

# Cultural Differences in Emoticon Perception: Japanese See the Eyes and Dutch the Mouth of Emoticons

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This study investigated cultural differences in the perception of emoticons between Japanese and Dutch participants. We manipulated the eyes and mouth of emoticons independently and asked participants to evaluate the emotion of each emoticon. The results show that Japanese participants tended to focus on the emotion expressed with the eyes while Dutch participants put weight on the shape of the mouth when evaluating emoticons. This tendency is consistent with a previous cross-cultural study comparing people from Japan and the United States (Yuki et al., 2007).

## Keywords

emoticon, emoji, cultural difference, facial expression, emotion

## Introduction

Emoticons, which convey senders' feelings through ideograms, are strengthening their presence with the current wide use of social networking services. Although normal text messages can usually convey only linguistic information, emoticons enable us to add nonverbal nuance to such messages and to express various emotions. This fact may lead us to the notion that emotions expressed on emoticons can be recognized universally among different language speakers or people from various cultures, but is this true? Research using big data analysis has revealed that the actual usage of emoticons differs among cultures (Bai et al., 2019; Park et al., 2013, 2014). Specifically, people from individualistic cultures such as North American and European countries favor horizontal emoticons emphasizing the shape of the mouth, while

those from collectivistic cultures such as East Asian countries tend to use vertical emoticons emphasizing the shape of the eyes (Park et al., 2014). This difference may reflect cultural differences in where attention is directed to the emoticons, that is, eyes or mouth, during emotion perception. In the present study, we aimed to investigate cultural differences in emotion perception from emoticons, focusing on differences between Japanese and Dutch people.

An emoticon consists of simple depicted eyes and mouth, while other information such as hairs, wrinkles, or facial colors is missing. Nevertheless, several studies suggest that an emoticon is not a mere picture but is processed like a real face. For example, the “face inversion” effect (Yin, 1969), which occurs specifically with faces (e.g., Farah & Tanaka, 1995), is observed even with emoticons (Churches et al., 2014). Besides, an event-related potential (ERP) study (Gantiva et al., 2019) suggests the similarity in neural processing between emoticons and real faces as indexed by the P100, N170, and late positive potential (LPP), although the effect of emoticons was smaller than that of real faces (see Weiß et al., 2019).

Thus, an emoticon functions as a nonverbal cue like a real face. However, cross-cultural studies have also suggested that people from different cultures differ in how they perceive emotions from emoticons. According to Takahashi et al. (2017), neither happiness nor sadness was conveyed to Cameroonian and Tanzanian people by Western emoticons (e.g., :- ) or :( ), Japanese emoticons (e.g., (^\_^) or (T\_T)), and smileys (e.g., ☺ or ☻). Yuki et al. (2007) demonstrated that there are also cultural differences even between countries where emoticons are commonly used. They asked participants from Japan and the United States to rate the degree of happiness or sadness of emoticons that consisted of happy, sad, or neutral eyes and mouths. They found that Japanese participants rated emoticons with emphasis on the shapes of the eyes, while American participants gave weight to the shape of mouth. Thus, although emoticons play an important role as nonverbal cues in online social communication, they are not always understood universally.

The purpose of the present study is to investigate whether we can generalize the “mouth superiority” shown by Americans to other Western cultures. We conducted a similar experiment to Yuki et al. (2007) with Dutch and Japanese people. Although Dutch people differ from Americans in their language usage and geographical situation, according to the cultural framework such as construals of the self (Markus & Kitayama, 1991), their individualism is as high as that of people in the United States (Hofstede, 2001), unlike East Asian's tendency of collectivism. If such a broader cultural framework affects the perception of emoticons, the results of Yuki et al. (2007) would be replicated in the comparison between Japanese and Dutch people.

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| Combination<br>Happier Locus | Happy + Neutral  | Sad + Neutral  | Happy + Sad   | Neutral + Neutral |
|------------------------------|--|--|---|-------------------|
|                              | Happier Eyes   | <br>emo.1 | <br>emo.2  |                   |
| Happier Mouth                | <br>emo.4 | <br>emo.5 | <br>emo.6 |                   |

Figure 1. The emoticon stimuli in the present study.

