

The Effect of Contextual Information and Emotional Clarity on Emotional Evaluation

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Abstract

The present study aimed to investigate the effect of contextual information and emotional clarity on valence and employed a three-factor mixed design in which participants were required to view the picture combined with athlete's facial expression and contextual information, and then to evaluate the emotional intensity of the athlete's expression using a 7-point scale. The results showed that the matched contextual information enhanced the emotional evaluation to the facial expression, namely making the valence of winning facial expression more positive and the losing more negative, and that the non-matched contextual information weakened the emotional evaluation. More importantly, the emotional evaluation was even reversed by the non-matched contextual information when the emotional clarity was lower. The results suggested that the matched contextual information had an "exaggeration effect" on valence and that the influence of non-matched context on emotional evaluation was more significantly impacted by the emotional clarity.

Keywords: Emotional clarity, Contextual information, Valence, Facial expression, Emotional evaluation

1. Introduction

Facial expression has a significant effect on social communication and interaction. However, people judge others' emotion through not only facial cues but also contexts, such as body posture, voice, and language. Therefore, the recognition of emotions usually depends on the combinational impact of facial expression and context information.

Researches on emotion have been trying to figure out how the facial emotion information was read by observers (e.g., Nakamura, Buck & Kenny, 1990; Aviezer, Hassin, Bentin & Trope, 2008; Yamashita, Fujimura, Katahira, Honda, Okada & Okanoya, 2016). Discrete-category perspective defined emotion as a discrete category represented by different behavior and the physiological pattern, namely basic facial expressions (Ekman, 1999). Nakamura et al. (1990) found that facial expression played a lead role in emotional evaluation when the meanings conveyed by expression and situation were both clear. Discrete-category perspective suggested that people had the ability to accurately identify the expressions in any circumstances and the reason why people couldn't accurately judge the emotions sometimes was that the emotional sense of expression was not clear enough (Ekman & Cordaro, 2011). However, the discrete-category perspective did not really take into account the situation factors (Calder & Young, 2005). Aviezer et al. (2008) combined standard facial expressions with various backgrounds, such as waving a fist, and the participants were told to judge the valence of facial expressions. The research found that the participants classified emotions according to the situations rather than facial expressions. For example, when the facial expression of anger was presented alone, it would be recognized quickly and accurately. When the anger was transplanted to a hurdling athlete's face, the participant could recognize emotions related to determination, not just anger. Barrett and Kensinger (2010) found that it could be insufficient to perceive emotion accurately when the facial expression was viewed independently. The contextual effect on emotion was inevitable.

Dimensional perspective proposed that the recognition of facial expression involved two processes. In the first stage, valence and arousal were read quickly and automatically, which was not influenced by the contextual information. In the second stage, it involved not only the further processing of valence and arousal, but also the processing of context (Russell, 1997).

Carroll and Russell (1996) used the Goodenough-Tinker paradigm to pair a fearful face with the angry-inducing context and asked the participants to judge the facial emotions. The results indicated that most of the participants reported the emotions consistent with the context.

Russell (1997) proposed that when the valence of facial emotion was opposite from that of the situation, the face won. However, the situation would be more dominant when their valences were consistent with each other. Although there were many differences, both the discrete category and the dimensional perspective proposed that affective information was read out from the face in the early perceptual stage, which was not affected by the context (Aviezer et al., 2008).

Recently, Aviezer et al. (2008) proposed the hypothesis of perceptual similarity to reconcile the contradiction in the previous studies. They assumed the body would serve as powerful context and perceptual similarity, namely the perceived similarity between facial expressions, which was an important factor to influence the context effect. Perceptual similarity determined whether the situation would influence the recognition of facial expression. That was to say, the emotional evaluation was mostly influenced by the facial expression when it was emotionally accurate. However, once the facial expression was emotionally ambiguous, the context would determine the recognition of emotion (Hassin, Aviezer & Bentin, 2013). The research found that body posture further overrode the face in judging valence while facial expression was emotionally ambiguous (Aviezer et al., 2008). In summary, the more similar facial expressions were, the stronger the influence of contexts would be, which was referred to as confusability effect (Hassin et al., 2013). In addition, some studies also discovered the role of external situation in classifying strong positive or negative emotions (Aviezer, Trope & Todorov, 2012; Hietanen & Astikainen, 2013). For example, when asked to judge players' emotion after a match, observers more accurately identified winners and losers shown only the body posture than shown only the face (Aviezer et al., 2012).

However, Zhang et al. (2014) found that a context effect existed even if the stimulus similarity between the context and expression was controlled. Other studies indicated that spontaneous faces rather than posed faces could be a good predictor of what happens in the real world (Kayyal & Russell, 2013). Kayyal et al. (2015) studied the emotion judgment based on 15 spontaneous facial expressions of athletes, in which context (correct context, incorrect context, and no context) was a between-subjects factor. The correct context indicated that the facial expression matched the written information about the competition result. Incorrect context indicated the opposite. No context indicated the face was presented with no information about the competition result. The results revealed that the contextual cues overrode the facial expressions on valence. According to the hypothesis of perceptual similarity (Aviezer et al., 2008), emotional clarity (the quality of being clearly perceived as positive or negative in a facial expression) was considered as being outside the scope in their study. Therefore, the present study wants to find how emotional clarity influences emotional evaluation. We assume that the non-matched contextual information will override the emotional evaluation on ambiguous expression.

