Emotional Expressions in Memojis

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Fig. 1. Users tend to express emotion with Memoji and It can lead the communication mood; misunderstanding, confusing and clear

Memojis often represent human faces in digital platforms, and investigations are anticipated beyond visual resemblance, ethnic bias, or graphic styles. Emotional conveyance receives particular attention, and we attempted to examine how Memojis accurately convey seven basic emotions. An online survey was conducted to collect user assessments of emotional expressions in Memojis. Memoji generated with Twenty-eight JACFEE datasets and created by iPhone with iOS 15.2. Eighty-two participants judged the emotional appeals of individual Memojis. Happiness and sadness are robust, while fear and contempt were inaccurately perceived. Finally, we discussed the limitations and challenges for proper use of the Memojis towards a better figure-based and non-verbal communication.

1 INTRODUCTION

As the human facial expressions are the universal media to convey emotions, "Emojis" or "Emoticons" are increasingly used in daily computer-mediated communication[2, 5]. SNS platforms have actively adopted them to assist users in enhancing emotional communication intuitively. Smith found the effectiveness of figures that relax the negative atmosphere[8], and Das studied emojis' influence on users' purchase intention[1].

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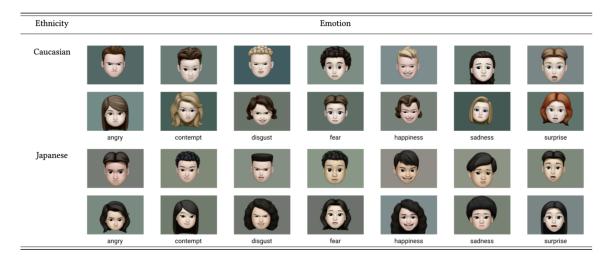
Fig. 2. Entire Memojis used in the survey. left to right signify angry, contempt, disgust, fear, happiness, sadness, surprise.

The application of facial illustrations has expanded to the "Memoji", which originated from the "Animoji." Initially, it was one of Apple's early object icons mainly generated from animals. However, since iOS 12, a Memoji-making tool has been included as one of the essential services, and the tool generates customized figures from one's facial images (https://support.apple.com/en-us/HT208986). Furthermore, beyond the resemblance, Memoji users expect that Memojis reflect their personality and mood state to be shared in communication[3, 11].

Along with the growth in users and contents of Memojis, studies about figure-based messages have pursued more proper representations. The concerns include accurate resemblance[10], ethnicity issues[6], or graphic style depend on the software[9].

In this circumstance, this study investigated the expression level for seven basic emotions in the Memojis. We attempted to figure out whether Memojis fairly or more effectively deliver emotions across emotion categories. Through an online survey, we tried to collect empirical evidence to understand the emotional conveyance of Memojis. As the emotional norms of facial expressions, we facilitated the JACFEE (Japanese and Caucasian Facial Expressions of Emotion, [7]) to generate the Memojis.

2 ONLINE SURVEY

2.1 Method

2.1.1 Materials: Memojis from JACFEE. To create the Memojis, we used the iPhone 11 operated with the iOS 15.2. In addition, we used verified JACFEE photography to generate the facial expressions. The JACFEE contains 28 Japanese and 28 Caucasian photographs covering men and women with the seven basic emotions. We reduced the survey duration to 28 photographs;7 Japanese men, 7 Japanese women, 7 Caucasian men, and 7 Caucasian women, one from each emotion category. Figure 2 presents the entire Memojis used in the survey.

2.1.2 Participants. We recruited 82 participants aged between 18 and 26 years old (Mean = 20.95, Standard Deviation = 2.49). All participants were Korean native university students, consisting of 43 men and 39 women. They were paid 5 dollars for voluntary participation.

Fig. 3. The online surveys;The emotional intensity was assessed in aspects of seven emotions.

Table 1. Emotional assessments of Memojis (N = 82): The averaged assessments are horizontally displayed regarding the seven intended emotions arrayed vertically. The strongest agreement is in underlined bold text.