**Methods**

*Participants*

The participants were composed of Japanese and Dutch groups. The Japanese group comprised 50 undergraduate students from Tokyo Woman’s Christian University whose native language is Japanese (*Mean age* = 20.0 years, *SD* = 2.6; all females). The Dutch group was made up of 42 undergraduate and graduate school students<sup>1</sup> who speak Dutch as their native language from Leiden University (*Mean age* = 20.7 years, *SD* = 2.9; 37 females). The participants of each group were recruited in each university.

*Stimuli*

Stimuli were seven emoticons composed of eyes and mouths as shown in Figure 1. Six of them (Happier eyes emoticons: happy eyes/neutral mouth (Figure 1, emo. 1), neutral eyes/sad mouth (emo. 2), happy eyes/sad mouth (emo. 3); Happier mouth emoticons: neutral eyes/happy mouth (emo. 4), sad eyes/neutral mouth (emo. 5), and sad eyes/happy mouth (emo. 6)) were the same as the stimuli used in Yuki et al. (2007)’s Study 1. In addition, we created a neutral emoticon, in which neutral eyes were combined with a neutral mouth (emo. 7). This neutral emoticon enabled us to examine the influence of changes in the eyes or the mouth for each emoticon from the neutral baseline. These stimuli were presented on the display at a size of 7.25 cm × 7.25 cm (actual size) along with a number line for a rating on the display of the laptop (Dell Latitude 15 (3540)) at a distance of 50 cm from each participant, resulting in at a visual angle of 8.3° × 8.3°. The presentation of visual stimuli and record of participants’ responses were controlled through Hot Soup Processor 3.4 (Onion software).

*Procedure*

The experiment was conducted in a silent experimental room at Tokyo Woman’s Christian University or Leiden University. Each participant engaged in the task alone. Participants were seated in front of a laptop at a distance of around 50 cm and asked to rate how happy or sad

each expression of each emoticon was and to respond by pressing a numeric key (1 to 9).<sup>2</sup> Each emoticon was presented once (7 trials). While Yuki et al. (2007) used two versions of questionnaires in which trial orders were different, we fixed the order of the trials among all participants (both cultural groups) to minimize variance in evaluation scores.

**Results**

First, to check whether there was a cultural difference in the rating of an emoticon itself, we ran a one-way ANOVA on the original rating scores (1: *extremely sad*, 9: *extremely happy*) for the neutral emoticon (emo. 7). Results showed that Japanese participants rated the neutral eyes/neutral mouth emoticon sadder than Dutch participants did ( $F(1, 90) = 5.83, p = .018, \eta_p^2 = .06$ ). This indicates that Japanese participants tended to select more negative scores (“negative interpretation bias”) than Dutch participants did. To exclude the possibility that this bias affected the score, we used a difference score calculated by subtracting each participant’s original rating score on the neutral emoticon from that of the other emoticons in the subsequent analyses (we show both original rating scores and difference scores in Table 1).

To investigate whether participants’ ratings differed between cultures, we conducted a 2 (culture: Japanese, Dutch) × 2 (happier locus: eyes, mouth) mixed-factorial ANOVA on the sum of difference scores in each locus (Figure 2). Results showed significant main effects for culture ( $F(1, 90) = 12.19, p < .001, \eta_p^2 = .12$ ) and for happier locus ( $F(1, 90) = 13.61, p < .001, \eta_p^2 = .13$ ), and an interaction of culture and happier locus ( $F(1, 90) = 100.60, p < .001, \eta_p^2 = .53$ ). A simple main effect analysis revealed that Japanese participants rated happier-eye emoticons (emo. 1 + emo. 2 + emo. 3) as happier than Dutch participants did ( $F(1, 90) = 69.28, p < .001$ ). On the other hand, Dutch participants tended to rate happier mouth emoticons (emo. 4 + emo. 5 + emo. 6) as happier than Japanese participants did, though this tendency was only marginally significant ( $F(1, 90) = 3.20, p = .077$ ).

