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Abstract

The development of information and communication technologies has provided a new non-verbal channel to convey emotions using emoticons. Although a great diversity of emoticons is widely used today in text-based communications, little is known about the way emotions are recognized when using emoticons compared to other modes of expression. In a pretest and three studies (N = 1,203), 'new' emoticons specifically designed to represent the six basic emotions were proposed to participants who had to recognized the emotions conveyed by each. The quality of recognition was compared to other modes of emotional expression, including facial expressions. In using a between-subject design, the first two studies revealed that the emotions conveyed by 'new' emoticons were recognized more effectively than other modes of expression, including facial expressions. Using a within-subject design, a third study confirmed the more successful recognition of 'new' emoticons than other modes of expression, and with a greater intensity. For all the studies, this effect was mainly due to the negative emotions of disgust (Study 1, 2, and 3) and sadness (Study 2 and 3). These findings suggest the need to use specific emoticons to convey easily recognized basic emotions for communication technologies, and implement them in social media.

Keywords: emoticons; basic emotions; facial expressions

The Recognition of Emotions Beyond Facial Expressions: Comparing Emoticons Specifically Designed to Convey Basic Emotions with Other Modes of Expression

Emotions are omnipresent in our social life, and facial expressions are one of the main non-verbal communication channels used to convey emotions (Ekman, 2003; Matsumoto et al., 2013). A vast number of studies have been conducted on the facial expression of emotions and their recognition by people in different groups (Elfenbein et al., 2002; Merten, 2005; Rotter & Rotter, 1988; Young & Hugenberg, 2010) and cultures (Carroll & Russell, 1996; Izard, 1991; Krauss et al., 1983). Based on pioneer research (Ekman & Friesen, 1971; Izard, 1971, 1991), six basic emotions have been identified and considered as universal: anger, disgust, fear, happiness, sadness, and surprise (Ekman, 2003; Ekman, 1992a, 1992b; Ekman & Friesen, 1971, 1981, 1986). Although recent findings have expressed some doubts about their universality (Crivelli, Jarillo, et al., 2016; Crivelli, Russell, et al., 2016; Jack et al., 2012), the utility and function of these basic emotions in human communication are crucial. The expression of emotions is so important that individuals need to replace them when they are lacking, as in the case of communication via modern technologies, for example, in situations in which people use figurative representations such as emoticons to convey their emotions. Although emoticons are widely used to convey emotions in social media, little is known about how emotions are recognized from emoticons compared to other modes of emotional expression. The aim of three studies was to examine the recognition of emotions from 'new' emoticons specifically designed to convey basic emotions, and to compare this recognition to other modes of expression.

1. Emoticons to convey emotions

The term 'emoticon', originates from combining the two words 'emotion' and 'icon' and refers to graphic representations of facial expressions that many users embed in their messages via different technologies to convey emotions (Garrison et al., 2011; Kaye et al.,

2017; Tossell et al., 2012; Walther & D'Addario, 2001). Emoticons have shifted from typographical symbols such as :-) to convey happiness to graphic forms  (Bai et al., 2019; Huang et al., 2008; Tang & Hew, 2018; Wang et al., 2014). A great diversity of graphic emoticons (also called smiley or emojis) has been developed with predefined names and codes, or evaluated on a set of criteria and categorized on a database, such as in the Lisbon Emoji and Emoticon Database (Rodrigues et al., 2018). This latter work, found that the majority of the emoji set represented facial expressions (88.89%), the remaining concerned abstract concepts including animals, plants, activities, gestures and objects.

Today, graphic emoticons are widely used in text-based communications to convey emotions similarly to non-verbal cues used in face-to-face interactions (Derks et al., 2008; Rezabek & Cochenour, 1998; Saini et al., 2018; Luor et al., 2010; Tossell et al., 2012). They have also be used as a measure of emotions elicited by different stimuli, such as food in consumer experiences (Jaeger et al., 2018; Swaney-Stueve et al., 2018; Toet et al., 2018). A study with more than 85,000 Facebook users demonstrated that 90% of them included at least one graphic emoticon in their public feed (Oleszkiewicz, Karwowski, et al., 2017), and this kind of communication is privileged among young adults and university students on social media (Dunlap et al., 2016). As such, emoticons may act as 'quasi-non-verbal cues' influencing various social behaviors and cognitive processes (Lo, 2008). For instance, they may encourage the acceptance of advice (Duan et al., 2018), increase information richness to influence perceived playfulness in text messaging (Hsieh & Tseng, 2017), and encourage students to recycle (Meng & Trudel, 2017). They may also have an impact on the perception of e-mails (Ernst & Huschens, 2018; Ganster et al., 2012; Skovholt et al., 2014), virtual first impressions (Glikson et al., 2018), reading behaviors (Robus et al., 2020), judgment accuracy on others' personality (Wall et al., 2016) and others' emotions (Lohmann et al., 2017), for example. Nevertheless, one of the prerequisites for emoticons to have an impact on social

behaviors and cognitive processes is that the emotion conveyed should be well-recognized to be correctly interpreted by the receiver.

2. The recognition of emotions from (graphic) emoticons

Although the ability to recognize emotions from facial expressions either expressed in photographs or videos has been widely examined by researchers (Ekman & Friesen, 1971; Montagne et al., 2007; Tcherkassof et al., 2013; Wells et al., 2016), to date, very few studies have compared facial expressions to other modes of expression of emotions, including emoticons. Moreover, when such a comparison was conducted, mixed results were found. For instance, the recognition of emotions was found to be more accurate for photographs of faces than for synthesized facial expressions (Wehrle et al., 2000). In examining low and high intensity faces, Fischer et al. (2018) showed that photographs of human faces were rated as more intense than drawings of faces (i.e., icons), which were rated as more intense than synthesized facial expressions (i.e., avatars). When comparing photographs of human faces and drawings of faces, Brechet (2017) found that the latter were recognized more successfully than the former. By contrast, another study compared photographs of faces and graphic emoticons and found no significant difference (Oleszkiewicz, Frackowiak, et al., 2017). Other studies have compared emotional processing for emoticons and human faces using electrophysiological measures (Gantiva et al., 2020). They found that the N170 neural response, reflecting basic face processing involved in recognition of facial emotion, had larger amplitudes for emoticons than for human faces, and anger generated larger amplitudes than happiness.

