Investigating the Effects of Self-Image Feed in Task-Oriented Video-Mediated Communication

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Introduction

Video chat is used in many task-oriented, computer-mediated-communication contexts; called video-mediated-communication (VMC) in such cases. In VMC, users are able to see their own facial feedback through a separate window on the screen, which can be adjusted into smaller or bigger sizes. Remote work, be it for schooling, or a job, has long since become a regular feature of modern life. From front-face camara lens installed on portable phones to the flipped camera monitor on single lens camera, accessibility to one's own facial appearance or bodily appearance sees increasing popularization and normalization in people's life. The constant interaction with self-image, however, has been widely speculated with its potential negative outcomes on people since the beginning of technological advancement. Taken the analogy of Narcissus, many cultural norms include expectations that disputte the act of self-gaze due to its ulterior influence on self-obsession, or the opposite, self-hatred (Marcus, 2020; Pfund et al., 2020,). Regardless of prior worrisome towards this novel feature of technology, research has indicated a complex variety of observations and empirical results suggesting different implications regarding the affordance to self-focus on social platforms. While some pointed out elevated exposure of self-representation induces an overflow of social comparison and decremented self-esteem (Midgley et al., 2021), other results observed an aiding effect in improving the sense of control in social relations as well as self-image perception (Harriger & Pfund, 2022; Toma & Choi, 2016).

In particular, a practical function that features affordance of exposing one to oneself consistently while internet using is the small window that can demonstrate one's own video on videoconference applications. Upon influence of the worldwide pandemic, online education and online working become more prevalent than ever, and many have been influenced from various

mediators brought forth by the increasing use of this feature. To strive for a comprehensive understanding towards its effect, investigative inquiry addressing the impact of self-video feed is in great demand. As a response to this, we propose our research question: how does self-video feedback in VMC affect subjective experience and performance in different tasks? By assessing the degree to which video-feed impacts task completion over VMC, we intent to probe for the optimal practice via VMC, and to provide empirical reference to the technical design and suggestive use guidelines of future VMC application development.

The synchronous perception of own faces is never usual in human history, as reflected by the clichéd metaphor of the mythological figure of Narcissus, yet with soaring prevalence of novel technological affordances, e.g., front-facing camera, viewing and processing one's own appearance have become a mundane routine. The effects of the significant emphasis on self-appearance, especially own facial display, have attracted interdisciplinary investigative interests. Neuroscientific and psychological studies have shown that human faces carry vast amount of information ranging from interoceptive sensitivity (Ainley, 2012), implicit emotional representation (Ainley, 2012) to behavioral appropriateness/ fitness in social settings (Fenigstein, 1979). Allocating attentional effort to gaze one's own face is hence inherently significant to survival and social navigations as the behavior of gazing is deeply ingrained in human mind and behavior (Devue, 2009). Through the introspective, contemplative gaze, representations of own faces assist deeper and more accurate understanding to one's psychophysiological responses which are usually rare and valuable for conscious observations (Porciello et al., 2014). This process of self-gaze and the voluntary action to sustain the attention are generally referred to as objective self-awareness (Duval & Wicklund, 1972). Objective self-awareness is suggested to have distinct implications for individual performances in various arenas including self-

evaluation, self-esteem, group conformity, and task performance (Duval & Wicklund, 1972). The types of objective self-awareness—private and public self-awareness—which falls under the umbrella of objective self-awareness oblige in different effects on people. Inwardly averting the gaze and undergoing inner self-inspection is understood as private self-awareness whereas partaking the third perspective to observe public/ social presentation of self is seen as public self-awareness (Buss, 2001). Prior studies have shown that both the placement of a mirror and the presence of camera can incur private and public self-awareness respectively (Fenigstein et al., 1975). As a combination of the two functions, i.e., both the reflective and recording features, videoconference applications that enable self-video display on screen should be most reasonably responsible for eliciting objective self-awareness, thus, we stipulate that:

H1: Individuals participated the videoconference with their self-video present on monitor score higher in both private and public self-awareness than those participated the videoconference without instant video feedback.

