DOES A SMILE SIGNAL HAPPINESS? BELIEFS AMONG LAYPERSONS ABOUT EMOTIONAL FACIAL EXPRESSIONS

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Abstract

Although the majority of experts agree that emotions and their corresponding facial expressions are universal, beliefs of laypersons about this matter are not well understood. The purpose of the current study was to better understand whether or not belief in universality is the "commonsense" view and determine how belief in universal emotional facial expressions might be related to performance on an emotion recognition task. In total, 236 participants responded to an online study designed to examine beliefs about emotional facial expressions. Participants first provided demographic information, indicated that emotions and emotional facial expressions are universal, and then responded to more specific questions examining their beliefs about these constructs. Participants then completed a modified emotion recognition task, in which they viewed 14 faces (50% female) depicting each of the six basic emotions (and a neutral face). During this task participants responded to questions about the facial expressions that they saw. Although the majority of participants endorsed the idea that emotions were universal, only 34% believed that emotional facial expressions were universal. Those who endorsed the universality view of emotional facial expressions were more likely to believe that facial expressions were also universal. Facial expressions were most commonly identified by participants as the clearest and best signal for identifying emotions in others. Participants who believed emotional facial expressions were universal, those who did not believe that they were universal, and those who were unsure did not differ in accuracy on the emotion recognition task. All three groups were also highly confident in their emotion recognition abilities. During the emotion recognition task, participants indicated a belief that emotional facial expressions occur with underlying emotions more than 70% of the time. The results here suggest that while most laypersons believe emotions are universal, this belief does not translate into a belief in universal emotional facial expressions. Whether or not laypersons endorse a view of universal emotional facial expressions, they still consider emotional facial expressions to be an important signal for understanding and recognizing the underlying emotional states of others.

Keywords: *Facial expression, emotion, universality, basic emotions, emotion recognition.*

1. Introduction

Ekman's (1972) neuro-cultural theory of emotion proposed that there are at least six universal facial expressions that serve as reliable signals for six basic emotions: happiness, sadness, fear, anger, disgust, and surprise. Ekman (1992) argued that the production of emotional facial expressions (EFE), and the ability to recognize emotions in the facial expressions of others, is an evolutionary adaptation that facilitated appropriate responses from our ancestors. This adaptation was crucial in situations that posed significant threats to survival or provided opportunities for reproductive success. For example, recognizing disgust on another person's face could serve as a cue to avoid a situation, such as spoiled food, that could lead to illness. Ekman (2007) argued that prior to his research establishing some degree of universality in emotions and EFEs, there was a clear division in the acceptance of any degree of universality. On one side, there were those who believed that emotions, and their expressions, were socially constructed and learned, varying by culture. Conversely, the work of others, such as Darwin, suggested that emotional signals in the body, voice, and face were products of evolution, and therefore believed to be universal. Ekman and colleague's (1969) work on emotions and facial expressions, with an isolated culture, the Fore of Papua, New Guinea, provided the first strong evidence that facial expressions were universally expressed and recognized. The Fore people appeared to produce and recognize the same

EFEs as westerners. Thus, Ekman's work appeared to settle the long-standing debate between the two schools of thought; however, a strong critic of Ekman's work, James Russell, suggested that Ekman's (2003) description of that clear division in attitudes about emotions and facial expressions was not quite accurate. Russell (1994) suggested that many people appear to believe that some aspects of emotion are innate and universal, and others are cultural and socially learned. Russell further suggested that the "commonsense" view throughout history, held by people who understand little about the nature of emotion and facial expression, is that emotions and their facial expressions are assumed to be universal:

> *"In short, the universality thesis predates Darwin by several thousand years. That facial expressions might not be universal appears not to have occurred to most people. Both evolutionists and creationists believed in universality. Universality is a background assumption, a part of common sense, at least in Western cultures" (Russell, 1994, p.104)*.

To better understand current opinions regarding the proposed universality of emotions and facial expressions, Ekman (2016) surveyed a large sample of emotion researchers. He found that 88% believed that there was compelling evidence for universals in at least some aspects of emotions. Furthermore, 80% of the respondents believed that there was significant evidence supporting the existence of universal signals of emotions in the face or voice. Thus, the experts largely agree on the universality of emotions and the existence of corresponding universal emotional signals. Although Ekman's work captured the explicit beliefs of experts, little is known about the explicit beliefs of laypersons. For the purposes of this study, the term "laypersons" is used to describe anyone who is not an expert in the area of emotions and facial expression. To our knowledge, there is no research that has asked laypersons directly about their beliefs concerning emotions and facial expressions. Existing research using standard emotion recognition paradigms can only inform us on implicit, rather than explicit, beliefs.

