

monkeys could not express thought (for more recent developments, see Allen, 2003). SiS is an overarching scientific hypothesis that unifies diverse findings about spoken language perception and production. The evidence for it is derived both from comparative research that taps the natural abilities of nonhuman animals and from behavioral, developmental, and biological studies of humans. Much basic research remains to be done. Knowledge gained from this research will yield both a model of language function and an account of spoken language as part of the human genetic endowment.

Recommended Reading

Aitchison, J. (2000). *The seeds of speech: Language origin and evolution*. New York: Cambridge University Press.

Lieberman, A.M. (1996). Introduction: Some assumptions about speech and how they changed. In A.M. Liberman (Ed.), *Speech: A special code* (pp. 1–44). Cambridge, MA: MIT Press.

Pinker, S. (1994). *The language instinct*. New York: HarperCollins.

Trout, J.D. (2001). (See References)

Notes

1. Address correspondence to J.D. Trout, Philosophy Department and the Parmly Hearing Institute, Loyola University Chicago, 6525 North Sheridan Rd., Chicago, IL 60626; e-mail: jtrout@luc.edu.

2. A performance function is a graph that depicts how behavior on a task—such as percentage of responses that are correct—changes with carefully controlled changes along a dimension of the stimulus.

3. The premotor cortex is an area near the front of the brain that appears to store much gestural information about motor activities such as moving the hands or the mouth.

References

Allen, C. (2003, Summer). Animal consciousness. In E.N. Zalta (Ed.), *The Stanford encyclopedia of philosophy*. Retrieved July 23, 2003, from <http://plato.stanford.edu/archives/sum2003/entries/consciousness-animal>

Arbib, M. (2003). The mirror system, imitation, and the evolution of language. In C. Nehaniv & K. Dautenhahn (Eds.), *Imitation in animals and artifacts* (pp. 229–280). Cambridge, MA: MIT Press.

Dawes, R. (1994). *House of cards*. New York: Free Press.

Fowler, C.A., Galantucci, B., & Saltzman, E. (2003). Motor theories of perception. In M. Arbib (Ed.), *The handbook of brain theory and neural networks* (pp. 705–707). Cambridge, MA: MIT Press.

Hauser, M. (1996). *The evolution of communication*. Cambridge, MA: MIT Press/Bradford Books.

Hauser, M., Chomsky, N., & Fitch, W. (2002). The faculty of language: What is it, who has it, and how did it evolve? *Science*, 298, 1569–1579.

Kluender, K. (1991). Effects of first formant onset properties on voicing judgments result from processes not specific to humans. *Journal of the Acoustical Society of America*, 90, 83–96.

Kuhl, P., & Miller, J.D. (1975). Speech perception by the chinchilla: Voiced-voiceless distinction in alveolar plosive consonants. *Science*, 190, 69–72.

Lieberman, A.M., & Mattingly, I.G. (1985). The motor theory of speech perception revised. *Cognition*, 21, 1–36.

Lieberman, A.M., & Mattingly, I.G. (1989). A specialization for speech perception. *Science*, 243, 489–494.

Rizzolatti, G., Fogassi, L., & Gallese, V. (2000). Cortical mechanisms subserving object grasping and action recognition: A new view on the cortical motor functions. In M. Gazzaniga (Ed.), *The new cognitive neurosciences* (2nd ed., pp. 539–552). Cambridge, MA: MIT Press.

Trout, J.D. (2001). The biological basis of speech: What to infer from talking to the animals. *Psychological Review*, 108, 523–549.

Universals and Cultural Differences in Recognizing Emotions

Hillary Anger Elfenbein¹ and Nalini Ambady

Haas School of Business, University of California at Berkeley, Berkeley, California (H.A.E.), and Department of Psychology, Harvard University, Cambridge, Massachusetts (N.A.)

Abstract

Moving beyond the earlier nature-versus-nurture debate, modern work on the communication of emotion has incorporated both universals and cultural differences. Classic research demonstrated that the intended emotions in posed expressions were recognized by members of many different

cultural groups at rates better than predicted by random guessing. However, recent research has also documented evidence for an in-group advantage, meaning that people are generally more accurate at judging emotions when the emotions are expressed by members of their own cultural group rather than by members

of a different cultural group. These new findings provide initial support for a dialect theory of emotion that has the potential to integrate both classic and recent findings. Further research in this area has the potential to improve cross-cultural communication.

