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Impacts of video communication on psychological well-being and cosmetic surgery acceptance

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ABSTRACT

Video communication via platforms such as Zoom has been routinely used as a communication tool during the COVID-19 pandemic. Scientific evidence has suggested that constant video communication can have detrimental consequences such as “Zoom fatigue”, inhibiting collaboration, and new information exchange. The current study focuses on the effects of using video communication technology on self-esteem, affect, and image perception under the framework of objective self-awareness (OSA). We implemented a survey among a large sample of video communication users. The results revealed a nuanced picture of OSA with video communication: merely seeing self-video and the time of using video communication won't activate OSA. However, being a listener and a part of the audience in video communication activated OSA. In turn, OSA significantly increased the attention paid to oneself, leading to critical self-evaluation, negative affect, and a greater level of cosmetic surgery acceptance. Moreover, OSA reduced the level of self-esteem. Theoretical and practical implications are discussed.

1. Introduction

People's daily lives have been significantly influenced by the COVID-19 pandemic, and one manifestation is the heavy adoption of and reliance on video communication technology. Indeed, video communication enables people to stay connected safely during the pandemic (Jiang, 2020). While video communication benefits us tremendously, its negative impacts and downsides should not be ignored and need to be better understood given its unprecedented popularity for people to better utilize it as a communication tool. There are some articles that discuss the negative impacts of video communication, including “Zoom fatigue” (Jiang, 2020; Morris, 2020), reduction in individual satisfaction, and team performance (Hassell & Cotton, 2017). Indeed, video communication moves away from the established, routinized, and highly institutionalized ways of learning in human society (Morris, 2020). Studies have pointed out that one of the factors that lead to the detrimental effects of video communication is the video camera that reflects the appearances of the users floating on the screen, which allows users to see themselves in a third-person perspective, i.e., the way they look at other people (Jiang, 2020; Morris, 2020). This affordance of video

communication corresponds to the stimuli that trigger objective self-awareness (OSA) (Duval, Duval, & Mulilis, 1992; Ickes, Wicklund, & Ferris, 1973; Storms, 1973). Hence, it is plausible to expect that video communication users will experience objective self-awareness when they see their own images on the screen constantly. OSA has a series of implications (Duval & Wicklund, 1972). For example, objective self-awareness can impact psychological well-being by negatively influencing individuals' self-evaluation, self-esteem, and affective experiences (Duval & Wicklund, 1972; Ickes, Wicklund, & Ferris, 1973). Objective self-awareness can also influence individuals' behavior (Duval & Wicklund, 1972). For example, OSA was found to impact behaviors related to image perception and management, such as the pursuit of cosmetic surgery (Yazdanparast, 2012; Yazdanparast, 2016, pp. 321–322; Yazdanparast & Spears, 2018). Interestingly, there are news stories and professional reports pointing to the rise of cosmetic surgery during the pandemic (American Society of Plastic Surgeons, 2020; Hughes, 2020; Stahl, 2020; Williams, 2020), and research has found that people's increasing interest in facial plastic surgery amid the COVID-19 pandemic despite numerous business industries suffering due to the pandemic (Dhanda, Leverant, Leshchuk, & Paskhover, 2020). These

Abbreviations: OSA, Objective self-awareness; APS, Attention paid to self; CSE, Critical self-evaluation; SES, Self-esteem; CSA, Cosmetics surgery acceptance.

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phenomena resonate with the propositions and findings that seeing one's self-image can activate OSA and increase the pursuit of image management (Yazdanparast, 2012; Yazdanparast, 2016, pp. 321–322; Yazdanparast & Spears, 2018). However, there's no study to date that has inspected the relationship between using video communication and OSA, let alone its implications. The current study, therefore, investigates the relationship between using video communication, OSA, and the downstream effects to fill this void. Our aim is to unravel the psychological mechanisms underlying the effects of using video communication on self-esteem, affect, and image perception under the framework of the objective self-awareness theory.

2. Literature review

2.1. OSA and video communication

The objective self-awareness (OSA) theory posits that when people pay attention to themselves, they become the “object of [their] own consciousness (p.2, Duval & Wicklund, 1972)”, which will exert positive and negative impacts (Gonzales & Hancock, 2011). The effects of video presentation on boosting objective self-awareness and self-regulation were well-documented in the literature (Carver & Scheier, 1990; Jonassen, 1979; Kluger & DeNisi, 1996; Wicklund & Frey, 1980)”. It was generally agreed that the prerequisite for triggering objective self-awareness is the type of devices and stimuli that enable people to observe themselves, such as a mirror, the audio of self-voice, and a camera that provides photos and video of the self (Duval et al., 1992; Ickes, Wicklund, & Ferris, 1973; Storms, 1973). In addition, a multitude of studies confirmed that without such stimuli, there would be no objective self-awareness, let alone the consequences of OSA such as critical self-evaluation, affective experiences, variation in self-esteem, and so on (Carver, 1974; Duval & Wicklund, 1972, 1973; Liebling & Shaver, 1973; Pryor et al., 1977; Wicklund & Duval, 1971). Often it is found that seeing one's own picture activates objective self-awareness and this, in turn, makes a person more critical of oneself (Duval & Wicklund, 1972; Silvia & Duval, 2001; Wegge, 2006) as OSA postulates that individuals who are in the state of objective self-awareness automatically pay attention to the self and notice the shortcomings of the salient self attributes in the context (Duval & Wicklund, 1972).