Paradoxically, although emoticons are often used to express emotions in social media, little is known about how emotions are recognized from emoticons compared to other modes of expression, including photographs of facial expressions. As each system provider develops their own emoticons, research has investigated a great diversity of emoticons, sometimes

after pretesting (Huang et al., 2008; Marengo et al., 2017; Sun et al., 2019; Luor et al., 2010). In practice, when people use emoticons to express emotions in text-based communications, depending on the system used, there might be a misunderstanding between sender and receiver (Miller et al., 2016, 2017; Miller Hillberg et al., 2018). Paradoxically, emoticons used in research are generally extracted from well-known platforms, and they have not been developed from the six basic emotions involved in facial expressions. In the present research, 'new' emoticons specifically designed for the six basic emotional facial expressions were created, developed and pretested. Accuracy in recognizing emotions based on 'new' emoticons was then compared to that for other modes of emotional expression such as emoticons of other platforms including Facebook and iOS, sketches of faces, and photographs of facial expression.

3. The present research

The aim of the research was to examine the quality of recognition of the emotions based on 'new' emoticons compared to other modes of expression, and notably emotional facial expressions used as standards or reference points because they have been widely examined in the literature. Three studies were conducted while controlling for the participants' emotional intelligence, an individual difference variable known to influence processing of emotional information and recognition of emotions (Austin, 2005; Elfenbein et al., 2002). Although, it was not our purpose to examine the effects of emotional intelligence *per se*, it seemed useful to statistically control this variable in exploratory research. In Study 1, female participants (all were university students) indicated via a paper-and-pencil questionnaire the emotions conveyed either by 'new' emoticons, Facebook emoticons, sketches of faces or photographs of a woman's face expressing different emotions. Two other studies were conducted to replicate and extend this first exploratory study, using either a between-subjects design (Study 2) or a within-subjects design (Study 3). In these second two

studies, a web-questionnaire was administered to both male and female participants from a more diverse sample who were instructed to identify emotions conveyed by the 'new' emoticons, photographs of men's or women's faces expressing different emotions, and iOS emoticons (only in the Study 3).

4. Study 1

4.1. Method

4.1.1. Participants

We determined the required sample size using G*Power (Faul et al., 2009; Perugini et al., 2018). We assumed a 'medium' effect size ($f = 0.25$). Power analysis indicated an optimal sample of 280, based on $a = .05$ and power = 0.95 for an ANOVA with a fixed factor, and 279 for an ANCOVA using emotional intelligence scores as a covariate. We decided to enlarge the sample size to provide more robust findings. This study involved 351 all-female participants, who were first year university students in psychology and learning sciences. Those retaking their first year in psychology ($n = 7$) were excluded from the statistical analyses because they had already studied emotional facial expressions the previous year, and thus, they could have been influenced by their knowledge in this field (e.g., basic emotions).

The sample consisted of psychology ($n = 249$) and learning science ($n = 95$) students, aged between 17 and 34 years ($M_{age} = 18.66 \pm SD = 1.91$). All participants used a smartphone and a great majority of them had accounts on different social networks such as Facebook (94.5%), Snapchat (86.9%), Instagram (86.6%), YouTube (80.2%), and Twitter (55.2%). Among the participants, 40.7% had five accounts, 34% had four accounts, 16.3% had three accounts, 6.1% had two accounts, 2.3% had one account, and 0.3% had no accounts.

4.1.2. Materials

In this study, 24 stimuli were used, six for each of the four experimental conditions: 'new' emoticons, Facebook emoticons, sketches of faces, and photographs of a woman's face (see Appendix A).

*Emoticon*s. Two types of emoticons were used: (1) six Facebook emoticons used by Oleszkiewicz et al. (2017), available on Facebook Messenger application[1] and (2) six 'new' emoticons specifically designed from the facial expressions of the six basic emotions. The Ekman's (2003) facial expressions photographs of the basic emotions were used by a professional graphic designer to design an emoticon for each of them. The form of the 'new' emoticons was designed so as to be as close as possible to the facial expressions and respecting the same graphic charter for all emoticons. A pretest was then performed in which 11 different emoticons were presented in a booklet to measure emotion recognition rates associated with each of them. In this pretest, 253 participants had to choose the emotion conveyed by each emoticon among a list of 14 emotional adjectives containing the six basic emotions and eight adjectives reflecting secondary emotions. The recognition rate analysis allowed us to select six emoticons out of the 11 that best conveyed the six basic emotions: disgust (96.3%), surprise (91.9%), happiness (91.3%), sadness (87.8%), anger (79.6%), and fear (57.4%).

Photographs of facial expressions. As individuals recognize emotions better from facial expression of ingroup than outgroup members (Young & Hugenberg, 2010), only photographs of a woman's face were used. Six photographs of facial expressions representing the six basic emotions were chosen from the Radboud faces Database (Langner et al., 2010). All were based on the Facial Action Coding System built around specific Action Units, i.e. actions of individual muscles or groups of muscles producing a given facial expression (Ekman et al., 2002). A single model of a Caucasian woman was chosen to represent the six basic emotions, and her age was very similar to that of the university students. The

percentage of agreement on emotion categorization ranged from 69% to 100%: sadness (69%), disgust (70%), surprise (92%), fear (92%), anger (100%), and happiness (100%).

Sketches of faces. Six sketches representing the six basic emotions were also selected from Heaston's (2013) face drawing work. The comparison with this kind of stimuli was exploratory, and no pretest was performed on this material which was relevant for a paper-and-pencil questionnaire. The sketches of the faces were added to provide an alternative kind of material, figural like emoticons and realistic like facial expressions.

Emotional intelligence. This was measured using the 33 items of the Schutte Self-Report Emotional Intelligence scale (Schutte et al., 1998). The scale assesses the appraisal and expression of emotion, regulation of emotion, and use of emotions in problem solving for the self and others. Examples of the sample items include "I easily recognize my emotions as I experience them" and "I know why my emotions change." Participants had to answer on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores were calculated for each participant by summing all items after recoding reverse items. A Principal Component Analysis (PCA) revealed a 10-factor structure explaining 57.29% of the variance, instead of the 4 factors in the original scale. As these results do not support the original construct, the emotional intelligence scores were not used as a covariate in the statistical analyses.

4.1.3. Procedure

After reading and signing a consent form, participants filled out the emotional intelligence scale and socio-demographic variables (discipline, level of education, accounts on social networks, usage of social media, etc.), and were randomly assigned to one of the four experimental conditions ('new' emoticons, Facebook emoticons, sketches of faces, and photographs of a woman's faces). The different types of material were assembled into four versions of a booklet, which were randomly distributed at the beginning of a course in a

lecture hall. Participants had to indicate the emotion conveyed by each of the six stimuli (1 per page) which were in the same order for each condition. All stimuli were of the same size (5.0 x 5.0 cm), and participants had to choose the corresponding emotion in a list containing 14 emotional adjectives, including those concerning the six basic emotions (anger, disgust, fear, happiness, sadness and surprise). The remaining eight adjectives were secondary emotions, and were considered as fillers in the present research (disappointment, guilt, pride, curiosity, embarrassment, shame, hate and envy). Each of the six basic emotions was coded by 0 (*not recognized*) or 1 (*recognized*), providing a correct recognition score from 0 to 6 for each participant.

