Can The Ibn Saud Robot Really Learn The Emotional Facial Expressions of All Cultures?

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Abstract

New research has resurrected the culture specific school of thought regarding emotions and their corresponding facial expressions as opposed to the dominant "universal" position. Hundreds of studies have clearly shown that there are cultural differences with the universalist camp attributing differences to "cultural display rules". Any research, however, which yields information on cultural differences, is useful to businesses operating in several cultures, and to those working in social robotics. The Ibn Saud Robot will be much harder to program if the universalist theory of emotions is inadequate to describe the experience of emotion.

Sure, if facial expressions are universal. There's the rub. It would be a much more complex problem if there is a different set of emotional expressions for every "culture". The Ibn Saud robot at the United Arab Emirates university is the first Arabic speaking robot and also is said to make and recognize (at an elementary level) emotional facial expressions (Lake 2009). There are other robots that claim this capability, including Albert Hubo (Hanson Robotics 2015) and FACE (Howard 2015). One problem is that all of these robots either skirt the issue of

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whether facial expressions of emotion are universal, or assume Paul Ekman's (2006) theory of universal facial expressions is true. It may very well not be true or at least admits to so many exceptions that it makes the problem of programming these robots extremely difficult.

Are facial expressions of emotion universal? It might seem to many that this rather old debate in psychology is more important than ever in a world more and more integrated into a global economy and with emerging affluent economies (for example China, Saudi Arabia, and Singapore). One company has concluded the opposite -- expressions are culture-specific, and has offered to teach us how to interpret Chinese facial expressions to conduct business without undue confusion (Bitterman 2010). This paper reviews the history of this universal vs. culture-specific debate, looks at new research challenging the universalist position, and makes suggestions for the future of the debate, especially as it relates to international business, and to those working in social robotics.

Literature Review

This debate is still a hotly contested area of scientific research. Led by the cross-cultural research of Paul Ekman and his predecessors (For example Ekman 1973; Friesen 1972; Ekman and Friesen 1971; Tomkins 1962), the mainstream psychological teaching for about half a century is that emotional facial expressions are universal and an evolutionary heritage. Ekman's research supporting the universal view contradicted the previous prevailing view that facial expressions are culture specific. New research in turn revives the culture specific point of view (For example, Gendren et al 2014). As a physical anthropologist or biologist might point out, there is only one species of the genus Homo left, so why should we not be more alike than different? In fact it was Charles Darwin who first proposed that human facial expressions are

innate, universal, and vestiges from lower mammals (Darwin 1965). If Darwin is correct on this, programming a small set of emotional expressions into a robot should be manageable. Legendary anthropologists Margaret Mead (for example Mead 1928) and Ray Birdwhistell (for example Birdwhistell 1975), however, championed the idea of culture-specific facial expressions of emotion in the mid twentieth century. Eminent psychologist Jerome Bruner agreed in a classic review of the literature (Bruner and Tagiuri 1954). Cultural specificity replaced the Darwinian view and was the accepted doctrine on the eve of the Paul Ekman era. Ekman revived the Darwinian view, largely with a classic study of the Fore tribesman in Papua New Guinea, people who could not have been influenced by western standards or the mass media (Ekman 1973). The isolated Fore tribesman recognized Ekman's photos of emotion and, moreover, made similar expressions when read various emotional scenarios. Armed with this study and many others (Matsumoto 2001), Ekman's argument for universal expressions was compelling and became the dominant view in psychology during the last decades of the twentieth century and into the twenty-first. As Tehnouten (2006) aptly put it: "Thus the concept of universalism in emotional expression has again emerged as dominant, although being tweaked to accommodate those emotions that are not necessarily primary, but may be secondary and tertiary and therefore subject to differing cultural or ethnic training".

The universal theory has always had dissidents within the ranks of psychologists (for example Russell 1980; Bruner and Tagiuri 1954). Whole disciplines, notably Cultural Anthropology and Consumer Behavior, have been skeptical of a universal theory, instead siding with the philosophy of cultural relativism (Boas 1911; Mead 1928; de Mooij 2011). If the cultural relativists are correct, it is going to be a much more challenging problem to create a

robot to emotionally interact with all of humankind. Recently new challenges to the universal hypothesis by psychologists have gained traction and attention.