The essential and unique element of video communication is the dynamic visuals, in comparison to other forms of communication such as text, audio, and in-person communication. In addition, these visuals are presented in the third-person contexts. When using video communication software such as Zoom or FaceTime, individuals not only can see other people's faces as in interpersonal communication, but they can also see the images of themselves as they see other people when communicating. Such a third-person perspective provided by video communication serves as a condition that trigger objective self-awareness. The self-images prompt users to look at and observe themselves, a process that is automatic and inescapable (Wicklund, 1975, pp. 233–275). Once attention is paid to oneself, individuals become “the object of [their] own consciousness”. In other words, attention paid to the self is a necessary condition of objective self-awareness and the third-person perspective makes a sufficient condition. After entering the state of objective self-awareness, most individuals tend to be critical of the self especially the self-related features that are salient in the context (Duval & Wicklund, 1972).

Additionally, the OSA state can be disrupted only when conscious interventions are employed to interrupt such a process (Duval & Wicklund, 1972). The stimulators that direct attention to something else instead of oneself also determine the magnitude of objective self-awareness (Wicklund, 1975, pp. 233–275). Specifically, supplying a distraction such as a task or an activity was found to effectively reduce OSA. For example, Ferris and Wicklund (1975) reported that watching a television program decreased female undergraduates' objective self-awareness. Wicklund (1975, pp. 233–275) also found that physical

activities can serve as the distractors of OSA, and the most effective distractors are the type of activities that are very unlikely to result in unexpected disruption, failure, and surprise, and the activities should be “natural” in the context (Wicklund, 1975). Connecting to video communication, the affordances of video communication software allow diverse communication activities, hereby, the level of objective self-awareness can vary due to the different activities people engage in during a video meeting. For instance, being a speaker or presenter, using text chat, and interacting with the other attendees during a video meeting can be the distractors that turn the attention away from oneself thus disrupting the state of OSA. In contrast, being an audience member in video communication tend not to interrupt or reduce the objective self-awareness as such a passive activity requires very little effort. When an audience member is staring at the screen, the activity itself typically requires little attention. Thus, the present study posits that the most prominent stimulator in this situation (i.e., being an audience member) would be the self-image that is floating on the screen, hereby, individuals may automatically and inescapably enter the objective self-awareness stage according to OSA (Duval & Wicklund, 1972; Wicklund, 1975, pp. 233–275).

Based on the above rationales, the following hypotheses are therefore proposed:

- H1.** The frequency of being a speaker or presenter in video communication negatively influences the level of OSA.
- H2.** The frequency of being an audience member in video communication positively influences the level of OSA.
- H3.** The frequency of text chatting in video communication negatively influences the level of OSA.
- H4.** The frequency of interacting with other people in video communication negatively influences the level of OSA.
- H5.** The higher the OSA, the greater attention is paid to oneself.
- H6.** The higher the OSA, the higher level of critical self-evaluation.

That being said, it is intriguing to ask whether the time of using video communication overall and the frequency of turning on the web camera in video communication will activate OSA. Considering that the OSA theory does not have propositions concerning the effects of video communication on OSA while taking into consideration the factors related to the affordances of modern video communication software and no research has investigated this either, the present study asks these research questions:

RQ1. How does the amount of time of using video communication impact the level of OSA?

RQ2. How does the frequency of using a web camera in video communication impact the level of OSA?

As aforementioned, one of the manifestations of OSA is the attention paid to oneself, and the consequences of OSA include critical self-evaluation, affects, self-esteem, and in addition, cosmetic surgery acceptance in this paper (Duval & Wicklund, 1972, 1973; Carver, 1974; Liebling & Shaver, 1973; Pryor et al., 1977; Wicklund & Duval, 1971; Yazdanparast & Spears, 2018). Moreover, once the OSA state is disrupted by the distractors (i.e., conscious interventions) such as attention-demanding tasks and physical activities, the downstream effects of OSA won't be instigated (Duval & Wicklund, 1972). Hence, the present study speculates that OSA is a mediator between using video communication and the downstream effects of OSA, including critical self-evaluation, self-esteem, and cosmetic surgery acceptance.

H7. Objective self-awareness mediates the positive relationship between (a) the time of using video communication (b) the frequency of using a web camera (c) the frequency of being an audience member and the attention paid to oneself.

H8. Objective self-awareness mediates the negative relationship

between (a) the time of using video communication (b) the frequency of using a web camera (c) the frequency of being an audience member and self-evaluation.