With an increase in objective self-awareness via videoconferencing, impactful changes on task performance in group are investigated in much research. In the language learning scenario, Yamada and Akahori (2009) discovered that when learners are provided with both teacher's video and self-video feed, they engage in more self-correction and meta-cognitive behaviors, which greatly benefit the learning process that involves linguistic challenges. Tasks that are not learning-specific also take advantage of the instant video-feed. In Miller's (2017) study, participants are assigned to discuss informal topics with each other through video chat, and those who have themselves displayed on the computer monitor demonstrate high cooperativeness, responsiveness as well as perceived sophistication at the task. Other studies that investigate VMC and its relationship with task outcome consolidated Miller's result by proposing a prosocial effect on heightened objective self-awareness. Prosocial behavioral

adaptions including self-disclosure (Joinson, 2001), relational adjustment (Miller et al., 2017), and social-oriented expression (Yao & Flanagin, 2006) are all detected to correlate with either private or public self-awareness. In particular, Yao and Flanagin (2016) found that participants using VMC to fulfill a group task perceived more attractiveness and politeness from their assigned partners, and that they purposefully engaged in more prosocial behaviors to approach one another throughout the conversation. Taken the results, we propose that:

H2: Individuals who can see their own video feeds are more socially oriented during the conference than participants who do not have access to their own video feeds.

However, alternative findings refute the efficiency in the additional efforts by indicating that task-irrelevant behaviors such as prosocial oriented attentions are counterintuitive in predicting productive performances. While certain tasks benefit from consistently attending public self-presentation, tasks that are cognition-demanding will encounter great impedance due to overloaded information processing. As evident in previous research, overly attending self-relevant information is taxing in attentional and cognitive computation (Brédart, 2006; Feingstein, 1979; Hasell & Cotton, 2017; Homer et al., 2007). Some research signifies that when informational feedback of self is synchronized as the task participation goes on, people tend struggle to shift their attention away from their own image (Devue, 2009). In Deveu's (2009) study, when tasked to find a target face in a presented selection where one's own face is also included, participants spend more time in seeing and processing their own faces at expense of interpreting other stimuli, i.e., unfamiliar images of other. Faces are thus costly objects for people to pay attention to and are especially effortful to manage when they co-exist with an assigned task. On the other hand, researchers have also found that human brain obtains limited attentional span and cognitive capacity for active use (Sweller, 1988). Coined by J. Sweller

(1988), this restrain on human cognition is referred to as the Cognitive Load Theory (CLT),

which suggests that when information required to focus is both relevant and irrelevant to a

learning task, one is more prone to show compromised overall performance (Sweller, 1988). In

Homer's (2007) study, participants who prefer verbal learning in multimedia learning setting,

i.e., video learning, experience greater cognitive inundation compared to participants who are not

presented with multimedia learning modalities. Miller's (2017) research champions the CLT

presumption by indicating that self-image presentation is negatively related to task-directed

processing while being positively associated with social-oriented attention. In sum, existing

evidence contend the deleterious effect of additional exterior stimuli on persistent focus by

explicating the eye-grabbing nature of people's own faces and the extended time often paid to

sustain self-gaze. Therefore, we anticipate that participants who frequent more on their social

presentations on screen will experience more irrelevant distractions during task oriented VMC

due to the presence of their own image. Taken this into account, we hypothesize:

H3: Participants using videoconference in which they can see themselves are more frequently
distracted by their own image in teamwork compared to those who do not see their own feed
while meeting.

Albeit many have supported that richer media impair cognitive processing of various

tasks by occupying additional amount of attention, there are certain types of tasks that are

intrinsically demanding in information transmission between task partners. For example, in tasks

that feature conflict-negotiating scheme, such as those that need group decision on matters

consisting intertwined interest, people need to collaborate to approach a unified one end despite

initial discordance on personal objectives as well as unbalanced access to information

(Hollingshead & McGrath, 1993). To meet the group consensus, all participants are expected to

engage in extensive interaction guided by appropriate evaluation, judgement, understanding, and negotiation towards the subject, through which group members rely on cooperative strategies prominent in perspective-taking to assist communication (Hollingshead & McGrath, 1993). Not surprisingly, empirical evidence proposes that the ability to think collaboratively and empathetically, i.e., using perspective-taking, is positively associated with objective self-awareness (Scaffidi Abbate et al., 2016; Orive, 1984; Stephenson & Wicklund, 1983). In Orive's (1984) experiment, participants who are placed in situations that promote both private and public self-awareness during group project exhibit minimal behavioral extremity and are less persistent on polarized opinion than their control group counterparts regardless of their confidence in pre-existing beliefs. Objective self-awareness is also significant in reducing egocentric thinking, which privileges the participants in experiment group to correctly estimate their teammates' probably suggestions (Abbate, 2016). Similarly, Stephenson and Wicklund (1983) found that when they presented participant's voice recordings during group project, i.e., more private self-awareness, participants are more inclined to validate and approve of other's opinions and feel less entitled to the work product. For this reason, teams that engage in collaborative tasks through means that promote their objective self-awareness will be more efficient in negotiating conflicts, managing controversy, and reaching agreement. Despite previous assumption suggesting that participants undergo cognitive overload due to the presence of their own images on screen, which serve to be irrelevant distractors (Hassell & Cotton, 2017), we stipulate that such overload is not a mere waste of attention, instead, it is a proper strategy endeavored to navigate the attention-demanding task, which the additional effort to act prosocial. Thus, we expect that people who invest more into acting empathetically and considerately about other

people's stance will report more in-group satisfaction regarding the process and final solution that they will be obligated to put forth. Upon that, we propose:

H4: Teams that use videoconference while having access to own video feed experience more process and solution satisfaction during teamwork than other groups.

The present study will expand on previous research investigating VMC and its effect on task performance by adding a control group to observe both main effect on VMC with self-video feed and VMC without self-video feed as well as the interactive effect between conflict-negotiating task and neutral task that contradicts in its demanded qualities for cognitive processing. The study focuses on subjective reports on perceived experience in participating the task to further theoretical suggestions on cognitive overload, which in mainstream assumes a negative position on self-video feed due to its distracting effect on task-performance. The original CLT claims that intense self-focus unnecessarily occupies cognitive capacity that is crucial for task performance, hence leading to a compromised competence in completing an attention-demanding task (Sweller, 1988). Supporting evidence argues in favor of CLT by pointing out that inflated concerns addressed towards self-presentation during videoconference will inevitably take up people's attentional span, increasing the risk of failing to voice for their critique or controversial perspective, which, consequently, leads to low perceived contentment (Hassell & Cotton, 2017). We aim to enrich the existing finding by proposing a new potential mediator—prosociality—which functions to facilitate task navigation in conflict-negotiating scenarios. We expect that heightened objective self-awareness will promote social-oriented cognitive processing and interactive behaviors in a group. Thus, we hypothesize that the participants with self-video feed will not have compromised task experience as suggested in previous research (Hassell & Cotton, 2017). Instead, they will be more prone to report positively

in regard to subjective experience as well as process satisfaction, because increased prosociality will assist them to take partners' stances, and to better sustain harmonious, efficient group discussion. The study also intends to mimic real-life workplace scenarios in which people from different age groups, and likely from different backgrounds, engage in the same task to reach a consensus. However, the study will be limited to its practical generalizability taken that it is not conducted in an actual workplace setting with formal employees as participants.

Method

Methodology

This research aims to develop an experiment that takes form of a 2 x 2 factorial designs. The first independent variable is the self-video feedback presence, thus, the two levels of the variable would be 1) VMC with self-video feedback and 2) VMC without self-video feedback. The second independent variable is the task type, in which the levels are either neutral task, i.e., ice-breaking task, or the conflict-negotiating task, i.e., International Institute Task. The ice-breaking task is designed purposefully to contradict with the conflict-negotiating task in terms of the task objective. While the conflict-negotiating requires participants to reach group consensus on a specific matter which can be controversial for each person, the ice-breaking task is in nature less involved in conflict-resolving and group unity, instead, it is highly individualistic in regard to information exchange and perspective-taking. We have designed the research as an experiment because we intend to draw conclusions from the experimental treatment—the main effect of presence of video-feed and task type as well as the interactive effect between the two independent variables. We want to investigate whether the type of task that participants engaged in affects the perceived experience in variation of the presence of self-video feed.

Participants

All participants will be recruited from Prolific with the appropriate amount of compensation. The age range for our study will range from 25 to 65 with no preference on educational background. No other demographic backgrounds are preferred other than age. We do expect that the gender splits half-half between sex-male and sex-female. However, proficiency in English will be controlled by previously sent self-report questions. Participants eligible for the study must meet at least one following criteria: a) native English speaker, b) non-native English

speaker with federally approved English as Second Language Standardized test certificate, c) non-native English speaker with a local work-permit.

VMC setup

In this experiment, all of the teams will partake the assigned group project task through Zoom app previously installed and updated on the device. The zoom meeting will be started before the participants enter to avoid potential technical issues with launching the meeting. Researchers will be available to help with accidental occurrences at the beginning of the meeting. The initial setup of zoom meeting for the experiment group will involve one small window at the right downward corner for self-video feed whereas the control group has a fish tank gif at the same position as the self-video feed window. Both the control and the experiment group will have video feed from their partners', which will initially be placed at the center of the screen. Each participant's device will be muted until their arrival. The devices will be connected to a charger the entire time to make sure no sudden interruptions will take place.