Free Sort vs. Forced Choice

Many emotion theorists have never been comfortable with the experimental paradigm of asking various subjects to look at pictures of posed facial expressions of emotion and categorizing them into one of the theoretical discrete emotions: usually anger, fear, joy, sadness, surprise, and disgust. While much of Ekman's early work was done in just this way, giving the subjects the emotional categories in advance can greatly influence the outcome. Ekman himself was uncomfortable with it, and he and his colleagues went on to seek evidence for universality using another method, using "free sorts", a methodology that allows the participants to categorize the expressions without pre-determined labels (Haidt and Keltner 1999).

The Gendren et al Study in Namibia

It is this idea of free sorts vs. forced choice categories that is the focus of Lisa Feldman-Barrett's challenge (Gendren et al 2014). Like Ekman, she also used subjects from a primitive tribe (in Namibia), and asked them to sort photos of Africans posing the discrete emotions. When asked to sort according to the traditional emotion categories used by Ekman, both the tribal subjects and western controls did indeed replicate Ekman's basic findings. When asked to free sort the photos, Westerners again approximated the Ekman findings, but the tribal subjects did not come close at all to recognizing them as Ekman's six traditional emotions.

In a reply, Ekman (Ekman and Keltner 2014) was dismissive. He addressed the main findings in a couple of sentences, saying that Feldman-Barrett "missed the point, not recognizing the difference between unselected and theoretically selected facial expressions". Ekman's

criticism seems to be that Feldman-Barrett did not use the right photos of facial expressions. She created her own set and did not use Ekman's set which were scored according to his Facial Action Coding System (FACS) (Ekman and Friesen 1978). It is always possible that Feldman-Barrett could have chosen poor examples of expressions, but this has not been demonstrated. Her study cannot be dismissed because she failed to use Ekman's set of expressions. One could ask, just how difficult is it to produce a reasonably recognizable sad, angry or fearful face? Ekman then goes on to cite another free sort study which he says does support his findings (Haidt and Keltner 1999), although this study has been challenged (Widen, Christy, and Russell 2009). He also cites research using other paradigms, including spontaneous expressions and neurological correlates. While he certainly has these latter studies to show, this comes across as a change of subject from the Feldman-Barrett study. He ends his reply with an ideological plea: the finding of universality of facial expressions shows the similarity of the races and counters racist ideas. This could make one feel guilty for entertaining the culture-specific hypothesis but an ideologue might also point out that imposing western notions on other peoples is also a sore point with formerly colonized peoples. Also, cultural relativity (Boas 1911; Mead 1928) has always been more associated with opposing racism than has Darwinism. Although this is a misinterpretation and we cannot blame Charles Darwin, "Social Darwinism" became the scourge of late nineteenth and early twentieth century science (for example, Spencer 1864).

Another reviewer, defending the universalist camp, makes a perplexing defense (Lansley 2014). The claim is made that judgment studies like Feldman-Barrett's are unimportant and should be rejected, because, reiterating Ekman, additional evidence supporting universalism comes from studies using "spontaneous expressions". Ekman's first program of research announcing the universality of expressions was in fact built on judgment studies, although it was

bolstered by later work using spontaneous expressions and work on the neurological correlates of the emotions. The author admits, however, that Feldman-Barrett's study "helped to stimulate debate".

The Jack et al Study with Chinese Subjects

Jack et al (2009; 2012), have recently challenged the universalists with a study of Chinese judgments of emotion. The University of Glasgow built a computerized simulation program (a robot) which randomly activates all the facial muscles on a screen, flashing every conceivable facial expression before our eyes. Subjects were ethnic Chinese living in Scotland. The task was not a free sort--when the subjects spotted an expression that they recognized as an emotion, they would stop and name the category of emotion from Ekman's list to which it belonged. As in Ekman's and Feldman-Barrett's studies, western control subjects separated the expressions into the traditional categories. The Chinese subjects saw some of the same categories, but a cluster analysis revealed there was significant overlap among categories. Furthermore, the Chinese subjects perceived the intensity of the emotion coming from "dynamic eye activity", something not found in the western subjects. Jack et al's conclusion is that the traditional set of emotions is inadequate to describe the Chinese experience of emotion.