2.2. Affects, OSA, and video communication

Affective reaction is one of the important consequences of objective self-awareness (Duval & Wicklund, 1972). The OSA theory posits that attention devoted to oneself leads to a realization of intra-self-discrepancy, as individuals notice the distance between their ideal self and the actual self, which can lead to the negative affects that is in proportion to the distance of the perceived discrepancy. The intensity of the affect experienced is determined by the level of OSA and the size of the perceived discrepancy (Duval & Wicklund, 1972).

The OSA theory also stipulates that OSA can cause both positive and negative affect, depending on individual dispositions and whether the salient self-attribute in the context exceeds or is close to the ideal self-attributes (Greenberg & Musham, 1981; Ickes, Wicklund, & Ferris, 1973). For example, Wegge (2006) reported that people with positive dispositions experienced positive emotions seeing their image during a videoconference. Nevertheless, the present study hypothesizes that using video communication arouses and intensifies negative affect across most people. The classic hypothesis of OSA theory asserts that self-aware subjects find shortcomings within the self-related attributes that are the focus of attention (Duval & Wicklund, 1972). In reality, only a few have what they aspire to have. For most people, the discrepancy between aspiration and attainment is assumed, and there is a distance between reality and the ideal. Duval and Wicklund (1972) in fact argued that virtually all naturally occurring discrepancies are negative (Duval & Wicklund, 1972). Scheier and Wicklund went a step further and argued that one's ideal self could shift upward even if the real self was firmly anchored (Wicklund, 1975, pp. 233–275). Attainment could also be transient: when the real self meets the ideal self, the ideal self will also move upward (Duval & Wicklund, 1972). Along this vein, the current study, therefore, postulates that OSA will instigate negative affect among the participants.

Although affect as one of the consequences of OSA has been investigated (Duval & Wicklund, 1972), there is scant literature directly exploring the psychological mechanisms underlying the affective experiences in video communication. Wegge (2006) showed that seeing self-picture during a video conference easily aroused negative affects. More specifically, it was found that anger, dislike, and shame were intensified across all conditions in the videoconference experiment (Wegge, 2006). However, Wegge's (2006) study was not conducted under the lens of OSA, and it lacks a theoretical framework to explain the psychological mechanisms happening. We believe the OSA theory articulates the driving factor of self-awareness and self-ideal discrepancy well enough to explain the consequences of video conferencing revealed by Wegge (2006). Therefore, we propose.

H9. Objective self-awareness elicits negative affect.

H10. Objective self-awareness mediates the positive relationship between (a) the time of using video communication (b) the frequency of using a web camera (c) the frequency of being an audience member and negative affect.

2.3. OSA, self-esteem, and cosmetic surgery

Self-esteem consists of beliefs about oneself and one's emotional states because of those beliefs (Snyder & Lopez, 2001). It is a concept of how we think of ourselves, including both positive and negative evaluations of the self (Smith & Mackie, 2007). Self-esteem can be relatively long term, but it can also fluctuate short-term (Kernis et al., 1993). The variability of self-esteem is a function of a variety of factors, for example, what aspect of the self is salient in a certain situation and the nature of an evaluative event experienced recently (Markus & Kunda, 1986).

According to Fejfar and Hoyle (2000), people's self-esteem decreases when they engage in objective self-awareness. The argument is that these means of reflection enable people to examine themselves as they believe others do (Gonzales & Hancock, 2011). As we are social beings, we constantly observe our environment, social or natural, and the objects and people in the environment. Considering that the mirror, the self-voice audio, and videotape of oneself are the stimuli that can trigger OSA (Duval et al., 1992; Duval, Duval, & Neely, 1979; Ickes, Wicklund, & Ferris, 1973), it is logical to contend that if using video communication can lead to OSA, and self-esteem will be decreased due to the effects of OSA. The camera lens enables direct observation of the self on the screen in a video meeting, triggering OSA in comparison to others and to the ideal self. It is, hence, reasonable to believe that seeing oneself can stimulate OSA, leading to a decrease in self-esteem.

H11. Objective self-awareness lowers the level of self-esteem.

H12. Objective self-awareness mediates the negative relationship between (a) the time of using video communication (b) the frequency of using a web camera (c) the frequency of being an audience member and the level of self-esteem.

The OSA theory maintains that people are generally harsh on self-related features, they'll automatically notice the discrepancy between the actual self and ideal self when in the state of OSA, leading to the experiences of negative affects (Duval & Wicklund, 1972; Wicklund, 1975, pp. 233–275). Such negative affects motivate people to reduce the perceived discrepancy (Duval & Wicklund, 1972). Indeed, research has revealed that critical self-evaluation led to dissatisfaction with the self and body image (Yazdanparast, 2012; Yazdanparast, 2016, pp. 321–322; Yazdanparast & Spears, 2018). In addition, the negative affect elicited by OSA motivated people to pursue even the ultimate corrective action: cosmetic surgery (Yazdanparast & Spears, 2018). Obviously in this study, we are not interested in the actual behaviors themselves, but their acceptance as a possibility. We believe the level of acceptance may also be a more sensitive measure in this psychological process, as actual behaviors are affected by a whole new set of variables including availability, financial concerns, and possible consequences.