2. Methods

2.1 Participants

Forty-eight undergraduates from Nantong University (22 males, 26 females) whose average age was 21.79 ± 1.29 volunteered to participate in the present study. They were right-handed, without mental illness, color blindness, or color weakness, and had normal or corrected-to-normal vision. A small gift was given in return for participation. This study was approved by the Human Ethics Committee of Nantong University. Informed consent was obtained from all participants in the present study.

The sample size and sufficient power were tested by the G-power software and the results showed that the Power was 0.9996 when the total sample size was 48 which was exactly the sample size of the present study. If the Power was set to an ideal value of 0.8, the proper sample size will be estimated and the results showed that the actual power was 0.8350 and the total minimum sample size was 18. These results suggest the Power and sample size of the present study are sufficient enough.

2.2 Materials

The original 30 pictures were found from the Internet, which were all athletes' facial expressions without any signs of winning or losing, such as a gold medal. High emotional clarity (emotional accurate, EAC) and low emotional clarity (emotional ambiguous, EAM) were selected prior to the experiment.

EAC faces were selected based on participants' judgment to correctly distinguish between winners and losers in the absence of context. Ten faces whose correct rates were more than 0.8 were chosen as EAC faces, and another ten faces whose correct rates were between 0.4 and 0.6 were chosen as EAM faces.

The formal pictures consisted of twenty athletes' facial expressions, of which ten were EAC and the rest were EAM. Besides, half of these ten EAC faces were winning facial expression and half were losing. So were the ten EAM faces. All the formal pictures were made into black-and-white, 400-px \times 400-px images. The variable of contextual information included three levels: Matched, Non-matched, and Unrelated. Participants were evenly assigned to one of the three conditions at random. The Matched indicated the contextual information was consistent with the athlete's facial expression, winning or losing. The Non-matched indicated the opposite. Unrelated condition indicated that an athlete's facial expression paired with contextual information which was not related to the expression, such as geographically-related or politically-related nouns. Four Chinese characters were applied as contextual information and the number of words was matched among the three conditions. The contextual information and the picture were presented at the same time in the present study.



Figure 1. It's an example of the materials. The Chinese characters “输掉比赛” mean “lose in the game” which was matched with this athlete's facial expression “losing”. So, this condition was named “matched”. The second Chinese characters “赢得比赛” mean “won in the game” which didn't matched with the facial expression and then was named “non-matched”. The “民族企业” means “national enterprise” which was unrelated with the expression

2.3 Procedure

A 2 (Facial Expression: Win vs. Lose) \times 2 (emotional clarity: High vs. Low) \times 3 (Contextual Information: Matched vs. Non-matched vs. Unrelated) mixed design was applied in the present study, of which Contextual Information was a between-subjects factor. Participants were asked to observe each picture and to judge the intensity of seven emotions (happy, sad, angry, proud, afraid, disgusted and excited) displayed by the person, and then pressed the corresponding number keys on the keyboard to give a score to each of the seven emotions using 7-point Likert scale ranging from 0 (not at all) to 6 (extremely).

2.4 Measures

A positive score was the average of scores for happy, proud and excited. A negative score was the average of scores for sad, angry, afraid and disgusted. The valence score, as a dependent variable, was that the positive score minus the negative score. Higher valence scores indicated more positive emotions and it was more negative when the valence scores were lower. Consequently, the higher valence score indicated that the emotional evaluation was more positive; meanwhile, the lower valence score indicated the opposite.

3. Results

A 2 \times 2 \times 3 repeated-measures ANOVA revealed the main effects of the facial expression ($F(1, 45) = 159.31, p < .001, \eta^2 = 0.78$), emotional clarity ($F(1, 45) = 28.68, p < .001, \eta^2 = 0.39$), and contextual information ($F(2, 45) = 5.94, p < .01, \eta^2 = 0.21$), were all significant.

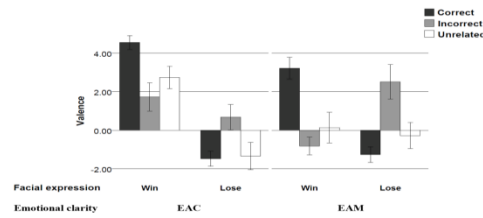


Figure 2. Mean valence scores (and standard error) of Win and Lose are shown for high or low emotional clarity respectively on Matched, Non-matched or Unrelated contextual information.