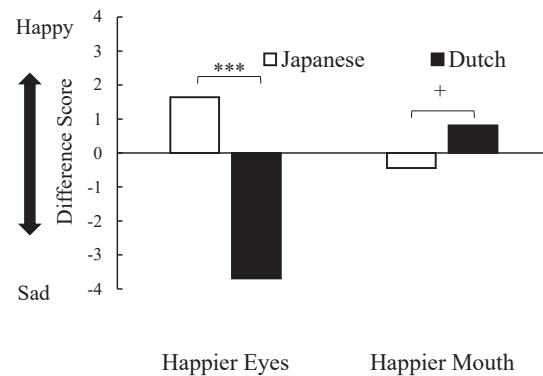
<sup>1</sup>In addition, eight participants in the Dutch group were excluded from the analysis for the following reasons: One had already learned the Japanese language, three were not native Dutch language speakers, and the other four did not indicate their age.

<sup>2</sup>Participants were randomly assigned to the group instructed to rate *extremely sad* as 1 (*extremely happy* as 9) or that instructed to rate oppositely (*extreme happy* as 1). In the analysis, we reversed each participant’s score in the latter group.

Thus, as with the results of Yuki et al. (2007) for Japanese and North American participants, Japanese participants perceived happier emotions from the eyes than Dutch participants did.

Next, following the procedure of Yuki et al. (2007), we examined the impact of culture on the three types of combinations of the eyes and mouth separately using the difference score. On difference scores for each combination (Happy + Neutral, Sad + Neutral, Happy + Sad), we conducted a 2 (culture: Japanese, Dutch) × 2 (happier locus: eyes, mouth) mixed-factorial ANOVA. First, for the happy and neutral combination (emo. 1 vs emo. 4), main effects of culture ( $F(1, 90) = 16.47, p < .001, \eta_p^2 = .16$ ) and happier locus ( $F(1, 90) = 17.08, p < .001, \eta_p^2 = .16$ ) and their interaction ( $F(1, 90) = 33.65, p < .001, \eta_p^2 = .27$ ) were all significant. A simple main effect analysis revealed that Japanese participants rated the happy eyes/neutral mouth emoticon (emo. 1) as happier than Dutch participants did ( $F(1, 90) = 36.05, p < .001$ ), while there was no significant difference between cultural groups for the neutral eyes/happy mouth emoticon (emo. 4) ( $F(1, 90) < .01, p = .964$ ). Second, for the sad and neutral combination (emo. 2 vs emo. 5), the main effect of happier locus ( $F(1, 90) = 63.24, p < .001, \eta_p^2 = .41$ ) and the interaction between culture and happier locus ( $F(1, 90) = 28.62, p < .001, \eta_p^2 = .24$ ) were significant. The main effect of culture was not significant ( $F(1, 90) = .13, p = .719, \eta_p^2 < .01$ ). A simple main effect analysis revealed that Japanese participants rated the sad eyes/neutral mouth emoticon (emo. 5) as sadder than Dutch participants did ( $F(1, 90) = 5.75, p = .019$ ), while Dutch participants rated the neutral eyes/sad mouth emoticon (emo. 2) as sadder than Japanese participants did ( $F(1, 90) = 4.06, p = .047$ ). Third, for the happy and sad combination (emo. 3 vs emo. 6), that is, a mixed or ambivalent expression, the main effects of culture ( $F(1, 90) = 14.78, p < .001, \eta_p^2 = .14$ ) and happier locus ( $F(1, 90) = 44.33, p < .001, \eta_p^2 = .33$ ) and the interaction between culture and happier locus ( $F(1, 90) = 68.02, p < .001, \eta_p^2 = .43$ ) were significant. Japanese participants rated the happy eyes/sad mouth emoticon (emo. 3) as happier than Dutch participants did ( $F(1, 90) = 83.23, p < .001$ ), while there was no significant difference in rating between cultural groups for the sad eyes/happy mouth emoticon (emo. 6)

( $F(1, 90) = 2.08, p = .153$ ). We show the difference score for each emoticon in Figure 3.