4.2. Results and discussion

Data were analysed through an analysis of variance (ANOVA) with experimental condition as the between-subjects factor.

A significant difference in recognition of emotions was observed between the experimental conditions, F (3, 340) = 5.62, p = .001, η^2 = .047. A contrast analysis (3 –1 –1 –1) revealed that emotions were recognized better with 'new' emoticons (M = 4.66 ± SD = 1.09) than photographs of the woman's face (M = 4.27 ± SD = 1.25), Facebook emoticons (M = 3.89 ± SD = 1.33), and sketches of faces (M = 4.32 ± SD = 1.33), t (340) = 3.22, p = 001. As can be seen in Figure 1, all the differences between the 'new' emoticons and the other conditions were significant, except those with the sketches of faces which did not reach the significance threshold of .05.

*** Insert Figure 1 about here ***

A closer examination of the percentage of recognition of each emotion showed that the higher level for 'new' emoticons was essentially due to disgust. No significant difference between the conditions was observed for the other emotions: surprise, fear, and sadness (see Table 1). The recognition rate of disgust was higher with the 'new' emoticons than sketches

of faces, $\chi^2(1, N = 167) = 30.9$, $p < .001$, photographs of the woman's face, $\chi^2(1, N = 174) = 25.40$, $p < .001$, or Facebook emoticons, $\chi^2(1, N = 175) = 112$, $p < .001$. For anger, only one significant difference was found: the recognition rate was higher with 'new' emoticons than sketches of faces, $\chi^2(1, N = 167) = 7.25$, $p = .007$. Another result revealed a significant difference for happiness which was recognized more successfully with Facebook emoticons than sketches of faces, $\chi^2(1, N = 170) = 5.28$ $p = .022$, or 'new' emoticons, $\chi^2(1, N = 175) = 7.77$, $p = .005$, but not compared to photographs of the woman's face, $\chi^2(1, N = 177) = 2.24$, $p = .135$.

*** Insert Table 1 about here ***

In this first study, we found that (female) participants recognized emotions conveyed by the 'new' emoticons specifically designed for the six basic emotions more accurately than emotions conveyed by other means. More specifically, emotions were recognized more successfully when they were conveyed by the 'new' emoticons than Facebook emoticons, and more importantly, the recognition was also better than for photographs of the woman's facial expressions. However, no difference was found between the 'new' emoticons and sketches of faces in the recognition of emotions. This lack of difference may be explained by the figurative nature of these two modes of emotional expression based on drawings. However, these results did not explain why emotions were recognized more accurately from the sketches of faces than Facebook emoticons, and why no difference was observed between sketches of faces and photographs of the woman's facial expressions. When each emotion was considered separately, it appeared that the enhanced recognition of emotions conveyed by the 'new' emoticons was mainly due to disgust. The presence of a salient detail in this emoticon (tongue sticking out), may explain the better recognition of disgust with this emoticon than with the other modes of emotional expressions. The level of intensity of such an emotion may also explain the greater recognition of disgust expressed by this 'new'

emoticon. In emotional facial expression research, the intensity of facial expressions partly explains the quality of the recognition of emotions (Wells et al., 2016; Wingenbach et al., 2018). Extending this reasoning to emoticons, it is possible that the 'new' disgust emoticon conveyed emotions of greater intensity than other modes of emotional expression. However, our results did not explain why a similar effect was not observed for anger for which the 'new' emoticon was recognized better than when it was expressed by a sketch of a face (but not by any other means).

Another explanation based on gender differences in the recognition of emotions may be proposed. Indeed, happiness, sadness and fear are considered typically feminine emotions, while anger and disgust are essentially perceived as masculine emotions (Fischer, 2000). As the sample in the present study consisted of only females, it is possible that the facial expressions of anger and disgust were more difficult to recognize on the photograph of a woman's face than on the 'new' emoticons expressing similar emotions. Finally, it was also shown that happiness was recognized more successfully with Facebook emoticons than with other stimuli, excepting the photographs of the woman's face. It is reasonable to assume that the happiness emoticon of Facebook is very familiar to most people, including participants in the present study. Indeed, research has revealed that it is the most used emoticon in text-based communication (Oleszkiewicz, Karwowski, et al., 2017), and a recent study found that very similar happiness emoticons extracted from iOS were highly familiar to participants (Jones et al., 2020)

As for all research, some limitations can be raised by this first exploratory study. A first limitation concerns the impossibility to statistically control the participants' emotional intelligence score because of the poor psychometric quality of the self-report scale used (Schutte et al., 1998). A second limitation concerns the sample exclusively composed of women. Although some studies have found gender differences (McClure, 2000; Rotter &

Rotter, 1988), or small differences limited to disgust, which is more successfully recognized by females than by males (Connolly et al., 2019), other studies have reported no gender differences in the recognition of emotions based on facial expressions (Matsumoto & Hwang, 2011; Rahman et al., 2004). Similarly, it has been demonstrated that females use more emoticons (Oleszkiewicz, Karwowski, et al., 2017), and are more familiar with them than males (Jones et al., 2020). Taken together, these studies suggest that not only the gender of participants, but also the gender of the faces expressing the emotions in photographs need to be taken into account.

A second study was conducted to examine differences between men and women in the recognition of the basic emotions on a woman and man's faces, comparing them with the 'new' emoticons, but not including either the Facebook emoticons or sketches of faces. Moreover, in order to remedy the poor psychometric quality of the SSREI in our sample, another measure of emotional intelligence was used: the Wong and Law Emotional Intelligence Scale (Wong & Law, 2002).

Based on the findings of the first exploratory study, it was expected that the emotions would be recognized better when conveyed by 'new' emoticons than by facial expressions of a woman or a man. Based on contradictory results, it can be predicted that this effect would either be higher among females than males (McClure, 2000; Rotter & Rotter, 1988), particularly for disgust (Connolly et al., 2019) or independent of gender (Matsumoto & Hwang, 2011; Rahman et al., 2004). These alternative hypotheses were tested while controlling statistically for the individuals' emotional intelligence.

5. Study 2

5.1. Method

5.1.1. Participants

We determined the required sample size using G*Power. According to the effect size of Study 1, for the second study we used a slightly smaller effect size ($f = 0.20$). Power analysis indicated an optimal sample of 390, based on $a = .05$ and power = 0.95 for a 3 (modes of expression, 'new' emoticons vs. expressions on a woman's face vs. expressions on a man's faces) x 2 (Gender of participants, males vs. females) between-factor ANCOVA, with emotional intelligence scores as a covariate. As in the first study, we decided to enlarge the sample size to obtain more robust findings.