Keywords

emotion; universality; cross-cultural differences

The scientific study of how people express emotion has been intertwined with the question of whether or not emotions are universal across cultures and species. Many psychology textbooks de-

scribe classic research from the 1960s demonstrating that participants around the world could judge the intended basic emotional states portrayed in posed photographs at rates better than would be expected from random guessing (Ekman, 1972; Izard, 1971). On the basis of these and related studies, many psychologists concluded that the recognition of emotion is largely universal, with the implication that this skill is not learned, but rather has an evolutionary and thus biological basis.

More recently, researchers have attempted to move beyond an either-or approach to the nature-versus-nurture debate, in order to explore how differences across cultures may affect the universal processes involved in expressing and understanding emotions. In this article, we contrast the ability of two theories to account for recent research findings.

**EVIDENCE FOR BOTH
UNIVERSALS AND
CULTURAL DIFFERENCES
IN COMMUNICATING
EMOTION**

The communication of emotion has a strong universal component. For example, people of different cultures can watch foreign films and understand much of their original feeling. Likewise, people can develop strong bonds with pets while communicating largely through nonverbal displays of emotion. Thus, messages on an emotional level can cross the barrier of a cultural or species difference.

Still, although much of an emotional message is retained across these barriers, some of the message gets lost along the way. For example, when traveling or living abroad, or when working in multinational environments, many people develop

an intuition that their basic communication signals tend to be misinterpreted more frequently when they interact with individuals from cultures foreign to them than when they interact with compatriots. Therefore, it is not a contradiction to say that the expression of emotion is largely universal but there are subtle differences across cultures that can create a challenge for effective communication.

**New Interpretations of
Classic Research**

The early researchers who studied how people communicate emotion across cultures focused their efforts on establishing universality, and therefore did not pay as much attention to the cultural differences as to the cross-cultural similarities in their data (Matsumoto & Assar, 1992). For example, Table 1 lists the results from Ekman's (1972) five-culture study. Participants viewed photographs and for each one selected an emotion label from six possible choices, so that guessing entirely at random would yield one correct answer out of six, or 16.7% accuracy. Because all cultural groups' performance for all six emotional expressions was much higher than 16.7%, Ekman and his

colleagues concluded that there is a *universal affect program*, a biologically programmed guide that governs the communication of emotion.

However, other researchers have noticed different patterns in these same data. For example, Matsumoto (1989) noted that U.S. participants outperformed the Japanese in the study. He argued that some cultures, such as Japanese culture, encourage the use of decoding rules (Buck, 1984), social norms that inhibit the understanding of emotion in cases when understanding may be disruptive to social harmony. Further, he argued that some languages, such as English, are superior to others in their emotion vocabulary (Matsumoto & Assar, 1992). Thus, he argued that Americans are generally more effective than most other cultural groups at understanding emotion.

We noticed yet a different pattern in the data in Table 1: The group with the highest performance is also the same group from which the experimental stimuli originated (Elfenbein & Ambady, 2002b). All participants in the study viewed photographs of American facial expressions, so Americans were the only participants to view members of their own cultural group, or in-group.

Table 1. Accuracy at recognizing American facial expressions (Ekman's 1972 five-culture study)

Expression	Participant group				
	United States	Chile	Brazil	Argentina	Japan
Happiness	97	90	92	94	87
Fear	88	78	77	68	71
Disgust	84	85	86	79	82
Anger	68	76	82	72	63
Surprise	91	88	81	93	87
Sadness	87	91	82	88	80
Average	86	85	83	82	78

Note. All values listed are the percentage of participants who correctly judged the emotional expression indicated.

Everyone else in the study judged expressions from a foreign group, or out-group. We found it interesting that the South American participants were only slightly less accurate than U.S. participants, whereas the difference in performance was larger for the Japanese, who were the most culturally distant.