Intended Emotion	Aspect Emotion						
	anger	contempt	disgust	fear	happiness	sadness	surprise
anger	0.52(1.25)	-1.08(1.00)	**1.10(1.07)**	-1.30(0.92)	-1.00(0.96)	-1.30(0.94)	-1.50(0.77)
contempt	0.21(1.28)	0.07(1.44)	**0.70(1.19)**	-1.00(1.04)	-1.00(1.25)	-0.60(1.34)	-1.30(0.90)
disgust	0.04(1.25)	-0.76(1.18)	**0.80(1.06)**	-0.80(1.12)	-1.00(1.03)	-0.70(1.21)	-1.20(0.94)
fear	-1.11(1.08)	-1.57(0.69)	-1.30(0.97)	**0.10(1.25)**	-2.00(0.79)	-0.80(1.19)	-0.80(1.25)
happiness	-1.81(0.46)	-0.04(1.17)	-1.50(0.87)	-1.60(0.65)	**1.00(0.84)**	-1.80(0.54)	-0.90(1.17)
sadness	0.03(1.47)	-1.43(0.85)	-1.20(1.00)	-0.7(1.18)	-2.00(0.71)	**1.30(1.09)**	-1.50(0.81)
surprise	-1.38(0.92)	-1.53(0.80)	-1.10(1.04)	**1.30(0.99)**	-1.00(0.91)	-1.30(0.94)	**1.30(1.02)**

2.1.3 Questionnaires. As shown in Figure 3, we presented one out of 14 Memojis asking participants to rate emotional intensity with regard to the seven emotions using 5-point (1-5) scale, labeled strongly disagree (-2), disagree (-1), neutral (0), agree (1), and strongly agree (2).

2.1.4 Procedure. To proceed with the survey while not losing participants' attention, we limited the stimuli to 14 out of 28 Memojis thereof. We randomly selected the materials for the survey made a total of 41 evaluations for each Memojis. Participants joined the survey remotely, and responses were collected via a web-based survey platform.

3 RESULTS AND ANALYSIS

Based on the assessments, we summarized the central tendency across the seven emotions. Each Memoji was assessed in aspects of seven emotions, and we tried to figure out whether the intended emotion was mainly agreed.

As shown in Table 1, the summarized results are the averaged assessments of four categories, such as Caucasian men, women, and Japanese men, women. The assessment scores confirmed that happiness, sadness, and disgust were assessed as intended, showing that the agreement scores were equal or greater than 0.8, between -2 (strongly disagree) and $+2$ (strongly agree). Furthermore, the scores for happiness, sadness, and disgust were distinctively higher than

those on different emotions. It indicates these three emotions are well reflected in their Memojis. However, a different tendency was found regarding the remaining four emotions. With surprising expressions, participants were confused with fear and surprise, showing that the scores on both emotions were equally 1.30. Also, in the case of fear, the highest score was 0.10, which is natural, indicating that the Memojis failed to contain fearful expressions. Furthermore, angry and contemptuous faces were mostly disgusted, which showed that Memojis inaccurately deliver intended emotions. Finally, the results implied that Memojis might have inaccurately communicated the emotions unless they illustrated happy, sad, or disgusting faces.

4 DISCUSSION

This study aims to figure out what is the level of expression for seven basic emotions in the Memoji. The participants recognized the intended emotion from the Memojis with happy, sad, or disgusting emotion. The other four emotions remain challenging. Surprising Memojis appealed to both surprise and fear emotions. Ironically, the fearful Memojis failed to deliver any distinctive emotions. Also, angry and contemptuous Memojis were perceived as disgusting faces.

The results imply inaccurate or vague communication when Memoji tries to express emotions using facial expressions. As the cause, Memojis intend to be like typical cartoon characters by having bigger eyes, flawless skins, or round face contour. Such graphical characteristics might have hindered, biased, or exaggerated actual human faces, which we are more familiar with. Perhaps the Memojis could appeal to the friendly look but potentially deliver incorrect messages.

However, we admit the survey was limited to Korean participants. As Hess asserted, people judge facial expressions more accurately within the same ethnicity[4]. Nonetheless, the study may motivate designers to develop the Memoji better in specific emotions. The empirical evidence of this study expects to be utilized to advance emotional communication in figure-mediated conversation.

5 CONCLUSION

We investigated how Memojis accurately convey seven basic emotions. In particular, we tried to figure out whether the intended emotions were effectively perceived. We conveyed an online survey with two sets of 14 Memojis generated from the JACFEE dataset. Eighty-two participants assessed one of the survey sets. Their responses were statistically analyzed, Memojis convey happy, sad, and disgusting emotions as intended. However, they might inaccurately deliver surprising emotions. Also, fearful emotion is difficult to be expressed using Memojis. Both angry and contemptuous Memojis might be seen as disgusting look.

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