We hypothesized that if Russell's (1994) assumption about the commonsense view of emotions and facial expressions is correct, most laypersons would report believing that emotions and their corresponding facial expressions are universal. Furthermore, we predicted that an acceptance of universal EFEs would lead to higher confidence in decisions made during an emotion recognition task, as well as in higher estimates of the number of universal EFEs that exist. Thus, the purpose of the present study was to address the gap in existing literature describing laypersons' beliefs about EFEs. In this online study, we asked participants about their beliefs concerning the nature of emotions and facial expressions. Additionally, participants completed an emotion recognition task, in which they were asked questions about the six EFEs that have the strongest support for universality: happiness, sadness, fear, anger, disgust, and surprise.

2. Method

2.1. Participants

Two-hundred and thirty-six undergraduate students at the University of New Brunswick took part in the present study. The average age of participants was 21.36 years (*SD* = 4.98). Most participants (80.9%) identified as female; the remainder identified as male (17.4%), two spirited (.4%), non-binary (.4%), gender fluid (.4%), and one preferred not to disclose. The majority of the sample (88.6%) spoke English as their first language.

2.2. Measures

Beliefs about universal emotions and facial expressions. To determine if participants believed that facial expressions are an important source of information for identifying emotions, we asked "Which of the following provides the clearest and best information about the emotion that another person is feeling?" Possible responses were "*body language"*, "*tone of voice"*, "*facial expression"*, "*words being spoken"*, and "*other (specify)"*. To determine if participants believed that emotions and facial expressions were universal, we asked two questions: 1) *"Do you believe that there are universal emotions?"* and 2) *"Do you believe that emotional facial expressions are universal?".* Participants responded by indicating "Yes", "No", or "Unsure" to both of these questions. We further investigated these beliefs by asking participants to provide the number of emotions, and facial expressions, that they thought were universal.

Emotion recognition task. Fourteen facial expression stimuli were taken from the Warsaw Set of Emotional Facial Expression Pictures (WSEFEP; Olszanowski et al., 2015). Two examples (one male and one female) of each of Ekman's proposed basic emotions, and two neutral faces, were used in this task. No two facial expression stimuli were of the same individual. After seeing each face, participants choose which emotion was displayed. The options were: Happiness, Sadness, Disgust, Fear, Surprise, Anger, Neutral, or Other (provide response). They also answered five questions about the specific facial expression that was depicted. Here, we present the findings of two of those items: 1) *How confident are*

you in your decision about which emotion is being displayed in this facial expression? and 2) *When someone experiences this emotion, how often would you expect to see this expression on their face (from 0 – 100% of the time)?* Overall accuracy on the task was calculated.

2.3. Procedure

The current study was conducted using the online survey software, Qualtrics. The study was advertised at the University of New Brunswick Saint John. Participants received a bonus credit towards their grade in an eligible undergraduate course. After providing informed consent, participants completed a demographics form, questions asking about specific beliefs in universality, number of emotions and facial expressions thought to be universal, and what they believed to be the best signal available for determining which emotions another person is feeling. After completing these questionnaires, participants moved onto the facial expression recognition task. During this task, participants were presented with 14 faces depicting EFEs, in a randomized order. In addition to making a choice about which emotion was being displayed, participants responded to the set of questions previously described. Participants were given as much time as necessary with each face. After completing the emotion recognition task, they were thanked for their time and contribution.

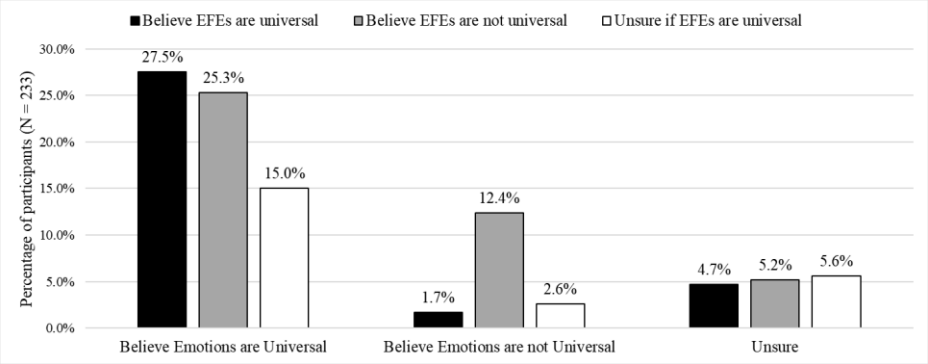
3. Results

3.1. Beliefs about emotions and facial expressions

Clearest emotional signal. When asked what provides the clearest and best information about the emotions that another person is experiencing, the most common response was *facial expression* (40.3%), followed by *tone of voice* (24.2%) and *body language* (23.3%), with the remainder choosing *words spoken* (10.6%) or *other* (1.7%). To determine whether or not these responses were independent of belief in universal facial expressions, a Chi squared analysis was conducted and indicated that the participants' responses were independent of their belief in universal facial expressions, X^2 (8) = 4.97, p = .761.