New Findings on In-Group Advantage

In explaining these cultural differences, earlier researchers tended to focus either on the attributes of the group expressing the emotions or on the attributes of the group perceiving the emotions. In contrast, we tried to think about both groups at the same time, in terms of the match between them. In other words, we considered whether observers were judging emotional expressions made by members of their own cultural in-group or made by members of a cultural out-group. In a meta-analysis (a statistical analysis that combines the results of multiple studies), we assembled the results of 97 studies, which involved 182 different samples representing more than 22,000 total participants (Elfenbein & Ambady, 2002a). These studies included the classic research of Ekman (1972) and Izard (1971), more recent work on the understanding of emotions across cultures, and unintentionally cross-cultural studies in which researchers borrowed testing materials that portrayed people who were not from the geographic location where they were conducting their research.

Our results strongly replicated the earlier finding that people can understand the intended emotional state in posed expressions from other cultures with accuracy greater than predicted by chance guessing. However, this observation alone does not necessarily mean that emotion recognition is

governed entirely by universals (Russell, 1994). We also found evidence for an *in-group advantage* in the understanding of emotion: Participants were generally more accurate in recognizing emotions expressed by members of their own culture than in recognizing emotions expressed by members of a different cultural group. The in-group advantage was replicated across a range of experimental methods, positive and negative emotions, and different nonverbal channels of communicating emotion, such as facial expressions, tone of voice, and body language.

Even when the cultural differences in understanding emotion are small, they can still have important real-world consequences. If cross-cultural interactions are slightly less smooth than same-culture interactions, then misunderstandings can accumulate over time and make interpersonal relationships less satisfying. However, the findings of this and our other studies also provide a hopeful message regarding cross-cultural communication: The in-group advantage is lower when groups are nearer geographically or have greater cross-cultural contact with each other, and over time participants appear to learn how to understand the emotions of people from foreign cultures (Elfenbein & Ambady, 2002b, 2003a, 2003b).

The idea of an in-group advantage has been controversial (Elfenbein & Ambady, 2002a, Matsumoto, 2002), largely because of a theoretical disagreement about whether it is necessary to force members of different cultures to express their emotions using exactly the same style. Researchers have debated whether the studies that have not done this are a valid test of the in-group advantage. Understanding this controversy requires first understanding some theoretical perspectives on the communication of emotion.

A PRELIMINARY DIALECT THEORY

Researchers have attempted to weave together diverse strands of evidence to develop theory about how biology and culture influence the communication of emotion.

Ekman's Neurocultural Theory

The neurocultural theory of emotion (Ekman, 1972), based on Tomkins's earlier work (Tomkins & McCarter, 1964), posits the existence of a universal *facial affect program* that provides a one-to-one map between the emotion a person feels and the facial expression the person displays. According to this theory, the facial affect program is the same for all people in all cultures, and therefore everyone expresses emotion in the same manner in nonsocial settings. However, in social settings, people use conscious "management techniques" (Ekman, 1972, p. 225) called *display rules* to control and override the operation of the universal facial affect program. These display rules can vary across cultures, and they are norms that serve to intensify, diminish, neutralize, or mask emotional displays that would otherwise be produced automatically. Extending neurocultural theory from the expression to the perception of emotion, Matsumoto (1989) argued that all people in all cultures perceive emotional expressions in the same manner, but that there are culturally specific norms (i.e., decoding rules) about whether or not to acknowledge that one has understood.

Developing a Dialect Theory

Tomkins and McCarter (1964) articulated the metaphor that cultural differences in emotional expression are like "dialects" of the "more universal grammar of emo-

tion" (p. 127): Just as dialects of a language (e.g., American vs. British English) can differ in accent, grammar, and vocabulary, the universal language of emotion may also have dialects that differ subtly from each other.

Expanding on these ideas, we developed the new dialect theory to account for the empirical evidence of an in-group advantage in understanding emotion. Earlier researchers who had noticed this effect referred to it as *bias* and argued that participants were more motivated and perhaps paid closer attention when judging in-group members than when judging out-group members. However, our evidence did not support this interpretation, because in many of the studies reviewed in our meta-analysis, participants could not have known that the emotional expressions were from a foreign culture (this was the case, e.g., in studies in which Caucasians judged facial expressions of Caucasians from other cultures and in studies in which filtered vocal tones served as stimuli). Translation difficulties (i.e., mismatches between the emotion words participants used to judge stimuli and experimenters used to instruct the posers who generated the stimuli) could have contributed to the in-group effect but could not fully explain it, given that the in-group advantage also existed across cultural groups speaking the same language. Thus, we had to find another explanation for the in-group advantage.