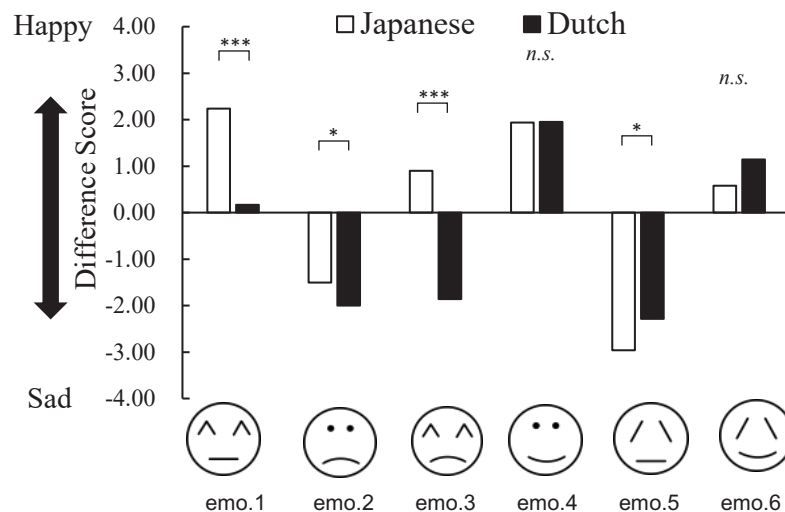


**Figure 2.** The sum of difference scores in each locus ( $+p < .10, ***p < .001$ ).

Overall, the results of the present study replicated those of Yuki et al. (2007). In rating the emotions of emoticons, Japanese participants tended to be influenced by the eyes while Dutch participants' ratings were affected by emotion expressed in the mouth, as was true of North American participants in the previous study.








### Discussion

The present study aimed to replicate the cultural differences in the perception of emoticons shown in Yuki et al. (2007) between Japanese and Dutch people. The results showed that Japanese participants perceived emotions from the eyes of emoticons, while Dutch participants perceived emotions focusing on the mouth, just as in the comparison between Japanese and North American participants in Yuki et al. (2007). That is, the cultural difference in the perception of an emoticon is observed not only limited to the Japanese–North American comparison but also in a comparison between Japan and the Netherlands, another Western country. The similarity among Western countries might be explained in terms of a wide cultural framework such as the construal of the self



**Figure 3.** The difference score for each emoticon ( $*p < .05, ***p < .001$ ).

**Table 1.** Comparison of the difference scores and original rating scores for each emoticon ( $*p < .05$ ,  $**p < .01$ ,  $***p < .001$ ).

|                       |                     | Happier Eyes  |   |   | Happier Mouth   |   |   | Neutral   |
|-----------------------|---------------------|---|---|---|---|---|---|---|
|                       |                     | Happy + Neutral   | Sad + Neutral   | Happy + Sad   | Happy + Neutral   | Sad + Neutral   | Happy + Sad   | Neutral + Neutral   |
|                       |                     |  |  |  |  |  |  |  |
|                       |                     | emo.1   | emo.2   | emo.3   | emo.4   | emo.5   | emo.6   | emo.7   |
| Difference Score      | Japanese            | 2.24 (1.74)   | -1.50 (1.04)  | 0.90 (1.62)   | 1.94 (1.38)   | -2.96 (1.03)  | 0.58 (2.17)   | -   |
|                       | Dutch               | 0.17 (1.53)   | -2.00 (1.34)  | -1.86 (1.2)   | 1.95 (1.21)   | -2.29 (1.64)  | 1.14 (1.42)   | -   |
|                       | Cultural Difference | ***   | *   | ***   | <i>n.s.</i>   | *   | <i>n.s.</i>   |   |
| Original Rating Score | Japanese            | 6.66 (1.47)   | 2.92 (0.78)   | 5.32 (1.46)   | 6.36 (0.85)   | 1.46 (0.76)   | 5.00 (1.87)   | 4.42 (1.03)   |
|                       | Dutch               | 5.02 (1.46)   | 2.86 (1.37)   | 3.00 (1.27)   | 6.81 (1.13)   | 2.57 (1.65)   | 6.00 (1.10)   | 4.86 (0.61)   |
|                       | Cultural Difference | ***   | <i>n.s.</i>   | ***   | *   | ***   | **  | *   |

Standard deviations are given in parentheses.

(Markus & Kitayama, 1991) that may shape the perception of emoticons. The present study extends the previous finding that Americans tend to focus on the mouth of an emoticon to Western culture. The same tendency may be observed in other East Asian countries, given that the tendency to pay attention to the eye region has been observed in Chinese when observing pictures of real faces (Jack et al., 2009). It is also consistent with a study using vertical emoticons that can express a variety of emotions that found that the eyes are preferred in South Korea (Park et al., 2014).

