DO FACIAL ICONS CONTRIBUTE TO OUR OWN EMOTIONAL EXPERIENCE? AND HOW?

Amel Achour-Benallegue

Cognition, Environment and Communication Research Team

INTRODUCTION

Facial icons are the representations of faces in different artistic and ethnographic artifacts. Most of them are considered as highly aesthetic representations. They have been crafted all over the world and at different periods of time. They share common properties such as facial features that are the building blocks of facial expressions, themselves an efficient means for communicating emotions.

How our ancestors responded to their represented reality? How our past experience led us to current behavior with avatars and emoticons? How can this behavior contribute to design more efficient visual communication tools or simply more entertaining AI and animation characters ? What features are crucial in conveying emotions and would be efficient in designing human facial-expression surrogates in specific social interactions? How can highly aesthetic representations and their highly emotional features be combined to enhance well-being in people's daily lives?

Studies on facial icons might contribute to bring answers to these questions, for they are cues for communication and emotion expression, as well as rich representations from diverse cultures and eras with high aesthetic attributes.

METHOD

11 facial icons from different ethnographic origins have been rated online by 45 participants,
2 rating questionnaires have been administred

Icon-rating questionnaire

Rating the emotions expressed by the stimuli and the morphometric features that appear on these stimuli

Self-emotion-rating questionnaire

Rating the emotions felt by the participants them-selves

Ratings were presented on 7-item Likert scales. Rating variables include:

9 emotion dimensions and categories

- Happiness
- Surprise
- Sadness
- Valence
- Arousal
- Dominance
- Disgust
- Fear
- Anger

7 morphometric features

- Human likeness
- Craft quality
- Ornamental features
- Beauty
- Eye contact
- Eye expression
- Mouth expression

PREVIOUS RESEARCH

FACIAL ICONS IN THE LITERATURE

- Different instances of facial icons, such as portraits, face-likes, or face sketches, participate in the increase of the negativity of the N170 and provoke early brain activation in the cortical region associated with the perception of human faces [1]. Face-likes (pareidolia faces) are associated with rapid categorization of faces [2].
- Real faces have proven to be less quick and less efficient than facial icons (such as humorous newspaper or cartoons) in their ability to communicate information including emotion [3] . Compared to real faces, facial icons in cartoons have a higher processing intensity and speed during the early processing stage when recognizing facial expressions [4]. Compared to other emotions, the recognition of happiness in cartoon faces has an advantage; and the accuracy recognition of happiness and expression-intensity perception of sadness in these images are stronger compared to real faces [5]. Stick figures trigger facial mimicry as much as do photographs of real faces, and they provide a better material for recognizing emotions that photographs [6].

- Masks from various cultures produce strong perceptions of emotion with substantial variations [7]. Similarly, clay figures from early Japanese cultures produce emotion perception in the participants; more the figures are perceived as happy, more they are rated as approachable, and inversely more they are perceived as fearful, less they are rated as approachable [8]. "The ability of the masks to produce effective perceptions of emotion was due to the artists' inclusion of facial features that reliably signal emotions in everyday life" [7].
- The emotion of threat in facial icons would share universal characteristics [9]. Some facial expressions (pain, anger, sadness, determination/stain, and elation) are universal in the perception of ancient American facial icons [10].

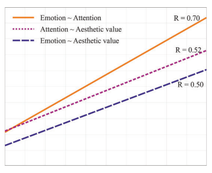
→ Possibility to address the perception of facial icons on the basis of emotion processes beyond ethnographic and cultural approaches, and to generalize the ability of conveying emotions, to the wide set of cross-cultural facial icons.

MIMICRY OF HUMAN FACIAL EXPRESSIONS

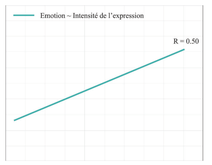
- Facial mimicry is the tendency of individuals to imitate others' facial expressions [11]. It occurs unconsciously and spontaneously and is difficult to suppress[12]. However, some studies showed that it may be moderated by contextual information[13].
- Disrupting or altering feedback from facial muscles and neural processes involved in facial mimicry reduces the speed and accuracy with which people process others' expressions of emotion [14].
- Facial mimicry contributes to social and emotional interactions and embeds the individual in the simulation of another person [15] , as well as it may translate into emotional contagion [16]

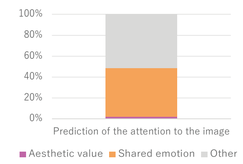
Possible simulation process toward facial icons indicating a possible emotional contagion

Intensity of the **attention**
Intensity of **shared emotion**
Aesthetic value
Human-likness
Expression **intensity**



High correlations between participants' felt emotion and their assessment of the expression intensity in cross-cultural facial icons. Given that the intensity of expression reflects an intensity of the expressed emotion, this may state a presence of a simulation process and possibly an emotional contagion.