Two central observations inspired the dialect theory. The first observation was that any explanation of the in-group advantage must consider the cultural match between the expresser and the perceiver of an emotional display, rather than considering either group independently. This was a logical point because the definition of the in-group advantage is that perceivers' emotion judgments are

more accurate with culturally matched than culturally mismatched materials. The second observation was that the cultural differences that cause the in-group advantage must be contained within the appearance of the emotional expressions themselves, because the in-group advantage was found when participants did not have any other cues about the cultural identity of the expresser. For example, Americans could have outperformed other Caucasian cultural groups when judging American facial expressions only if there was something particularly American about the expressions.

The dialect theory arose from these two observations. It begins with a universal affect program,² a guide for expressing emotions that is the same for all cultural groups. Because a person can express any single emotion in multiple ways, this program is not necessarily the one-to-one map of neurocultural theory.³ Additionally, each cultural group has a *specific affect program* that incorporates some adjustments to the universal program. Acquired through social learning, these adjustments create subtle differences in the appearance of emotional expression across cultures. These stylistic differences do not necessarily have a specific purpose or meaning; thus, they differ from display and decoding rules, which are conscious management techniques for the benefit of social harmony. Figure 1 illustrates the relation between the universal affect program and specific affect programs from different cultures.

Figure 2 illustrates the dialect theory of how emotion is communicated and perceived. A key distinction between dialect theory and neurocultural theory is that dialect theory suggests that cultural differences in emotional expression can arise from two sources—the specific affect program and display rules—rather than from display

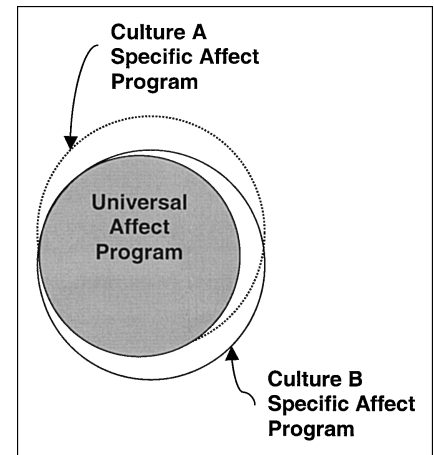


Fig. 1. Illustration of the relation between the universal affect program and the specific affect programs for two cultures. Copyright 2003 by Hillary Anger Elfenbein. Reprinted with permission of the author.

rules alone. Similarly, dialect theory posits two different sources of cultural differences in perceiving emotion—the specific affect program and decoding rules—rather than decoding rules alone.

A second key distinction from neurocultural theory is that dialect theory suggests there is a direct link between the cultural differences that arise in the expression and perception of emotion. This link is the specific affect program, which governs the two complementary processes. After all, people tend to interpret another person's behavior in terms of what they would have intended if they had used the same expression. In contrast, neurocultural theory posits that cultural differences in emotional expression and perception emerge from two separate processes: display rules and decoding rules. Because these two sets of rules are not explicitly linked to each other, neurocultural theory does not account for the empirical evidence of the in-group advantage. This is because, as we have noted, any explanation of the in-group advantage must consider the cultural match between the ex-