We recruited 638 participants by posting an online survey on a blog on social media. In total, 489 participants (324 women and 165 men) between 18 and 71 years old ($M_{age} = 29.94 \pm SD = 11.11$) filled in the whole questionnaire (76.6%), the 149 remaining participants dropout before completing all the items (23.4%). The latter were not considered in the statistical analyses. The sample population was more diverse than in the first study, and consisted of 36.2% of students, 52.35% of working people, 2.25% of retired people and 9.2% who were in the "other" category. Participants had varying levels of education, 46.42% had a baccalaureate, 24.13 % had a bachelor degree, 25.97 % had a master's degree and 3.48% described themselves as belonging to another category. Ninety-six percent of participants used a Smartphone in their daily life, and all of them used at least one social medium.

5.1.2. Material

In this study, we used a web-questionnaire administered using LimeSurvey application to present 18 stimuli. The same photographs (faces of a woman) and the 'new' emoticons presented in the first study were used. In addition, we included six photographs of a man's face to represent the six basic emotions from Radboud faces Database (Langner et al., 2010); this model was a Caucasian man similar in age to the woman used in Study 1, with a similar percentage of agreement on emotion recognition (see Appendix A)

Emotional intelligence was measured with the 16 items of the Wong and Law Emotional Intelligence Scale (Wong & Law, 2002). Participants answered the questionnaire on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Examples of the sample items include: "I have a good understanding of the emotions of the people around me" and "I am able to control my temper and handle difficulties rationally." The scale contains four subscales of four items each: (1) Self Emotion Appraisals (Cronbach's alpha = .835), i.e. ability to understand one's own emotions and express them naturally; (2) Other's Emotion Appraisals (Cronbach's alpha = .807), i.e. ability to perceive and understand the emotions of other people; (3) Use of Emotion (Cronbach's alpha = .792), i.e. ability to use one's own emotions for activities and personal performance; (4) Regulation of Emotion (Cronbach's alpha = .878), i.e. ability to regulate one's emotions and to recover from them quickly. A Principal Component Analysis (PCA) revealed a 4-factor structure explaining 68.29% of the variance. Confirmatory factor analysis supported the original construct with four factors (χ^2 = 298.28; df = 100, p < .001; CFI = .94; TLI = .93; RMSEA = .06). A score was calculated for each factor separately, and because the reliability of the WLEIS was good (Cronbach's alpha = .84), an overall emotional intelligence score was also calculated for each participant by averaging all items.

5.1.3. Procedure

All participants began to complete the web-questionnaire by responding to socio-demographic variables (age, sex, occupation, level of education, accounts on social media, usage of social media), followed by the 16 items of emotional intelligence. Participants were randomly assigned to one of the three experimental conditions ('new' emoticons, photographs of a man or woman's face). They each had six stimuli (one per page) corresponding to the experimental condition, with one for each of the six basic emotions. In each condition, the stimuli were randomly presented in a similar size format (5.0 x 5.0 cm),

and centered on the computer screen. Participants had to select by clicking on a checkbox the corresponding emotion in a list containing 14 emotions, including the six basic ones (and the 8 filler adjectives used in the Study 1). Each emotion was coded by 0 (not recognized) or 1 (recognized), providing a possible score between 0 and 6 for each participant.

5.2. Results and discussion

Data were analysed through an analysis of covariance (ANCOVA) with the experimental condition and gender as between-subjects factor, and emotional intelligence scores as the covariate. There was a significant difference in the recognition of emotion between the experimental conditions, F (2, 482) = 22.31, $p < .001$, $\eta^2 = .085$, no significant main effect of gender of participants, F (1, 482) = 2.02, $p = .156$, $\eta^2 = .004$, no significant effect of the covariate, F (1, 482) = .001, $p = .98$, $\eta^2 < .001$, and no significant interaction effect between the gender of participants and the experimental conditions, F (2, 482) = .59, $p = .552$, $\eta^2 = .002$. Contrast analysis (2 –1 – 1) revealed, as predicted, that the recognition of emotions from 'new' emoticons ($M = 4.78 \pm SD = 1.07$) was better than from photographs of the woman's face ($M = 4.24 \pm SD = 1.22$), or the man's face ($M = 3.93 \pm SD = 1.10$), $t(482) = 6.46$, $p < .001$. When statistically controlling each of the four factors of emotional intelligence separately as a covariate, the same results were obtained.

*** Insert Figure 2 about here ***

On examining each emotion with Chi-square analyses the recognition rate of disgust was found to be higher with the 'new' emoticon than the photographs of the woman's face, $\chi^2(1, N = 343) = 61.27$, $p < .001$, or the man's face $\chi^2(1, N = 331) = 4.83$, $p = .028$. The same pattern was found for sadness for which the 'new' emoticon was recognized more successfully than the photographs of the woman's face, $\chi^2(1, N = 343) = 10.85$, $p < .001$, or the man's face, $\chi^2(1, N = 331) = 69.78$ $p < .001$. The recognition rate of anger with the 'new' emoticon was higher than with the photographs of the woman's face, $\chi^2(1, N = 343) = 8.85$, p

= .003, but there was no significant difference with the photographs of the man's face, $\chi^2(1, N = 331) = 1.5$, $p = .22$. Finally, the recognition rate of happiness with the 'new' emoticon was higher than with the photographs of the man's face, $\chi^2(1, N = 331) = 14.55$ $p < .001$, and lower than with the photographs of the woman's face, $\chi^2(1, N = 343) = 6.36$ $p = .012$. No significant effect of conditions was observed for surprise or fear (see Table 2).

*** Insert Table 2 about here ***

Taken together, the results of this second study confirm, with a larger and more heterogenous sample, that emotions were recognized better with the 'new' emoticons than with facial expressions, expressed either by a woman or a man. As in the first study, the 'new' emoticon of disgust obtained a significantly higher level of recognition, and similarly recognition of anger for the 'new' emoticon was significantly higher than the woman's face. However, no difference was observed between the 'new' emoticon of anger and the photograph of the man's face. In addition to the results of the first study, a similar superiority effect of the 'new' emoticons was found for sadness, which was recognized more accurately from the 'new' emoticon than from the photograph of the man's or woman's face. A distinctive effect was also found for happiness, with this emotion being recognized better when expressed by the 'new' emoticon than by the photograph of the man's face, but less well recognized than from the photograph of the woman's face. It is surprising that happiness was less well recognized when expressed with the 'new' emoticon than with the photograph of the woman's face, and we could base a speculative interpretation on research on intensity of emotional facial expressions. Indeed, research has revealed that basic emotions are reliably recognized, but that recognition thresholds vary for different expressions from 20% of intensity for happiness to 40-50% for the other emotions (Calvo et al., 2016; Wells et al., 2016). Although the intensity of emotional expressions was not measured in this study, it is possible that it varied according to the gender of the face, and was higher for a woman's but

lower for a man's face. This result may also be due to the forced-choice method used in the present study in which participants had to choose an emotion among 14 adjectives, six reflecting the basic emotions, and eight reflecting secondary emotions treated as fillers. A closer examination of the choices in each condition revealed that the low recognition rate of happiness for the man's face was due to a large number of participants choosing 'pride' (34.2 %) instead of 'happiness' (see the Table in Supplementary Online Materials for the descriptive statistics on secondary emotions). This finding suggests a stereotypic 'bias' in the recognition of emotions, with pride having a greater masculine than feminine connotation, and consequently being recognized more on a man's than on a woman's face.