Task

The conflict-negotiating task is an adaption of the International Institute Task (Hassell & Cotton, 2017; Zigurs et al., 1988). The goal of this task is for teammates to have a thorough discussion over the information they are given and to conduct an optimal solution for the task. The task characterizes a mock scenario in a university committee, in which the three participants play the role as three committees who will be responsible for deciding admission of a university-sponsored international program. The team will be given the general information about three applicants and the background of the international program that the applicants are applying for, and each team member will be individually given some additional information regarding the participant's personality, extra-curricular activities, etc., for reference. The complementary

information is extensive and is of the same length for each team member. The information is also exclusive to the assigned team member and is not initially shared among other group members, thus participants will be expected to communicate this information throughout the task. The task is featured with small amount of shared information and large amount of un-shared, individualized information, which create biased judgments, i.e., conflicts in decision, when it comes to selecting one candidate. The team is informed to make the optimal solution to the admission based on the information that they have, hence the process of negotiating is also needed to reach the task objective. The task will last 20 to 25 minutes according to prior research (Hassell & Cotton, 2017).

In the neutral task is a video-chat task that is featured with provided ice-breaker questions. Each participant will receive a question sheet with eight different ice-breaker questions extracted from the internet, which ensures that question will not run out. The participant will also be given instructions to discuss over some questions out of their preferences, so it eliminates the possibility of being obligated to resolve potential controversial discussions. The questions will be selectively chosen to not cover self-awareness-eliciting items such as questions that ask for personal anecdotes, inward introspections or self-trait evaluation (Miller, 2017; also see Appendix E). The task will last 20 to 25 minutes.

Procedure

The participants will be instructed to the laboratory at the appointment time. Upon arrival, each participant will be led to a separate room that is structured similarly with each other (hopefully) and will be asked to unmute themselves as soon as they feel comfortable to start the task. Participants will be introduced with the general direction of the: a) the task will be completed through zoom, b) group members will only be virtually present with them while

completing the task, c) the task does not have a hardcore time limit, but suggestively 20 to 25minutes, d) they should exit the meeting as soon as they have confirmed to have finished the task, e) the task will be evaluated upon group performance, f) they will participate other minor tasks after the meeting with their paired partners, g) after they exit the meeting, they will complete a set of questionnaires that has been sent to their mobile devices.

Teams will be assigned to one of the four VMC groups, each composed by three to four participants. In the experiment groups (groups that are obligated to complete the conflict-negotiating task), all teams, regardless their video-feed presence, will be handed with a complete application package which includes the general information of all candidates they will be reviewing. The general information for each applicant incorporates essay, recommendation letter, and demographic information. The complete application package will be uploaded to Zoom chat that is viewable for every participant throughout the task prior their arrival. Each applicant will also be given a physical copy of an information sheet which provides distinct complementary information about one of the applicants. The information sheet contains different information for each participant, and since it is a physical copy, it is not initially shared among group members. Each information sheet lists similar amount of content and uses identical formatting. The control group, in which teams will be instructed to complete the ice-breaker task, will be given one piece of question sheet that consist of enough questions to cover the task duration. After completion of the task, all teams will be instructed, as mentioned prior, to complete a few questionnaires on their own mobile devices.

Instruments

The objective self-awareness will be measured by the *Self-Consciousness Scale* (Scheier & Carver, 1985). The scale incorporates 23 items that assess individual differences in both

private and public self-awareness (see Appendix A). Participant's prosociality in tasks will be measured via Prosocialness Scale for Adults which will be a 16-item Likert scale (Caprara, 2005; also see Appendix B). Perceived satisfaction of the task will be measured via Green and Taber's (1980) five-item scale, which is anchored by end points of "very much" and "not at all" (see Appendix C). The distraction is measured by a three-item questionnaire designed for this study. It contains two self-report questions investigate on their frequency and intensity of distraction and one free response question that asks for the type of distraction (see Appendix D).

Appendix A

Self-Consciousness Scale–(SCS-R)

Please answer the following questions about yourself by darkening in an appropriate circle on your IBM answer sheet. for each of the statements, indicate how much each statement is like you by using the following scale:

> 3 a lot like me
> 2 somewhat like me
> 1 a little like me
> 0 not like me at all

Please be as honest as you can throughout and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers.