In sum, perceived salient attributes about self-image during video conferencing may lead to negative affect and dissatisfaction, motivating image management intentions according to the OSA theory. Therefore, it is plausible to hypothesize:

H13. Objective self-awareness increases cosmetic surgery acceptance.

H14. Objective self-awareness mediates the positive relationship between (a) the time of using video communication (b) the frequency of using a web camera (c) the frequency of being an audience member and cosmetic surgery acceptance.

3. Method, measures, analysis, and results

The pandemic suddenly made the population of video conferences easily available. Some estimate that over 300 million people use Zoom regularly (Richardssays, S., & Deansays, B., 2022). It is safe to say that almost every working adult has used Zoom over the last three years. We recruited 564 participants through Amazon Mechanical-Turk after calculating the sample size necessary for our study for statistical power. A total of 439 valid observations were left after data-cleaning procedures including incomplete responses and participants who spent less than 200 s on the survey. The selection metrics used for recruiting participants on Amazon Mechanical-Turk including U.S. locations and all adults whose survey completion rate was greater than 98%.

3.1. Measures

3.1.1. Demographics

There were 229 men, 207 women, and 3 non-binary/third gender people ($M = 1.49$, $SD = 0.51$) who took part in the study. Overall, they

seemed to be a normal group in terms of age ($M = 3.00$, $SD = 1.32$, $Kurtosis = -0.09$), education ($M = 2.81$, $SD = 0.97$, $Kurtosis = -0.1$), religion ($M = 2.38$, $SD = 2.19$, $Kurtosis = -0.8$), and political partisanship ($M = 4.65$, $SD = 2.15$, $Kurtosis = -0.75$).

3.1.2. Video communication experience

People's experiences of using video communication were measured by a series of items such as "Please try your best to estimate on average, how many hours you use video communication software per business day?" ($M = 2.77$, $SD = 1.78$) using a seven-point scale ranging from "Less than 1 h" to "More than 12 h", "How often do you turn on the web camera to show your own video on the screen during the video meeting?" ($M = 3.42$, $SD = 1.18$), and "How often do you participate in the video meeting as a listener or audience?" ($M = 3.48$, $SD = 1.04$), the last two items were assessed using a five-point Likert scale ranging from "Always" = 5 to "Never" = 1. A higher score indicates a longer time of using video communication or using it in a certain way.

3.1.3. Attention and critical self-evaluation

Attention during Zoom sessions was measured by four items including "It is distracting seeing my own image on the screen" (please see the Supplemental Appendix for the complete scale), with a higher score indicating a higher level of attention devoted to oneself ($\alpha = 0.79$, $\omega = 0.81$, $M = 3.30$, $SD = 1.04$).

Critical self-evaluation was measured by four questions such as "Seeing my own image makes me care about my appearance" (please see the Supplemental Appendix for the complete scale). A higher score reflects a harsher attitude towards oneself ($\alpha = 0.75$, $\omega = 0.88$, $M = 3.48$, $SD = 0.62$).

3.1.4. Objective self-awareness

This instrument consists of a situational OSA scale with three modified items for the purpose of the present study ($\alpha = 0.85$, $\omega = 0.92$, $M = 3.51$, $SD = 0.86$). For example, "When I see my own image, I am concerned about the way I present myself" to measure public self-awareness, and three items to measure private self-awareness (Govern & Marsch, 2001; Morin, 2011). For instance, "Seeing my own image, I am conscious of my inner feelings" (please see the Supplemental Appendix for the complete scale). A higher score indicates a higher level of OSA.

3.1.5. Negative affect

The affect aroused by seeing a self-video were measured by part of the emotion scale (EMO-16) used by Schmidt-Atzert & Hüppe (1996). The participants were asked to choose on a six-point Likert Scale to describe how intensively they experienced each affect listed on the scale, which contains emotions such as dislike and anger (please refer to the Supplemental Appendix for the complete scale). This scale was used by a few studies to examine the arousals that participants experienced during videoconferences (Wegge, J. 2006) ($\alpha = 0.93$, $\omega = 0.95$, $M = 2.47$, $SD = 1.42$).

3.1.6. Self-esteem

Self-esteem was measured using Rosenberg Self-Esteem scale (Rosenberg, 1965) with 10 items. Half of the items were reverse coded. Although this scale was generally used to measure trait self-esteem, previous studies of objective self-awareness have used this measure to capture temporary changes in self-esteem due to awareness-enhancing stimuli (Heine, Takemoto, Moskalenko, Lasaleta, & Henrich, 2008) ($\alpha = 0.87$, $\omega = 0.93$, $M = 3.53$, $SD = 0.71$) (please refer to the Supplemental Appendix for the complete scale).

