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Description	

A Comparative Study of the Effects of Clapping Hands Sounds and Gesture Presentation During Online Meetings

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Abstract—To prevent the spread of COVID-19, face-to-face meetings have moved online to avoid human contact. Although the online format has made it easier for people to participate in meetings, consensus building in meetings has become increasingly more difficult since the speakers are in different locations. Notably, there is a difference in the way people applaud in online meetings. In addition to clapping and making sounds as in face-to-face meetings, people have turned to new methods of communicating online, such as clapping and gesturing on the screen. For this study, we categorized online meetings into four categories: “with applause,” “without applause,” “gesture/mark presentation only,” and “with applause and a gesture/mark.” We then compared the effect of applause with the emotional information read from each person’s face through microexpressions. The results indicate a significant difference in feelings of sadness over two kinds meetings as an effect of applause and gestures, which had a positive effect, facilitating future online communication.

Keywords—clapping hands, online meeting, gesture, consensus, microexpression

I. INTRODUCTION

Applause is the most respectful way to express agreement and is considered to be the most respectful way to build consensus. With the rapid proliferation of online meetings in the midst of the COVID-19 crisis, the difference between a face-to-face meeting and an online meeting is fading. To compensate for this change, people in online meetings are using symbols, such as applause icons and pictographs, to express approval and supplement consensus building. In an example of remote applause, a remote-controlled robot clapping with a human has been reported to have a positive effect. Similarly, when clapping is presented remotely through a screen, humans are predicted to react positively [1].

Regarding the role of human emotions in social influence, Pankaj stated that participants in a meeting within a small network are influenced by the emotional information conveyed by people at influential nodes within that network, which is then transmitted to other participants in that network.

In this study, we compared the effects of applause for four types of online meetings that appeared within the top three pages of a YouTube search: “with applause,” “without applause,” “gesture/mark presentation only,” and “with applause and a gesture/mark.” We then compared the effects

of applause with the emotional information read from the faces through micro expressions.

II. RELATED WORK

First, as a consensus-building system in a meeting, Ito et al.’s system uses artificial intelligence to collect positive keywords and remove negative ones.

To help people agree on a lecture, the system aggregates words from among the many opinions discussed in the meeting and suggests whether the words were hot topics.

This system can be used in online meetings as well. The present study predicts that, by adding emotional information to the words uttered by humans in the consensus-building system, people’s opinions can be compared not only based on words but also emotional information. For example, it is predicted that people will use heart symbols for favorable opinions and teardrop symbols for less favorable opinions.

The analysis of human facial information from this YouTube meeting also serves as a preliminary experiment to provide emotional information to help people reach a consensus.

III. METHODS

Based on several YouTube videos from the online meetings, we obtained 40 samples of videos that appeared within the top three pages of the search keywords “online conference” and “applause” immediately after the start of the conference. The Wilcoxon signed-rank sum test was used to compare the difference between faces “with applause,” “without applause,” “gesture/mark presentation only,” and “with applause and a gesture/mark” before action and after action groups. In total, 25 video samples were used for data acquisition.

The online conferencing systems employed for this online YouTube meeting included Zoom (25 samples) and Skype (one sample).

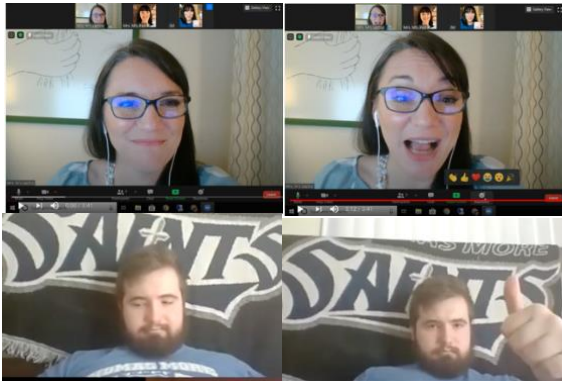


Fig. 1. Gesturing or using clapping hands marks “Emoji”.



Fig. 2. No reaction.



Fig. 3. Clapping hands.



Fig. 4. Clapping hands and gesturing.

The online meetings were classified into four types: seven samples “with applause,” six samples “without applause,” eight samples with “gesture/mark presentation only,” and four samples “with applause and a gesture/mark,” and the effect of applause was compared using emotional information from each face. The data were Youtube video as follows.

1. [Fig. 1] “With applause.” (Left) face immediately after the start of the meeting → (Right) face immediately after applause marks.
2. [Fig. 2] “No applause.” (Left) face immediately after the start of the meeting → (Right) face at the end of the meeting.
3. [Fig. 3] “Gestures and applause only.” (Left) face immediately after the start of the meeting → (Right) face

immediately after a gesture or applause mark is presented.

4. [Fig. 4] “Presentation of applause and gesture marks.” (Left) face immediately after the start of the meeting → (Right) face immediately after the gesture or applause mark is presented.

The facial images were gathered immediately after the start of the meeting and after each reaction, as well as without applause at the end of the meeting, using Microsoft APIs to analyze eight emotional responses (anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise) The results of the analysis were detected on a scale of 0.000–1.000, where 0.000 is 0% and 1.000 is 100%.