Universality. When asked if they believed that there were universal emotions, 67.8% of the sample said "yes". The remaining responses were split almost evenly between "no" (16.7%) and "unsure" (15.5%). When asked if they thought that EFEs were universal, only 33.9% of the sample said "yes", with 42.9% reporting that they did not believe in universal EFEs. Approximately 23% of participants were unsure whether EFEs were universal. A Chi squared analysis was used to assess independence between belief in universal emotions and belief in universal EFEs. The results indicated that responses to each question were not independent of one another, X^2 (4) = 22.31, p < .001, V = .217. Beliefs concerning universal EFEs were, therefore, associated with beliefs concerning universal emotions. A belief that EFEs are universal is most likely when the participant also believed emotions are universal. When participants did not believe in universal emotions, they almost always did not believe in universal EFEs. Those who were unsure about the universality of emotions were roughly evenly split between the three possible belief choices concerning the universality of EFEs (see Figure 1).

Figure 1. Proportion of participants believing facial expressions are universal, grouped by belief in universal emotions.



Number of Universal Facial Expressions. Participants reported an average of 3.45 (*SD* = 2.81) universal EFEs. To determine whether the number of reported universal facial expressions varied by belief in universality of EFEs, a one-way ANOVA examining differences between those who accepted universality, those who did not, and those who were unsure was conducted. Results of the analysis showed that groups differed in the number of facial expressions that they thought were universal, F (2, 206) = 25.49, p < .001, η^2 = .198. Post hoc tests revealed that all group estimates differed from one

another (p<.05). Those who believed EFEs are universal reported more universal EFEs than those who were unsure and those who did not believe EFEs were universal. Means for each group are presented in Table 1.

3.2. Emotion recognition task by belief in universality

Accuracy. Mean accuracy on the emotion recognition task was 88.93% (*SD* = 13.10). Accuracy for each expression ranged from 73.40% (fear) to 96.61% (happiness). A one-way ANOVA revealed no differences between groups based on beliefs in universal expressions for emotion recognition accuracy. Means for each group are presented in Table 1.

Confidence. On average, participants were 84.09% (*SD* = 12.05) confident in their choices during the emotion recognition task. A one-way ANOVA revealed a difference in confidence levels based on belief in universality of EFEs, F (2, 230) = 3.41, p = .035, η^2 = .029. Those who were unsure about the universality of EFEs were less confident than those who believed in the universality of EFEs (p = .04). No other comparisons were statistically significant (p > .05; see Table 1).

Estimate of the co-occurrence rate of EFEs with emotions. To determine how often people think EFEs occur with the experience of an emotion, we examined the average response to all facial expressions to the question: *When someone experiences this emotion, how often would you expect to see this expression on their face (from 0 – 100% of the time)?* Facial expressions were believed to accompany the experience of emotional states 72.03% of the time (*SD* = 15.45). A one-way ANOVA revealed no statistically significant differences based on belief in universal emotional expressions (see Table 1).

Table 1. Means of estimated number of universal EFEs, accuracy in emotion recognition task, confidence in decisions, and estimated rates of co-occurrence of EFEs with emotion, by belief in universal EFEs.

Belief	Estimated number of universal EFEs (SD)	Accuracy in EFE Recognition (SD)	Confidence in decision in EFE recognition (SD)	Estimated EFE co-occurrence with emotion (SD)
EFEs are universal	**4.97 (2.41)**	90.32% (11.38)	86.71% (10.20)	**74.19% (15.96)**
EFEs are not universal	**3.30 (2.80)**	87.86% (15.04)	83.34% (12.83)	71.22% (15.69)
Unsure	**2.15 (2.47)**	88.80% (11.56)	81.45% (12.70)	**70.17% (14.33)**

Note: bolded values differed from each other within the column.