Felt emotion (which may refer to a simulation) explains 49% of the attention paid to the facial icon, whereas this attention to the image is explained only to 4 % by the aesthetic value of that facial icon. This could indicate a significant implication of the simulated emotion in the artistic relation with the facial icons.

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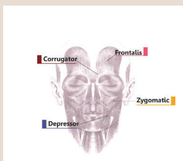
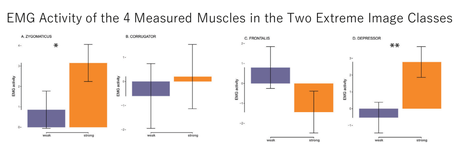
Mimicry reactions toward cross-cultural facial icons in zygomaticus and depressor (mouth expressions)



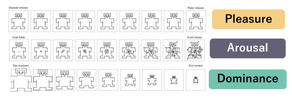


When facial icons depicted a strong expression of the corrugator, the zygomaticus activation in participants has been prevented toward positive-valence stimuli. This reflects a tendency of corrugator mimicry which might have been prevented by the hedonistic experience of art.

Achour-Benallegue et al. 2021. in Psychology of Aesthetics, Creativity, and the Arts

Consistently with previous mimicry results toward human faces [17], the observed mimicry indicates that facial icons depicting mouth expressions might also enhance a simulation process through sensorimotor reactions.

Higher feeling of being dominated by the icon when observing intense icons compared to neutral ones indicates an emotional impact of facial icons which might convey a strong influence.



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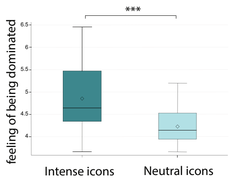
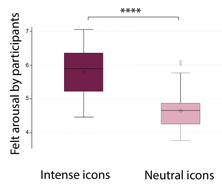


Higher self-arousal assessment when observing intense icons compared to neutral ones reflects an emotional contagion process in terms of arousal affect.



STUDY

"Iconic representations differ from realistic images in their ability to communicate specific information, including emotion, quickly and efficiently ... [they] highlight the advantages of simplifying image features and increasing contrast to communicate emotion " [5]

Test the ability of facial icons from different origins in conveying emotions efficiently from the simulation process perspective and explore the morphometric features that favor the emotional contagion

RESULTS

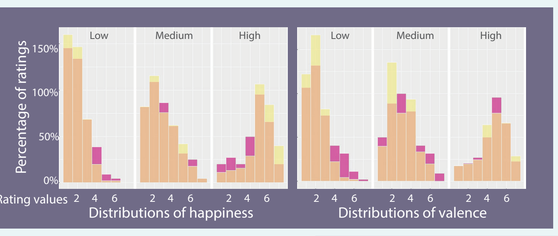
Emotions of participants were almost all significantly affected by the expressed emotions in facial icons

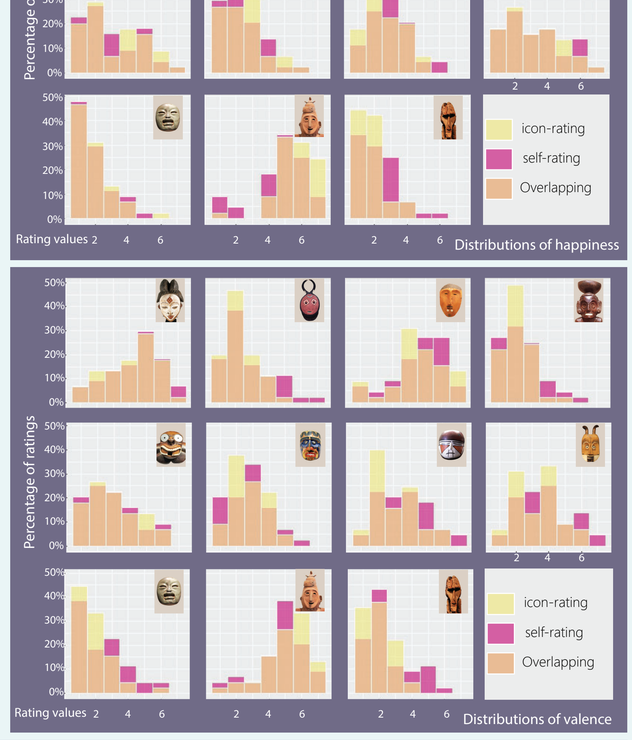
Participants' basic emotions were affected by the icon-rating levels of the same emotions

