meeting Experience through Shared Gaze-Attention. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '24)*. Association for Computing Machinery, New York, NY, USA, Article 128, 1–6. doi:10.1145/3613905.3651068

[25] Chris Lam. 2015. The role of communication and cohesion in reducing social loafing in group projects. *Business and Professional Communication Quarterly* 78, 4 (2015), 454–475. doi:10.1177/2329490615596417

[26] Bibb Latané, Kipling Williams, and Stephen Harkins. 1979. Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology* 37, 6 (1979), 822–832.

[27] Sung-Chul Lee, Jaeyoon Song, Eun-Young Ko, Seongho Park, Jihee Kim, and Juho Kim. 2020. SolutionChat: Real-time Moderator Support for Chat-based Structured Discussion. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. 1–12.

[28] Xiaoyan Li, Naomi Yamashita, Wen Duan, Yoshinari Shirai, and Susan R. Fussell. 2022. Improving Non-Native Speakers' Participation with an Automatic Agent in Multilingual Groups. *Proc. ACM Hum.-Comput. Interact.* 7, GROUP (2022), Article 12, 1–28. doi:10.1145/3567562

[29] Robert C. Liden, Sandy J. Wayne, Renata A. Jaworski, and Nathan Bennett. 2004. Social loafing: A field investigation. *Journal of Management* 30, 2 (2004), 285–304. doi:10.1016/j.jm.2003.02.002

[30] Brian E. Mennecke, Joseph S. Valacich, and Bradley C. Wheeler. 2000. The Effects of Media and Task on User Performance: A Test of the Task-Media Fit Hypothesis. *Group Decision and Negotiation* 9, 6 (2000), 507–529.

[31] Lucas Monzani, Pilar Ripoll Botella, Jose M. Peiró, and Rolf van Dick. 2014. Loafing in the digital age: The role of computer mediated communication in the relation between perceived loafing and group affective outcomes. *Computers in Human Behavior* 33 (2014), 279–285. doi:10.1016/j.chb.2014.01.013

[32] Meredith Ringel Morris and Eric Horvitz. 2007. SearchTogether: An Interface for Collaborative Web Search. In *UIST*. ACM, 3–12.

[33] Paul W. Mulvey and Howard J. Klein. 1998. The impact of perceived loafing and collective efficacy on group goal processes and group performance. *Organizational Behavior and Human Decision Processes* 74, 1 (1998), 62–87.

[34] Sherry L. Piezon. 2011. *Social loafing and free riding in online learning groups*. Doctoral dissertation. Florida State University Libraries.

[35] Alfred P. Rovai. 2007. Facilitating online discussions effectively. *Internet High. Educ.* 10 (2007), 77–88. doi:10.1016/J.IHEDUC.2006.10.001

[36] John Short, Ederyn Williams, and Bruce Christie. 1976. *The social psychology of telecommunications*. John Wiley & Sons, New York.

[37] John Storck and Lee Sproull. 1995. Through a Glass Darkly What Do People Learn in Videoconferences? *Human Communication Research* 22, 2 (1995), 197–219.

[38] James Suleiman and Richard T. Watson. 2008. Social loafing in technology-supported teams. *Computer Supported Cooperative Work (CSCW)* 17, 4 (2008), 291–309. doi:10.1007/s10606-008-9075-6

[39] Toshitake Takata. 2003. Self-Enhancement and Self-Criticism in Japanese Culture: An Experimental Analysis. *Journal of Cross-Cultural Psychology* 34, 5 (2003), 542–551. doi:10.1177/0022022103256477

[40] Chih-Ching Teng and Yu-Ping Luo. 2015. Effects of perceived social loafing, social interdependence, and group affective tone on students' group learning performance. *The Asia-Pacific Education Researcher* 24 (2015), 259–269. doi:10.1007/s40299-014-0177-2

[41] Pieter Vanneste, A. Raes, Jessica Morton, K. Bombeke, B. V. Van Acker, Charlotte Larmuseau, F. Depaepe, and W. Van den Noortgate. 2020. Towards measuring cognitive load through multimodal physiological data. *Cognition, Technology & Work* 23 (2020), 567 – 585. doi:10.1007/s10111-020-00641-0

[42] Joseph B. Walther. 1996. Computer-mediated communication: Impersonal, interpersonal and hyperpersonal interaction. *Communication Research* 23, 1 (1996),

3–43.