4. Discussion

The current study revealed several findings regarding beliefs about emotions and EFEs in laypersons. First, universality appears to be the "commonsense" view for underlying emotions, but this does not appear to be the case for EFEs. Most participants (67.8%) endorsed the idea that emotions were universal, but substantially fewer participants (33.9%) believed that EFEs are universal. Therefore, the present findings only offer partial support for Russell's (1994) assumption, that universality of emotions and EFEs is the "commonsense" view. Secondly, when a participant endorsed the view of universal emotions, roughly equal proportions of participants indicated that EFEs were (40.56%) or were not (37.32%) universal. For participants who believed that emotions were not universal, the vast majority (74.3%) took the position that EFEs were also not universal. For those who were uncertain about the universality of emotions, roughly equal proportions believed EFEs were universal, did not believe EFEs were universal, or were uncertain. This is likely because believing in universal emotions does not necessitate a belief in universal EFEs, but a belief in universal EFEs would appear to require a belief in universal emotions.

Regardless of our participants' views on universality, responses to two items indicated that they believed in a strong connection between EFEs and underlying emotional states. When asked what provided the "clearest" and "best" information about the emotions experienced by people, the most common response was "facial expression". Additionally, when participants were asked to estimate how often the EFE that they saw in the emotion recognition task accompanied the corresponding underlying emotional state, participants estimated an average co-occurrence rate of approximately 72% percent. Thus, laypersons believe that when people experience an emotion, there is a high probability that an EFE will also occur. This finding is in contrast with a recent meta-analysis by Durán and Fernandez (2021) which concluded that predicted EFEs do not reliably occur with the basic six emotions proposed by Ekman. This, combined with our results, suggests that people might place too much weight on the value of EFEs in terms of reliably identifying the occurrence of underlying emotions.

Finally, we expected that accuracy and/or confidence in the emotion recognition task might differ between participants who endorsed the universality of EFEs and those who do not. Our hypothesis was based on the logic that participants who did not endorse the view of universal EFEs might be more open to additional interpretations of EFEs than those who do endorse universality. Overall, however, this did not appear to be the case. In this study there were few statistically significant differences on the

emotion recognition test. There was an exception – participants who were unsure about the universality of EFEs were less confident in their decisions than those who believed EFEs were universal. It is important to note, however, that average confidence in all groups was greater than 80%, suggesting highly confident judgements occurred. In retrospect, the lack of differences in the performance of each group is not that surprising. Accuracy and confidence are likely to be independent of beliefs in universality in this particular task. The expressions represent the most studied expressions in the literature, and those who do not endorse universality of EFEs could have simply recognized the expressions as being common to their own culture. The sample consisted mostly of those raised in western, or westernized, cultures, where the basic six emotions were first identified. This does not necessarily mean that the findings in this laboratory-based task translate perfectly to real life judgements of emotions. It is entirely possible that beliefs in the universality of EFEs matter more when individuals are making judgements about emotions of people from different cultures in real world settings. It is also possible, however, that it does not. Further research in this area is needed.

To our knowledge, this was the first attempt to understand explicit beliefs of laypersons about emotions and EFEs. As with any study, there are limitations that need to be considered. First, the EFE stimuli were taken from an existing validated database of EFEs, the WSEFEP. This set, however, only contains Caucasian faces. Some research argues for a within-culture advantage in recognizing facial expressions (Elfenbein & Ambady, 2002). Future research should incorporate a more diverse stimuli set to account for this possibility. Secondly, the mere fact that some individuals denied a belief in universal EFEs and then proceeded to provide a number of EFEs that they thought were universal draws the estimate of that group into question. We would expect that those who say that they do not believe EFEs are universal should follow this response with an estimate of "0" universal EFEs, but this did not occur in the current study. It is possible that they misunderstood the way that the question was asked, but this is unlikely as the terms "universal EFEs" were clarified in paratheses as "*the same emotional facial expressions are shown by all people, in all cultures"*. It is possible that this question needs to be examined in another way. We intend to address these limitations in future research.

In conclusion, Russell's (1994) assumption, that the universality of emotions and EFEs is the "commonsense" view, is only partly supported here. While many people agreed that underlying emotions are universal, there was indeed some type of division in how people think about EFEs. Understanding the beliefs of laypersons about emotions and EFEs is important, as people often make automatic and rapid judgements of the emotional states of others. To further highlight the importance of understanding explicit beliefs, we also asked our participants the extent to which they agreed with the statement "being able to recognize another person's emotions is very important to me" on a 1 (disagree completely) to 7(agree completely) point scale. Participants expressed high agreement with this item (M = 5.68, SD = 1.30), with no differences between groups based on beliefs in universality ($p > .05$). So, regardless of beliefs in universality, people place high importance on the ability to recognize emotions in others. What people believe about how we make judgements about the emotional states of others is important in understanding how accurate people are likely to be everyday social settings, as well as when that inaccurate judgments of emotions have more serious consequences, such as in legal or clinical settings.

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