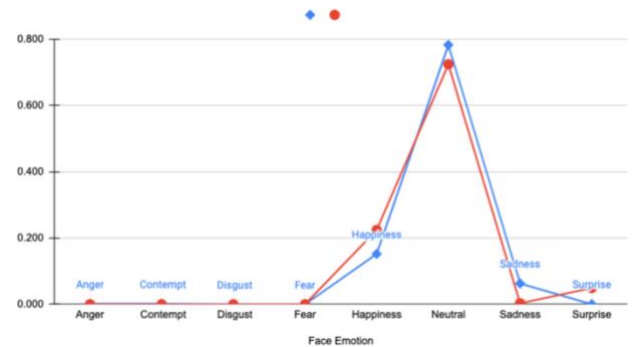


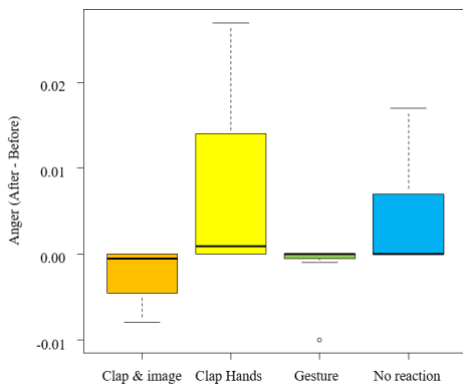
Fig. 5. Comparison before meeting (red line) and after gestures (blue line).

After calculating one data set from the Microsoft Face API, the meanings of the numbers are as follows: happiness is 0.221, neutral is 0.776, and sadness is 0.011.

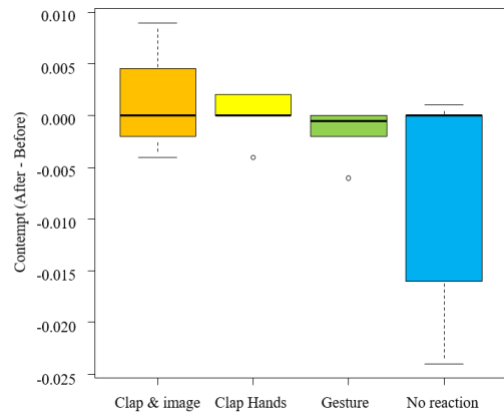
For Fig. 5, we produced an eight-sample average of the actions at the start of the meeting and after the presentation of the gesture after or during t and plotted them on a line graph. To produce a more detailed comparison of the actions in the four meetings, the Kruskal–Wallis test → Steel–Dwass multiple comparisons and the Wilcoxon signed-rank sum test were performed to compare of pre- and post-test differences within groups as a method of EZR test (see Fig. 6).

IV. RESULTS

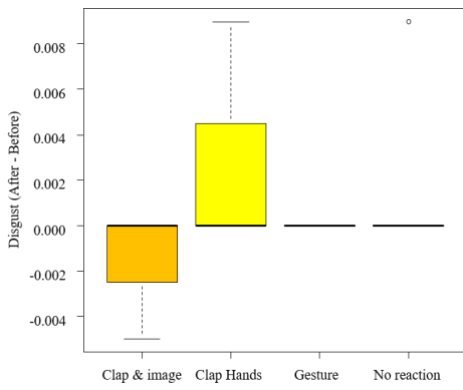
In this study, we analyzed seven samples of online meetings “with applause,” seven samples “without applause,” six with “gesture/mark presentation only,” eight samples featuring “applause and a gesture/mark,” and four samples of online meetings with eight emotional responses (anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise). From a Kruskal–Wallis Test to Steel–Dwass multiple comparison and Wilcoxon signed-rank sum test were conducted as well. Data on eight emotional responses were calculated beforehand using Microsoft API and input into Excel, with each value displayed as a boxplot using EZR software (see Fig. 6).