There was a significant three-way interaction among the three independent variables ($F(2, 45) = 8.80, p < .01, \eta^2 = 0.28$). Further simple interaction analysis indicated that the valence scores of facial expressions, winning and losing, were significantly different in all three contextual information conditions ($F(1, 45) = 257.15, p < .001$; $F(1, 45) = 115.90, p < .001$; $F(1, 45) = 46.84, p < .001$). In Unrelated condition, valence score for winning facial expression (Mean = 1.44, SD = 0.24) was significantly higher than that for losing facial expression (Mean = -0.81, SD = 0.26). In Matched condition, valence score for winning facial expression (Mean = 3.89, SD = 0.24) was significantly higher than that for losing facial expression (Mean = -1.37, SD = 0.26), which meant that compared with that in unrelated condition, the winning was rated more positively, while the losing was appraised more negatively. However, in Non-matched condition, valence score for winning (Mean = 0.46, SD = 0.24) was significantly lower than that for losing (Mean = 1.59, SD = 0.26), which meant that the winning was rated more negatively, while the losing was appraised more positively.

When taking into account the emotional clarity, it showed that for the winning facial expression in all three contextual information conditions, the valence score of EAC expressions was significantly higher than that of EAM expressions ($F(1, 45) = 22.84, p < .001$; $F(1, 45) = 16.76, p < .001$; $F(1, 45) = 87.8, p < .001$). For losing facial expression in Non-matched and Unrelated condition, the valence score of EAC expressions was significantly lower than that of EAM expressions ($F(1, 45) = 15.41, p < .001$; $F(1, 45) = 21.18, p < .001$).

From another perspective, for EAC expressions, the valence score for winning was significantly higher than that for losing in all three contextual conditions ($F(1, 45) = 240.60, p < .001$; $F(1, 45) = 41.65, p < .001$; $F(1, 45) = 110.05, p < .001$). For EAM expressions, the valence score for winning was significantly higher than that for losing in Matched condition ($F(1, 45) = 147.09, p < .001$); however, in Non-matched condition, the valence score for winning was significantly lower than that for losing ($F(1, 45) = 151.38, p < .001$); in Unrelated condition, there was no difference between winning and losing facial expression ($F(1, 45) = 1.23, p > .05$). That meant, only when emotions as difficult to decipher (EAM), the perceived valence of happy faces was reduced in the unmatched context compared to the matched context.

4. Discussion

The present study explored the effect of facial expression and contextual information on valence which indicated that the matched contextual information enhanced the emotional evaluation, namely making the valence of winning facial expression more positive and the losing more negative, and that the non-matched contextual information weakened the emotional evaluation. More importantly, the emotional evaluation was even reversed by the non-matched contextual information when the emotional clarity was lower. The present study first showed that contextual information could only override EAM faces instead of always overriding the facial expressions on valence (Kayyal et al., 2015). This finding supported the hypothesis of perceptual similarity (Aviezer et al., 2008) which meant the judgment was mostly influenced by the facial expression when it was emotionally accurate; otherwise, the context could have a strong effect on the perception of emotion.

The previous studies, such as Kayyal et al. (2015), found that the contextual information took an important part in emotional evaluation as well as emotion recognition. The present study is different from the previous researches mainly because we are concerned about the impact of emotional clarity on the emotional evaluation. From the results of present study, the emotional evaluation tended to be exaggerated due to the matched context and we called it "Exaggeration Effect of the Matched Context". However, the non-matched context weakened the emotional evaluation and even reversed the valence score in the condition of low emotional clarity (EAM) rather than high emotional clarity (EAC). This meant that the emotional evaluation on EAM was completely dominated by the non-matched context and we called it "Reversal Effect of the Non-matched Context".

EAC was perceived more emotionally clearly, so participants could easily distinguish winning and losing. It would be difficult to identify the athletes' emotions in the condition of EAM, under which the ambiguous expression made the emotion perception difficult and then the contextual information could disambiguate them to show the features congruent with context. In addition, although the emotional evaluation was mainly based on facial expression in the case of EAC, it was still influenced by non-matched context, which made the valence score significantly different than that in the matched context condition. When contextual information and facial expression mismatched, participants were more likely to suppress the emotion they perceived even if they were aware of the incongruence (Kalokerinos, Greenaway, & Casey, 2017).

We also found that participants were apt to add cognitive consistency in order to reduce conflicts. For instance, when the expression was "losing" but the context showed that the athlete won the game, the facial expression tended to be explained in line with contextual information, such as "tears of joy", to reduce the cognitive conflict, and then the "reversal effect" appeared. It followed that the emotional evaluation could either be correctly made or misled by contextual cues.

Overall, the matched contextual information had an "exaggeration effect" on valence and the non-matched contextual information weakened that judgment and had a "reversal effect" on EAM expression. However, there are also limitations to the present study which will be improved in the future. More athletes' facial expressions and participants will be fine to verify the present results; meanwhile, we speculate that different cognitive styles might have a certain influence on the emotional evaluation, which will be a meaningful topic in the future. In addition, Smith (2016) indicated that emotional extremes (very weak and very strong emotions) were associated with EAM, whereas moderated intensity emotions EAC. Therefore, emotional intensity should be seriously considered in further related studies.

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Declaration of Conflicting Interests

The Author(s) declare(s) that there is no conflict of interest.

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