Finally, it is worth noting that a similar pattern of results was found among female and male participants with whom no gender difference was found in the recognition of emotions between the three modes of expression. This result contrasts with previous research on emotional facial expressions revealing that females exceeded males in their ability to recognize emotions whether expressed by men or women's faces (Connolly et al., 2019; McClure, 2000; Rotter & Rotter, 1988). On the other hand, the present findings are consistent with other research which did not find any empirical support for gender differences in the perceived intensity of the basic emotions presented in photographs of human faces, synthesized facial expressions or drawings of faces (Fischer et al., 2018). Lastly, the present study suggests that the participants' emotional intelligence, statistically controlled for as a covariate, did not have any effect on the recognition of emotions, either among men or women.

As for all research, these two studies present some limitations. Firstly, the 'new emoticons' were compared to only one set of facial expressions, either one male or one female face. It is possible that the observed differences originated from the specificity of the woman's or man's face. Secondly, in using a between-subjects design, a participant had to

recognize only one series of stimuli, and did not have the possibility to evaluate all modes of expression. Thirdly, the first study only compared the recognition of emotions based on "new" emoticons with the emoticons on Facebook. To extend our findings, we decided it would be useful to use emoticons extracted from another digital platform. Finally, in addition to the recognition of emotions, it would also be useful to measure arousal or intensity of each stimulus, i.e. the degree to which a face/emoticon brings an observer to a state of greater alertness (Mancini et al., 2018). Consequently, to reinforce the findings of the first two studies, a third study was conducted using a within-subjects design allowing male and female participants to be exposed to several sets of men's and women's faces, and to emoticons taken from another digital platform (iOS) than that used in the first study (Facebook). The intensity of each stimulus was also measured.

6. Study 3

6.1. Method

6.1.1. Participants

The required sample size, calculated with G*Power indicated an optimal sample of 132, based on a = .05 and power = 0.95 for a mixed ANOVA with a moderate effect size (f = 0.25). The modes of emotional expression were treated as a within-subjects variable ('new' emoticons vs. iOS emoticons vs. women's faces vs. men's faces), and the gender of participants (male vs. female) was treated as a between-subjects variable. Emotional intelligence scores were also used as covariates.

We recruited 255 participants by posting an online survey on a blog on social media. In total, 117 participants (71 women and 46 men) between 17 and 73 years old (M_{age} = 29.39 ± SD = 11.17) filled in the whole questionnaire (45.9%), while 138 participants dropout before completing all the items (54.1%) and were therefore not considered in the statistical

analyses. The high dropout rate may be easily explained by the length of the questionnaire in a within-subject design.

The sample population consisted of 39.9% of students, 42.7% of working people, 1.7% of retired people, 9.4% unemployed, and 6.8% in the "other" category. Ninety-four percent of participants used a smartphone in their daily lives, and all of them, except two, used at least one social media device.

6.1.2. Materials and procedure

In this study, a web-questionnaire administered with LimeSurvey was used to present 36 stimuli: 18 stimuli were the same as those used in Study 2 and an additional 18 new stimuli, six for each mode of expression of emotions (see Appendix A). Six photographs each of a single male and a single female model extracted from the RaFD database were added (Langner et al., 2010). The models were Caucasian, similar in age to the models used in previous studies, and with very close percentage agreement on emotion recognition. Six graphical iOS emoticons were also added, replacing those in Study 1 that were taken from Facebook. The iOS emoticons were chosen because they are considered more familiar, more aesthetic, and clearer than those proposed by Android (Rodrigues et al., 2018). In order to select the most representative iOS emoticons for each basic emotion, the results of two previous studies were examined (Franco & Fugate, 2020; Rodrigues et al., 2018). Emoticons common to both studies were selected (happiness, surprise, and anger). For sadness and fear, the selected emoticons came from the study of Rodrigues et al. (2018), while the disgust emoticon was very similar to that used in Study 1.

Regarding disgust, no emoticon conveying disgust appears clearly either on WhatsApp (Jaeger et al., 2018), or on iOS (Franco & Fugate, 2020). In examining several databases, platforms and publications, we only found one graphic emoticon that can be considered as disgust, although it can also be viewed as a "confounded face" (Annamalai & Abdul Salam,

2017). The study of Franco and Fugate (2020), not published at the time of the designing the first two studies, showed that disgust was the emotion most often associated with the "confounded face", i.e. the emoticon used in the present research.

As in Study 2, emotional intelligence was measured using the WLEIS (Wong & Law, 2002). A Principal Component Analysis revealed a four-factor structure explaining 73.67% of the variance. Confirmatory factor analysis supported the original construct with four factors (χ^2 = 162.98; df = 100, p < .001; CFI = .94; TLI = .93; RMSEA = .07), and a good reliability of each of them whose values were between .822 and .905.

After completing the same web-questionnaire as in the Study 2, participants were exposed to the 36 stimuli. To control the order effects, the four series of stimuli ('new' emoticons, iOS emoticons, men's and women's faces) were counterbalanced to be presented in six different ways. In each series, the stimuli were randomly presented in a similar size format (5.0 x 5.0 cm). Participants had to select the corresponding emotion in a list of 14 emotions, including the six basic ones (and the 8 filler emotions). Each emotion was coded by 0 (*not recognized*) or 1 (*recognized*), providing a possible score between 0 and 6 for each participant. They also had to evaluate the intensity of each stimulus on a seven-point Likert scale from 1 (*low intensity*) to 7 (*high intensity*).

6.2. Results and discussion

6.2.1. *Recognition of emotions*

As the recognition scores of the two women and men models were correlated (r = .22, p = .015; r = .23, p = .014, respectively), an overall recognition score for the women's and men's faces was calculated by averaging the scores of the two models. Preliminary analysis revealed no effect of the order of presentation in the series of stimuli, $F(5, 111) = .55$, p = .817, η^2 = .02.