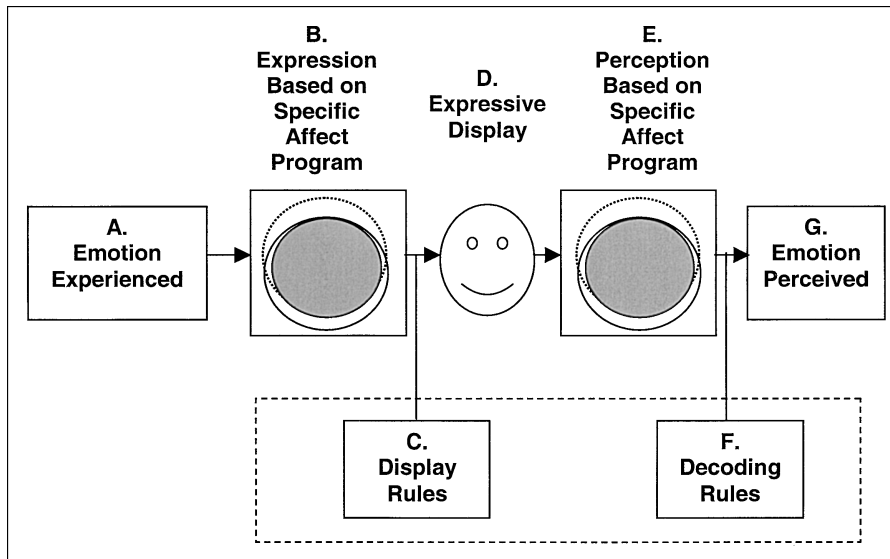


Fig. 2. Representation of a dialect theory of emotion. This theory incorporates processes described by Brunswick (1955), Buck (1984), and Ekman (1972). The universal affect program is represented by the gray circles, and specific affect programs of two different cultures are represented by the partially overlapping white circles (see Fig. 1). The dashed box shows the only sources of cultural differences in the communication of emotion according to Ekman (1972) and Matsumoto (1989). Copyright 2003 by Hillary Anger Elfenbein. Reprinted with permission of the author.

presser and the perceiver of an emotional display, rather than either group independently.

Evidence for the In-Group Advantage

This background assists in clarifying the disagreement regarding whether the evidence supports the existence of an in-group advantage in emotion. Matsumoto (2002) argued that an in-group advantage in perceiving emotion should result only from differences across perceivers. This is because his theoretical perspective treats cultural differences in expressing and perceiving emotion as two unlinked processes, and he argued that they should be examined separately. Thus, he argued that a valid test of the in-group advantage in emotion recognition should remove all cultural differences in the appearance of emotional expressions in order to achieve “stimulus equivalence” (Matsumoto, 2002, p. 236). How-

ever, according to dialect theory, there are cultural differences in the appearance of emotional expressions resulting from the specific affect program. Therefore, forcibly eliminating all cultural differences in the appearance of facial expressions also would eliminate one of the two matched processes responsible for the in-group advantage, cultural differences in expression and perception that arise from the specific affect program. Thus, failures to demonstrate an in-group advantage under stimulus equivalence fit rather than disconfirm the predictions of dialect theory. Further, not only is eliminating cultural differences in the appearance of emotional expression an undesirable step for researchers according to dialect theory, but recent empirical evidence demonstrates that in practice it can be nearly impossible to do so—such differences are so robust that they can leak through processes designed specifically to neutralize them (Marsh, Elfenbein, & Ambady, 2003).

FUTURE DIRECTIONS

Universals and cultural differences in the communication of emotion have been hotly debated and will likely continue to be. Research studies that can help to tease apart the competing perspectives—while acknowledging the complex roles of both nature and nurture—would greatly benefit the field.

The dialect theory of emotion is still speculative and being developed primarily on the basis of recent empirical data. The theory requires direct testing. The most authoritative studies would uncover the particular aspects of emotional expression that vary across cultures—such as specific facial muscle movements, features of vocal tones, or body movements—and would map the use of these cues directly to cross-cultural differences in perceiving emotion. It is important to do this research in a context that limits alternative explanations for the in-group advantage, such as language differences and bias. Further research could determine how these cues are learned.

Although differences in emotion across cultures can create a barrier to effective communication, it is heartening to know that people can overcome these barriers. Further work in this field has the potential to help bridge intergroup differences by contributing to training and intervention programs that can help to improve cross-cultural communication.

Recommended Reading

- Darwin, C. (1998). *The expression of the emotions in man and animals* (3rd ed.). New York: Oxford University Press. (Original work published 1872)
- Ekman, P. (1993). Facial expression and emotion. *American Psychologist*, 48, 384–392.

Elfenbein, H.A., & Ambady, N. (2002b). (See References)
Russell, J.A. (1994). (See References)

Acknowledgments—We thank James Russell, Anita Williams Woolley, and Kevyn Yong for their helpful comments on the manuscript.

Notes

1. Address correspondence to Hillary Anger Elfenbein, Haas School of Business, University of California, Berkeley, CA 94720-1900; e-mail: hillary@post.harvard.edu.