3.1.7. Cosmetic surgery acceptance

This variable was evaluated by the acceptance of cosmetic surgery scale (Henderson-King & Henderson-King, 2005). This scale consists of 15 items (see Appendix) and the present study added three items for the

research purpose: "Seeing my own video on the screen during a video meeting increases my desire to undergo a cosmetic surgery if I can"; "Seeing my own video on the screen during video meeting increase my acceptance of cosmetic surgery"; "Seeing my own video on the screen during video meeting makes me think more positive about cosmetic surgery" ($\alpha = 0.96$, $\omega = 0.98$, $M = 4.16$, $SD = 1.52$).

3.2. Analysis and results

3.2.1. Assumption tests

Structural equation modeling (SEM) was employed to test the hypotheses. Analyses were conducted with Lavaan (Rosseel, 2012) for the statistical package using a robust maximum likelihood (MLR) estimator. The data analyses of the present study had no issue with the assumptions of multiple linear regression. First of all, the current study adopted the maximum likelihood estimator with robust standard errors (MLR) for the data analysis. The MLR estimated with standard errors and a chi-square test statistics that were robust to non-normality and non-independence of observations for both complete and incomplete data (Rosseel, 2010). Moreover, structural equation modeling was immune to the multicollinearity problem (Ramlall, 2016, pp. 15–17) since there were multiple measures to describe the latent constructs in the present study.

3.2.2. Results

Following the two-step process recommended by Kline (2015), a measurement model was considered fit to confirm the factor structure of the latent variables. There were six latent variables (attention, self-image evaluation, objective self-awareness, self-esteem, cosmetic surgery acceptance, and negative emotions). These six variables were measured with 47 items. Moreover, the model used 47 observations and, using formula $p(p+1)/2$. It was established that the model had 1128 elements. There were 109 freely estimated parameters (47 loadings, 47 error terms, and 15 latent covariances, 34 item covariances), resulting in 985 degrees of freedom. Global Model fit was adequate, $\chi^2(985) = 1903.60$, $p < .001$, $RMSEA = 0.048$, 90% $CI = [0.045, 0.051]$, $CFI = 0.932$, $TLI = 0.925$, $SRMR = 0.109$.

The initial measurement model did not achieve acceptable global model fit, $\chi^2(1019) = 4132.408$, $p < .001$, $RMSEA = 0.087$, 90% $CI = [0.085, 0.090]$, $CFI = 0.766$, $TLI = 752$, $SRMR = 0.123$. Local model fit was examined to identify the nature of the model misfit. The residual matrix revealed instances in which item covariances were underestimated by the latent variables. Modification indices suggested numerous within-variable correlated residuals. Inspection of the scales suggested that numerous redundancies in item wordings were contributing to these correlated residuals (e.g., four items with high residual correlations included the stem: "Seeing my own image, I am ..."). This is a common source of model misfit when using multiple variables measured with a large number of items ($n > 6$, cf. Marsh, Hau, & Wen, 2004). To resolve this issue, the covariances between items suggested by the modification indices were released from the biggest chi-square improvement values one by one until the model achieved an acceptable model fit. Eventually, 34 covariances between the items were released. The resulting model achieved adequate fit: $\chi^2(985) = 1903.60$, $p < .001$, $RMSEA = 0.048$, 90% $CI = [0.045, 0.051]$, $CFI = 0.932$, $TLI = 0.925$, $SRMR = 0.109$. An investigation of the loadings and residuals supported convergent and divergent validity for each measure (see Supplemental Appendix).

A structural hybrid model was fitted that included six observed variables (video communication using time; frequency of using a web camera in video communication; frequency of being as a speaker or presenter in video communication; frequency of being as a listener or audience in video communication; frequency of text chatting in video communication; frequency of interacting with other people in video communication) and six latent variables (objective self-awareness; attention paid to oneself; critical self-evaluation; affect; self-esteem;

cosmetic surgery acceptance). The structural relationships were specified as depicted in Fig. 1. Model fit was acceptable¹: χ^2 (1261) = 2515.773, $p < .001$, $RMSEA = 0.050$, 90% $CI = [0.047, 0.053]$, $CFI = 0.911$, $TLI = 0.904$, $SRMR = 0.119$.

Concerning the research questions, the time of using video communication (RQ1) and the frequency of turning on the web camera (RQ2) did not exert any effects on OSA as the results showed non-significant relationships. The relationships between the frequency of being a speaker or presenter in video communication and OSA (H1), text chatting and OSA (H3), interacting with other people, and OSA (H4) are not significant, hence those hypotheses were not supported by the data. Yet, there is a significant relationship between being a listener or audience in video communication and OSA ($\beta = .210$, $p < .001$), hence, H2 was supported. H5 was supported as OSA significantly increased the attention paid to oneself ($\beta = 0.521$, $p < .001$). The results also supported that OSA positively influenced critical self-evaluation (H6) ($\beta = 0.964$, $p < .005$). The positive relationship between OSA and a number of negative emotional reactions including dislike, anger, envy, unrest, sadness, and shame (H9) was also supported ($\beta = .307$, $p < .001$). Additionally, OSA negatively impacted the level of self-esteem (H10) ($\beta = -0.547$, $p < .001$). Moreover, OSA was found to be positively correlated with the acceptance of cosmetic surgery (H11) ($\beta = 0.544$, $p < .001$).