Matsumoto (2009), Ekman's colleague, wrote the first reply. The differences that Jack et al (2012) achieved are well known to him. Many studies, according to Matsumoto, show the same pattern which he contends is basic agreement with some difference in "absolute level of agreement", and confusions between disgust and anger, and between fear and surprise. It seems this defense could be leveled at just about any differences that might arise in any judgment study of facial expressions--the results will not be identical. The point of Jack et al (2012) is just that--

the groups are different, and considerably so. Matsumoto does not mention an obvious issue: this is a judgment study with the subjects forced to choose among categories, the same as in Ekman's early work. Is Matsumoto agreeing that the studies that support the universalist position frequently show many exceptions? How many exceptions can be tolerated before it must be admitted that cultural relativity is as important, if not more so, than any universals?

Sauter and Eisner (2012) also replied to the Jack et al study. They criticized the study on several grounds. The titles of the studies sum up the thrust of the debate: which are more important--the commonalities of facial expressions across cultures, or the differences (see titles in references)? Sauter and Eisner argued that the Eastern Asian subjects might not have been proficient enough in English to understand some emotion terms. Jack et al (2013) countered that the East Asian subjects possessed a high International English Language Testing System score and that the emotion labels were well within their capability. Sauter and Eisner argued that the Chinese cultural group includes many cultural and linguistic subgroups. Jack et al (2013) countered that if variability was due to linguistic differences in subcultures one would expect variance *within* emotion categories, whereas results showed variance *between* emotion categories. Sauter and Eisner said the study found six clusters for the East Asian group--this is apparently erroneous as six clusters were found only for the Europeans and no optimal number of clusters for the East Asian subjects. Sauter and Eisner argue that "… methods fail to account for configural facial expression processing… and …dynamic cues." Jack et al (2013) countered that their study did in fact capture the dynamic face information, including relevant dynamic information in facial configurations.

Display Rules

Ekman (for example, Ekman 1973) has always admitted that there are "display rules" in various cultures, so people do not always express the evolutionarily dictated facial expression all the time. So it is tempting to say both camps have a point and the whole controversy is not as important as we might think. (This is reminiscent of the nature-nurture controversy in "intelligence" and "personality" which seems to have concluded that they are both important and interacting). There are biological responses which all humans share (the fight or flight response is an obvious one--would anyone deny that this is biological?), but cultures influence the way we display and perceive expressions. Both genetic and environmental influences exist which are hard to tease apart. If culture is so important to both the culture-specific and universalist camp, should we be focusing our first attention on these cultural differences? It has long been recognized that when we interact with people from another culture, we must attend to such things as interpersonal space and "proxemics" (Hall, 1959). For business researchers, it might not matter which camp is "right"-- because people doing business cross-culturally certainly need to understand all the cultural differences in emotional expression and decoding of emotion, even if there are universalities such as the fight or flight syndrome. For robots, the question is: Can all the display rules be learned and programmed in?

Conclusions

Darwin's ideas in the "The Expression of the Emotions in Man and Animals" has had a tremendous influence on psychology. Much of emotional life could be hard wired into the human nervous system. If emotions are adaptive mechanisms then the recognition and expression of emotions should be universal. This would facilitate programming the information

into a robot. Ekman demonstrated that they largely are--with liberal allowance for differences which Ekman ascribes to cultural display rules. Cultural relativists such as Mead objected on the grounds that marginalizing the differences impugned the legitimacy and validity of non-western cultures. Mead was responding to the era of "Social Darwinism", Colonialism, and Eurocentrism. The debate has persisted to this day. The accepted view has changed twice: once during the heyday of cultural relativism and again with Ekman's work. Research on facial expressions has reached a general conclusion which seems to be supported by both the universalist and cultural relativist camps: there is much similarity among cultures, but differences also exist (and this latter point makes it difficult for robots).

While universal mechanisms do exist--notably the "fight or flight syndrome", the cultural relativists believe that emotion is constructed through an interplay of biology, cognition, and culture. Judgment studies of facial expression of emotion invariably result in the discovery of at least some differences among cultures--and so they should continue. These cultural differences are of paramount importance in cross-cultural business research and for emotional communication with robots. In an age where there are intensive interactions in business globally studies of cultural differences like the Jack et al studies assume greater importance. For the Ibn Saud Robot, regardless of any universalities, it means learning a huge number of cultural rules and differences, and programming them in.

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