> 1. I'm always trying to figure myself out.
> 2. I'm concerned about my style of doing things.
> 3. It takes me time to get over my shyness in new situations.
> 4. I think about myself a lot.
> 5. I care a lot about how I present myself to others.
> 6. I often daydream about myself.
> 7. It's hard for me to work when someone is watching me.
> 8. I never take a hard look at myself.
> 9. I get embarrassed very easily.
> 10. I'm self-conscious about the way I look.
> 11. It's easy for me to talk to strangers.
> 12. I generally pay attention to my inner feelings.
> 13. I usually worry about making a good impression.
> 14. I'm constantly thinking about my reasons for doing things.
> 15. I feel nervous when I speak in front of a group.
> 16. Before I leave my house, I check how I look.
> 17. I sometimes step back (in my mind) in order to examine myself from a distance.
> 18. I'm concerned about what other people think of me.
> 19. I'm quick to notice changes in my mood.
> 20. I'm usually aware of my appearance.
> 21. I know the way my mind works when I work through a problem.
> 22. Large groups make me nervous.

Appendix B

Prosocialness Scale for Adults (PSA)

The following statements describe a large number of common situations. There are no right or wrong answers; the best answer is the immediate, spontaneous one. Read each phrase carefully and fill in the number that reflects your first reaction.

1	**2**	**3**	**4**	**5**
Never/Almost Never	**Rarely**	**Occasionally**	**Often**	**Always/Almost Always**

1. I am pleased to help my friends/colleagues in their activities.　　1 2 3 4 5

2. I share the things that I have with my friends.　　1 2 3 4 5

3. I try to help others.　　1 2 3 4 5

4. I am available for volunteer activities to help those who are in need.　　1 2 3 4 5

5. I am empathic with those who are in need.　　1 2 3 4 5

6. I help immediately those who are in need.　　1 2 3 4 5

7. I do what I can to help others avoid getting into trouble.　　1 2 3 4 5

8. I intensely feel what others feel　　1 2 3 4 5

9. I am willing to make my knowledge and abilities available to others　　1 2 3 4 5

10. I try to console those who are sad.　　1 2 3 4 5

11. I easily lend money or other things　　1 2 3 4 5

12. I easily put myself in the shoes of those who are in discomfort　　1 2 3 4 5

13. I try to be close to and take care of those who are in need　　1 2 3 4 5

14. I easily share with friends any good opportunity that comes to me　　1 2 3 4 5

15. I spend time with those friends who feel lonely　　1 2 3 4 5

16. I immediately sense my friends' discomfort even　　1 2 3 4 5
　　when it is not directly communicated to me.

Appendix C

Process Satisfaction (Green & Taber, 1980)

1. How would you describe your team's problem-solving process? (Inefficient-Efficient)
2. How would you describe your team's problem-solving process? (Uncoordinated-Coordinated)
3. How would you describe your team's problem-solving process? (Unfair-Fair)
4. How would you describe your team's problem-solving process? (Confusing-Understanding)
5. How would you describe your team's problem-solving process? (Dissatisfying-Satisfying)

Solution Satisfaction (Green & Taber, 1980)

1. How satisfied or dissatisfied are you with the quality of your team's solution? (Very Dissatisfied-Very Satisfied)
2. To what extent does the final solution reflect your input? (Not at all-Very much)
3. To what extent do you feel committed to your team's solution? (Not at all-Very much)
4. To what extent are you confident that your team's solution is correct? (Not at all-Very much)
5. To what extent do you feel personally responsible for the correctness of your team's solution? (Not at all-Very much)

Appendix D

Distraction Measurement

1. How many times have you been distracted during the videoconference
   a. Never
   b. Rarely
   c. Occasionally
   d. Often
   e. Always

2. How intense is your distraction? (Intense means that you struggle to focus back on task, not intense means that you shift your focus back quickly)
   a. Not intense at all
   b. A bit intense
   c. Very intense

3. What is one of the most recurrent themes of your distraction? (e.g., self-pertinent, other-related, etc.)

Appendix E

Ice-breaking task sample questions (Miller et al., 2017)

1. What do you like to eat on your pizza?
2. What is your favorite animal?
3. Would you rather go on a beach holiday or a mountain holiday?
4. If you could go visit any place in the world, where would you go?
5. If you could live in any period of history, when would it be?
6. If you could have dinner with one person – dead or alive – who would it be?
7. Would you rather be invisible or be able to read minds?
8. If you could learn any skill, what would it be?
9. If you could have one superpower, what would it be?
10. Would you rather always feel too cold or always too hot?
11. If your house was burning down, what object would you try to save?
12. If you were at a restaurant and found a fly in your soup, what would you do?
13. What's the weirdest thing you have ever eaten?
14. Would you rather eat a banana or an apple?
15. Would you rather wrestle a lion or fight a shark?
16. We created the list from a

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