A significant difference in emotion recognition was observed between the modes of expression, $F(2.83, 345) = 18.63$, $p < .001$, $\eta^2 = .139$, no significant effect of gender, $F(1, 115) = .353$, $p = .554$, $\eta^2 = .003$, and there was no significant interaction effect between gender and modes of expression, $F(2.83, 345) = 1.82$, $p = .146$, $\eta^2 = .016$. Bonferroni's post-hoc analysis with correction revealed, that the recognition of emotions with the 'new' emoticons ($M = 4.42 \pm SD = 1.16$) was better than facial expressions of women ($M = 3.92 \pm SD = .93$; $p < .001$), men ($M = 3.72 \pm SD = .85$; $p < .001$), and iOS emoticons ($M = 3.61 \pm SD = 1.06$; $p < .001$). In addition, none of the post-hoc comparisons between the last three conditions were significant (see Figure 3).

*** Insert Figure 3 about here ***

On examining each emotion separately with Chi-square analyses the recognition rate of disgust and sadness were found to be higher with the 'new' emoticon than for the other modes of expression. It also appeared that the recognition rate of happiness with the iOS emoticon was higher than for the other modes of expression, including the 'new' emoticon of happiness (see Table 3). These results confirm those obtained in the first two studies.

*** Insert Table 3 about here ***

In additional analyses, the scores of each of the four emotional intelligence factors were added separately as a covariate. The results revealed that the effect of the modes of expression on the recognition of emotions disappeared when each of the emotional intelligence factors was controlled, excepted for that concerning "other's emotional appraisal", $F(2.83, 342) = 2.67$, $p = .051$, $\eta^2 = .023$. No significant effect of gender, $F(1, 114) = .36$, $p = .55$, $\eta^2 = .003$, covariate (other's emotional appraisal), $F(1, 114) = .01$, $p = .917$, $\eta^2 < .001$, and interaction between gender and modes of expression were significant, $F(2.83, 342) = 1.58$, $p = .197$, $\eta^2 = .01^2$.

6.2.2. *Intensity of emotions*

A significant difference in the intensity of emotions was found between the modes of expression, $F(3, 345) = 52.68$, $p < .001$, $\eta^2 = .314$, no effect of gender, $F(1, 115) = 1.13$, $p = .289$, $\eta^2 = .010$, and no interaction effect between gender and modes of expression, $F(3, 345) = 0.53$, $p = .662$, $\eta^2 = .005$. The results were not influenced by the emotional intelligence scores added as covariate. As Figure 4 shows, post-hoc analysis with Bonferroni's correction revealed that the intensity of emotions of 'new' emoticons ($M = 5.60 \pm SD = .85$) was greater than for the other modes of expression, iOS emoticons ($M = 5.25 \pm SD = .98$; $p < .001$), facial expressions of women ($M = 5.00 \pm SD. = .90$; $p < .001$), and facial expressions of men ($M = 4.82 \pm SD = .84$; $p < .001$). The difference in intensity of emotions between facial expressions of men and women was marginally significant ($p = .065$).

*** Insert Figure 4 about here ***

On examining the intensity for each emotion separately, a significant difference was observed between the modes of expression, but no significant effect of gender or significant interaction effect between gender and modes of expression. As table 4 shows, the 'new' emoticons conveyed each emotion more intensely than other modes of expression excepted for happiness were a higher score was observed for the iOS emoticon.

*** Insert Table 4 about here ***

The results of this study confirm those of the two previous ones, demonstrating that basics emotions were recognized better with the 'new' emoticons than with the other modes of expression of emotions. This effect was mainly due to the negative emotions of disgust and sadness. The results also demonstrated that emotions conveyed by the 'new' emoticons were of greater intensity than with the other modes of expression, including facial expressions and, to a lesser extent, iOS emoticons. It is reasonable to consider that the representation of faces is simplified in emoticons, with less information to process than in faces, and consequently, the features that convey an emotion may be easier to recognize with a greater intensity. It is

worth noticing that the intensity of emotions conveyed by the 'new' emoticons of disgust and sadness may not fully explain the quality of recognition of these two emotions. Indeed, the results of the third study revealed that all the 'new' emoticons, except happiness, were perceived with a greater intensity than for the other modes of expression.

7. General discussion

The three studies aimed to examine the quality of recognition of emotions based on specifically designed 'new' emoticons representing facial expressions compared to other modes of emotional expression such as Facebook or iOS emoticons, sketches of faces, and photographs of men's or women's facial expressions. In Study 1, female students recognized emotions with a higher accuracy for 'new' emoticons than for other modes of emotional expression. When examining our results in more detail, recognition of disgust was more accurate for 'new' emoticons than for the other emotional expressions, including photographs of facial expressions. Results from study 2, among a more heterogeneous sample, confirmed the advantage of 'new' emoticons in the recognition of emotions compared to photographs of facial expressions. However, it appeared that only disgust and sadness were more successfully recognized with the 'new' emoticons than with facial expressions of the corresponding emotions. Although using a within-subjects design, Study 3 still replicated the findings of the first two studies which had used a between-subjects design. This third study goes further, revealing that the superiority of the 'new' emoticons in the recognition of emotions disappeared when emotional intelligence was controlled, excepted for one of its facets concerning others' emotional appraisal. Results of this last study also showed that the perceived intensity of the emotions varied according to the gender of the person expressing emotional facial expressions. Indeed, it was higher for the women's than for the men's faces suggesting a greater emotional expressiveness on the photographs of faces of women than men.

Taken together, these studies demonstrated that the enhanced recognition of 'new' emoticons was mainly due to the negative emotions of disgust (Study 1, 2, and 3) and sadness (Study 2 and 3). A possible explanation is that the 'new' emoticon expressing disgust with the tongue sticking out provided more clues than for the other emotions. However, the presence of this detail did not explain why a similar difference was observed for sadness in Study 2 and Study 3. An explanation may be provided regarding studies on emotional facial expressions, some of which found that sadness was the most difficult emotion to recognize on a face (Chronaki et al., 2015). Given the difficulty to recognize this emotion on facial expressions, the 'new' emoticons conveying sadness present an advantage. Although the enhanced emotion recognition for 'new' emoticons was found for disgust in the first study, and for disgust and sadness in the last two studies, we did not find any gender differences in recognition of emotions similarly to some previous studies on emotional facial expressions (Matsumoto & Hwang, 2011; Rahman et al., 2004). These findings also contrast with studies that demonstrated that females were better at recognizing anger on photographs of faces than males (Merten, 2005), and that males were superior to females in recognizing anger on men's faces (Rotter & Rotter, 1988).

