

Response, they released *Human Sexual Inadequacy* (1970), which applied their earlier research directly to solutions for sexual problems. Their continuous attention to their chosen field is demonstrated by a list of their subsequent books: *The Pleasure Bond* (1970); *Homosexuality in Perspective* (1979); *Human Sexuality* (1995); *Crisis: Heterosexual Behavior in the Age of AIDS* (1988); *Masters and Johnson on Sex and Human Loving* (1986); and *Heterosexuality* (1998).

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Reading 22: I CAN SEE IT ALL OVER YOUR FACE!

Ekman, P., & Friesen, W. V. (1971). Constants across cultures in the face and emotion. *Journal of Personality and Social Psychology*, 17, 124–129.

Think of something funny. What is the expression on your face? Now think of something in your past that made you sad. Did your face change? Chances are it did. Undoubtedly, you are aware that certain facial expressions coincide with specific emotions. And, most of the time, you can probably tell how people are feeling emotionally from the expressions on their faces. Now, consider this: Could you be equally successful in determining someone's emotional state based on facial expression if that person is from a different culture—say, Romania, Sumatra, or Mongolia? In other words, do you believe facial expressions of emotion are universal? Most people believe that they are, until they stop and consider how radically different other cultures are from their own. Think of the multitude of cultural differences in styles of dress, gestures, personal space, rules of etiquette, religious beliefs, attitudes, and so on. With all these differences influencing behavior, it would be rather amazing if any human characteristics, including emotional expressions, were identical across all cultures.

Paul Ekman is considered the leading researcher in the area of the facial expression of emotion. This article details his early research, which was designed to demonstrate the universality of these expressions. Although the authors acknowledged in their introduction that previous researchers had found some evidence that facial behaviors are determined by culturally variable learning, they argued that previous studies were poorly done and, in reality, expressions for basic emotions are equivalent in all cultures.

Several years prior to this study, Ekman and Friesen had conducted research in which they showed photographs of faces to college-educated people in Argentina, Brazil, Chile, Japan, and the United States. All the participants from every country correctly identified the same facial expressions as corresponding to the same emotions regardless of the nationality of the person in the photo. The researchers presented their findings as evidence of the universality of emotional expressions. However, as Ekman and Friesen themselves pointed out, these findings were open to criticism because members of the cultures studied had all been exposed to international mass media (movies, magazines, television), which are full of facial expressions that might have been transmitted to all these countries. What was needed to prove the universality of emotional expression was to study a culture that had not been exposed to any of these influences. Imagine how difficult (perhaps impossible) it would be to find such a culture given today's mass media. Well, even in 1971 it wasn't easy.

Ekman and Friesen traveled to the southeast highlands of New Guinea to find participants for their study among the Fore people who still existed as an isolated Stone Age society. Many of the members of this group had experienced little or no contact with modern cultures. Therefore, they had not been exposed to emotional facial expressions other than those of their own people.

THEORETICAL PROPOSITIONS

The theory underlying Ekman and Friesen's study was that specific facial expressions corresponding to basic emotions are universal. Ekman and Friesen stated it quite simply:

The purpose of this paper was to test the hypothesis that members of a preliterate culture who had been selected to ensure maximum visual isolation from literate cultures will identify the same emotion concepts with the same faces as do members of literate Western and Eastern cultures. (p. 125)

METHOD

The most isolated subgroup of the Fore was that group referred to as the South Fore. The individuals selected to participate in the study had seen no movies, did not speak English or Pidgin, had never worked for a Westerner, and had never lived in any of the Western settlements in the area. A total of 189 adults and 130 children were chosen to participate, out of a total South Fore population of about 11,000. For comparison, 23 adults were chosen who had experienced a great deal of contact with Western society through watching movies, living in the settlements, and attending missionary schools.

Through trial and error, the researchers found that the most effective method of asking the participants to identify emotions was to present them with three photographs of different facial expressions and to read a brief description of an emotion-producing scene or story that corresponded to one of the photographs. The participant could then simply point to the expression that best matched the story. The stories used were selected very carefully to be

sure that each scene was related to only one emotion and that it was recognizable to the Fore people. Table 22-1 lists the six stories developed by Ekman and Friesen. The authors explained that the fear story had to be longer to prevent the participants from confusing it with surprise or anger.