The current study also hypothesized the mediating role of OSA between the predictor and outcome variables. We adopted the mediation analysis approach recommended by Hayes (2009), MacKinnon et al. (2000), Rucker et al. (2011), Shrout & Bolger (2002), and Zhao et al. (2010). They suggested scholars abandon investigating full media or partial mediation but only focus on the significance and effect size of the indirect effects (i.e., mediating effects in this case). The results supported that OSA mediates the positive relationships between being as a listener or audience in video communication and attention paid to oneself (H7c) ($\beta = 0.109$, $p < .005$, 95% $CI [0.051, 0.186]$), being as a listener or audience in video communication, and critical self-evaluation (H8c) ($\beta = 0.202$, $p < .05$, 95% $CI [0.056, 0.196]$), being as a listener or audience in video communication and negative affect (H10c) ($\beta = 0.064$, $p < .005$, 95% $CI [0.031, 0.157]$), being as a listener or audience in video communication and cosmetic surgery acceptance (H14c) ($\beta = -0.115$, $p < .001$, 95% $CI [-0.074, -0.016]$). Furthermore, OSA mediates the negative relationship between being as a listener or audience in video communication and the level of self-esteem (H12c) ($\beta = 0.114$, $p < .005$, 95% $CI [0.059, 0.210]$). The rest of the mediating roles of OSA were not supported by the data (H7a, H7b, H8a, H8b, H10a, H10b, H12a, H12b, H14a, H14b).

The above results with p values and effect sizes demonstrated the quantitative values related to the effects (Lakens, 2013), the present study also conducted the null hypothesis significance test (NHST) (Nickerson, 2000) to further inspect the discrepancy between the parameters and the null hypothesis (Frick, 1996; Pernet, 2015; Walker & Nowacki, 2011). We constrained one of the significant direct effects to zero (i.e., the null hypothesis) each time and compared each of the reduced models to the full structural model using the Chi-square difference test, respectively. A significant difference in Chi-square between

the reduced model and full model indicates that there's a significant distance between the null hypothesis and the hypothesized relationship. In other words, it is robust to reject the null hypotheses. In particular, the difference between the null hypothesis and H2 is significant ($\Delta\chi^2 = 13.889^{***}$), the difference between the null hypothesis and H5 is significant ($\Delta\chi^2 = 63.664^{***}$), the difference between the null hypothesis and H6 is significant ($\Delta\chi^2 = 404.4^{***}$), the difference between the null hypothesis and H9 is significant ($\Delta\chi^2 = 18.943^{***}$), the difference between the null hypothesis and H11 is significant ($\Delta\chi^2 = 102.69^{***}$), the difference between the null hypothesis and H13 is significant ($\Delta\chi^2 = 77.848^{***}$). The results of NHST signify that all the hypothesized direct relationships are significantly different from the null hypotheses.

Since the current study adopted the cross-sectional survey method, the Discriminant Validity test (Bagozzi, Yi, & Phillips, 1991) as an inferential *ex-post* techniques was employed to investigate the Common Method Bias (CMB) at the stage of data analysis. According to Bagozzi et al. (1991), correlations among the latent variables at less than 0.90 ($r < 0.90$) indicated that CMB did not adversely inflate the internal consistency of the constructs in a study. If there was an inter-constructs correlation greater than 0.90, CMB might be present and could adversely inflate the internal consistency. The results of the Discriminant Validity Test, referred to in Table 3 in the Supplemental Appendix Section (Bagozzi et al., 1991) demonstrated that the current study might be influenced by CMB as the correlation between OSA and self-evaluation constructs is 0.965 (>0.90), but the correlations among the rest of the constructs including OSA and self-attention, OSA and self-esteem, self-esteem and cosmetic surgery acceptance were far less than 0.90. Therefore, although CMB appeared but we did not believe that there was considerable inflation of the internal consistency. According to Kock & Assaf (2021), the Item Characteristic Effects that included item ambiguity and scale formats could be a source of CMB. By inspecting the actual items that measured OSA and self-evaluation constructs, we believed the similar wording of the items should be the causes of the high correlation between OSA and self-evaluation (e.g., all the items of the two latent variables start with "Seeing my own image ...").

In conclusion, the statistical results indicated that the time of using video communication (RQ1) and the frequency of using the web camera (RQ2) did not stimulate OSA, supporting that being a listener or audience in video communication arouses OSA (H2). The results however did not support being a speaker or presenter (H1), text chatting in video communication (H3), and interacting with other people in video communication (H4) mitigate against OSA, as these activities did not have a significant relationship with OSA. However, OSA was found to increase the attention paid to oneself (H5), lead to critical self-evaluation (H6), elicits negative affect (H9), lowers the level of self-esteem (H11), and increase cosmetic surgery acceptance (H13).