The findings of the present study are consistent with the results of previous studies using real face stimuli. For example, a study using 3D computer graphics of faces revealed that East Asians perceive emotions through the movements of the eyes (Jack et al., 2012). In addition, East Asians tend to fixate on the eye region of a real face picture during an emotion categorization task (Jack et al., 2009). The current findings are also consistent with Yuki et al. (2007). In their Study 2, they showed similar cultural differences using real faces. Thus, cultural-specific perception of emoticons may be modulated by the experiences of seeing real faces in daily life.

Whereas some cultural differences may be innate and came into existence as a consequence of evolution, others may be learned through ontogenetic factors and have benefits in the current cultural environment but not necessarily the ancestral one (Camras et al., 1998; Darwin, 1872; Ekman et al., 1969; Ekman, 1972). A question that follows from our study is why East Asians would pay more attention to the eyes and Westerners to the mouth. Although the current study does not allow us to formulate a definite answer to this question, there are multiple possible explanations. For instance, cultural differences in the display of emotions on the one hand and in decoding rules of emotions on the other may have contributed to this finding. Since East Asians tend to conceal their negative emotions more frequently than Westerners (Matsumoto, 1990), their true emotions may be expressed more in the eyes as these are less voluntary controllable than the mouth (Duchenne, 1990). As a consequence, it is more relevant for them to attend to the eyes as a source of genuine emotions. In contrast, Westerners do not conceal negative emotions as much as East Asians (Matsumoto, 1990). Consequently, they may be more expressive with their mouth and use their mouth to intentionally convey certain

information. This may lead Western observers to focus more on the mouth. To verify this functional explanation, future research could examine cross-cultural differences in the relationship between emotional states and facial expressions, for instance by using a recording method such as electromyogram (EMG) or the Facial Action Coding System (FACS) coding. It is also important to understand why there is a cultural difference in concealing the expression of negative emotions in the first place. Taking an evolutionary perspective, a more specific question is what precise survival benefits our respective ancestors had under the unique environmental pressures in East Asia versus Europe (contemporary Americans of Western origin share the same evolutionary path as contemporary Europeans) that made certain behavioral patterns (attending to the eyes or mouth, or concealing certain emotions) to be selected in the people living in these two environments (e.g., Chiao & Blizinsky, 2010)? Was it the ancestral environment that shaped this behavior? Or could it be a side-effect? For example, morphological differences in the faces of East Asians and Westerners (e.g., the shape or color of the eyes) may make some expressions clearer which subsequently modulates observers' attention to specific parts of the face during interactions.

To gain a deeper understanding of the factors that contributed to the here observed cultural differences, further studies are needed. For instance, it would be interesting to compare East Asian and Western newborns to gain insight into the possible innateness of our findings. In addition, comparing East Asian people who grew up and live in a Western country with those born and raised in East Asia and vice-versa, Westerners who grew up in East Asia with those rooted in a Western country, can yield a deeper understanding of the possible effect of cultural experience.

We also found a negativity bias in our Japanese participants—they rated the neutral emoticon as sadder than Dutch participants did. Nevertheless, even after eliminating the effect of this bias, their tendency to focus on the eyes remained. Thus, we demonstrated the robustness of the cultural differences, which suggest that “East Asians see eyes, while Westerners see a mouth,” through difference scores that enabled us to eliminate the negativity bias. However, we should note that we could not find cultural differences in difference scores for two emoticons, the neutral eyes/happy mouth emoticon and



the sad eyes/happy mouth emoticon (Figure 1: emo. 4 and emo. 6). These emoticons have in common happy mouths. Considering this, the influence of smiling mouths like a “smiley” may be so strong that we could not find a cultural difference. In a future study, it may be useful to examine the effect of a milder curve mouth to detect a more subtle cultural difference.

Our findings may offer a suggestion regarding the current worldwide issue of the COVID-19 pandemic. In this crisis, we often see “cultural differences” in people’s willingness to wear face masks. For example, some news articles have pointed out that East Asians’ frequent use of face masks contrasts with Westerners’ reluctance to wear them (e.g., Adam & Booth, 2020; He & Laurent, 2020). This difference may be caused by common associations among Westerners, as wearing a face mask is often associated with a person’s infection with a serious disease or with criminals. However, considering the results of the present study, this may also reflect the cultural difference of a mouth superiority in Westerners. It would be interesting to investigate whether the new custom of wearing facemasks affected cultural differences in face recognition.

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