A total of 40 photographs of 24 different people, including men, women, boys, and girls, were used as examples of the six emotional expressions. These photographs had been validated previously by showing them to members of various other cultures. Each photograph had been judged by at least 70% of observers in at least two literate Western or Eastern cultures to represent the emotion being expressed.

The actual experiment was conducted by teams consisting of one member of the research group and one member of the South Fore tribe, who explained the task and translated the stories. Each adult participant was shown three photographs (one correct and two incorrect), told the story that corresponded to one of them, and asked to choose the expression that best matched the story. The procedure was the same for the children, except that they only had to choose between two photographs, one correct and one incorrect. Each participant was presented with various sets of photographs so that no single photograph ever appeared twice in the comparison.

The translators received careful training to ensure that they would not influence the participants. They were told that no responses were absolutely right or wrong and were asked not to prompt the participants. Also, they were taught how to translate the stories exactly the same way each time and to resist the temptation to elaborate and embellish them. To avoid unintentional bias, the Western member of the research team avoided looking at the participant and simply recorded the answers given.

Remember that these were photographs of expressions of emotions on the faces of Westerners. Could the Fore people correctly identify the emotions in the photographs, even though they never had seen a Western face before?

TABLE 22-1 Ekman and Friesen's Stories Corresponding to Six Emotions

EMOTION	STORY
1. Happiness	His (her) friends have come and he (she) is happy.
2. Sadness	His (her) child (mother) has died and he (she) feels very sad.
3. Anger	He (she) is angry and about to fight.
4. Surprise	He (she) is just now looking at something new and unexpected.
5. Disgust	He (she) is looking at something he (she) dislikes; or he (she) is looking at something that smells bad.
6. Fear	He (she) is sitting in his (her) house all alone and there is no one else in the village. There is no knife, axe, or bow and arrow in the house. A wild pig is standing in the door of the house and the man (woman) is looking at the pig and is very afraid of it. The pig has been standing in the doorway for a few minutes, and the person is looking at it very afraid, and the pig won't move away from the door, and he (she) is afraid the pig will bite him (her).

(Based on information on p. 126.)

TABLE 22-2 Percent of Adults Correctly Identifying Emotional Expression in Photographs

EMOTION IN STORY	NUMBER OF PARTICIPANTS	PERCENT CHOOSING CORRECT PHOTOGRAPH
Happiness	220	92.3
Anger	98	85.3
Sadness	191	79.0
Disgust	101	83.0
Surprise	62	68.0
Fear	184	80.5
Fear (with surprise)	153	42.7

(Based on data from p. 127.)

RESULTS

First, analyses were conducted to determine if any responses differed between males and females or between adults and children. The adult women tended to be more hesitant to participate and had experienced less contact with Westerners than the men had. However, no significant differences in ability to correctly identify the emotions in the photographs were found among any of the groups.

Tables Table 22-2 and Table 22-3 summarize the percentage of correct responses for the six emotions by the least Westernized adults and the children, respectively. Not all participants were exposed to all emotions, and sometimes participants were exposed to the same emotion more than once. Therefore, the number of participants in the tables does not equal the overall total number of participants. All the differences were statistically significant except when participants were asked to distinguish fear from surprise. In this situation, many errors were made, and, for one group, surprise was actually selected 67% of the time when the story described fear.

The researchers also compared the Westernized and non-Westernized adults. No significant differences between these two groups were found on the number who chose the correct photographs. Also, no differences were

TABLE 22-3 Percent of Children Correctly Identifying Emotional Expressions in Photographs

EMOTION IN STORY	NUMBER OF PARTICIPANTS	PERCENT CHOOSING CORRECT PHOTOGRAPH
Happiness	135	92.8
Anger	69	85.3
Sadness	145	81.5
Disgust	46	86.5
Surprise	47	98.3
Fear	64	93.3

(Adapted from p. 127.)

found between younger and older children. As you can see in Table 22-3, the children appeared to perform better than the adults, but Ekman and Friesen attributed this to the fact that they had to choose between only two photographs instead of three.