Concerning the mediating relationships, the results supported that OSA mediated the relationships between the frequency of being as a listener or audience in video communication and the attention paid to oneself (H7c); and between the frequency of being as a listener or audience in video communication, and critical self-evaluation (H8c); and that between the frequency of being as a listener or audience in video communication and negative affect (H10c); and that between the frequency of being as a listener or audience in video communication and self-esteem (H12c); and between the frequency of being a listener or audience in video communication and cosmetic surgery acceptance (H14c). The rest of the mediating hypotheses (H7a, H7b, H8a, H8b, H10a, H10b, H12a, H12b, H14a, H14b) were not supported by the data.

Lastly, it was reassuring that after entering the demographics including gender, age, education level, marital status, employment status, annual personal income, ethnicity, religion, political view, political affiliation as controls to the structural model, they did not change the results above.

¹ Although the model did not satisfy the cut-off points set by Hu and Bentler (1998, 1999), this does not mean the model is unacceptable. Hu and Bentler (1998, 1999) pointed out that the benchmarks in their study are not golden rules. Moreover, it has been revealed that when dealing with multiple latent variables with multiple indicators, Hu and Bentler's (1998, 1999) are unrealistic to achieve (Marsh, Hau, & Wen, 2004). Scholars who specialize in SEM have been calling for not to overgeneralize the Hu and Bentler (1998, 1999) results (e.g., Little, 2013; MacCallum & Austin, 2000; Marsh, Hau, & Wen, 2004). RMSEA was found to be a better model fit statistics compared to CLI, TLI, SRMR and so on (MacCallum & Austin, 2000) and the value of RMSEA of the current model is less than 0.06, and the value of CLI and TLI are greater than 0.90, these values have stated the benchmark of RMSEA built by Hu and Bentler (1998, 1999).

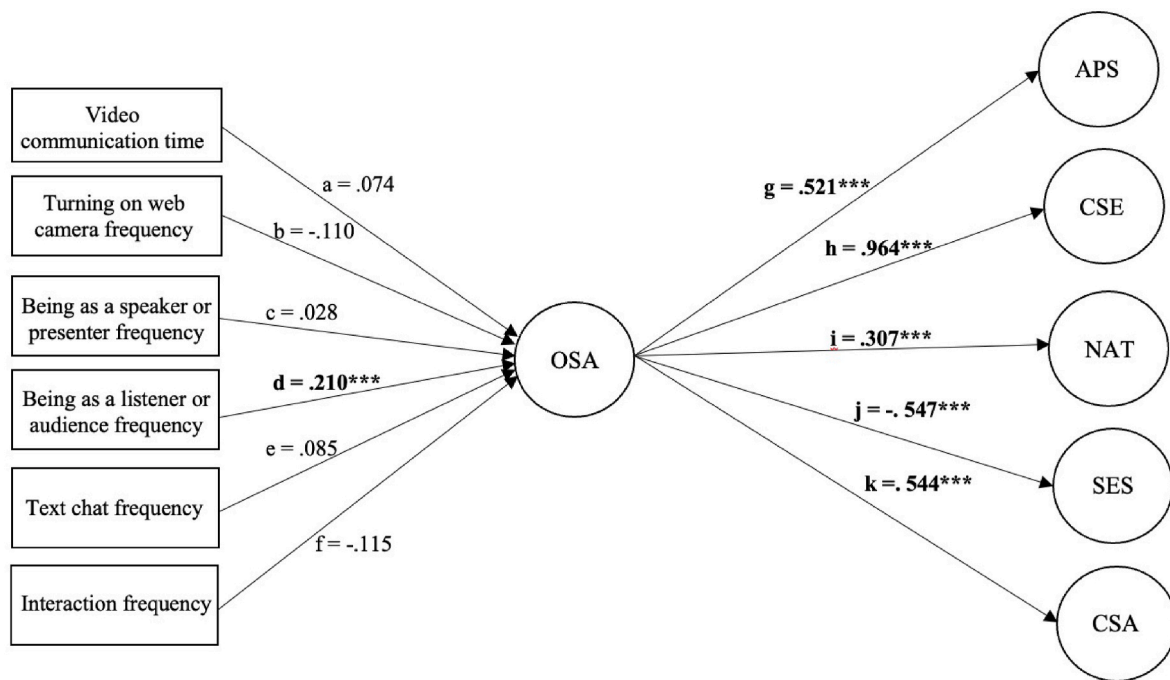


Fig. 1. Model of the structural relationships

Notes: * indicates significant p-value, *($p < .05$), **($p < .005$), ***($p < .001$); APS stands for attention paid to self; CSE denotes critical self-evaluation; SES represents self-esteem; CSA stands for cosmetics surgery acceptance.

4. Discussion

The current study provides invaluable insights into the OSA scholarship and video communication effects. Theoretically, evidence was gained to support the OSA from the context of video communication. Furthermore, by systematically specifying the different ways of using video communication software given its diverse affordances, a more nuanced picture was revealed: the time of using video communication overall and the frequency of using the web camera in general, do not activate OSA. It is the frequency of being an audience member that was found to be positively related to OSA and led to a series of consequences.