Although it was not our purpose to examine the effects of emotional intelligence, but only to used it as a control variable, some findings were nevertheless observed in our studies. In Study 1, the psychometric properties of the emotional intelligence scale were unsatisfactory and therefore it was not used as a covariate. In Study 2, the alternative scale used had no effect as a covariate on the recognition of emotion. This lack of effect raises some questions about the influence of emotional intelligence on the recognition of emotions, at least as measured in studies using a between-subjects design. However, results from the third study using a within-subjects design, provided interesting results about the role of emotional intelligence in recognizing emotion conveyed by emoticons, and particularly one

of the facets of the WLEIS: the others' emotional appraisal. Indeed, it appeared that the effect of the modes of expression on the recognition of emotions disappeared when each of the emotional intelligence factors was controlled, except for that concerning “others’ emotional appraisal”. Additional analyses considering emotional intelligence as a moderator demonstrated that only the effect of modes of expression was significant, while emotional intelligence was not, confirming the more successful recognition of ‘new’ emoticons than other modes of expression. Future studies should examine more thoroughly the role of emotional intelligence in the recognition of emotions conveyed by emoticons and in the usage of emoticons in social media.

Taken together, these studies have some limitations. One of the main limitations was the emotion recognition task used to select the emotion label that best described the emotional expression of a stimulus. The methodological limitation of the forced-choice paradigm, widely used in emotional facial expression studies, has been criticized (Paiva-Silva et al., 2016), and other methods have been proposed such as free labelling (Izard, 1971) or a categorization task (Gendron et al., 2014; Mermillod et al., 2010). In the forced-choice paradigm, only six emotions are provided as labels, and happiness is the only emotion that is clearly positive among the different alternatives. However, we tried to remedy these methodological limitations in the present studies, increasing the numbers of emotion labels from six to fourteen. Another limitation concerns the use of static stimuli using emoticons and photographs of facial expressions to recognize the emotions they convey. As dynamic stimuli using video have shown their value (Tcherkassof et al., 2007), it would be useful in future studies to examine the recognition of emotions by comparing static and animated emoticons. Finally, although our main objective was not to compare different expressions of disgust (and other emotions) by the means of emoticons, it would be important in future studies to control more systematically some details in designing emoticons. For example, the

nose scrunch/wrinkle or the tongue sticking out may produce different effects on recognition of facial expressions of disgust (Pochedly et al., 2012; Rozin et al., 1994). Similarly, we found in Study 1 (Facebook emoticon) and Study 3 (iOS emoticon) that happiness was recognized better with these classic emoticons than our 'new' emoticon. It is likely that this better recognition is due to the greater familiarity of the former two, but suggests a need to improve the 'new' emoticon expressing happiness.

8. Conclusion and implications

This research highlights the importance of using specifically designed emoticons of emotional facial expressions to convey basic emotions, thus improving their recognition. More importantly, it demonstrated that 'new' emoticons conveyed emotions more effectively than facial expressions, and specifically for negative emotions of disgust and sadness. The 'new' emoticons also convey emotions more effectively and intensively than other emoticons extracted from Facebook or iOS platforms, except for happiness which is better recognized probably due to its greater familiarity, exposure, and usage in social media. As emoticons are widely used in social media, essentially to communicate non-verbally with others, the implementation of the 'new' emoticons on a social medium is a relative 'success story' of our research. Indeed, the "new" emoticons specifically designed to convey the six basic emotions have been implemented on Wikiradio® developed by the EdTech Saooti; see Appendix B). As the emotions conveyed by these 'new' emoticons should be accurately recognized by the auditors, they can be used to deliver emotional feedback after listening to a broadcast, similar to the Facebook thumbs up symbol ('like') extensively used on numerous platforms. To date, very few studies have looked at emotional feedback (Moffitt et al., 2020; Sun et al., 2019), and more specifically the impact of emoticons, omnipresent on social media, on engagement, satisfaction, feelings and emotions, and many other outcomes. As the emotions conveyed by the 'new' emoticons are better recognized than faces, they can also be used as an emotional

feedback to express participants' emotions in video conferencing systems. Indeed, emoticons may offer users the possibility to convey their emotions without having to activate their webcam showing their faces. To finish, studying the impact of emoticons reflecting the six basic emotions on various outcomes may be a fruitful area of research for the future.

Figure captions

Figure 1. Recognition score of the six basic emotions in each experimental condition.

Figure 2. Recognition score of the six basic emotions in each experimental condition.

Figure 3. Recognition score of the six basic emotions in each experimental condition.

Figure 4. Perceived intensity of the six basic emotions in each experimental condition.

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Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical approval

All procedures were in accordance with the ethical standards of institutional and/or national research committees for studies involving human participants, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Open Practices

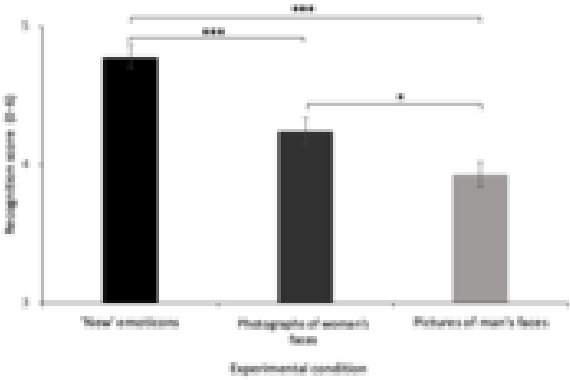
All data and supplemental materials have been made publicly available via the Open Science Framework and can be accessed at:

https://osf.io/w7m46/?view_only=8069a294df3c48e39a1a6b6e682c7bb5

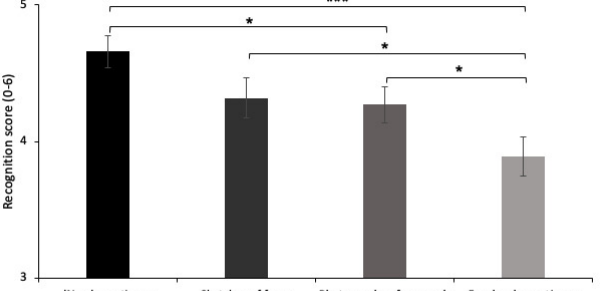
Footnotes

[1] Emoticons for anger, happiness, sadness and surprise were added on February 2016 as an additional element to the 'like' button below the posts on the Facebook platform. Emoticons fear and disgust are available in the chat.