DISCUSSION

Ekman and Friesen did not hesitate to draw a confident conclusion from their data: "The results for both adults and children clearly support our hypothesis that particular facial behaviors are universally associated with particular emotions" (p. 128). They based their conclusion on the fact that the South Fore group had no opportunity to learn anything about Western expressions and, thus, had no way of identifying them, unless the expressions were universal.

As a way of double-checking their findings, the researchers videotaped members of the isolated Fore culture portraying the same six facial expressions. Later, when these tapes were shown to college students in the United States, the students correctly identified the expressions corresponding to each of the emotions:

The evidence from both studies contradicts the view that all facial behavior associated with emotion is culture-specific, and that posed facial behavior is a unique set of culture-bound conventions not understandable to members of another culture. (p. 128)

The one exception to their consistent findings—that of the confusion participants seemed to experience in distinguishing between expressions of fear and surprise—Ekman and Friesen explained by acknowledging that certainly some cultural differences are seen in emotional expression, but that this did not detract from the preponderance of evidence that nearly all the other expressions were correctly interpreted across the cultures. They speculated that fear and surprise may have been confused "because in this culture fearful events are almost always also surprising; that is, the sudden appearance of a hostile member of another village, the unexpected meeting of a ghost or sorcerer, etc." (p. 129).

IMPLICATIONS OF THE RESEARCH

This study by Ekman and Friesen served to demonstrate scientifically what you already suspected: Facial expressions of emotions are universal. However, you might still be asking yourself "What is the significance of this information?" Well, part of the answer to that question relates to the nature-nurture debate over whether human behaviors are present at birth or are acquired through learning. Because facial expressions for the six emotions used in this study appear to be influenced very little by cultural differences, it is possible to conclude that they must be innate, that is, biologically *hardwired* in the brain at birth.

Another reason behavioral scientists find the notion of universal emotional expressions interesting is that it addresses issues about how humans

evolved. In 1872, Darwin published his famous book *The Expression of Emotion in Man and Animals*. He maintained that facial expressions were adaptive mechanisms that assisted animals in adapting to their environment, thereby enhancing their ability to survive. The idea behind this was that if certain messages could be communicated within and across species of animals through facial expressions, the odds of surviving and reproducing would be increased. For example, an expression of fear would provide a silent warning of imminent danger from predators, an expression of anger would warn less dominant members of the group to stay away from more powerful ones, and an expression of disgust would communicate a message of "Yuck! Don't eat that, whatever you do" and prevent a potential poisoning. These expressions, however, would do the animals no good if they were not universally recognized among all the individuals making up the species. Even though these expressions may now be less important to humans in terms of their survival value, the fact that they are universal among us would indicate that they have been passed on to us genetically from our evolutionary ancestors and have assisted us in reaching our present position on the evolutionary ladder.

A fascinating study demonstrated this *leftover* survival value of facial expressions in humans. The researchers (Hansen & Hansen, 1988) reasoned that if facial expressions could warn of impending danger, then humans should be able to recognize certain expressions, such as anger, more easily than other, less threatening expressions. To test this, they presented participants with photographs of large crowds of people with different facial expressions. In some of the photographs, all the people's expressions were happy except for one that was angry. In other photographs, all the expressions were angry, except for one that was happy. The participants' task was to pick out the face that was different. The amount of time it took the participants to find a single happy face in a crowd of angry faces was significantly longer than when they searched a crowd of happy faces for a single angry face. Furthermore, as the size of the crowds in the photographs increased, the time for participants to find the happy face also increased, but finding the angry face did not take significantly longer. This and other similar findings have indicated that humans may be biologically programmed to respond to the information provided by certain expressions better than others because those expressions offered more survival information.

RECENT APPLICATIONS

Other more recent studies in various areas of research have relied on Ekman's early findings in attempting to improve our understanding of children and adults with developmental or learning disabilities. One such study found that children diagnosed with autism (a pervasive developmental disorder marked by language deficits, social withdrawal, and repetitive self-stimulation behaviors) appear to have difficulty recognizing the facial expressions that correspond to basic emotions (Bolte & Poustka, 2003). This difficulty was even more pronounced in families with more than one autistic child and may

help explain why many autistic individuals show difficulty interpreting emotional responses from others.