The findings of the present study appeared to be counter-intuitive at first as the time of using video communication and frequency of exposure to the self-video feeds had no effect on OSA, which appeared to be inconsistent with the previous OSA studies. Similarly, the frequency of being a speaker or presenter, text chatting, and interacting with other attendees in video communication did not negatively influence OSA as hypothesized. It is possible that these “disrupters” were not disruptive enough in a normalized Zoom setting. The current study, however, gained supporting evidence of the OSA theory from a novel context of video communication by revealing how people use video communication is more important than merely the length they use it. Being an audience member in video communication leaves individuals enough attention resources to pay to the OSA stimulus (i.e., the self-video feeds), rather than something else during video communication, thus instigating OSA. Nevertheless, there are multiple affordances provided by video communication technology allowing people to do diverse activities that can distract attention away from oneself. Consequently, it is reasonable to find that the time of using video communication overall and frequency of exposure to self-video feeds did not affect OSA considering the diverse activities individuals can do in video communication. The results in this sense are in line with the propositions of the OSA theory as articulated in the literature review section (e.g., Silvia & Duval, 2001; Wicklund, 1975, pp. 233–275).

What’s more, the current study contributes to the OSA scholarship by unfolding a number of downstream effects of OSA. Congruent with the

OSA theory, OSA was found to increase attention paid to oneself and the acceptance of cosmetic surgery, to initiate critical self-evaluation, to lower self-esteem, and to arouse negative affect in the context of video communication. In addition, it is being an audience member in video communication, but not the time of using video communication and the frequency of using a web camera as well as other activities in video communication that resulted in these consequences.

Practically, the present study provides clues to explain the phenomenon that the cosmetic surgery industry is thriving during the pandemic despite that numerous other businesses have suffered (American Society of Plastic Surgeons, 2020; Dhanda et al., 2020; Hughes, 2020; Stahl, 2020; Williams, 2020) and gives a scientific explanation that unravels the psychological mechanisms underlying the influences of video communication on individuals. What’s more, the novel findings of the current study suggest that majority of people may be under the influence of OSA as most are the audience and passive members in a Zoom session, resulting in a series of negative consequences. Lastly, the findings can suggest better utilization and design of video communication tools, such as having physical activities in video communication, that can be a good way of avoiding negative impacts. Engaging the audience seems especially important in video communication since attention paid to the tasks at hand is attention away from the detrimental effects of OSA and its negative implications.

5. Limitations and future directions

The most prominent limitation of this study is common for any survey research. That is, the relationships supported by the data are correlational in nature, and there’s not enough solid evidence to suggest the direction of the relationships. In other words, whether or not being an audience member in video communication leads to OSA, and whether or not OSA causes negative affects, decreases self-esteem, and increases cosmetic surgery acceptance still remain to be answered. Additionally, CMB is present in the current study, which means that CMB maybe adversely inflating the internal consistency of the study variables. However, it appears between OSA and self-evaluation only, with all

other latent variables being free of CMB. We are confident that it is the wording of the items that share similar stems being a source of CMB (Kock & Assaf, 2021). Although the detrimental effects of CMB on the present study is limited future research should pay extra attention to avoid such bias and create better measurement for OSA and self-evaluation.

Furthermore, the findings that the distractors including being a speaker or presenter, text chatting, and interacting with other attendees fail to reduce OSA might also be due to the survey research method and the measures of the present study. The non-significant relationships between these variables and OSA suggested by the data of the current study can't confirm that these activities are not effective distractors of OSA, it is possible that they disrupt the OSA state successfully, but the cross-sectional method is only able to detect the disruption outcome but not the process of how the distractors minimized OSA. Hence, experimental studies are needed to be deployed to further interrogate the causal relationships between using video communication, OSA, and the downstream effects, as well as the dynamic functioning process of the distractors in video communication.

6. Conclusion

Despite the limitations, the current research provides invaluable and novel findings for the OSA and video communication scholarships by revealing how video communication impacts the psychological well-beings including self-evaluation, self-esteem, affect experiences, and acceptance of cosmetic surgery under the framework of the objective self-awareness theory. This is the first study that we know of that systematically examined how the different ways of using video communication impact OSA. We believe it is important to explore the mechanisms video communication on psychological well-being and image management intent. These findings lend credence to the thinking, and they are timely and significant in light of the unprecedented and increasing popularity, importance, and prevalence of video communication the world today. Lastly, the current study provides a valuable and validated theoretical framework for studying the mechanisms underlying the psychological and behavioral effects of video communication, as we identify not only the affordances of video communication that can activate OSA, but also specify the conditions that may disrupt or intensify OSA.

Credit author statement

Yuanyi Chen: Conceptualization, Methodology, Data Collection, Data Analysis, Writing. **Shuhua Zhou:** Conceptualization, Methodology, Writing, Reviewing.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chb.2022.107625>.

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