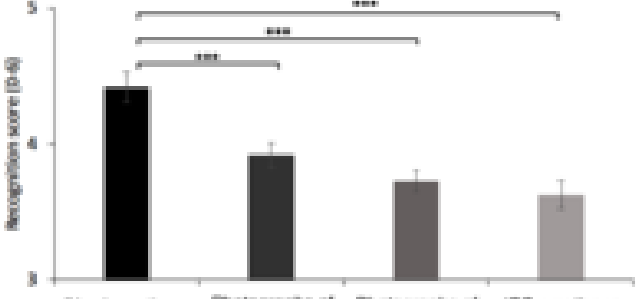
[2] Each of the four emotional intelligence factors were added separately as a moderator, revealing a significant difference between the experimental conditions in favour of the 'new' emoticons on the recognition of emotions ($p < .001$ for each factor). A main effect was also found on two factors, "other's emotional appraisal" and "use of emotion" ($p = .023$ and $p = .021$, respectively). They yielded that participants scoring higher on these factors recognize emotions better. There was no significant effect of either gender, or interaction between variables.



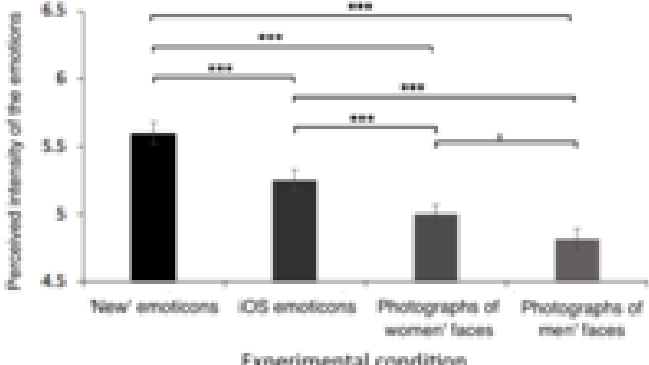
Note. ***p < .001, *p < .05



Note. ***$p < .001$. *$p < .05$


***
***
***
Recognition score (0-6)
6
3
'New' emoticons
Photographs of women' faces
Photographs of men' faces
iOS emoticons
Experimental condition

Note. *** $p < .001$.



Note. ***$p < .001$, *$p < .05$

Table 1. *Recognition rate of each emotion according to the experimental condition, and differences between the experimental conditions.*

Emotions	Experimental condition				χ^2
	'New' emoticons	Photographs of a woman's face	Sketches of faces	Facebook emoticons	
Anger	82.6 $_{a}$	72.7 $_{a,b}$	64.2 $_{b}$	77.5 $_{a,b}$	8.02*
Disgust	98.8 $_{a}$	71.6 $_{b}$	66.7 $_{b}$	20.2 $_{c}$	122***
Happiness	72.1 $_{a}$	80.7 $_{a,b}$	75.3 $_{a,b}$	88.8 $_{b}$	8.48*
Surprise	97.7 $_{a}$	90.9 $_{a}$	90.1 $_{a}$	88.8 $_{a}$	5.46
Fear	45.3 $_{a}$	47.7 $_{a}$	63.0 $_{a}$	46.1 $_{a}$	6.91
Sadness	69.8 $_{a}$	63.6 $_{a}$	72.8 $_{a}$	67.4 $_{a}$	1.77
Total	77.5	71.2	72.0	64.8	

Note. $N = 351$. Values with differing subscripts within rows are significantly different at the $p < .05$ level by Bonferroni's method.
$^{*}p < .05$. $^{***}p < .001$.

Table 2. *Recognition rate of each emotion according to the experimental condition, and differences between the experimental conditions.*

Emotions	Experimental condition			χ^2
	'New' emoticons	Photographs of a woman's face	Photographs of a man's face	
Anger	82.2 $_{a}$	68.4 $_{b}$	76.7 $_{a,b}$	8.97*
Disgust	96.8 $_{a}$	63.9 $_{b}$	91.1 $_{a}$	76.97***
Happiness	80.0 $_{a}$	89.9 $_{b}$	61.0 $_{c}$	37.45***
Surprise	95.7 $_{a}$	94.3 $_{a}$	93.2 $_{a}$	1.01
Fear	55.7 $_{a}$	57.0 $_{a}$	49.3 $_{a}$	2.05
Sadness	68.1 $_{a}$	50.6 $_{b}$	21.9 $_{c}$	70.05***
Total	79.7	70.7	65.5	

Note. $N = 489$. Values with differing subscripts within rows are significantly different at the $p < .05$ level by Bonferroni's method.
$^{*}p < .05$. $^{***}p < .001$

Table 3. *Recognition rate of each emotion according to the experimental condition, and differences between the experimental conditions.*

	Experimental condition				
	'New' emoticons	iOS Emoticons	Photographs of women's faces	Photographs of men's faces	χ^2
Anger	72.6 $_{a,b}$	80.3 $_{b}$	60.3 $_{a,c}$	56.4 $_{c}$	24.71***
Disgust	96.6$_{a}$	11.0 $_{b}$	68.4 $_{c}$	80.3 $_{d}$	227.80***
Happiness	56.4 $_{a}$	92.3 $_{b}$	74.8 $_{c}$	67.5 $_{a, c}$	41.45***
Surprise	53.0 $_{a}$	38.5 $_{a,b}$	50.9 $_{a}$	33.3 $_{b}$	20.50***
Fear	90.6 $_{a, b}$	93.2 $_{b}$	85.5 $_{a,b}$	80.3 $_{a}$	13.23**
Sadness	72.6 $_{a}$	44.4 $_{b}$	55.6$_{b}$	57.1 $_{b}$	19.43***
Total	73.6	60.1	65.9	62.5	

Note. $N = 702$. Values with differing subscripts within rows are significantly different at the $p < .05$ level following Bonferroni's method.
$^{**}p < .01$. $^{***}p < .001$.

Table 4. *Mean perceived intensity (and Standard Deviation) of each emotion according to the experimental conditions.*

Emotions	Experimental condition				*F*(3, 345)
	'New' emoticons	iOS Emoticons	Photographs of women's faces [(a)]	Photographs of men's faces [(a)]	
Anger	5.58 (1.31)	5.55 (1.28)	4.34 (1.24)	4.70 (1.14)	43.95***
Disgust	6.26 (1.12)	5.36 (1.40)	5.23 (1.04)	5.03 (1.12)	37.37***
Happiness	4.95 (1.29)	6.00 (1.12)	5.62 (.99)	4.89 (1.05)	41.88***
Surprise	5.74 (1.26)	5.03 (1.46)	4.96 (1.12)	4.62 (1.13)	23.00***
Fear	5.49 (1.30)	5.38 (1.30)	5.13 (.99)	5.27 (.96)	3.01*
Sadness	5.61 (1.25)	4.21 (1.44)	4.75 (1.15)	4.43 (1.22)	39.17***
Total	5.60 (.85)	5.25 (.90)	5.00 (.98)	4.82 (.84)	

Note. $N = 117$. [(a)] Means for the two models.

***$p < .001$. *$p < .05$.