The influence of Ekman's research, however, is not limited to humans. Ekman's 1971 study has been cited in research on the emotions of, believe it or not, *farm animals* (Desire, Boissy, & Veissier, 2002). These researchers suggest that the welfare of farm animals depends, in part, on their emotional reactions to their environment. When individual animals feel in harmony with their environment, their welfare is maximized; however, "any marked deviation from the state, if perceived by the individual, results in a welfare deficit due to negative emotional experiences" (p. 165).

A study citing Ekman's 1971 article attempted to shed light on exactly how one, specific facial feature—the eyebrows—contributes to facial recognition (Sadr, Jarudi, & Sinha, 2003). Previous research had centered more on the eyes and mouth, but these researchers found that the eyebrows may be more important than the eyes themselves. The authors concluded "that the absence of eyebrows in familiar faces leads to a very large and significant disruption in recognition performance. In fact, a significantly greater decrement in face recognition is observed in the absence of eyebrows than in the absence of eyes" (p. 285). So, if you are ever in need of an effective disguise, be sure to cover your eyebrows!

CONCLUSION

Over the past three decades following his early cross-cultural studies on emotional expressions, Ekman has continued his research individually and in collaboration with Friesen and several other researchers. Within this body of work, many fascinating discoveries have been made. One further example of Ekman's research involves what is called the *facial feedback theory* of emotional expressions. The theory states that the expression on your face actually feeds information back to your brain to assist you in interpreting the emotion you are experiencing. Ekman tested this idea by identifying the exact facial muscles involved in each of the six basic emotions. He then instructed participants to tense these muscles into expressions resembling the various emotions. When they did this, Ekman was able to measure physiological responses in the participants that corresponded to the appropriate emotion resulting from the facial expression alone, and not from the actual presence of the emotion itself (Ekman, Levensen, & Friesen, 1983).

Ekman has also extended his research into the area of deception and how the face and the body *leak* information to others about whether someone is telling the truth. In general, his findings have indicated that people are able to detect when others are lying at a slightly better than chance level when observing just their facial expressions. However, when allowed to observe another's entire body, participants were much more successful in detecting lies, indicating that the body may provide better clues to certain states of mind than the face alone (see Ekman, 1985, for a complete discussion of this issue). Most recently, Ekman has distilled his extensive research in a book titled, *Emotions*

Revealed: Recognizing Faces and Feelings to Improve Communication and Emotional Life, written to help all of us apply his work on the recognition of the meaning of facial expressions to improving our communication and interactions with romantic partners, children, coworkers, and even strangers (Ekman, 2007).

Ekman and his associates have provided us with a large literature on the nonverbal communication provided by facial expressions (see Ekman, 2003). And research in this area continues. It is likely that studies will continue as we become increasingly skilled at the process that was the title of Ekman and Friesen's 1975 book, *Unmasking the Face*.

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Reading 23: WATCHING YOUR EMOTIONS?

Ross, P. (2003, August 11). Mind readers. *Scientific American*, 289(3), 74–77.

This research report is a bit of a departure from the other studies in this book, but it seems very appropriate to include it. As you know, this is a book about the major *classic* studies that changed the field of psychology in significant ways. The study discussed in this section is one that has done that, but, as you may have noticed, it's relatively recent. So this study is representative of research that is in the *process* of changing psychology in potentially compelling ways, right now, as we speak. This research concerns new, highly technical methods of actually peering into your brain (noninvasively) and "seeing" what is happening in your brain and how your brain functions including your emotions, your thoughts, your experiences, etc. OK, that may not be true "mind reading" as you usually think of it, but what psychology and neuroscience is capable of today is nothing short of astounding.

Most of you have heard of magnetic resonance imaging (MRI); probably many of you have experienced the procedure. The MRI is a major advance compared to the X-ray or CT scan because it does not emit radiation (so it's harmless to the body) and can show soft tissue abnormalities clearer (often three-dimensionally) than the CT scan (this is especially important in visualizing