- The sum of scores per stimulus of the icon-ratings were highly correlated with the sum of scores per stimulus of the self-rating for all emotions
- Data from participants' emotion self-rating were significantly equivalent to data from icon-ratings
  - Equivalence in all 3 levels of rating (low, medium, high) for valence, happiness and fear
  - Equivalence in low and medium levels for dominance, surprise, sadness, and disgust
  - Equivalence in the low or medium level for anger and arousal respectively
- Self-emotion ratings were almost all low, medium and high when the icon-ratings for the same emotion were low, medium and high respectively

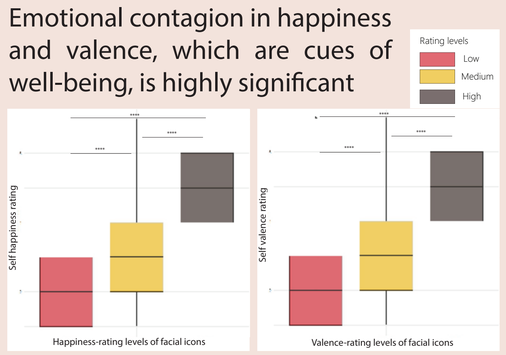
Emotional contagion

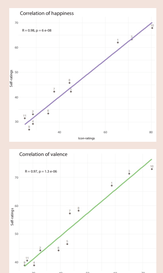
Equivalent self and icon ratings in all 3 levels of emotion





Emotional contagion in happiness and valence, which are cues of well-being, is highly significant

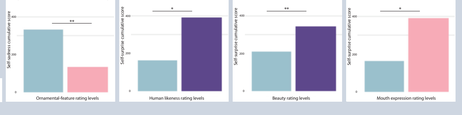




Correlations between icon-rating scores and self-rating scores in happiness and valence

Impact of morphometric features on self-emotion

- Human-likeness, beauty, ornamental features as well as eye contact and mouth expression impacted the highly emotional response of arousal, surprise and sadness in participants
- Only high-contact icons induced high arousal and high surprise

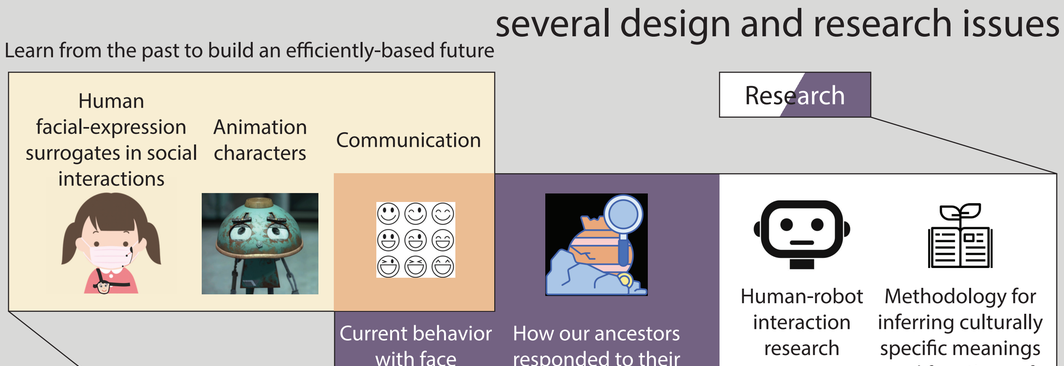


CONCLUSION & APPLICATIONS

Research on facial icons might contribute to build a theoretical framework underlying several design and research issues

- The influence of ratings of perceived expressions in facial icons on self-affects (valence & arousal) and most self-basic emotions (happiness, sadness, surprise, fear, anger) reflects an efficient emotional contagion through simulation process
- The similarity of data distributions of valence and happiness as well as the lower self-sadness for highly beautiful and ornamented stimuli, indicate that facial icons might be a good means for conveying well-being → Art appreciation has been related to positive impacts on the mental and physical well-being in people's daily lives [18]

Learn from the past to build an efficiently-based future



Understand past experiences to unravel present ones

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