2. We do not refer to the universal affect program as a facial affect program in order to emphasize that it includes additional nonverbal channels of communication, such as vocal tone and body movements.

3. We thank James Russell for this observation.

References

- Brunswick, E. (1955). Representative design and probabilistic theory in a functional psychology. *Psychological Review*, 62, 193–217.
- Buck, R. (1984). *The communication of emotion*. New York: Guilford Press.
- Ekman, P. (1972). Universals and cultural differences in facial expressions of emotion. In J. Cole (Ed.), *Nebraska Symposium on Motivation*, 1971 (Vol. 19, pp. 207–282). Lincoln: University of Nebraska Press.
- Elfenbein, H.A., & Ambady, N. (2002a). Is there an in-group advantage in emotion? *Psychological Bulletin*, 128, 243–249.
- Elfenbein, H.A., & Ambady, N. (2002b). On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin*, 128, 203–235.
- Elfenbein, H.A., & Ambady, N. (2003a). Cultural similarity's consequences: A distance perspective on cross-cultural differences in emotion recognition. *Journal of Cross-Cultural Psychology*, 34, 92–110.

- Elfenbein, H.A., & Ambady, N. (2003b). When familiarity breeds accuracy: Cultural exposure and facial emotion recognition. *Journal of Personality and Social Psychology*, 85, 276–290.
- Izard, C.E. (1971). *The face of emotion*. New York: Appleton-Century-Crofts.
- Marsh, A., Elfenbein, H.A., & Ambady, N. (2003). Nonverbal "accents": Cultural differences in facial expressions of emotion. *Psychological Science*, 14, 373–376.
- Matsumoto, D. (1989). Cultural influences on the perception of emotion. *Journal of Cross-Cultural Psychology*, 20, 92–105.
- Matsumoto, D. (2002). Methodological requirements to test a possible ingroup advantage in judging emotions across cultures: Comments on Elfenbein and Ambady and evidence. *Psychological Bulletin*, 128, 236–242.
- Matsumoto, D., & Assar, M. (1992). The effects of language on judgments of universal facial expressions of emotion. *Journal of Nonverbal Behavior*, 16, 85–99.
- Russell, J.A. (1994). Is there universal recognition of emotion from facial expression? A review of the cross-cultural studies. *Psychological Bulletin*, 115, 102–141.
- Tomkins, S.S., & McCarter, R. (1964). What and where are the primary affects: Some evidence for a theory. *Perceptual and Motor Skills*, 18, 119–158.

Crib Death: A Biobehavioral Phenomenon?

Lewis P. Lipsitt¹

Department of Psychology, Brown University, Providence, Rhode Island

Abstract

In developed countries, more children under 1 year of age die of crib death (sudden infant death syndrome, SIDS) than of all other causes combined. Researchers and clinicians have proposed many possible causes of SIDS, but the abrupt, unexpected death of some babies remains mysterious and frightening. Although infant behavior may explain some of these deaths, scant attention has addressed behavioral characteristics of babies who die without medical explanation. Any explanation of SIDS must account for the fact

that most SIDS deaths occur at 2 to 5 months of age, acknowledging that a protective mechanism appears to spare babies before 2 months but then disappears. The respiratory occlusion reflex serves as an initial defense against smothering and can provide such an explanation. Infantile reflexes wane, after providing opportunities for learned responses to be acquired. During this well-documented neurobehavioral transition from subcortical to cortically mediated responding, some babies, viable for the first 2 months, may become especially vulnerable if they fail to acquire sufficiently

strong defensive behaviors needed to prevent occlusion after the waning of the life-preserving reflex. Recent success of back-to-sleep directives, urging that babies sleep on their backs to avoid smothering, supports this hypothesis.

Keywords

sudden infant death syndrome; crib death

Until about 40 years ago, when a baby died of no apparent or diagnosable cause, the medical examiner was likely to state that the death was due to pneumonia. Aggrieved parents usually accepted this medical explanation, believing their baby died of a "disease." In the 1960s, however, parents' displeasure with gratuitous diagnoses and chagrin over false accusations of neglect and abuse, among other factors, led to a change in attitude. A small group of sympathetic pedi-