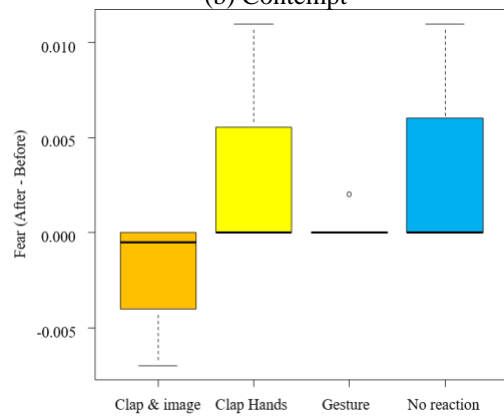
(a) Anger



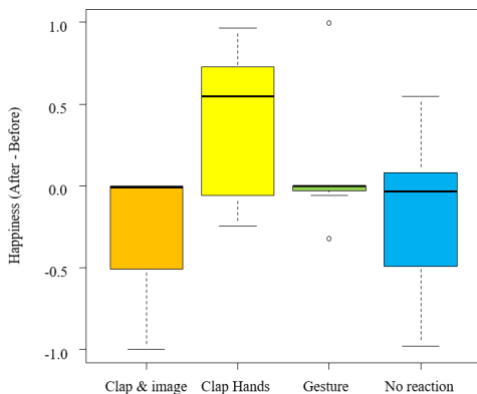
(b) Contempt



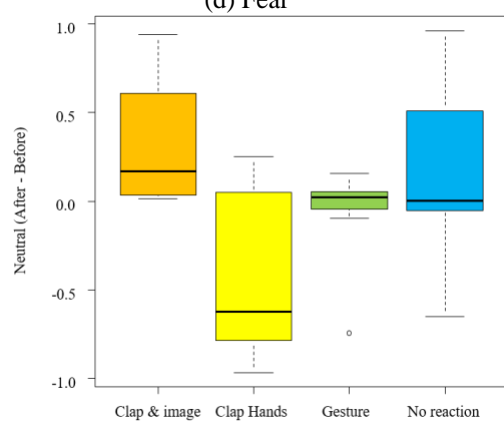
(c) Disgust



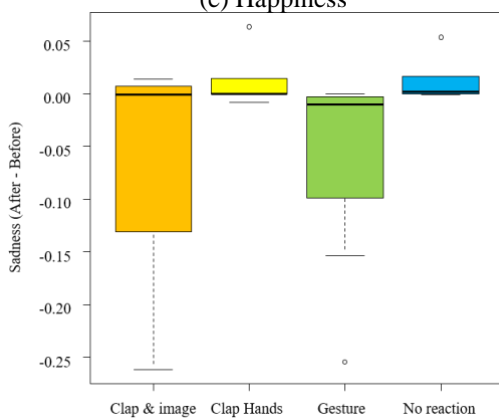
(d) Fear



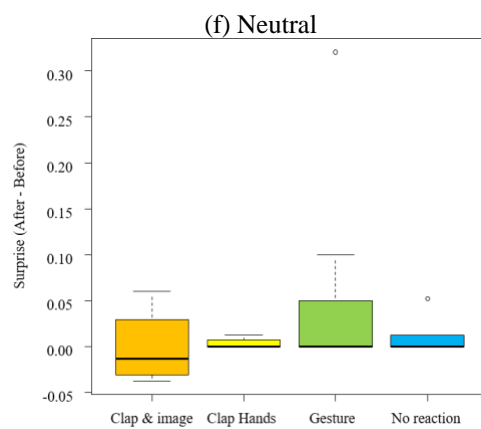
(e) Happiness



(f) Neutral



(g) Sadness



(h) Surprise

Fig. 6. A Kruskal–Wallis test of eight emotions.

V. DISCUSSION

A. Comparison of Clapping Hands and Gestures

The results of the Kruskal–Wallis test presented in Fig. 6 indicate that sadness was significantly different among the eight emotional responses. This change occurred because the natural state of well-being in a meeting varies greatly depending on the content of the meeting. Therefore, we can infer that the presentation of gestures and applause as common items during the meeting mitigated the negativity and reduced the sadness. Furthermore, gestures and applause positively influence the psychology of others in online meetings. Although there was no significant variability in happiness or surprise, it is understood that the natural numerical difference is less variable. Conversely, contempt and disgust were as close to zero as possible because very little information was presented to the face.

A comparison of the means during the gestures (see Fig. 5) shows that happiness and surprise increased slightly before and after the start of the meeting, while neutral emotions and sadness decreased slightly before and after the gestures. Thus, gesture presentation is more uplifting and produces a positive outcome.

B. Limitations

In this study, the effect of applause in online meetings could have been analyzed more thoroughly by increasing the sample size to at least 50 by analyzing YouTube videos and performing statistical processing. In addition, the number of participants, the size of the conference, and the duration of the conference were not homogeneous in the comparison of existing online conferences. In the future, we will conduct experiments with homogeneous meetings as units of study to measure the effect of applause in meetings more accurately and to explore the possibility of the effect of applause.

VI. CONCLUSION

For this study, we categorized online meetings into four categories: “with applause,” “without applause” “gesture/mark presentation only,” and “with applause and a gesture/mark.” We then compared the effect of applause with the emotional information read from each person’s face through microexpressions. The results indicate a significant difference in feelings of sadness as an effect of applause and gestures, which had a positive effect. The results of the Kruskal–Wallis test in Fig. 6 suggest that sadness was significantly different among the eight emotional responses.

It can be said that gesture and applause positively influence the psychology of others in online meetings. Although there was no significant variability in happiness or surprise, it is understood that the natural numerical difference

is less variable. These results confirm the positive effect of online applause and the presentation of the gesture/clap symbol on reducing sadness.

For future work, it is expected that the online conference system will be more effective if there is a sound effect (e.g., applause) corresponding to the mark in addition to the button for presenting the mark in the online conference system in order to raise the participants’ spirits with the same applause effect as in a real face-to-face meeting. It is then expected that the mark presentation and the sound effect will make the meeting smoother and consolidate the meeting in a smooth and positive direction for people to reach a consensus.

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